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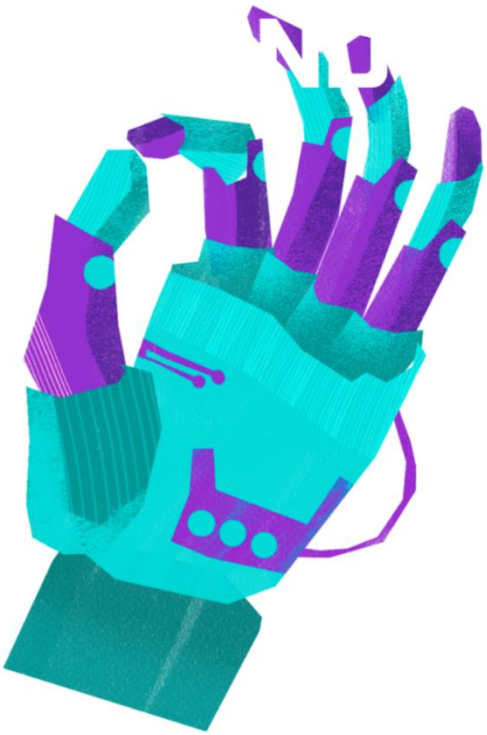

BCIPCON-2K24

"INNOVATION AND TECHNOLOGY IN PHYSIOTHERAPY: A WAY FORWARD"

Editor–Dr. C S Ram

BCIPCON-2K24

"*INNOVATION AND TECHNOLOGY IN PHYSIOTHERAPY: A WAY FORWARD*"

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BCIPCON-2K24

"INNOVATION AND TECHNOLOGY IN PHYSIOTHERAPY: A WAY FORWARD"

EDITORIAL TEAM

PREFACE

Dear Readers,

It is a feeling of contentment, when I again connect myself with the scholars and researchers of my field through the release the BCIPCON 2K24 national level conference proceedings. I must thank my editorial team for bringing together two important aspects of physiotherapy namely "change' and "practice". While we are still in process of evolving standards of best practices; I am sure, our proceedings provides a medium for researchers to put forth new ideas and facts for emerging technologies in the field of physiotherapy. Valid evidence is all that is required to reinforce scientific basis of physiotherapy and combat challenges faced by our profession. A local resource with data, information and guidelines is being consolidated by every intellectual work published in journals or other resources. I am happy that many researcher and professionals are contributing to its development story. The research ideas and initiatives happening around and coming across are quite encouraging. I congratulate all authors for their valuable inputs and contributions. Our unsung editorial team remains the powerhouse behind our modest attempts and initiatives and I realize it at every stage of this publication. I stand behind my editorial team to keep it erect against all odds.

On behalf of this my colleagues & contributors of this publication, Welcome!

Organizing Team

CHIEF GUEST MESSAGE

DR. ARUN KUMAR AGGARWAL
Ex-Dean, Maulana Azad Medical College
President, Delhi Council for Physiotherapy and Occupational Therapy

Dear Readers,

Banarsidas Chandiwala Institute of Physiotherapy, New Delhi, has grown from modest beginnings into a distinguished center of excellence. The institute is now recognized for its commitment to delivering high-quality education and for its significant contributions to the holistic development of its students, shaping future leaders in the field of physiotherapy.

This year, the theme "Innovation and Technology in Physiotherapy: A Way Forward" resonates deeply with the evolving landscape of healthcare. As we navigate the complexities of modern medicine, it is imperative that we embrace the cutting-edge advancements in technology that are revolutionizing physiotherapy. From robotics and AI-driven rehabilitation tools to telehealth and wearable devices, the integration of innovation in physiotherapy is not just a trend, but a necessity to ensure the best outcomes for our patients.

As we look ahead to the future, it is our youth who will lead the way in pushing the boundaries of what is possible in physiotherapy and beyond. Investing in their education and development is a valuable endeavor, one that will yield rich dividends in the years to come.

Banarsidas Chandiwala Institute of Physiotherapy, New Delhi, exemplifies this investment with its outstanding efforts. BCIP is playing a crucial role in preparing the next generation of leaders in the field. The institute's dedication to cultivating talent and embracing new advancements ensures that its students are well-equipped to drive progress and make significant contributions to the future of physiotherapy.

I would like to extend my sincere congratulations to the Director and faculty members of BCIP for their exceptional dedication and relentless hard work. Their ongoing contributions will undoubtedly pave the way for even greater achievements and ground breaking advancements, further solidifying the institute's esteemed reputation and impact in the future.

GUEST OF HONOUR MESSAGE

DR. ASHISH DESHWAL

Member Executive Committee, DCPTOT

It is a profound honor to address you at this conference centered on "Innovation and Technology in Physiotherapy: A Way Forward." As we navigate the rapidly evolving landscape of healthcare, embracing technological advancements such as robotics, artificial intelligence, and telehealth is becoming increasingly vital. These innovations hold the promise of transforming physiotherapy by enhancing the precision and effectiveness of treatments.

This conference serves as an invaluable platform for delving into these cutting-edge technologies and exploring their potential applications in our field. By integrating these advancements, we can significantly improve patient outcomes and advance the practice of physiotherapy.

I would like to commend the Banarsidas Chandiwala Institute of Physiotherapy for its commitment to fostering innovation and advancing education in this dynamic era. The institute’s efforts to stay at the forefront of these developments ensure that its students and professionals are well-prepared to lead and excel in the future of physiotherapy. Let us seize this opportunity to collaborate, learn, and drive forward the future of our field with creativity and excellence.

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SECTION-I: GUEST SPEAKERS ABSTRACTS

ROLE OF TELE-PHYSIOTHERAPY IN PULMONARY REHABILITATION

Dr. Sumata Ghosh,
Co-Founder, Health specifics Academy, Delhi

TelePhysiotherapy is transforming Pulmonary Rehabilitation by integrating conventional and contemporary technologies into Cardio-Pulmonary care. As a specialized branch of Tele-medicine, Tele-rehabilitation allows patients to receive physiotherapy remotely, retaining the benefits of traditional rehabilitation while addressing barriers such as limited access to specialized centers. This approach enhances accessibility and patient adherence by reducing the need for travel and associated costs.

Recent advancements in pulmonary physiotherapy have shown that telerehabilitation is as effective as in-person rehabilitation, with notable success in managing conditions like pulmonary diseases, osteoarthritis, low-back pain, and cardiac rehabilitation. Tele-rehabilitation provides a cost-effective alternative, offering high-quality care directly to patients in their homes. Its feasibility and effectiveness have been demonstrated across various medical conditions, making it an essential component of modern healthcare. This evolving practice not only ensures better health outcomes but also represents a significant shift toward more accessible and patient-centered care.

ALIGNING INNOVATION IN PHYSIOTHERAPY WITH SUSTAINABLE DEVELOPMENT GOALS

Dr. Kshitija Bansal,
Professor, MRIIRS, Faridabad

Physiotherapy is increasingly recognized as a vital contributor to achieving the Sustainable Development Goals (SDGs), a global initiative aimed at ending poverty, protecting the planet, and ensuring well-being by 2030. By aligning its practices with these goals, physiotherapy plays a crucial role in several areas. It enhances health outcomes through rehabilitation, injury prevention, and health education, supporting universal health coverage and reducing mortality rates, thereby contributing to Good Health and Well-being (SDG 3). In the realm of Quality Education (SDG 4), physiotherapy helps develop skilled professionals who strengthen health systems and promote lifelong learning. The field also addresses Gender Equality (SDG 5) by providing inclusive healthcare services that cater to diverse populations. Moreover, by improving workforce productivity and promoting active aging, physiotherapy supports Decent Work and Economic Growth (SDG 8). It also plays a key role in reducing health disparities by offering accessible and equitable

care, particularly to vulnerable groups, aligning with Reduced Inequalities (SDG 10). Additionally, physiotherapy encourages active lifestyles and contributes to creating inclusive, sustainable urban environments, supporting Sustainable Cities and Communities (SDG 11). The field's adoption of sustainable healthcare practices also aligns with Climate Action (SDG 13), helping to reduce environmental impact. Finally, by fostering collaboration with various stakeholders, physiotherapy contributes to Partnerships for the Goals (SDG 17), essential for integrating SDGs into practice and promoting sustainable development. By incorporating these goals into its practice and education, physiotherapy not only advances health and well-being but also plays a pivotal role in building a more inclusive and sustainable future.

TECHNOLOGY DRIVEN ENTREPRENEURSHIP IN PHYSIOTHERAPY

Dr. Anil Kumar Sharma,
Founder, The Physicare, Delhi

Technology-driven entrepreneurship is revolutionizing the physiotherapy profession by integrating modern innovations into practice, enhancing patient care, and expanding business opportunities. The focus of this session was on how technology, such as Tele-rehabilitation, wearable devices, and mobile applications, is reshaping physiotherapy. Tele-rehabilitation uses video conferencing and remote monitoring to deliver therapy at home, overcoming barriers like limited access to specialized centers and improving accessibility and adherence. Wearable technologies track patient progress and provide real-time feedback, while mobile apps offer guided exercises and progress tracking. The session also highlighted successful entrepreneurial ventures that have harnessed these technologies, demonstrating their potential to drive innovation in physiotherapy. By showcasing case studies and emphasizing the role of technology in creating new business opportunities, the session underscored the transformative impact of technology on the future of physiotherapy and encouraged participants to explore entrepreneurial paths within the field.

ROBOTICS IN NEURO-REHABILITATION

Dr. Sachin Samuel,
Physiotherapist & HOD, Institute of Brain & Spine, Delhi

Recent advancements in neuro-rehabilitation are reshaping the field through the integration of both traditional and cutting-edge technologies. Key innovations such as robotics, repetitive transcranial magnetic

stimulation (rTMS), Pablo-gait analysis, HOPE of Hand, and electromyography (EMG) are significantly enhancing rehabilitation outcomes. Robotics, for example, offers targeted, repetitive, and intensive therapy, which is crucial for patients with neurological impairments. These technologies facilitate recovery by stimulating neural plasticity—the brain's ability to reorganize and form new connections—thereby promoting adaptation and relearning of compromised functions. The session highlighted how these advancements are not only improving rehabilitation efficacy but also emphasizing the need for personalized and patient-centered approaches. As neuro-rehabilitation continues to evolve, the integration of these technologies represents a major step forward in delivering more effective and tailored patient care.

TECHNOLOGICAL ADVANCEMENT IN NEURO-REHABILITATION

Dr. Prateek Aggarwal & Dr. Jaishree,
Centre Head, IHIF, Delhi & Noida.

Recent advancements in neuro-rehabilitation are profoundly transforming treatment methods and patient outcomes through the integration of innovative technologies. Key technologies such as RYMO offer precise and engaging therapy for motor function recovery, incorporating features like initial assessments, customized programs, guided therapy sessions, and progress monitoring. Functional Electrical Stimulation (FES) plays a critical role in preventing muscle atrophy, enhancing neural plasticity, improving circulation, and reducing spasticity, which contributes to better motor function and muscle strengthening.The integration of Virtual Reality (VR) and Augmented Reality (AR) technologies, exemplified by tools like Tymo, has revolutionized gait training by providing real-time feedback and customizable programs that enhance balance and stability. Additionally, the Interactive Assessment and Exercising of Upper Limbs (Pablo) system uses gamification to improve motor skills, coordination, cognition, and strength, making rehabilitation more engaging and effective. EMG Biofeedback (Myomed) enhances muscle awareness and control, supports neuromuscular re-education, and keeps patients motivated, which is essential for successful rehabilitation outcomes.Tele-rehabilitation offering remote therapy sessions to ensure continuous support and patient engagement. This approach allows for ongoing monitoring and adaptation of treatment plans, ensuring that care remains personalized and effective. Overall, these advancements represent a significant shift towards more effective, accessible, and patient-centered neuro-rehabilitation, paving the way for improved recovery and quality of life for individuals with neurological impairments.

SECTION II :RESEARCH PAPER PRESENTATION FULL ARTICLES

1. COMPARISON BETWEEN DRY NEEDLING AND CORTICOSTEROID INJECTIONS FOR TREATMENT OF LATERAL EPICONDYLITIS: A SYSTEMATIC REVIEW.

I Aman[1], K Zutshi[2], S Saifi[3]
Assistant Professor, Jamia Hamdard University [1, 3]
Associate Professor, Jamia Hamdard University[2].

ABSTRACT

INTRODUCTION: During physical activity and exercises, there is more stress and forces are exerted on the tendon which increases the risk of injury. There are several studies that suggest dry needling has a positive effect in treating tendinopathy. Corticosteroid injections are the most commonly used treatment for acute and chronic tendon lesions. In this review we will compare different lines of treatment; dry needling and corticosteroid injections for tendinopathy and their efficacy in reducing symptoms. The aim of this systematic review is to critically analyze the literature to find the effect of dry needling when compared with corticosteroid injection in treating lateral epicondylitis. METHOD: This systematic review was conducted according to PRISMA guidelines. The aim of the study was to critically analyze the effect of dry needling over corticosteroid injections in treating lateral epicondylitis. Various electronic databases were used to search relevant articles using different keywords. Articles were collected altogether and selected on the basis of eligibility criteria. The final sets of articles were selected after complete screening. RESULT: Both dry needling and corticosteroid injection are significantly effective for treatment of lateral epicondylitis both for short term whereas the DN is more significantly effective in long term use CONCLUSION: Dry needling is better than corticosteroid injection in treating lateral tendinopathy.

KEYWORDS: *Dry needling AND Corticosteroid injection AND lateral epicondylitis AND Tendinitis*

INTRODUCTION

The need for athletic performance has grown over the past few decades. Acute and overuse sports injuries are becoming more likely as a result of this. The tendon experiences increased stress and pressures during physical exercise, raising the possibility of damage. Achilles, patella, posterior tibial, hamstring, supraspinatus, other rotator cuff tendons, common wrist extensors, and common wrist flexors are the most often injured tendon in sports[1]. Tennis elbow, or lateral epicondylitis, is the term used to characterize an overuse injury that results from an eccentric overload of the common extensor tendon at the extensor carpi radialis brevis (ECRB) tendon's origin.The lateral epicondylar area of the distal humerus is the starting point of these muscles. The insertion of the extensor carpi radialis brevis is implicated in several situations[2]. The root of the extensor tendon may have hyaline degeneration as a result of overuse injuries like LET. Excessive tension on the elbow tendons can result from manual labor, repeated contractions, and overuse of the forearm and elbow muscles and tendons. These hand manipulations from contractions or manual labor lead to tendon maladaptations, which in turn induce discomfort over the lateral epicondyle. The discomfort is mostly situated anteriorly and distally to the lateral epicondyle [3]. Work-related activities that include wrist extension, pronation, or

supination during manual labor, as well as household chores and hobbies, are thought to be significant contributing factors to this injury [4]. Both sexes experience LET at the same rate. The illness strikes most often in people between the ages of 30 and 50. Of all cases, twenty percent last more than a year [5]. In the arsenal of pain management techniques, dry needling (also known as intramuscular stimulation, Western acupuncture, or medical acupuncture) is a relatively recent technique.Numerous earlier reviews discussed various techniques, the pathophysiological foundation, and dry needling effectiveness trials [6]. Additionally, dry needling can lessen peripheral and central sensitivity by influencing the amounts of local blood flow, b-endorphin, and substance P, dry needling also aids in the reduction of pain. The biomechanical, circulatory, and chemical effects of dry needling have been demonstrated in several investigations. By lowering cortisol levels and raising beta-endorphin levels, dry needling has demonstrated effects at the endocrinological level [7]. Corticosteroid injections have been used globally since the last many decades and for both acute and chronic tendon injuries, it is the most often utilized form of therapy. Injections of corticosteroids are also used to prevent adhesion development, lessen discomfort, and maintain biomechanical integrity. Numerous research revealed undiscovered negative corticosteroid side effects [7]. Both dry needling and corticosteroid injections have shown significant effect on many musculoskeletal conditions.

The aim of this systematic review is to critically analyze the literature to find the effect of dry needling v/s corticosteroid injection for the treatment of lateral epicondylitis.

METHODOLOGY

PROTOCOL

This systematic review was piloted as per the PRISMA guidelines. Various databases were used to search relevant articles using different keywords. All of the articles were gathered, and those that met the eligibility requirements and had duplicates removed were chosen. Once all of the articles were screened, a final batch was chosen.

SEARCH STRATEGY

Electronic data based searches were performed under PubMed, Cinhal, Scopus and Google Scholar until March 2024.

According to the Cochrane Handbook for Systematic Review of Interventions, the search strategy was divided into two, i.e. intervention and condition.[8] Apart from this, a basic search strategy was used with the help of following keywords: Dry needling AND Corticosteroids injection AND Tendinitis AND Dry needling OR Corticosteroids injections.

SELECTION OF STUDIES AND DATA EXTRACTION

The studies were evaluated on the basis of their eligibility criteria. The inclusion criteria for choosing the study was (1) only English language articles (2) studies should be categorized under RCT's (3)participants in the research were accepted regardless of their age (4) both gender (4) sample subjected in paper were diagnosed with lateral epicondylitis (5) Both Corticosteroid injections and dry needling should be the treatments utilized in the trials. Exclusion criteria were (1) unpublished articles (2) research abstract from a meeting proceeding, PhD thesis.

Finding the publications using a data-based search and references list was the first step. Titles and abstracts that met the requirements for eligibility were chosen for full text reading. Articles that met the eligibility requirements were chosen after they were evaluated according to the inclusion and exclusion critera

STUDY SELECTION

The selections of studies were shown in flowchart (Fig. 1). Initially 98 articles were selected for reviewing. After 1st screening, 60 articles were removed due to duplication. 34 articles were removed after the 2nd screening phase that is abstract analysis as 17 were not related to physiotherapy, 7 articles used different interventions and 4 articles were not related to lateral epicondylitis and 6 articles were not RCTs. On the basis of eligibility criteria and availability of full text articles five articles were selected. Out of which only 4 articles were selected for review.

IDENTIFICATION Records identified through database searching PubMed (n=30) Pedro (n=19) Web of Science (n=21) Cinahl (n=20) Total (n=121)	Initially 98 articles were selected for reviewing. After 1st screening, 60 articles were removed due to duplication.
Additional records identified through references list (n=10)	34 Articles were removed after the 2nd screening phase that is abstract analysis as 17 were not related to physiotherapy, 7 articles used different interventions and 4 articles were not related to lateral epicondylitis and 6 articles were not RCTs.
SCREENING Records after duplicates remove were (n=48)	On the basis of eligibility criteria and availability of full text articles 6 articles were selected. After Final Screening, only 4 articles were selected.

ELIGIBILITY Articles removed after second screenings were (n=28) INCLUDED Full text articles assessed for eligibility (n=6) Full text articles excluded with reasons (n=2) Final studies included (n=4)	

Fig.1: flow chart of selection criteria

STUDY CHARACTERISTICS

Demographic data of the included study is mentioned in table 1. Included participants were of both genders of age above 18 years. A complete overview which included Year of publication, population, intervention and result is included in the study is presented in table2. The outcome measures included in the study were PRTEE Score, VAS, DASH Score and Jamar Grip Strength.(Table 3)

DEMOGRAPHIC DATA

STUDY	E.Uygur et al9	Gungor et al10	Nagarajan V11	A.A Wani12
AGE	-	18 years and above	20-75 years	Mean age was 39.9-43.8
GENDER	-	-	M:23 F:21	M:18 F:24

Table 1: Demographic Data

STUDY	YEAR	POPULATION	INTERVENTION	RESULT
E.Uygur et al[9]	2019	108 Participants with lateral epicondylitis were equally and randomly divided into two groups; Group I (DN) and Group II (CS).	Group I receives fifteen 0.25 X 25 mm stainless steel dry needles at lateral epicondyle throughout the course of ECRB. Needle was placed for 10 minutes and rotated 3-4 times. DN was repeated twice every week for 5 sessions. Group II received CS injection (2 ml methylprednisolone	Both treatments were effective with p= <0.01 at 3 weeks and 6 months of treatment. However participants treated with CS injection develop some complications like skin atrophy, thus it has been concluded

			88 acetate, 40 mg/ml (single dose) by the second author who peppered using a 22-G needle. The periosteum was pricked 20–30 times without withdrawing the needle.	that DN is better than to CS.
Gungor et al[10]	2021	72 patients diagnosed with lateral epicondylitis divided into three groups of 24 individuals. Grp 1: DN Grp 2: cs Grp 3: PRP	Group 1 underwent dry needling 2 sessions per week for 3 weeks. Group 2 received a 40 mg Single dose of methylprednisolone acetate. Group 3 received a single dose of PRP treatment.	The VAS score for the dry needling group was 1.16 ± 0.56 and for the corticosteroids group it was 0.75 ± 0.60. This indicates a statistically significant difference between the two groups—the dry needling and corticosteroids groups and the corticosteroids and PRP groups ($p = 0.015$ and $p = 0.000$, respectively). VAS scores declined in each treatment modality group during the third week and third month, indicating a statistically significant difference between the groups ($p < 0.01$). Over time, Jamar's grip strength got stronger in every group. After three weeks, there were no discernible variations in any group's DASH score ($p > 0.05$). DASH scores increased somewhat in the PRP group throughout the same period with a statistically insignificant shift ($p > 0.05$), while they declined dramatically in the dry needling and corticosteroid group from the third

				week to the third month ($p < 0.01$). For all groups, DASH scores dramatically dropped by the third month ($p = 0.014$).
Nagarajan V[11]	2022	54 patients were included who were diagnosed with lateral epicondylitis and were divided equally into two groups: grp1:DN grp2: CS	Grp1: 8-12 disposable filiform needles of size 25 mm were inserted under aseptic conditions at the lateral epicondyle region and left for 10-12 minutes. Sessions: 5 Grp 2: , participants received a single dose (2 mL) of triamcinolone acetate (40 mg/mL) injection.	There were statistically significant ($p < 0.001$) variations between the pre-injection baseline value and the PRTEE score at the fourth and eighth week of follow-up.
A.A Wani[12]	2024	42 participants who were diagnosed with lateral epicondylitis were divided into two groups. Group I (n=20): Received DN Group II (n=22): Received CS	Group I received dry needles of size 25 mm were inserted at ECRB, close to the site of maximal tenderness, for approximately 10-12 min. Group II received a single dose (2 mL) of triamcinolone acetate (40 mg/mL) injection.	Group I: mean PRTEE score before the start of therapy, at the 4th week and 8-weeks follow-up was 68.96±6.89, 44.13±5.23 and 37.18±5.81. Group II: PRTEE score before the session, 4th week & 8th weeks follow-up was 65.23±4.82, 51.08±6.32 and 43.72±4.12

STUDY OVERVIEW

*DN=Dry needling; CS= corticosteroid

Table 2: Study Characteristi

OUTCOME MEASURES

STUDY	E.Uygur et al[9]	Gungor et al[10]	Nagarajan V et al[11]	A.A Wani[12]
OUTCOME MEASURE	PRTEE scores	VAS DASH Score Jamar Grip Strength	PRTEE scores	PRTEE scores

Table 3: Outcome Measures of Included Studies

INTERVENTION

The studies were grouped into two main interventions: (1) dry needling group (2) corticosteroid group. (Table 4, 5)

STUDY	E.Uygur et al[9]	Gungor et al [10]	Nagarajan V et al [11]	A.A Wani[12]
DURATION OF TREATMENT	10 minutes (Static)	10 minutes (Static)	10-12 minutes (Static)	10-12 minutes (Static)
FOLLOWUP	3wks, 6 months	3 wks, 3 month	4wks, 8wks	4wks, 8wks

Table 4: Intervention of Dry Needling

CORTICOSTEROID INJECTION

STUDY	E.Uygur et al[9]	Gungor et al [10]	Nagarajan V et al[11]	A.A Wani[12]
DOSE	2 ml methylprednisolone 88 acetate, 40 mg/ml	40 mg methylprednisolone acetate	e (2 mL) of triamcinolone acetate (40 mg/mL injection	2 mL of triamcinolone acetate (40 mg/mL) injection
FOLLOWUP	3wks, 6 months	3wks, 3 months	4wks, 8wks	4wks, 8wks

Table 5: Intervention of Corticosteroid Injection

QUALITY ASSESSMENT OF STUDY

Quality assessment of study was done via PEDro Scale[32]. All three studies are considered as highly 'good' to 'excellent' studies as scores of the studies range between 6-8/10 and 10/10. Scoring of these studies was summarized in table 5

STUDY	E.Uygur et al[9]	Gungor et al [10]	Nagarajan V et al[11]	A.A Wani[12]
Eligibility criteria were specified	YES	YES	YES	YES
Subjects were randomly allotted to groups	1	1	1	1
Allocation was concealed	1	1	1	1
The groups were similar at the baseline regarding the most important prognostic indicator	1	1	1	1
There was blinding of all subjects	0	0	0	0
There was blinding of therapist who administered the 1 therapy	0	0	0	0
There was blinding of all assessor who measure at least one key outcome	0	0	0	0
Measures at least one key outcome were obtained from than 85% of subjects initially allocated to groups	1	1	1	1
All subjects for whom outcome measures were available received the treatment or control condition as allocated or, where this was not the case, data for at least one key outcome was analysed by "intention to treat''	1	1	1	1
The results of between-group statistical comparisons are reported for at least one key outcome	1	1	1	1
The study provides both point measures and measures of variability for at least one key outcome	1	1	1	1
SCORE	8	7	8	8

Table 5: PEDro scoring

DISCUSSION

The goal of this study was to form an opinion on the effectiveness of DN and corticosteroid injections.

PRTEE scoring, DASH scoring, VAS and Grip Jamer strength has been frequently utilized in researches to evaluate patient's functional state, pain and strength both before and after the intervention

DN is less intrusive and simple to execute, it is less expensive and requires less training from the therapist. While there is a lower prevalence of problems with DN treatment than with corticosteroid therapy, certain mild local effects, such injection site discomfort, redness, and other short-term local inflammatory responses, are to be expected. The requirement for several sessions—five sessions were required in this study—and the lack of follow-up are two other disadvantages [12]. In addition, Ga et al. found that the use of dry needling produced better results than cortisone injections. In a randomized trial, he assigned 39 subjects with myofascial pain syndrome affecting one or both upper trapezius muscles and single blinded them. Although he found improvements in the subjects' pain score, cervical spine range of motion, pressure pain threshold, and depression level, none of these

results were statistically significant. [13]

While DN needs numerous sessions, corticosteroid injection has the benefit of providing functional improvement with the first injection. While no significant complications were observed after a single corticosteroid injection during the eight-week maximum follow-up, similar prior studies with larger sample sizes and long-term follow-ups suggest that patients are more likely to experience complications after multiple injections, which can range from skin pigment changes to tendon atrophy and delayed wound healing [14].

Similarly, a study was conducted on plantar fasciitis in 2018. S.Restegar compared the effect of dry needling and corticosteroid injection on 66 patients. They were followed up for 12 months and monitored for total perception of pain using the visual analogue scale (VAS), with data obtained at baseline and at 3rd and 6th weeks, 3rd, 6th and 12 months after the treatment. He also concluded that steroid injection can palliate plantar heel pain rapidly but dry needling can provide more satisfactory results for patients with plantar fasciitis in the long term. [15]

Another study was conducted by E.Uygar et al in 2015 on plantar fasciitis. Researchers divided the participants into 2 groups and administered dry needling in one group and corticosteroid injection group 2. Patients were assessed in the 3rd week and then at 6 months by a single investigator using the FFI. In terms of FFI Score, dry needling gives rise to a significant decrease in the 3rd week and also in the 6th month. However, although corticosteroid significantly subsides at the 3rd week, it lost efficacy in the sixth month ($p < .001$). [16]

LIMITATION

The only limitation of this study is that fewer randomized control trial studies were available which compared the dry needling with corticosteroid injection for the treatment of lateral epicondylitis. Therefore, more studies are required for further research.

CONCLUSION

Based on the evidence selected, it was determined that while both DN and CS are much better for short-term usage, DN is superior than CS for long-term use since it has less or no negative effects than CS. Long-term usage of CS has been linked to skin bleaching and atrophy. Therefore, it has been determined that injections of corticosteroids are inferior to dry needling.

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2. IMPACT OF BODY MASS INDEX (BMI) ON VISUAL REACTION TIME (VRT) IN ADOLESCENTS

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ABSTRACT

Background and objectives: Reaction time is important to be considered, as every activity depends upon the integration of different reactions by CNS. The process of VRT is to see the stimulus, interpreting it and producing a response required to perform different skills. VRT is one of the most important components for activities like reading, writing, driving etc. BMI has an influence on VRT but there is no clear association shown for different BMI categories in literature. Hence, the aim of this study is to find the association of BMI with VRT.Methods: A correlational study was conducted involving adolescents aged 10 to 18 years. BMI for participants was assessed using WHO 2006 & IAP 2015 combined growth charts. After categorising the participants on the basis of BMI, the participants were recorded for VRT using Digital Reaction Time Instrument.Result: A total of 100 adolescents participated in the study. Normal distribution of the data was checked by Shapiro-Francia Test. ANCOVA was done for the difference in means of reaction time for different colours for various BMI categories using age as a covariate. In all tests performed,$p<0.05$ is considered to be statistically significant. Conclusion : The findings suggest that there is a significant correlation of BMI with VRT; showing prolonged reaction time for underweight, overweight and obese categories.

Key words: *Visual Reaction Time (VRT), Body Mass Index (BMI), Adolescents*

Introduction-

Adolescence is a transitional face that is considered to be between childhood and adulthood. The World Health Organization (WHO) definition of an adolescent says that any person between ages 10 and 19 can be considered as adolescent.[1] It is characterised by cognitive, psychosocial, and emotional development. Cognitive development is the progression of thinking from the way a child does to the way an adult does. Cognitive development has three main areas of development- First, adolescents develop more advanced reasoning skills, including the ability to explore a full range of possibilities inherent in a situation, think

hypothetically (contrary-fact situations), and use a logical thought process. Secondly, adolescents develop the ability to think abstractly.[2] Adolescents move from being concrete thinkers, who think of things that they have direct contact with or knowledge about, to abstract thinkers, who can imagine things not seen or experienced. This allows adolescents to have the capacity to love, think about spirituality, and participate in more advanced mathematics. Third, the formal operational thinking characteristic of adolescence enables adolescents to think about thinking or meta-cognition.[2] This characteristic allows youth to develop the capacity to think about what they are feeling and how others perceive them.

Vision, the most dominant of our senses, plays a critical role in every facet and stage of our lives. We take vision for granted, but without vision, we struggle to learn to walk, to read, to participate in school, and to work. Therefore, it becomes necessary for us to learn about it.[3] The visual impairment imposes three general effects, all of which may have influence on cognitive development:

- range and variety of experiences
- ability to get about
- control of environment and self in relation to environment.[3]

Reaction time is one of the measures that determines the level of cognition development and ultimately the behaviour of the child depending upon different stimuli. It is the length of time required to react to a stimulus which involves series of events from getting a stimulus to interpretation of stimuli in CNS that results in an action or response for that particular stimulus.[4] Visual Reaction Time, in the same way, is the length of time that is required by a human to discern a visual stimulus and retaliate to it.

Visual reaction time depends on various characteristics like age, sex, left or right hand, central versus peripheral vision, practice, fatigue, fasting, breathing cycle, personality types, exercise, and intelligence of the subject.[5] Visual reaction time is important for us to determine because almost every activity of our daily living requires different stimuli to be perceived and act on like writing from blackboard, reading , driving etc. Any abnormal or reduced VRT thus can lead to harmful consequences as well as may be a source for low self-esteem of child who may be feeling outsided due to his slow responses to the stimuli.

Overweight and obesity are defined as abnormal or excessive fat accumulation that presents a risk to health. A body mass index (BMI) over 25 is considered overweight, and over 30 is obese. Rates of overweight and obesity continue to grow in adults and children.[6] From 1975 to 2016, the prevalence of overweight or obese children and adolescents aged 5–19 years increased more than four-fold from 4% to 18% globally. 18.5% prevalence rate of obesity had affected about 13.7 million children and adolescents. Prevalence of obesity was 13.9% among 2- to 5-year-olds, 18.4% among 6- to 11-year-olds, and 20.6% among 12- to 19-year-olds.Childhood obesity is also more common among certain populations. One of the major epidemics of this millennium is obesity that

affects individuals throughout the world. It causes multiple systemic complications, some of which result in severe impairment of organs and tissues. The accumulation of adipose tissue and the numerous cytokines produced by adipocytes leads to mechanical changes caused by these complications of obesity.[7]Body Mass Index (BMI), govern cognitive function, memory, reasoning, processing speed and sensorimotor performance, has been shown in neurophysiological studies.[8] According to nerve conduction studies, obese patients have higher risk of evolving slow conduction of nerve and small fiber neuropathy that could lead to some effect on reaction times. The pathophysiological changes like systemic inflammation, insulin irregulation etc. linked with obesity can influence managerial functions via vascular pathway.[4] Obesity has influence on VRT as it is shown in different studies but all have different opinions regarding the same. It makes the need to study the association of VRT with BMI to find the actual relationship among them,which further can play a role in designing some appropriate protocol of treatment for these people to make them work or do all their activities efficiently.

Methodology - After obtaining permission from the institutional ethics committee, 100 adolescents aged 10-18 years were included in this study. Participants with colour blindness, visual impairments such as nystagmus or blindness that cannot be corrected, any history of eye surgery or infection, neurological, orthopaedic, or psychological disorders, and any other comorbidities were excluded from the study. Prior to inclusion, informed consent/assent was obtained from the parents of the children. The process was explained to the participants through videos, and demonstrations were conducted to make them confident about the task. The participants performed a Visual Reaction Time (VRT) task using a Digital Reaction Time measuring instrument available at the Department of Physiology, Dr. DY Patil College of Medical College, Pune [9,10] . During the task, a light would blink either red or blue, depending on the instructor's choice. The participant had to respond to the correct stimulus to stop the blinking. The digital recording of the time interval between the initiation of the stimulus and its end was done by the machine, showing the time in milliseconds. After data collection, data analysis was conducted accordingly.

Results - The data of 100 participants was entered in Excel and analysed using SPSS v26. Categorical variables were expressed in terms of frequency and percentage with 95% CI (where applicable), Continuous variables expressed as mean and SD. Normal distribution was verified by the Shapiro-Francia test. ANCOVA was done for the difference in means of colour reaction time for the various BMI categories using age as a covariate.

Out of a total 100 participants, the distribution of participants according to underweight, normal, overweight and obese BMI categories was 20, 26,40,14 respectively (Table 1).

The mean visual reaction time for Red colour was found to be 531.520±97.29, 456.67±85.97, 456.68±107.16, 550.17±142.94 for underweight, normal, overweight and obese categories

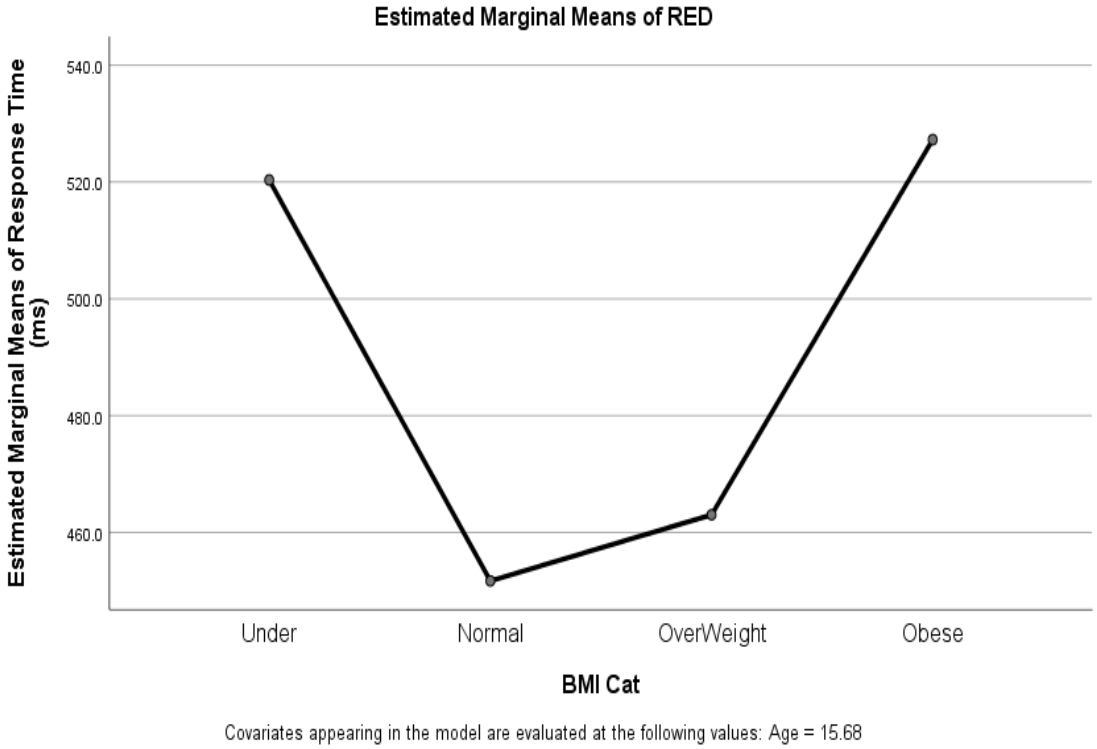
respectively and the result of association was found to be significant at p<0.05 (Graph 1).The mean visual reaction time for Yellow colour was found to be 506.06±92.65, 440.39±87.33,473.23±115.54, 515.64±127.51 for underweight, normal, overweight and obese categories respectively and the result of association was found to be significant at p<0.05 (Graph 2).The mean visual reaction time for Blue colour was found to be 443.90±25.39, 421.09±22.10,435.98±17.89, 502.97±30.13 for underweight, normal, overweight and obese categories respectively and the result of association was found to be significant at p<0.01 (Graph 3).The mean visual reaction time for Green colour was found to be 520.18±125.36, 457.82±72.19,475.59±78.63, 508.17±137.25 for underweight, normal, overweight and obese categories respectively and the result of association was found to be significant at p<0.01 (Graph 4).

Table 1- Descriptive Analysis of participants according to BMI category

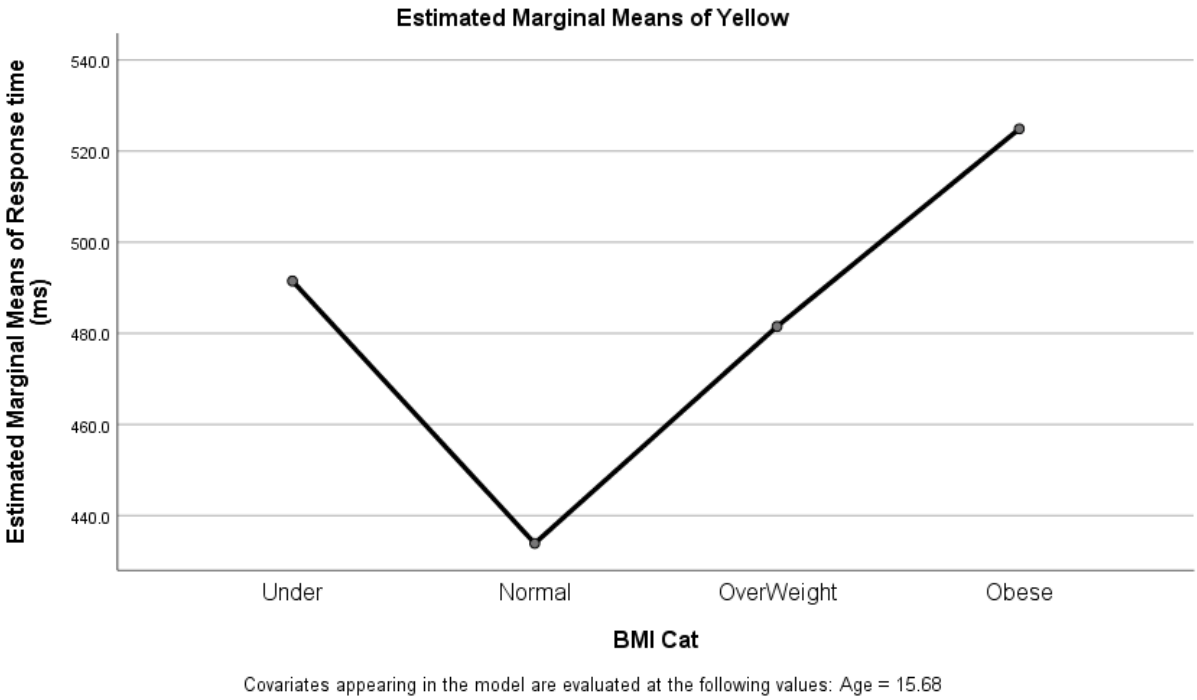
BMI Category	N	95 % CI
Underweight	20	10.03%
Normal	26	14.63%
Overweight	40	26.41%
Obese	14	5.82%
Total	100	

*****Table showing descriptive analysis of BMI category-wise.

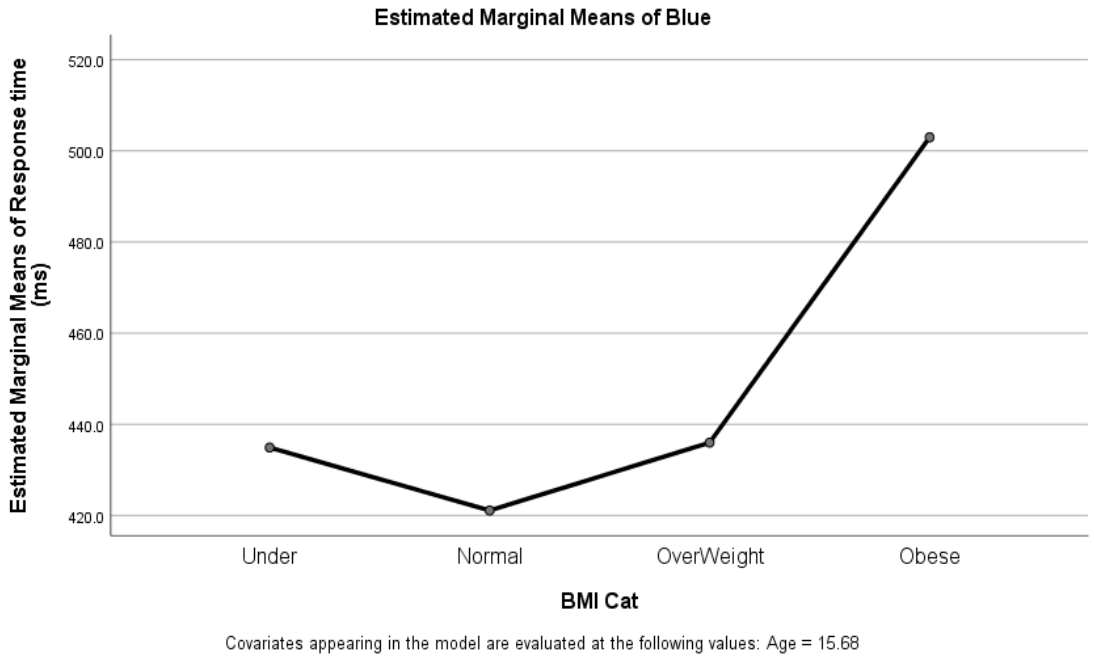
Graph 1 - Graph showing mean Reaction Time for Red colour according to BMI category



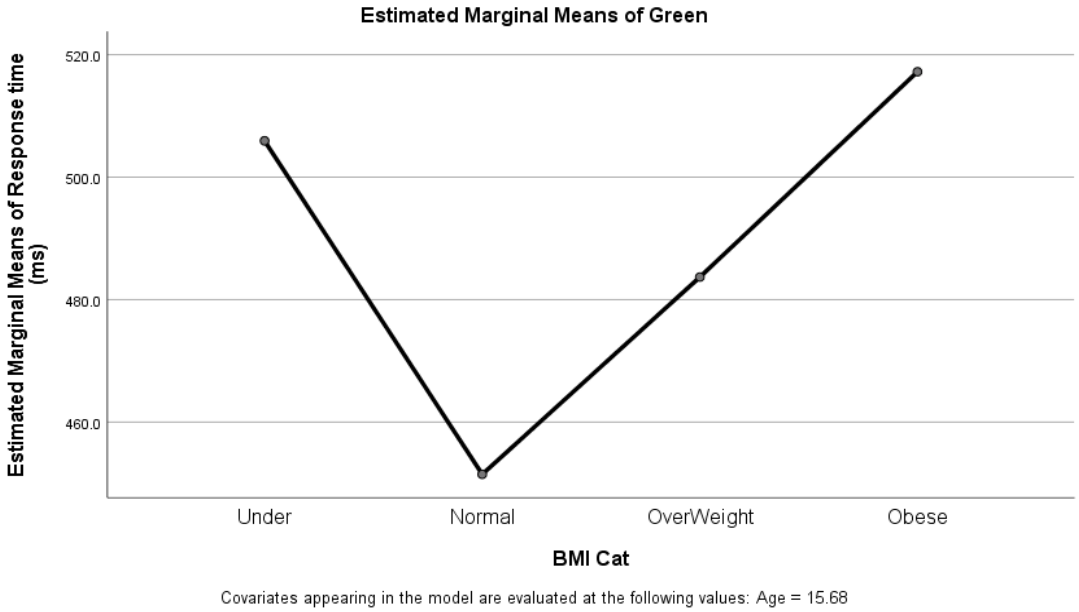
Graph 2 - Graph showing mean Reaction Time for Yellow colour according to BMI category



Graph 3 - Graph showing mean Reaction Time for Blue colour according to BMI category



Graph 4 - Graph showing mean Reaction Time for Green colour according to BMI category



Discussion -

This study investigated the association between Body Mass Index (BMI) and Visual Reaction Time (VRT) in adolescents. We recruited 100 participants with varying BMI categories and assessed their VRT for red, green, yellow, and blue colours. Our results indicated that participants categorised as underweight, overweight, and obese exhibited slower reaction times compared to those with a normal weight.

These findings align with previous research by Choon Wei Ngo et al. (2015), who reported prolonged reaction times in underweight individuals compared to their normal-weight counterparts (4). Similarly, Deepmala Nagorao Deore et al. (2012) observed that females in underweight, overweight, and obese categories displayed slower reaction times compared to the normal-weight group (11). Our results are further supported by A. Skurvydas et al. (2007), whose study demonstrated that participants with a higher BMI reacted significantly slower than others (12).

Recent studies offer potential explanations for this extended reaction time. Research suggests that obese adolescents experience deficits in various cognitive domains, including attention and executive functions. It is believed that BMI may influence brain functions like attention, memory, cognition, reasoning, and processing speed (13). One hypothesis proposes that secretions from fat cells (adipocytes) and cytokines (signalling molecules) act as harmful factors that can disrupt brain function (14).

Overweight and obese individuals are at a higher risk of developing metabolic syndrome, characterised by a cluster of conditions including high blood pressure, abnormal blood lipid levels (dyslipidemia), and insulin resistance. Metabolic syndrome has been linked to cognitive decline and slower reaction times, possibly due to the

combined effects of vascular damage and metabolic dysregulation on brain function. Additionally, overweight and obese individuals often exhibit insulin resistance, where cells become less responsive to the effects of insulin. This resistance can lead to chronic low-grade inflammation, particularly in the brain (neuroinflammation). Neuroinflammation can impair neuronal function and communication, including the speed of cognitive processes like reaction times (15).

For underweight individuals, prolonged reaction times may be attributed to various physiological factors, ranging from altered neurotransmitter function to changes in brain structure and metabolism. Underweight individuals frequently suffer from nutritional deficiencies, particularly in essential nutrients like vitamins and minerals. These deficiencies can impair the function of neurotransmitters, which are critical for efficient neural signalling. For instance, inadequate intake of B vitamins, such as B12 and folate, can lead to decreased production of neurotransmitters like serotonin and dopamine, impacting cognitive processes like reaction time (16).

Underweight individuals may also experience hormonal imbalances, including reduced levels of hormones like leptin and insulin. Leptin is known to influence cognitive processes like memory and attention, and its dysregulation in underweight individuals could contribute to slower reaction times (17). Malnutrition can disrupt the formation and function of synapses, the connections between neurons where neurotransmitters are released. This disruption can lead to impaired synaptic transmission, affecting the speed and efficiency of neural signalling and consequently prolonging reaction times (18).

It is important to note that our findings contradict those of Samad Esmaeilzadeh et al. (2018), who reported no significant association between body mass index, fat percentage, waist circumference, waist-to-height ratio, and any of the information processing tests administered in their study, after adjusting for potential confounding factors (19). Further research is warranted to explore these discrepancies and elucidate the complex interplay between BMI and cognitive function in adolescents.

Conclusion - The results showed that there is significant association of various colours visual reaction time with BMI. It showed that BMI can directly affect VRT with prolonged reaction times in underweight, overweight and obese adolescents.

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3. A NARRATIVE REVIEW ON EFFECT OF CHRONIC NECK PAIN ON CARDIAC AUTONOMIC FUNCTIONING.

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ABSTRACT

INTRODUCTION: Chronic neck pain (CNP) is considered to be one of the most frequently recorded symptoms by individuals with chronic musculoskeletal pain which have a negative impact on quality of life (Bovim et al., 1994). It has become major medical and socioeconomic burden over recent decades (Artner et al., 2013). CNP is not only a set of symptoms they are condition that impair all aspect of patient life(Artner et al., 2013). Cardiac autonomic nervous system being one of them .HRV is a reliable and non-invasive method used to test the autonomic function of the heart (Appelhans & Luecken, 2006). HRV is a test of the relationship between the excitation of sympathetic and the inhibition of parasympathetic nervous system (Appelhans & Luecken, 2006). HRV is decreased in pain patients (Cho et al., 2011). Although chronic pain is generally known as related to higher sympathetic activation and low parasympathetic tone, the specific mechanism has not yet been discussed (Koenig et al., 2014). for example, in fibromyalgia, sympathetic hyperactivation was shown (FM) (Nilsen et al., 2007), in low back pain (Telles et al., 2016), in whiplash associated disorders (Passatore & Roatta, 2006), and in migraine also there is hyperactivity of sympathetic nervous system (Bäcker et al., 2008). HRV alternation has been shown to be linked to different forms of pain. For example, patients with chronic low back pain showed decreased parasympathetic and increased sympathetic activity (Telles et al., 2016). By far from the above data, we know that chronic pain cause alteration in cardiac autonomic functioning but there is scarcity of this data with chronic neck pain patients.
The aim of this narrative review is to find some correlation between the chronic neck pain and cardiac autonomic nervous system. METHODOLOGY: Electronic database such as PubMed, Google Scholar, EMBASE, Web of Science and Cinhal was used to search articles related to the topics using refine keywords.
RESULT: By this review we have seen that there is Increase in activity of the sympathetic nervous system and reduction in parasympathetic nervous system in patients with chronic pain.

KEYWORDS: *Chronic neck pain AND Cardiac Autonomic Function AND HRV AND Neck pain AND Physiotherapy AND Chronic Pain*

INTRODUCTION

Chronic neck pain (CNP) is considered to be one of the most frequently recorded symptoms by individuals with chronic musculoskeletal pain which have a negative impact on quality of life (Bovim et al., 1994). It has become major medical and socioeconomic burden over recent decades (Artner et al., 2013). It is a highly prevalent condition, with about two thirds of the adult population at one time in their lives affected (Hoy et al., 2010).CNP is not only a set of symptoms

they are condition that impair all aspect of patient life(Artner et al., 2013). One of the aspects is cardiac autonomic functioning that will get hamper in chronic neck pain patients.

Autonomic nervous system is an aspect of the peripheral nervous system that keeps smooth, cardiac muscles and glands unintentionally controlled. The ANS is then divided into sympathetic and parasympathetic branches, in which sympathetic nerves normally stimulate organ activity (except digestive organs) and parasympathetic nerves disrupt activity of organs (except digestive organs).(Todman, 2008). Such systems (ANS and PNS) are responsible for monitoring and responding to challenges a number of critical involuntary physiological functions, such as blood pressure, temperature and heart rate .HRV is a reliable and non-invasive method used to test the cardiac autonomic functioning (Appelhans & Luecken, 2006). HRV is characterized as the distance variability measured by an electrocardiogram between the electrical heartbeat signal's consecutive R peaks. This variation is indicative of the heart's ability to physiologically and environmentally respond to stimuli. HRV is a test of the relationship between the excitation of sympathetic and the inhibition of parasympathetic nervous system (Appelhans & Luecken, 2006).

HRV is decreased in pain patients (Cho et al., 2011). . A decrease in HRV (i.e. decrease in PA even without increase in SA) leads to increased morbidity and mortality.(Michels et al., 2013).

Although chronic pain is generally known as related to higher sympathetic activation and low parasympathetic tone, the specific mechanism has not yet been discussed (Koenig et al., 2014). for example, in fibromyalgia, sympathetic hyperactivation was shown (FM) (Nilsen et al., 2007), in low back pain (Telles et al., 2016), in whiplash associated disorders (Passatore & Roatta, 2006), and in migraine also there is hyperactivity of sympathetic nervous system

(Bäcker et al., 2008). HRV alternation has been shown to be linked to different forms of pain. For example, patients with chronic low back pain showed decreased parasympathetic and increased sympathetic activity (Telles et al., 2016) If there is changes in cardiac autonomic functioning then it will result in some serious heart disease . This literature review aims to explore current research findings, methodologies, and theoretical frameworks that elucidate how alterations in the autonomic regulation may contribute to the onset, perpetuation, and modulation of chronic neck pain or vice versa. By synthesizing evidence from various studies, this review seeks to provide a comprehensive analysis of the existing knowledge landscape, identify gaps in understanding, and propose directions for future research.

METHODOLOGY

This review involved a comprehensive literature search across multiple electronic databases, including PubMed/MEDLINE, Web of Science, Scopus, and Google Scholar. Keywords and Medical Subject Headings (MeSH) terms used for the search included "cardiac autonomic nervous system," "chronic neck pain," "heart rate variability," "sympathetic nervous system," "parasympathetic nervous system," and related terms. The quality of included studies was assessed using appropriate tools depending on study design. A narrative synthesis approach was

used to summarize findings across studies.

RESULTS

By the virtue of this review, we can say that heart rate variability is decrease in chronic neck pain patients. There is highest possible activity of the sympathetic nervous system and reduction in parasympathetic nervous system that can lead to a decrease HRV. There can be autonomic dysregulation with increased resting heart rate and reduced HR

Chronic pain can lead directly to dysregulation in autonomic nervous system.

DISCUSSION

ANS and PNS are responsible for monitoring and responding to challenges a number of critical involuntary physiological functions, such as blood pressure, temperature and heart rate. A balance between the excitatory SNS that is a part of ANS and inhibitory PNS is required to adaptively respond to external stressors (Njemanze et al., n.d.).It has been seen that Cardiac autonomic activity has been found to be associated with post myocardial infarction deaths, sudden death, and all-causes of mortality(Njemanze et al., n.d.).

We can measure cardiac autonomic activity through different means

Heart rate variability (HRV) is one of the valid tool for checking the cardiac ANS status non-invasively .(Glos et al., 2014) . Because of the sympathetic and vagal parasympathetic innervations of the heart, variation in heart rate(HRV) is generally used as a measuring point for autonomic nervous system function and its two branches(SA and PA, respectively).)(Bhati et al., 2019). HRV is characterized as the distance variability measured by an electrocardiogram between the electrical heartbeat signal's consecutive R peaks. This variation is indicative of the heart's ability to physiologically and environmentally respond to stimuli. A decrease in HRV (i.e. decrease in PA even without increase in SA) leads to increased morbidity and mortality.(Michels et al., 2013).

In general, HRV spectral analyses display three major components ranging from 0 to 0.4 Hz. The most commonly used bandwidths are: very low frequency (0.01 to 0.04 Hz) defined as VLF, medium frequency (0.04 to 0.2 Hz) defined as LF, and high frequency (0.2 to 0.4 Hz) defined as HF. Power is measured differently for all elements (the Power Spectrum Curve [PSD] region relative to each component)and total power defined as the total area under the PSD Curve). (Tracy, Ioannou, Baker, Gibson, Georgiou-Karistianis, et al., 2016). We can measure power in absolute units (msec 2), and uniform units (nu). Standardized power, as well as the ratio LF / HF, defines the power distribution in the frequency axis fractionally, without any influence due to total power, and is widely used to describe the sympathovagal balance mechanism. This ratio represents the connection between sympathetic machine activity and parasympathetic activity.(American, 1996).

Many experimental results suggest HF is a vagal activity indicator. The LF intensity is used as a sympathetic and parasympathetic measuring point and is usually associated with baroreceptor activity.(Santos-de-Araújo et al., 2019). Until now, the HRV's VLF component has no clear physiological meaning and is still subject to significant debate; the VLF component has its

attribute in many respects to thermoregulatory systems, peripheral vasomotor activity and the renin-angiotensin system. Until now it has been regarded as a indicator of SNS. Some researchers differentiate between 10 -2 and 10 -5 Hz, and fund an additional ultra-low-frequency (ULF) component. The ULF portion may be the result of nonlinear chaotic deterministic systems which control long-term mechanisms of heart rate.

Both sympathetic and parasympathetic nervous systems have their involvement in regulation of pain state such as a result of which it has been seen that the activity of these systems become disturbed in state of chronic(Tracy, Ioannou, Baker, Gibson, & Georgiou-karistianis, 2016).Chronic pain can lead directly to ANS dysre gulation, further decreasing the ability to respond t o threats (i.e., pain)(Tracy, Ioannou, Baker, Gibson, & Georgiou-karistianis, 2016) .

The available literature indicates that ANS dysregulation and decreased HRV were involved in the pathogenesis of some chronic pain disorders(Tracy, Ioannou, Baker, Gibson, Georgiou-Karistianis, et al., 2016). Changes in autonomic function such as low parasympathetic tone can place you at a higher risk of chronic pain due to reduced responsiveness to sensory and emotional threats. Regardless of the mechanism, both implicate a greater risk of mortality and disease beyond the direct impact of pain, warranting systematic evaluation of the evidence, before recommending targeted management. (Tracy, Ioannou, Baker, Gibson, Georgiou-Karistianis, et al., 2016). The autonomic nervous system (ANS) is an important factor in the mechanism of chronic muscle pain , elevation in the sympathetic activity can cause alteration in pain perception/sensitivity by increasing the tension in muscle and by impairing local microcirculation in the muscle affected by pain (Hallman et al., 2011)

In literature we can see that there is highest possible activity of the sympathetic nervous system and reduction in parasympathetic nervous system activity in patients with chronic pain such as neck-shoulder pain and fibromyalgia have been reported(Tracy, Ioannou, Baker, Gibson, Georgiou-Karistianis, et al., 2016).Clinical observations reveal that many chronic pain conditions, involving pain that persists for greater than 3 months(Tracy, Ioannou, Baker, Gibson, Georgiou-Karistianis, et al., 2016) Are linked to some form of autonomic dysfunction. Many medical problems, such as chronic low back pain (Santos-de-Araújo et al., 2019) chronic neck–shoulder pain(Santos-de-Araújo et al., 2019) and fibromyalgia(Tracy, Ioannou, Baker, Gibson, Georgiou-Karistianis, et al., 2016) unanimously provide evidence for autonomic dysregulation with increased resting heart rate and reduced HR. . In addition, a study found functional improvement in the sympathetic nervous system in staff suffering from chronic neck pain. This disorder in the sympathetic nervous system could cause and maintain chronic pain (Matsubara et al., 2011)

Research has shown that HRV is decreased in patients with pain based on small sample group associations with chronic pain conditions..(Tracy, Ioannou, Baker, Gibson, Georgiou-Karistianis, et al., 2016).Chronic pain is usually accompanied by

highly sympathetic activation and weak parasympathetic tone. (Santos-de-Araújo et al., 2019). Clinical observations reveal that many chronic pain conditions, involving pain that persists for greater than 3 months, are associated with some form of autonomic dysfunction(Laposky et al., 2016).

A cross-sectional study by tracy et al. recorded high HR and reduced HRV in workers with CNP and shoulder pain, particularly during sleep, suggesting low physical activity during leisure time..(Tracy, Ioannou, Baker, Gibson, Georgiou-Karistianis, et al., 2016) Tracy et al have also observed an abnormal sympathetic baroreceptor response to daily physical activity in participants with chronic neck pain.(Tracy, Ioannou, Baker, Gibson, Georgiou-Karistianis, et al., 2016).

Significant human neuroimaging research has shown that certain areas of the brain, including the prefrontal cortex, are involved in the processing of pain information and autonomous regulation.(Santos-de-Araújo et al., 2019). Patients with chronic pain have been shown to have their anatomy and work problems with the medial prefrontal cortex (mPFC), and the higher rapid pain levels were typically associated with increased activity in the mPFC (Morikawa et al., 2017). A research using functional magnetic resonance imaging (fMRI) also suggested that the mPFC was involved in autonomous responses development.(Morikawa et al., 2017). Such results clearly showed the role of prefrontal cortex in chronic pain by abnormal stimulation of the autonomic nervous sys

In conclusion, the narrative review provides compelling evidence for an association between reduced HRV and chronic neck pain, suggesting dysregulation within the cardiac autonomic nervous system. Mechanistic insights and implications for cardiovascular health underscore the importance of further research to clarify underlying pathways and develop targeted interventions. Addressing ANS dysfunction through therapeutic interventions may hold promise for improving outcomes in individuals with chronic neck pain.

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4. PULMONARY FUNCTION IN POLYCYSTIC OVARIAN SYNDROME (PCOS): A MINI REVIEW

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ABSTRACT

Introduction: Polycystic ovary syndrome (PCOS) is a common endocrine disorder characterized by menstrual dysfunction, subfertility, insulin resistance, and hyperandrogenemia. While the metabolic and reproductive aspects of PCOS are well-documented, its impact on pulmonary function are less explored and require further investigation, necessitating a comprehensive review of existing literature.Purpose and Relevance: This review aims to evaluate the current evidence on the relationship between PCOS and pulmonary function, identify significant findings, and suggest future research directions. Material and Methods: A systematic search was conducted using Scopus, PubMed, Google Scholar, and Web of Science databases. The search strategy included keywords such as "PCOS,", "pulmonary function," "respiratory health," "spirometry," and combined with Boolean operators. Studies were selected based on inclusion criteria: peer-reviewed, human subjects with PCOS, standardized pulmonary function measures, and English language. A total of 18 studies were identified, and after screening for relevance and quality, 7 studies were included in the review. Analysis: Studies focused on pulmonary function parameters (FEV1, FVC, FEV1/FVC ratio) and their association with PCOS-related factors such as hyperandrogenism, insulin resistance, and obesity were included. Results: The review found a consistent pattern of impaired pulmonary function in women with PCOS, with studies indicating a 10% higher likelihood of respiratory issues. Key findings included reduced FEV1, FVC, and FEV1/FVC ratios in women with PCOS, with contributing factors identified as menstrual irregularity, hyperandrogenism, insulin resistance, and obesity. Conclusion: PCOS is associated with impaired pulmonary function, influenced by hormonal imbalances and metabolic disturbances. Future research should focus on longitudinal studies and diverse populations to enhance comprehensive management.

Keywords: *PCOS, pulmonary function, respiratory health, spirometry, hyperandrogenism, insulin resistance, obesity.*

INTRODUCTION

Polycystic ovary syndrome (PCOS) is a prevalent endocrine disorder characterized by menstrual dysfunction, subfertility, insulin resistance and hyperandrogenemia which manifests clinically as hirsutism (Vigorito et al., 2007; Yang et al., 2022). As the exact causes of the disorder remain unknown, the prevalence of PCOS is estimated to be up to 22.5% using the Rotterdam criteria, being the most widely accepted for diagnosis (Bhimwal et al., 2023; Chaudhari et al., 2018; Ganie et al., 2019). PCOS extends beyond being an endocrine and reproductive disorder, affecting metabolic, pulmonary, cardiovascular, and psychological health across the lifespan. (Kujanpää et al., 2022).

While endocrine, reproductive, and metabolic

disturbances are well-explored aspects of PCOS, there is a scarcity of studies specifically investigating the influence of PCOS on pulmonary function (Bruner et al., 2006; Macsali et al., 2012; Simon et al., 2023). Van der Plaat's research adds valuable insights to this limited understanding, indicating a 10% higher likelihood of impaired pulmonary function in women with PCOS (van der Plaat et al., 2019).

Understanding the relationship between irregular menstruation, PCOS, and pulmonary function is crucial. Studies have demonstrated an association between irregular menstruation and reduced forced expiratory volume in one second (FEV1), forced vital capacity (FVC) and FEV1/FVC (Macsali et al., 2012; Underdal et al., 2020; Xu et al., 2022). Factors such as insulin resistance, overweight, and intrauterine development may contribute to this connection (Macsali et al., 2012). Women with PCOS, exhibiting signs of hyperandrogenism, often experience higher rates of pulmonary complications (Macsali et al., 2012). Increased rates of pulmonary disorders and diminished lung capacity highlight the need to consider respiratory health in PCOS care (Karanfil Yaman & Arslan, 2019; Macsali et al., 2012; Ucok et al., 2010; Underdal et al., 2020; van der Plaat et al., 2019; Xu et al., 2022; Zierau et al., 2016).

METHODOLOGY

A comprehensive evaluation of the relationship between PCOS and pulmonary function was conducted through a systematic literature review. The search included databases such as Scopus, PubMed, Google Scholar, and Web of Science, chosen for their extensive coverage of scientific and medical literature. The search strategy utilized a combination of keywords including "PCOS," "pulmonary function," "respiratory health," and "spirometry," combined with Boolean operators like "AND," "OR," and "NOT" to refine the results. The inclusion criteria for the studies were stringent: only peer-reviewed articles involving human subjects diagnosed with PCOS, employing standardized pulmonary function measures, and published in English were considered. Exclusion criteria eliminated animal studies, case reports, non-English publications, studies without standardized pulmonary function measures, and those lacking clear diagnostic criteria for PCOS.

The initial search identified 18 studies, each reviewed for relevance based on title and abstract. Studies meeting the inclusion criteria underwent full-text review and were evaluated for quality based on study design, sample size, statistical analysis, and clarity of reporting. After screening, 7 studies were selected for inclusion in the review.

Data extraction from each study was systematic to maintain consistency and accuracy. Extracted data included authors, sample size, population characteristics, pulmonary function measures, main findings, and associations between pulmonary function and PCOS-related factors such as hyperandrogenism, insulin resistance, and obesity.

The quality assessment of the studies considered clarity and appropriateness of the study design, sample size adequacy, use of standardized and validated measures, statistical analysis methods, and control for potential confounding variables.

RESULTS

Authors	Year	Sample Size	Population Characteristics	Pulmonary Function Parameters Measured	Key Findings
Uçok et al.	2010	31	Women with PCOS	FEV1, FVC, FEV1/FVC, FEF, PEF,MVV	Significant reduction in FEV1, FVC, and FEV1/FVC ratio in PCOS patients; linked to systemic inflammation and insulin resistance.
Xu et al.	2022	-	Women with PCOS	FEV1, FVC, FEV1/FVC,ERV, FRC	Decreased FEV1, FVC, and FEV1/FVC ratio in PCOS patients; associated with insulin resistance.
Underdal et al.	2020	145	Women with PCOS, age 18-45	FEV1, FVC	Women with PCOS reported higher prevalence of DDA compared with controls matched for age and smoking status. In addition, respiratory function was decreased, with both obstructive and restrictive components.
Van der Plaat et al.	2019	182,619	Women with PCOS	FEV1, FVC, FEV1/FVC	10% higher likelihood of impaired pulmonary function in PCOS; linked to metabolic disturbances.
Zierau et al.	2016	-	Women with PCOS	FEV1, FVC, FEV1/FVC	Lower FEV1/FVC ratio in PCOS patients; menstrual irregularity and hyperandrogenism implicated.
Macsali et al.	2012	-	Women with PCOS	FEV1, FVC, FEV1/FVC	Reduced FEV1 and FVC compared to controls; linked to insulin resistance and obesity.
Bruner et al.	2006	12	Women with PCOS	FEV1, FVC	Reduced FEV1 and FVC in PCOS group; obesity as a significant contributing factor.

DISCUSSION

This mini-review synthesizes evidence from seven studies investigating the relationship between polycystic ovary syndrome (PCOS) and pulmonary function. The results reveal a consistent pattern of impaired pulmonary function among women with PCOS, with reductions observed in key pulmonary metrics such as Forced Expiratory Volume in one second (FEV1), Forced Vital Capacity (FVC), and the FEV1/FVC ratio. These findings highlight significant respiratory concerns for women with PCOS, suggesting a need for greater awareness and intervention in clinical practice. The reviewed studies consistently show that women with PCOS have lower FEV1 and FVC levels compared to healthy controls. This decline in pulmonary function suggests patterns of restrictive or obstructive lung diseases. Notably, a lower FEV1/FVC ratio, observed in several studies, points to potential obstructive airway

disease in this population (Vigorito et al., 2007; Simon et al., 2023). These findings align with the understanding that metabolic disturbances associated with PCOS, such as insulin resistance and obesity, can negatively impact respiratory health. Research suggests that both insulin resistance and excessive adiposity contribute to chronic inflammation and impaired lung mechanics (Underdal et al., 2020; Xu et al., 2022).

One of the critical observations from this review is the association between PCOS-related hyperandrogenism and impaired pulmonary function. Elevated androgen levels, which are characteristic of PCOS, have been linked to respiratory complications in women. Hyperandrogenism is thought to affect lung function through various mechanisms, including the influence of androgens on airway smooth muscle contraction and lung inflammation (Karanfil Yaman & Arslan, 2019). Additionally, elevated androgen levels may exacerbate symptoms of obstructive pulmonary disease, contributing to the reduced FEV1 and FVC observed in PCOS patients (Bruner et al., 2006; Zierau et al., 2016).

Obesity, a common comorbidity in PCOS, also plays a significant role in the observed pulmonary dysfunction. Adipose tissue accumulation, particularly in the abdominal region, leads to diaphragmatic elevation and reduced chest wall compliance, which in turn impairs lung expansion and function (Vigorito et al., 2007). The studies reviewed show a clear correlation between higher body mass index (BMI) and decreased pulmonary function in women with PCOS, underscoring the need for effective weight management strategies in this population (Simon et al., 2023; Xu et al., 2022).

Menstrual irregularities, another prevalent symptom of PCOS, were also found to be associated with impaired pulmonary function. The hormonal imbalances that cause menstrual irregularities may have broader effects on respiratory health, potentially influencing lung function through mechanisms such as systemic inflammation and hormonal dysregulation (Underdal et al., 2020). This relationship indicates that the respiratory impacts of PCOS may be interconnected with its endocrine symptoms, highlighting the complexity of the disorder.Despite these significant insights, it is essential to recognize the limitations of existing literature. Most studies reviewed are cross-sectional, limiting the ability to establish causation between PCOS and pulmonary dysfunction. Moreover, variability in study designs, sample sizes, and diagnostic criteria for PCOS affects the comparability and generalizability of the findings (Karanfil Yaman & Arslan, 2019). Future research should focus on longitudinal studies with standardized methodologies to better understand the causal relationships and mechanisms underlying the observed pulmonary impairments. Additionally, there is a need for more diverse study populations to determine if these findings are consistent across various ethnicities, age groups, and stages of PCOS. Future research should also explore the potential benefits of specific interventions, such as weight reduction programs, insulin sensitizers, and hormonal therapies, on improving pulmonary function in women with PCOS. These studies could offer valuable insights into effective strategies for managing the respiratory aspects of PCOS and enhancing overall health outcomes for

these patients.

CONCLUSION

In conclusion, this mini-review highlights a significant association between polycystic ovary syndrome (PCOS) and impaired pulmonary function. The analysis of the literature reveals that women with PCOS tend to exhibit reduced levels of FEV1, FVC, and FEV1/FVC ratios compared to healthy controls, reflecting potential obstructive and restrictive lung patterns. The observed pulmonary dysfunction is primarily attributed to PCOS-related factors such as hyperandrogenism, insulin resistance, and obesity, all of which contribute to decreased lung capacity and altered respiratory mechanics. These findings emphasize the need for a more integrated approach to PCOS management that includes regular pulmonary assessments as part of routine care. To further advance understanding, future research should focus on longitudinal studies with diverse populations to explore causal relationships and the effectiveness of targeted interventions aimed at improving respiratory health in women with PCOS. Addressing these issues could lead to more comprehensive treatment strategies and better health outcomes for this patient population.

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5. "IMPACT OF SHORT-FOOT EXERCISE ALONG WITH CORRECTIVE EXERCISES IN IMPROVING BALANCE IN INDIVIDUALS WITH PES PLANUS"

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ABSTRACT

Introduction: Foot flattening on the ground due to collapse of the medial longitudinal arch caused by a malformation termed pes planus, also called flat foot.Because of changed foot mechanics, pes planus, or flat feet, can cause balance problems.In adult, population the prevalence of this condition is reportedly between 19.0% and 26.5% by different ages and population Proposed therapies to improve foot arch support and alignment and improve balance include short-foot exercises and corrective exercises.SFE cause the foot's intrinsic muscles to contract, shortening the MLA's total length and increasing its height.Short foot exercises involve raising the MLA while keeping the front and back of the foot on the ground, which activates the intrinsic foot muscles.Short foot exercises strengthened intrinsic muscles and enhanced proprioceptive perceptions. Examples of these exercises include spreading the toes and positioning the metatarsal head and calcaneus in a neutral posture.Exercises like calf raises, towel curls, toe spread and squeezes, tip toe coin pushes, and towel stretches are examples of traditional corrective exercises that stop the advancement of flat feet .Purpose & Relevance:The purpose of this study was to evaluate the effects of short-foot exercises in conjunction with corrective exercises on balance improvement in people with pes planus diagnoses, in order to shed light on practical rehabilitation approaches for this disease. Methods & Material:Individuals with pes planus diagnoses participated in a structured exercise program that included targeted corrective exercises aimed at improving foot alignment and stability as well as short-foot activities. Using established procedures, balance tests were carried out both before and after the intervention. Analysis:The balance measures were analyzed statistically both before and after the intervention, with an emphasis on remarkable improvements in static and slight improvements in dynamic balance parameters. Results:Following the interventions, notable advancements in static equilibrium were noted as compared to dynamic balance.Individuals exhibited improved steadiness and decreased Sway.According to these results, Individuals with pes planus can improve their balance by performing short-foot exercises and corrective exercises. Conclusion: Rehabilitation programmes that include corrective and short-foot exercises can help Individuals with pes planus improve their balance, which suggests that these interventions are important parts of all-encompassing therapy plans.

Key words: *Pes Planus, Foot, Prevalence, Short Foot Exercises, Corrective Exercises,Static and Dynamic Balance.*

INTRODUCTION

Pes planus is essentially the MLA's flattened height. This ailment occurs when the pressure of the body weight during vigorous walking causes the foot to become flat. According to various age groups and populations, the prevalence of this illness in the adult population ranges from 19.0% to 26.5%.[1]When the MLA curve is more flat than usual and the entire sole of the foot makes almost total or near total contact with the ground, the condition is known as pes planus.When assessing the degree of pes planus, the height of the MLA is the most crucial parameter.[2]There are other correlations between flat foot and age, gender, and foot length in addition to family history, wearing shoes as a baby, obesity, and living in an urban area.[3]

SFE cause the foot's intrinsic muscles to contract, shortening the MLA's total length and increasing its height.In order to engage the activated intrinsic foot muscles during short foot workouts, people must raise their MLA while keeping their front and rear feet on the ground.[4]The goal of short foot exercises is to improve general foot stability and develop the foot muscles with simple yet effective motions.Short foot Exercises can strengthen the intrinsic foot muscles, increase arch support, and promote general balance and posture.

They help those who want to strengthen and stabilize their feet for everyday activities or athletic performance, prevent or treat foot injuries, or just enhance foot function[5].In addition to strengthening intrinsic muscles, short foot workouts, including spreading the toes or putting the metatarsal head and calcaneus in a neutral posture, enhanced proprioceptive perceptions[4].

By properly engaging the muscles that support and stabilize the arch, this movement shortens the foot[6]Under the supervision of a healthcare provider, it is advised to carry out these exercises, particularly in severe flat feet or other foot-related disorders.[7]When paired with suitable footwear and maybe orthotic devices, Short foot exercises provide a cautious yet effective method for treating flat feet and enhancing general foot health and well-being.[8]

Exercises like calf raises, towel curls, toe spread and squeezes, tip toe coin pushes, and towel stretches are examples of traditional corrective exercises that stop the advancement of flat feet. Frequent use of these exercises can help to improve general foot function, strengthen the muscles supporting the arch, and perhaps stop further degeneration of flat feet.They're helpful for everyone who wants to strengthen, flex, and straighten their feet not just those with flat feet.[9]

RESEARCH GAP

According to the previous studies,comparison between the effect of SFE and arch support insoles and comparison between the effect of Plyometric exercises versus flat foot corrective exercises in individuals with pes planus have been done. Their

was no study reported till now that shows the result from combined effect of shortfoot exercises along with corrective exercises in improving balance in individuals with pes planus.So, their was need to bridge this gap.

AIM OF THE STUDY

To find the effect of Shortfoot Exercise combined with Corrective Exercises in improving balance in individuals with Pes Planus.

NEED OF THE STUDY

To identify the effect of Short foot exercises along with corrective exercises and in individuals with pes planus.

METHODOLOGY

Study Design: Experimental study

Study Subjects- Individuals with Pes Planus

Study Sample Size- 26

Inclusion Criteria[1,10]

1. Individuals with flat foot (Rigid flat foot, FFF, Flexible flat foot with short tendo-achilles)
2. Age between 18- 25 years
3. Both male and female
4. Navicular drop height (ND) more than 10 mm

Exclusion Criteria[1,10]

1.Participant had any lower extremity deformity, injury or Neuromuscular disorder
2.Have undergone prior foot or ankle surgery
3. Excluded were any foot hypoesthesia, fractures, dislocations, skin conditions, and vascular diseases.
4. BMI above 30 kg/m^2

VARIABLES

Dependent variables:

1.Static (Single Leg Stance) and Dynamic Balance (Y Balance test)

Independent variables:

1. Short foot exercises
2. Corrective Exercises

Instrumentation

1. Marker
2. A4 sheet
3. Scale
4. Measuring tape
6.Weight Machine
7. Height measuring Scale

INTERVENTIONS

Group A : The subjects performed Short-foot Exercise + corrective Exercises for 2 sessions per week for 6 weeks.

Short-foot Exercise- Patient placed the flat foot on the ground, and draw the metatarsals inward creating an arch with progression without flexion of the toes (20 reps with 5 seconds hold).

Corrective Exercises- Heel Raises(20 times without shoes), Achilles Tendon Stretching (5 repetitions with 30 seconds hold), Toe Spreading Exercises (20 reps with 5 seconds hold), Toe Extension Exercise (20 reps with 5 seconds hold).[10]

Group B : The subjects performed corrective exercises alone.

Corrective Exercises- Heel Raises(20 times without shoes), Achilles Tendon stretching (5 repetitions with 30 seconds hold), Toe Spreading Exercises(20 reps with 5 seconds hold), Toe Extension Exercises (20 reps with 5 seconds hold).[11]

Sit To Stand Navicular Drop Test (SSNDT)

(Brody 1982): One can diagnose pes planus. with the Sit to Stand Navicular Drop test(NDT). The primary objective of the calculation was to determine the difference between the height of the Navicular from the floor in a non-weight bearing (sitting) posture with the subtalar joint in a neutral position and the height of the Navicular from the floor in a full weight bearing position through relaxed stance.

The participant was positioned sitting down, feet flat on a stable platform, knee flexed to ninety degrees, and ankle joints in a neutral posture.With the subtalar neutral posture maintained, the most prominent position of the

Navicular tubercle was detected and marked on paper using a pen.Place the index card vertically over the Navicular bone on the ground, marking the location of the Navicular tubercle's most prominent point.After that, the person was instructed to stand with both feet in the same posture and to bear the same amount of weight.

When standing, the Navicular tubercle's most noticeable location in relation to the floor was once more determined and noted on the card.Lastly, a tape measure was used to quantify the variation between the Navicular tubercle's initial height when sitting and when bearing weight, giving the Navicular Drop measurement.[12]

Static Balance(Single leg stance):A Single Leg Stance test (with and without eyes closed) is used to evaluate static balance.Time was measured using watch.After doing the test three times, the average result were determined.[10]

Dynamic Balance(Y Balance Test): All individuals' limb lengths were measured in order to calculate their Y balance score.Length of Limb Measurement:

The individual was lying flat on her back. Measurement tape was used to determine the distance between the ipsilateral medial malleolus and the anterior superior iliac spine.All the subjects was explained about test procedure and were given one practice session prior to the actual procedure. Maintaining their non-testing leg in the middle of the grid was instructed for the subjects.

As much as possible, the patient was instructed to extend his great toe on the testing leg in all three directions (anterior, posterolateral, and posteromedial). The distance that each of the three subjects travelled was noted.

After that, another leg underwent the same process again.After doing the test three times, in each direction with each leg the average result was determined.[10]

Score of Y Balance Test: $\frac{\text{Anterior} + \text{Posteromedial} + \text{Posterolateral} \times 100}{3 \times \text{Limb length}}$

RESULTS

This chapter deals with the findings from the data analysis of the Ndt, Static and Dynamic Balance, Pre and Post-intervention values. **Paired t test** was used for intragroup analysis.

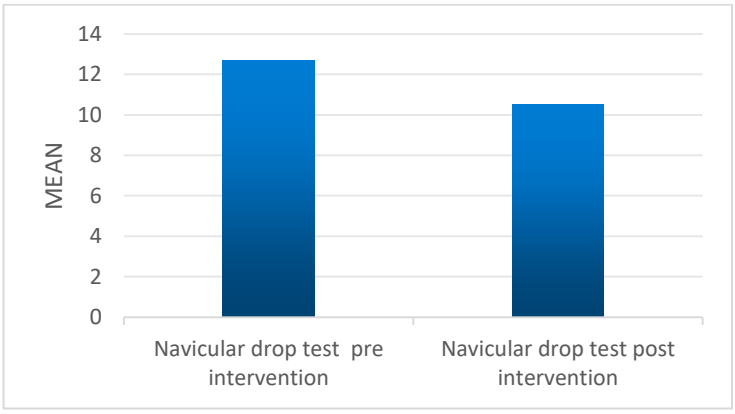
Comparison of pre and post readings of Group A (Short foot+Corrective exercises) for Ndt, Static and Dynamic Balance pre intervention and post intervention revealed a significant difference

(p≤.000) in NDT, (P≤.016) , (p≤.002) Static reading. balance, (p≤.013) Dynamic balance Left Leg 3rd

Comparison of Pre and post reading for Navicular drop test in Group A

	Group A	
	Pre	Post
Mean	12.69	10.53
S.D	±1.37	±.66
P-value	.000	

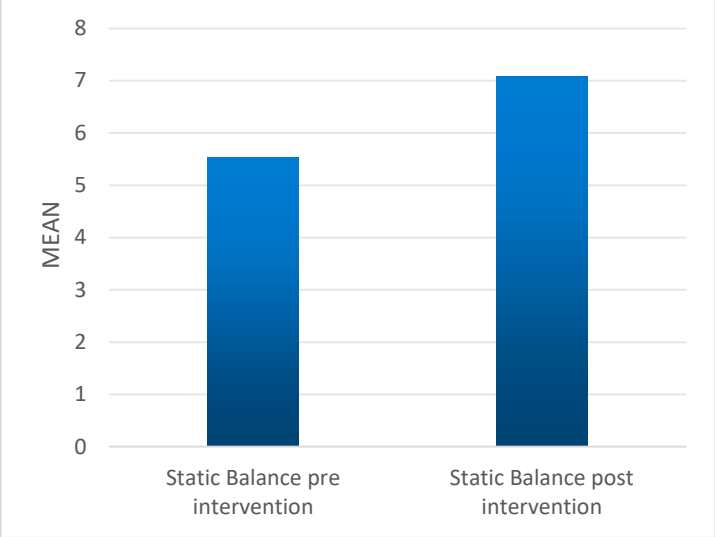
Comparison of Pre and post reading for Navicular drop test in Group A



Comparison of Pre and post reading for Static balance in Group A

	Group A	
	Pre	Post
Mean	5.53	7.07
S.D	±1.66	±1.6
P-value	.002	

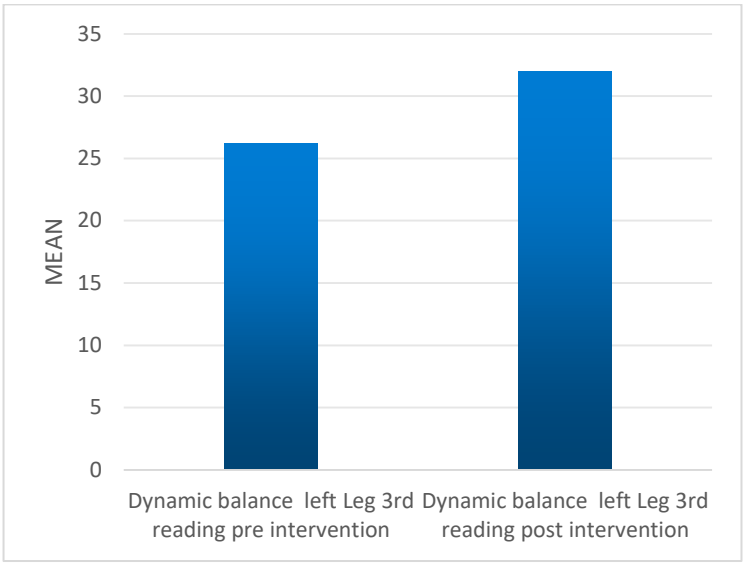
Comparison of Pre and post reading for Static balance in Group A



Comparison of Pre and post reading for Dynamic balance Left Leg 3rd reading (Anterior) in Group A

	Group A	
	Pre	Post
Mean	26.21	31.95
S.D	±12.45	±10.56
P-value	**.013**	

Comparison of Pre and post reading for Dynamic balance Left Leg 3rd reading balance in Group A

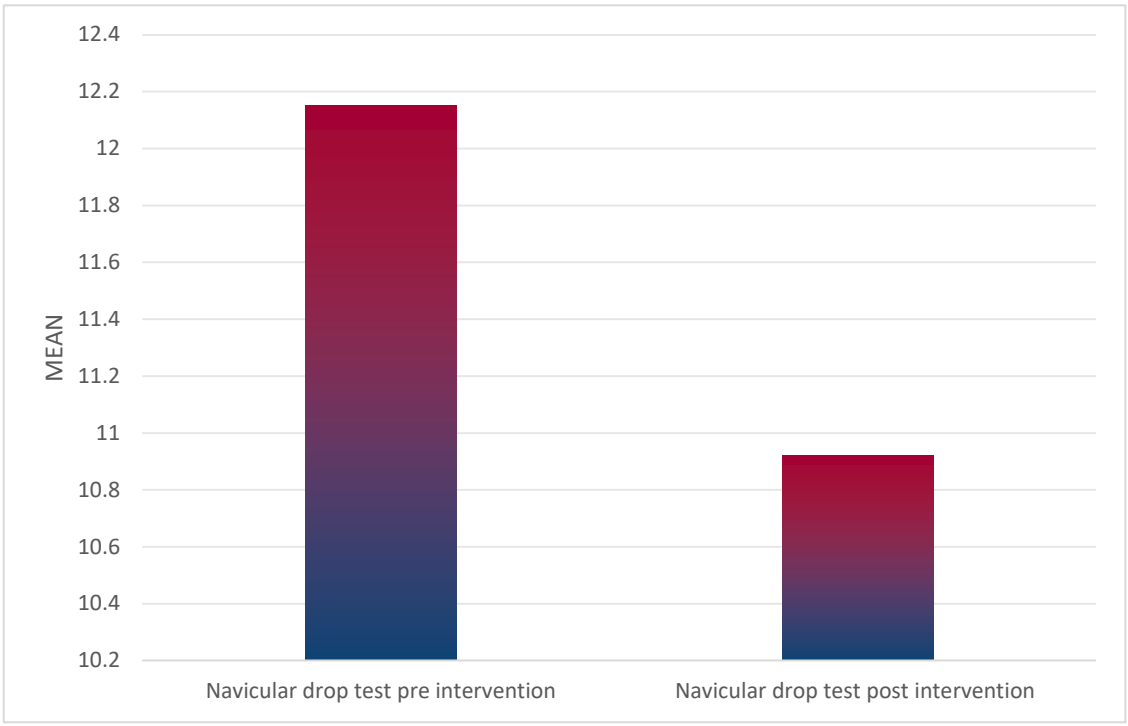


Comparison of pre and post readings of Group B (Corrective exercises) for Ndt, test, Static and Dynamic Balance pre intervention and post intervention revealed a significant difference (p≤.000) in NDT, (p≤.000) Dynamic balance Right Leg 1st reading ,(p≤.000) Dynamic balance Right Leg 2nd reading, (p≤.003) Dynamic balance Right Leg 3rd reading, (p≤.017) Dynamic balance Left Leg 1st reading, (p≤.027) Dynamic balance Left Leg 1st reading

Comparison of Pre and post reading for Navicular drop test in Group B

	Group B	
	Pre	Post
Mean	12.15	10.92
S.D	±1.21	±.86
P-value	**.000**	

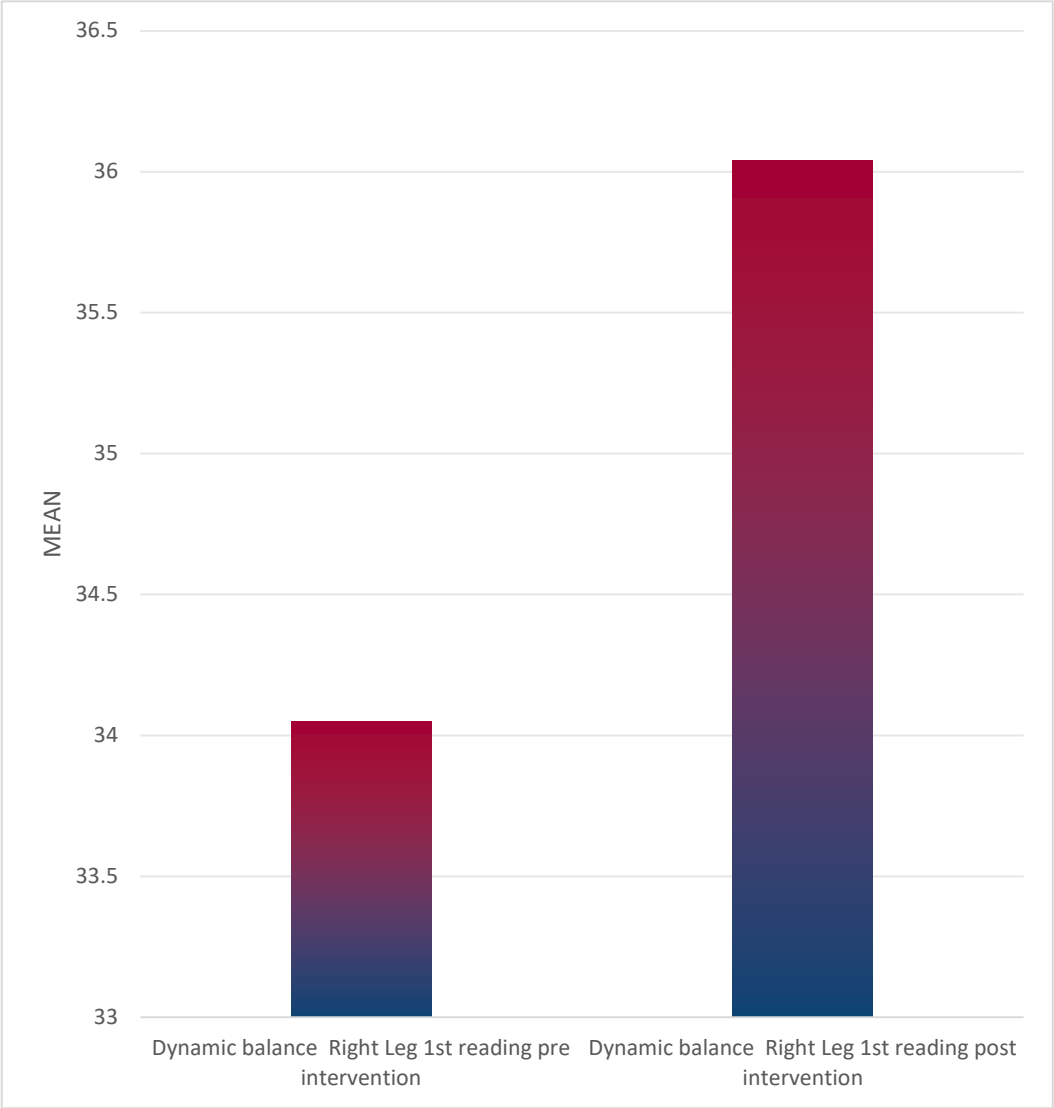
Comparison of Pre and post reading for Navicular drop test in Group B



Comparison of Pre and post reading for Dynamic balance Right Leg 1st reading (Posteromedial) in Group B

	Group B	
	Pre	Post
Mean	34.05	36.04
S.D	±2.76	±2.54
P-value	**.000**	

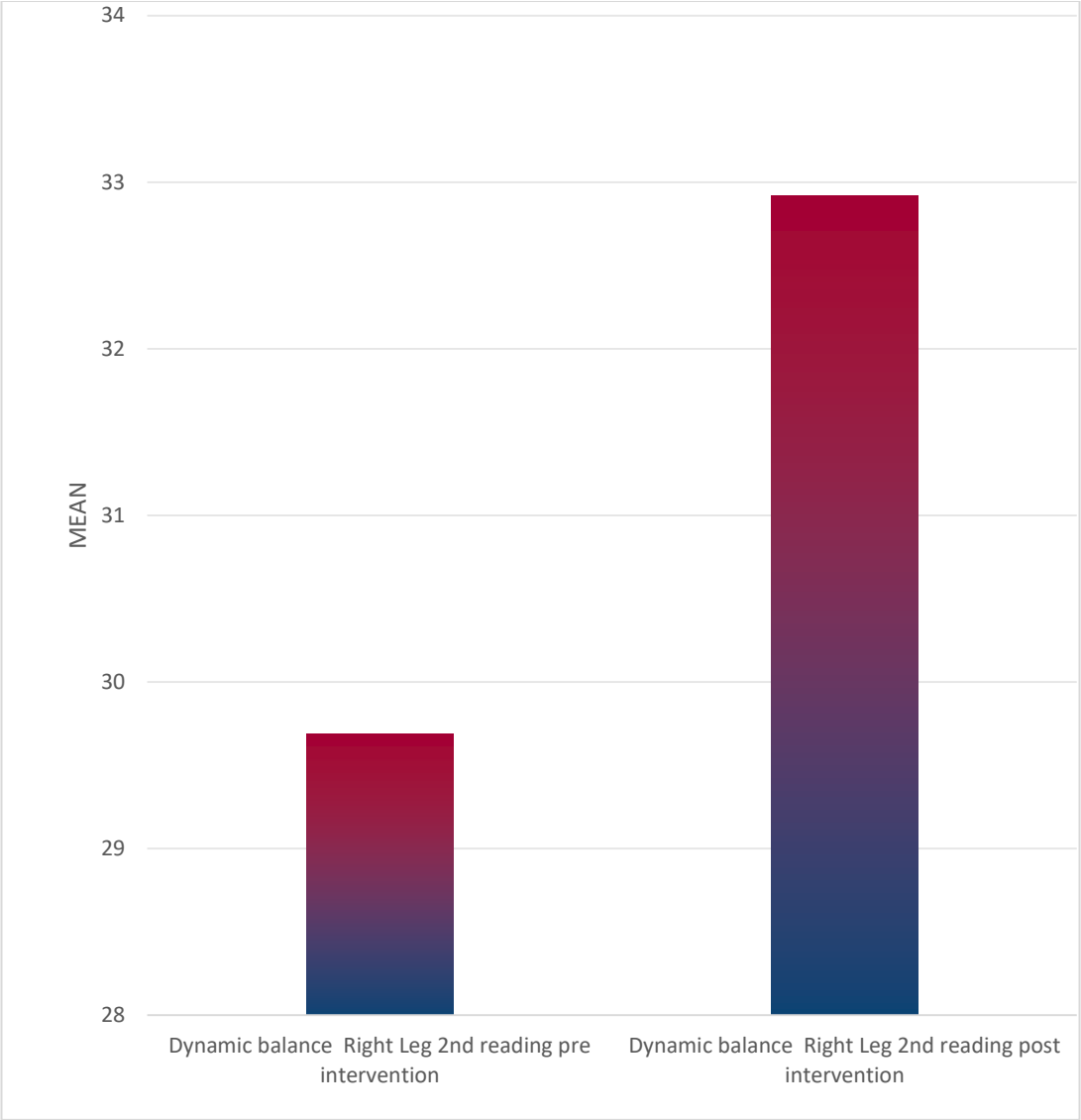
Comparison of Pre and post reading for Dynamic balance Right Leg 1st reading in Group B



Comparison of Pre and post reading for Dynamic balance Right Leg 2nd reading (Posterolateral) in Group B

	Group B	
	Pre	Post
Mean	29.69	32.92
S.D	±3.32	±3.3
P-value	**.000**	

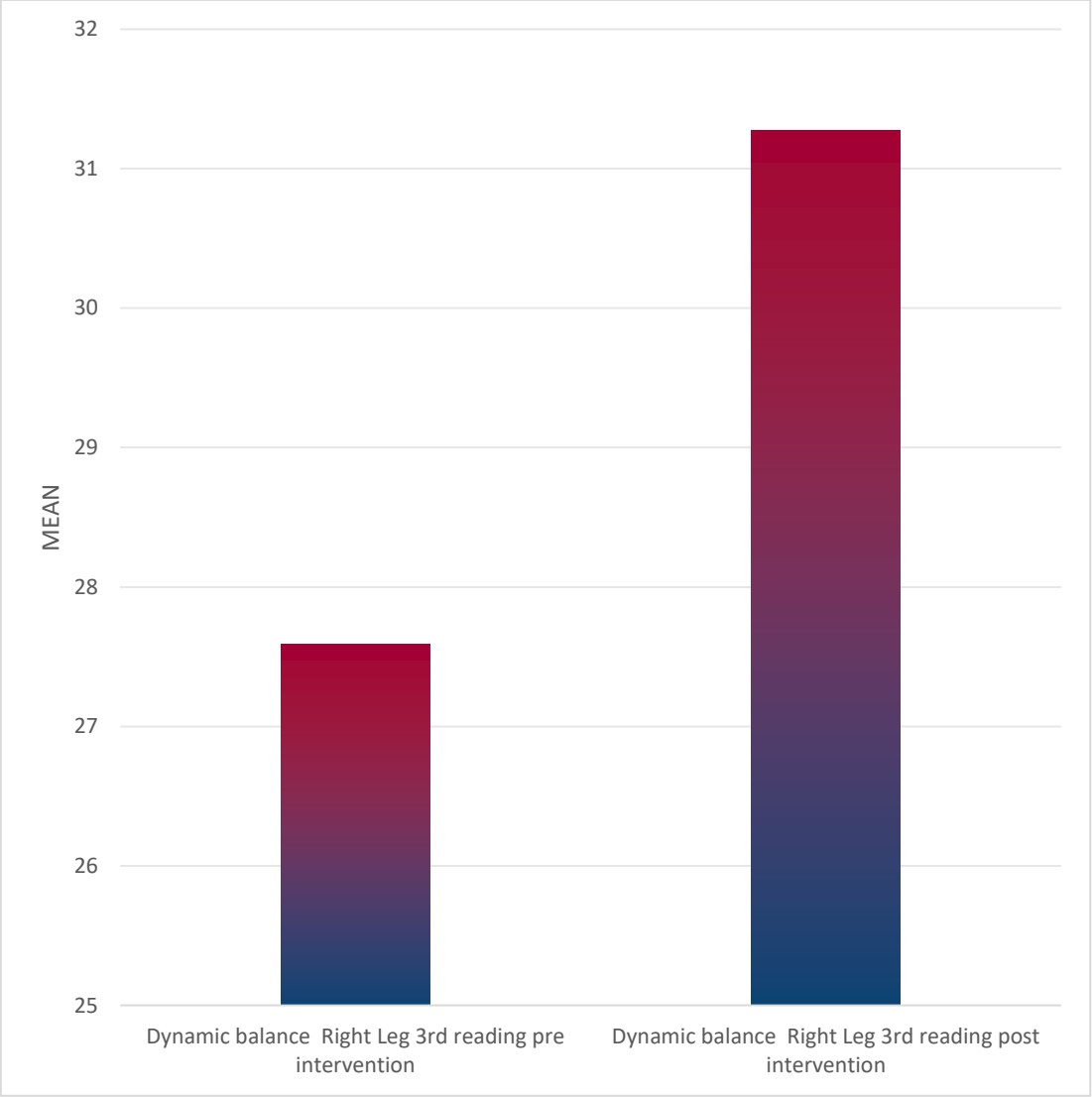
Comparison of Pre and post reading for Dynamic balance Right Leg 2nd reading in Group B



Comparison of Pre and post reading for Dynamic balance Right Leg 3rd reading(Anterior) in Group B

	Group B	
	Pre	Post
Mean	27.59	31.27
S.D	±3.9	±2.31
P-value	**.003**	

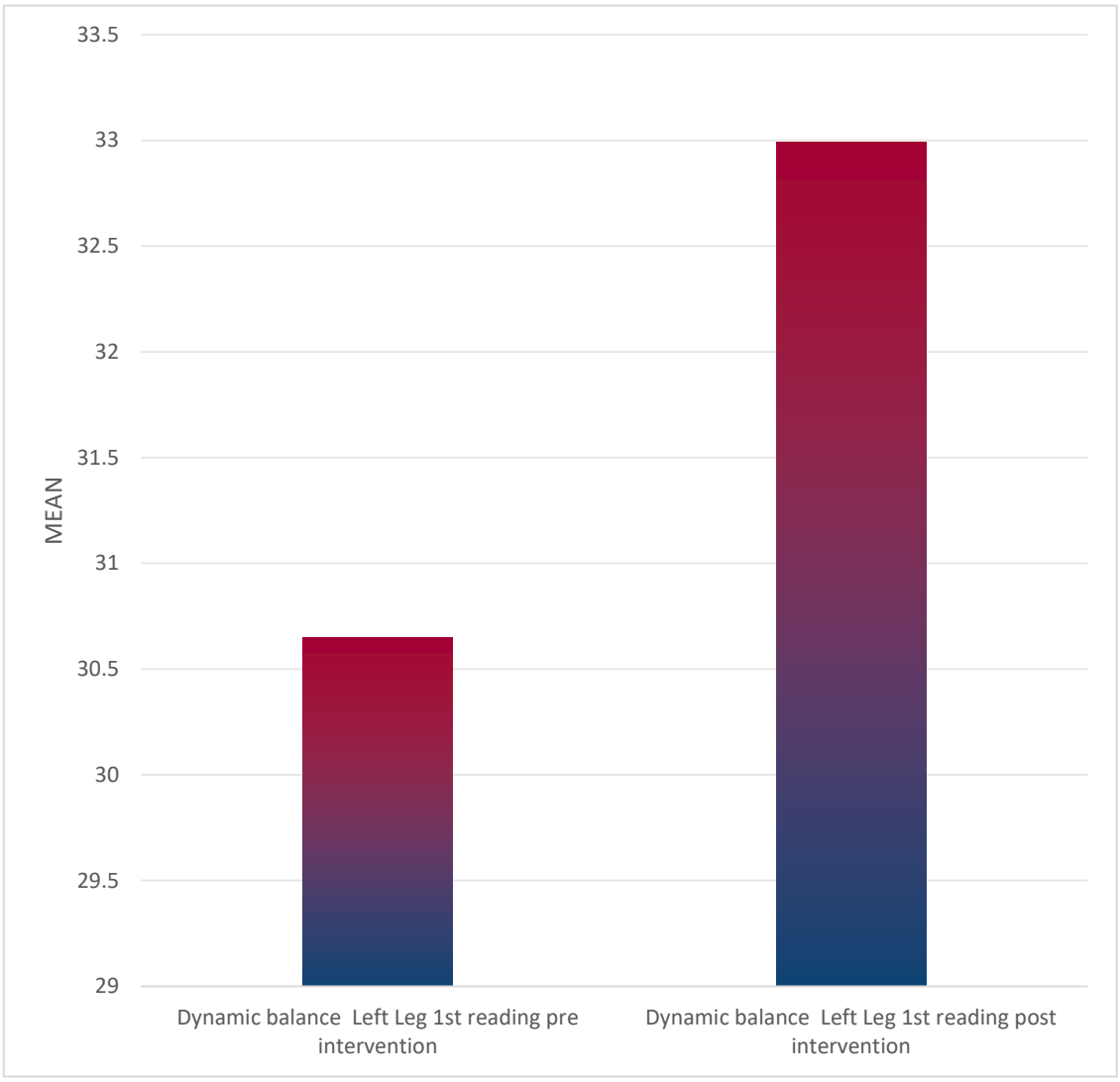
Comparison of Pre and post reading for Dynamic balance Right Leg 3rd reading in Group B



Comparison of Pre and post reading for Dynamic balance Left Leg 1st reading (Posteromedial) in Group B

	Group B	
	Pre	Post
Mean	30.65	32.99
S.D	±4.28	±4.81
P-value	**.017**	

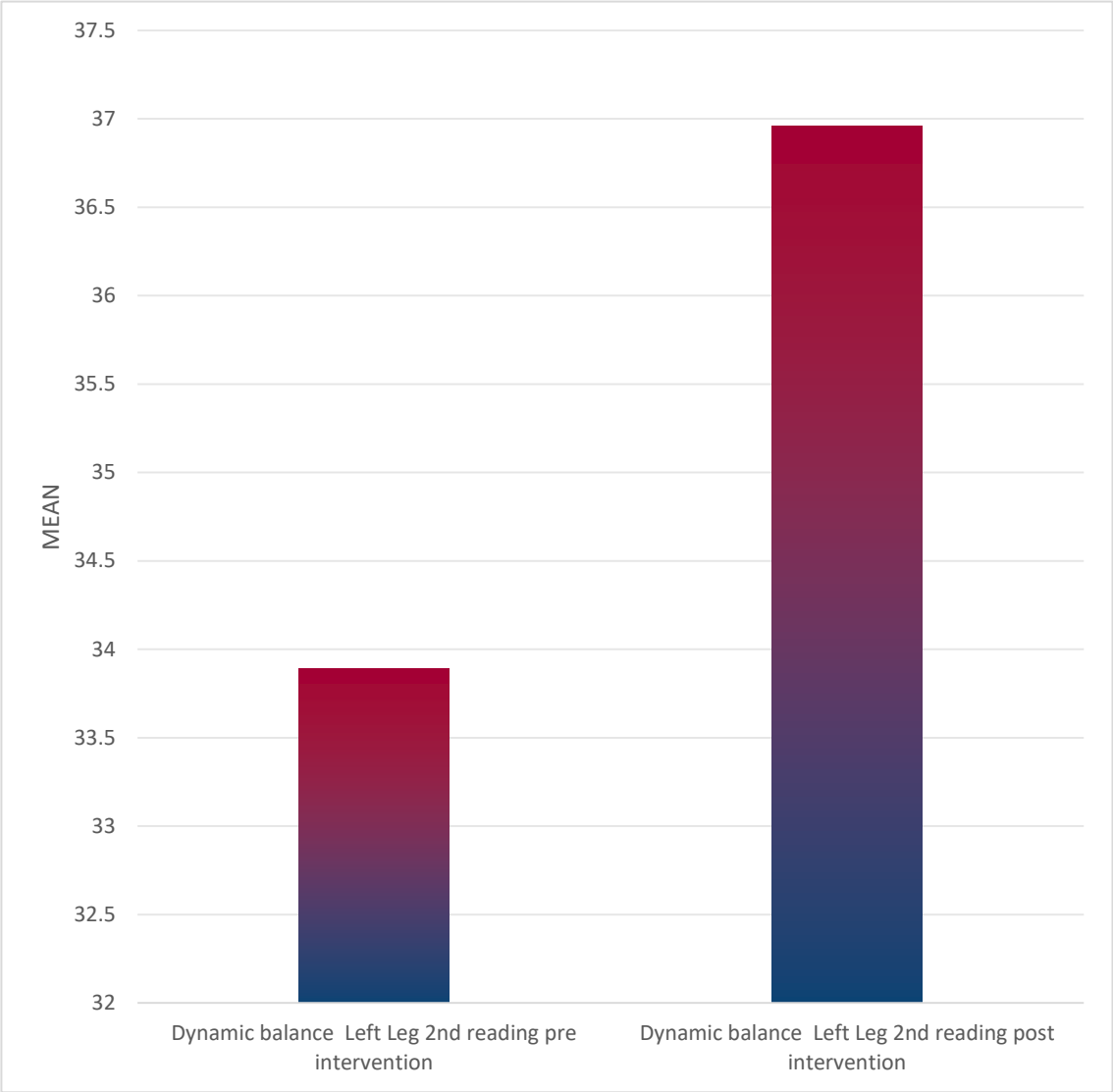
Comparison of Pre and post reading for Dynamic balance Left Leg 1st reading in Group B



Comparison of Pre and post reading for Dynamic balance Left Leg 2nd reading(Posterolateral) in Group B

	Group B	
	Pre	Post
Mean	33.89	36.96
S.D	±3.53	±3.99
P-value	**.027**	

Comparison of Pre and post reading for Dynamic balance Left Leg 2nd reading in Group B



DISCUSSION

The current study identify the effects of short foot exercises, which will improve quality of life and activity of daily living performance, with the goal of improving static and dynamic balance in people with pes planus.The findings of this study underscore the potential of short-foot exercises and corrective exercises in improving balance in individuals with pes planus. By targeting intrinsic foot muscles and addressing muscular imbalances, these exercises may mitigate the biomechanical deficits associated with flat feet, thereby reducing the risk of falls and enhancing overall functional performance.comparing results of Navicular drop test within the **Group A (Shortfoot)** shows significant difference with p-value **0.000**[11]**,** within **Group B (Conventional)** shows significant difference with p-value **0.000**[9] using paired t test,

analysis showed significant difference within group in both groups.When analysing Dynamic Balance **Group A (Shortfoot)** shows a significant difference only in left leg with p-value of **0.01** in Anterior direction, within **Group B (Conventional)** shows significant difference in right leg with p-value **.000** in Posteromedial direction, **0.000** in Posterolateral direction and 0.003 in Anterior direction also shows signification difference in left leg with p-value of **0.01** in Posteromedial direction, **0.02** in Posterolateral direction and shows no significant difference with p-vale of 0.10 in Anterior direction using paired t test, analysis revealed significant difference in Group B.When analysing Static Balance results showed a significant difference in both the groups.

RELEVANCE TO CLINICAL PRACTICE

These exercises are helpful in improving functions of individual by improving static and Dynamic Balance. Also, helpful for individual activities of daily living performance enhancement.

CONCLUSION

This study shows that Shortfoot exercises when combined with corrective exercises could improve Static Balance and reduce Navicular drop height Whereas, Corrective Exercises shows remarkable improvement in terms of Navicular drop height, static as well as in dynamic balance.

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6. ASSOCIATION BETWEEN SCAPULAR POSITION AND FORWARD HEAD POSTURE IN AUTORICKSHAW DRIVERS WITH MECHANICAL NECK PAIN

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ABSTRACT

INTRODUCTION: Nowadays, autorickshaws are an affordable and accessible mode of public transportation. However, drivers often work long hours, leading to poor posture, specifically forward head posture (FHP). This poor posture causes musculoskeletal disorders, resulting in pain and discomfort between the shoulder blades and neck. A large population suffers from FHP, leading to significant neck pain. AIM: To study the association between scapular position and forward head posture in autorickshaw drivers with mechanical neck pain. MATERIALS AND METHODS: This cross-sectional study, conducted from November 2021 to July 2022 among 60 autorickshaw drivers of Delhi, assessed mechanical neck pain using the Numeric Pain Rating Scale (NPRS). Forward head posture (FHP) was evaluated by measuring the craniovertebral angle (CVA) with a variable instrument called a goniometer, and scapular position was assessed using the Lateral Scapular Slide Test (LSST)at different scapular positions. RESULTS: The study found no statistically significant association between scapular position and forward head posture (FHP) in autorickshaw drivers with mechanical neck pain, likely due to the absence of a control group. However, there was a significant moderate correlation between FHP and pain level ($\rho = -0.595$, $p < 0.01$). The Lateral Scapular Slide Test (LSST) score had a high positive correlation with the Numeric Pain Rating Scale (NPRS) category. CONCLUSION: The study concluded that there was no statistically significant association between scapular position and forward head posture in autorickshaw drivers with mechanical neck pain.

KEYWORDS: *Mechanical neck pain, Forward head posture, Scapular position*

INTRODUCTION

In today's time, autorickshaws are relatively affordable and accessible mode of public transportation ensuring connectivity throughout crowded Indian cities. Musculoskeletal system related issues are more common among drivers and many times they experience these issues with their neck, shoulder and lower back. The driving sitting position involves nonneutral spinal postures, such as a decrease in neutral lumbar lordosis and increased or decreased neck flexion. Prolonged sitting and driving might cause spinal vertebral impact due to habitual posture of person in sitting and standing. Mostly used body parts by drivers in driving are the neck and shoulder areas. Scapular orientation is primarily controlled by the muscles that connects the shoulder girdle to the axial skeleton. Poor posture causes the muscles in

this area to overwork and leads to inadequate support resulting in pain between the shoulder blade and neck and also discomfort between scapula. Neck pain is a direct result of increasing cervical spine stress due to increased muscle activity of neck shoulder stabilisers.[1]

Improper cervical spine and scapulae alignment is commonly recognized as a potential cause of pain, discomfort, dysfunction, and limited range of motion. The cervicoscapular muscles (upper trapezius and levator scapulae) connects the scapulae to the cervical spine. Adjusting or altering the tension at the cervicoscapular muscles can affect the biomechanics of either the scapulae or the cervical spine.[2]. Many jobs require individuals to spend the majority of their workday sitting at a desk or computer terminal, or driving a car. These conditions can cause an exacerbated poor or forward head posture, putting strain on certain areas of the musculoskeletal system by increasing flexion of the lower cervical spine and extension of the upper cervical spine.[3]

Drivers who drive for prolong periods of time with poor posture, particularly forward head posture and protracted shoulders, may have an increase in thoracic kyphosis and can cause alteration in scapular position. Drivers who work long hours are more likely to develop poor posture, which can lead to musculoskeletal diseases such as forward head position (FHP).[1].

The anterior positioning of the cervical spine is known as forward head posture, or FHP. Other names for it include wearies neck, text neck, and scholar's neck.[4] Being a clinical disorder, it plays a significant role in several musculoskeletal pain syndromes.[1] It is the structural forward orientation of the head away from the body's center line, in which the lower cervical vertebrae bent and the upper cervical vertebrae extended, increasing the weight of the head supported by the neck [5].

Mechanical neck pain is also known as nonspecific neck pain. It can be defined as pain that is increased by activity, relieved by rest, and not associated with substantial underlying pathology [6]. Individuals with neck pain who do not have a clear pathoanatomic cause for their symptoms are typically diagnosed with mechanical neck pain. It usually begins gradually and is caused by a combination of factors, such as poor posture/muscle imbalance (FHP), anxiety, depression, neck strain, and sporting or occupational activity [7] The Craniovertebral angle, which is measured from C7 spinous process to the tragus of the ear is used to determine forward head posture.[8] It is common and it affects the people of all age groups, mean age group in males is 22-24years and normal craniovertebral angle in them is about 48.8 degrees, mean age group in females is 22-66years and normal craniovertebral angle in them is about 47.6 degrees. Normal craniovertebral angle is 49.9 degrees. Smaller the craniovertebral angle, more is the forward head posture [4] The Scapula, also known as the shoulder blade, is positioned approximately 2 inches from the midline in the posterior thorax, between the second and seventh ribs. The scapula rotates internally from vertical and upwardly by 10-20 degrees from vertical. The orientation of the scapula is critical for muscle balance. There is a substantial association between the contractile capacities of the muscles in the shoulder area and the position of the scapula; shoulder protraction developed owing to poor

posture, which created a challenge for muscular function [6] The present study aims to specifically investigate the Association between scapular position and forward head posture in autorickshaw drivers with mechanical neck pain.

MATERIALS AND METHODS

This cross-sectional study was conducted from November 2021 to July 2022 among 60 autorickshaw drivers of Delhi. Ethical clearance was obtained after approval from Departmental Research Committee (DRC) of School of Physiotherapy, Delhi Pharmaceutical Sciences and Research University (DPSRU), Government of NCT of DELHI. Duly filled consent form was obtained from all subjects prior to data collection.

INCLUSION CRITERIA

Subjects(Autorikshaw Drivers) of Age group between 25-40 years, working hours of 8 or more than 8 hours a day and 3 or more years of driving experience were included in the study.

EXCLUSION CRITERIA

Subjects (Autorickshaw Drivers) who were having documented diagnosis of scoliosis, known congenital defect of the spine (e.g., Klippel-Feil, Scheuermann's disease), respiratory disorders like asthma, congenital defect of the scapula (e.g., Sprengel's deformity), history of trauma or surgery of the rib cage, spine, or shoulder girdle, scapular winging or subjectively excessive posterior protrusion of either superior or inferior angles of the scapulae, history of whiplash injury, cervical spine injury, and cervical fracture and fracture/dislocation/subluxation or spine deformity were excluded from the study.

SAMPLE SIZE

60 Subjects were selected according to the inclusion and exclusion criteria by convenience sampling.

PROCEDURE

Assessment of mechanical neck pain, scapular position and forward head posture was done.

1.Mechanical neck pain was assessed by using Numeric Pain Rating Scale (NPRS) and pain level was further categorized into mild, moderate and severe categories.

2.Forward Head Posture was assessed by measuring the Craniovertebral angle (CVAM, where M=Mean) by using modified goniometer.

3. Scapular position was assessed by using Lateral Scapular Slide Test-LSST SCORE (Kibler Method)at different positions of scapula(At rest,45 degrees glenohumeral abduction and 90 degrees glenohumeral abduction along with internal rotation).

MECHANICAL NECK PAIN

Subjects were seated and asked about the severity of mechanical neck pain they experienced while sitting and driving for extended periods of time. The severity level of mechanical neck pain was evaluated using the Numeric Pain Rating Scale (NPRS). An NPRS was explained to the subjects as an 11-point scale with scores ranging from 0 to 10 and anchors of 0 = no pain and 10 = the worst possible pain [9] Mechanical neck pain was further classified into mild, moderate, and severe categories according to their NPRS scores. NRS ratings < 5 indicate mild pain, 6-7 indicate moderate pain, while ≥8 indicate severe pain affecting function [10]

FORWARD HEAD POSTURE

Subjects were seated straight and instructed to look straight ahead. The forward head posture of the subjects was evaluated by measuring the craniovertebral angle (CVA) which is the angle measured from C7 spinous process to the tragus of the ear. [8]. The craniovertebral angle was measured by using a variable instrument called a goniometer. The craniovertebral angle was measured with a subject in a sitting position. The axis of the goniometer was positioned at the C7 spinous process with stable arm placed horizontally at C7 level and movable arm at the tragus of the ear and the resulting angle was measured.[11] The craniovertebral angle was measured 3 times and the mean average (CVAM=Craniovertebral angle mean) was determined and utilized for data analysis.

MEASUREMENT OF CRANIOVERTEBRAL ANGLE BY USING A VARIABLE INSTRUMENT CALLED A GONIOMETER

SCAPULAR POSITION

Scapular position was assessed using the Lateral Scapular Slide Test-LSST SCORE (Kibler Method) at various scapular positions. Scapular position measurements were performed with the person standing in a normal, relaxed posture. Measurements were taken from three different positions:

1. First position is rest.
2. Second position: hands on hips.
3. The third position is 90 degrees of glenohumeral abduction and internal rotation.

Participants were required to stand in a relaxed position for the LSST's test position 1 assessment. The assessor checked the test position before palpating and marking the inferior aspect of the inferior angle of the scapula as well as the nearest spinous process in the same horizontal plane. The distance between the two reference locations was measured bilaterally using a centimeter-long measuring inchtape. The technique was repeated for test positions 2 and3. The participants were required to place both hands at the hip joint for test position 2 while maintaining the shoulder joint in medial rotation at 45° of abduction in the coronal plane. For measuring test position 3, participants were required to extend both elbows and maintain and maintained glenohumeral joint in 90degrees abduction along with maximal internal rotation (“thumbs down”) maintaining both upper extremities to 90° in the coronal plane. Examiner measured scapular distance bilaterally to assess the value of difference in side-to-side measurements. All scapular distance measurements were taken 3 times and the mean average was calculated and utilized for data analysis. The value of the difference between sides calculated by subtracting the value for the dominant side from the value for the nondominant side, and the further absolute value of this

difference was used for data analysis.[1] According to LSST, A difference obtained as 1.5 cm or more in any of the 3 positions was considered as altered scapula position and a positive result of the LSST.[12]

FIRST POSITION

SECOND POSITION

THIRD POSITION

STATISTICAL ANALYSIS

The data was analysed using descriptive test in terms of mean and standard deviation. Data was summarized as Mean ± SD. The outcome measures (Scapular position, forward head posture and mechanical neck pain) of subjects were evaluated by using Spearman rank correlation. Analysis was performed using Statistical Package for the Social Sciences-SPSS Statistics (version 24) software. The p-value <0.05 was considered as statistically significant.

RESULTS

A total of sixty (60) autorickshaw drivers were assessed for their scapular position, forward head posture and mechanical neck pain. Results shows that there was no statistically significant association between scapular position and forward head posture in autorickshaw drivers with mechanical neck pain, likely due to the absence of a control group.

However, there was a highly significant moderate correlation between Forward head posture and pain level experienced by them (ρ = -0.595, $p < 0.01$). The Lateral Scapular Slide Test (LSST) score had a high positive correlation (highly significant p value lesser than 0.01) with the Numeric Pain Rating Scale (NPRS) category (ρ=0.894). NPRS category score showed negative correlation with the CVAM with the spearman rank correlation coefficient ρ =-0.609 and p value lesser than 0.01. NPRS category showed no significant correlation with hours of daily driving. p value=0.734 and $\rho=0.045$. The trend has been seen that increased forward head posture leads to decreased craniovertebral angle and increased mechanical neck pain.72 percent autorickshaw drivers included in the study had more than 3 years of driving experience and 28 percent had 3 years of driving experience.55 percent of autorickshaw drivers demonstrated altered scapular position (LSST test positive) and 45 percent demonstrated unaltered scapular position (LSST test negative).100 percent of all the autorickshaw drivers demonstrated mechanical neck pain (of different degrees) but all had forward head posture.

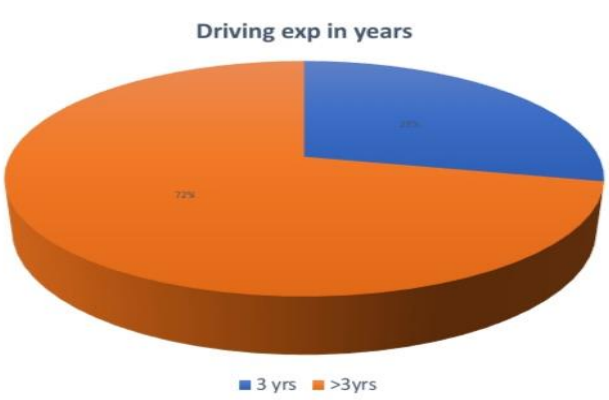
Correlations

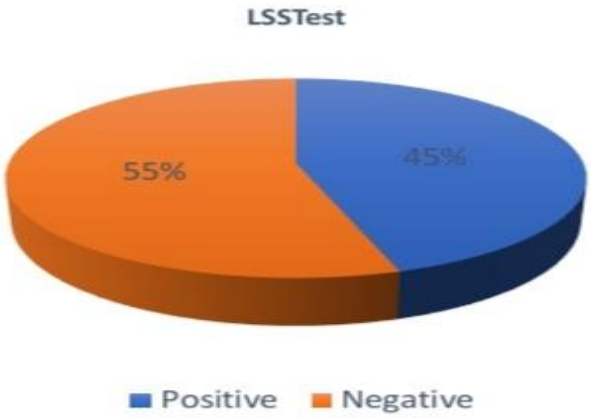
			LSSTestScore	CVAM
Spearman's rho	NPRScat	Correlation Coefficient	.894**	-.609**
		Sig. (2-tailed)	0.000	0.000
		N	60	60
	CVAM	Correlation Coefficient	-.609**	1.000
		Sig. (2-tailed)	0.000	
		N	60	60

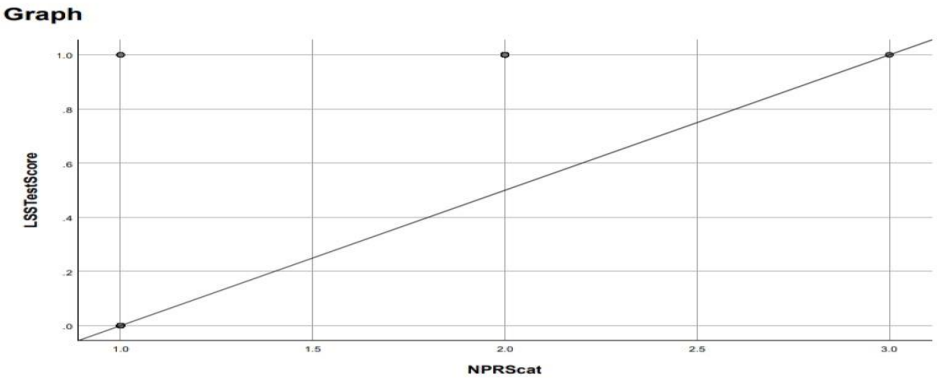
**. Correlation is significant at the 0.01 level (2-tailed).

NPRS score category and CVA mean

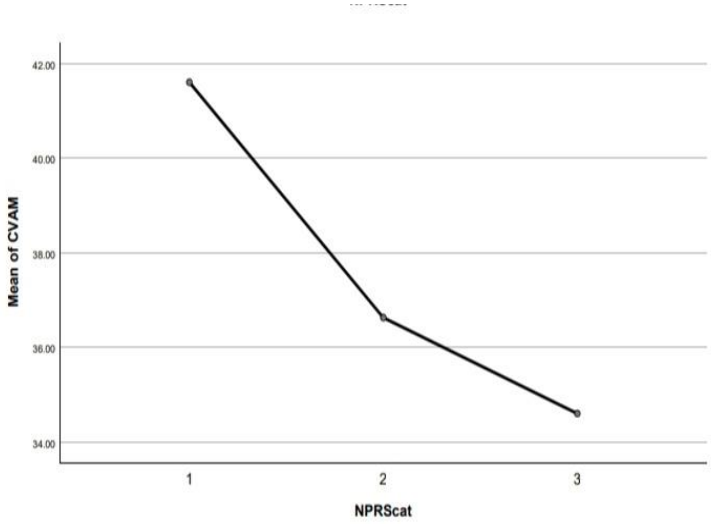
NPRS score	N (No of subjects)	CVA MEAN	SD
1	36	41.61	3.26
2	22	36.63	3.82
3	2	34.60	0.00



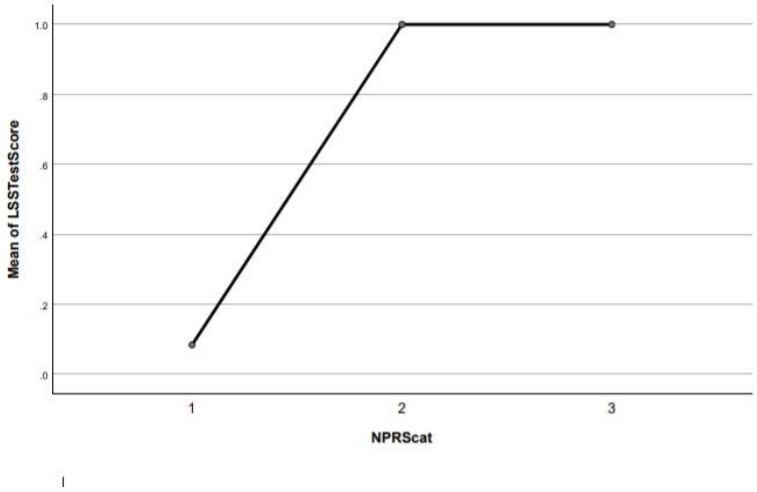




LSST score showed high positive correlation (highly significant p value lesser than 0.01) with the NPRS category score. Spearman rank correlation coefficient was found to be ρ=0.894



NPRS category score showed negative correlation with the CVAM with the spearman rank correlation coefficient ρ =-0.609 and p value lesser than 0.01.



The Lateral Scapular Slide Test (LSST) score had a high positive correlation (highly significant p value lesser than 0.01) with the Numeric Pain Rating Scale (NPRS) category (ρ=0.894).

DISCUSSION

The present research was conducted to study the association between scapular position and forward head posture in autorickshaw drivers with mechanical neck pain. A total of 60 Autorickshaw drivers were recruited in the research on the basis of the inclusion and exclusion criteria. In present study, authors have assessed the scapular position, forward head posture and mechanical neck pain. After observations from present study.it can be said that there was a highly significant moderate correlation between Forward head posture and pain level experienced by them (ρ = -0.595, p < 0.01). The Lateral Scapular Slide Test (LSST) score had a high positive correlation (highly significant p value lesser than 0.01) with the Numeric Pain Rating Scale (NPRS) category (ρ=0.894). NPRS category score showed negative correlation with the CVAM with the spearman rank correlation coefficient ρ =-0.609 and p value lesser than 0.01. NPRS category showed no significant correlation with hours of daily driving. p value=0.734 and ρ=*0.045*. The trend has been seen that increased forward head posture leads to decreased craniovertebral angle and increased mechanical neck pain. This study showed that there was no statistically significant association between scapular position and forward head posture in autorickshaw drivers with mechanical neck pain, likely due to the absence of a control group. Present research exhibits that all the subjects were autorickshaw drivers and population of age group between 25-40 years.

The previous studies done by Krishna et al., 2021 revealed that there was statistically significant difference of scapular alignment in autorickshaw drivers with neck pain was noted($p<0.05$) and concluded that scapular alignment is altered in autorickshaw drivers with neck pain as compared to those with no neck pain.[1]

Another study done by Dr.Pradnya Mahajan et al 2022 found that there exists a significant moderate

negative correlation between scapular position and head posture and there is no correlation between scapular position and neck pain. However, others studies have concluded that there was significant relationship between mechanical neck pain and scapular position Priya S, Padmanabhan et al.

The previous studies done by Dr.Edrish Saifee et al. concluded that there exists a moderate to good negative correlation between CV angle and neck pain. However, other studies (2022) Jyoti Dahiya, Savita Ravindra found that there exist significant observable changes in scapula protraction as well as scapula upward rotation among computer professionals having neck pain as compared to those who were not having neck pain.

Another study done by (Shinde & Shah, 2022) found that there exists a weak correlation of Craniovertebral Angle with Neck Pain in Undergraduate students.

The previous studies done by (Yip, Chiu & Poon, 2008) found that Craniovertebral angle in subjects with neck pain is significantly smaller than that in normal subjects and there is moderate negative correlation between CV angle and neck disability.

The other studies done by (2022) Jyoti Kataria et al found that scapular position is altered which includes altered scapular protraction and upward rotation in primary school teachers who are suffering from neck pain in all 3 positions of LSST and in scapular upward rotation.

LIMITATIONS

In the present study, there was absence of control group and autorickshaw drivers were taken from DELHI NCR only.

CONCLUSION(S)

The present study concluded that there was no statistically significant association between scapular position and forward head posture in autorickshaw drivers with mechanical neck pain, likely due to the absence of a control group. Thus, the Null hypothesis is accepted.

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7. ROLE OF PHYSIOTHERAPY IN FUNCTIONAL MOVEMENT DISORDERS: A REVIEW

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ABSTRACT

Functional Movement Disorders (FMD) are characterized by an array of motor and sensory symptoms due to disruptions in voluntary and somatic nervous systems. As a subset of Functional Neurological Disorders (FND), FMD contributes to considerable disability and economic burden. These disorders manifest with symptoms that improve with distraction but exacerbate with focused attention, reflecting potential underlying executive dysfunctions. The prevalence of FMD is notable globally, with diverse clinical presentations confirmed through comprehensive neurological evaluations. Neuroimaging studies in FMD patients reveal significant abnormalities in motor-limbic interfaces and sensorimotor integration, accompanied by heightened self-directed attention and maladaptive conditioning mechanisms. Effective management of FMD necessitates a multidisciplinary approach encompassing physiotherapy, cognitive-behavioural therapy, and motor retraining. Physiotherapy is pivotal in this context, focusing on patient education, movement normalization, and reducing cognitive distractions through task-oriented exercises and biofeedback techniques. This review synthesizes evidence-based physiotherapy management strategies for FMD, derived from a comprehensive literature search using databases such as Google Scholar and PubMed. Findings underscore the efficacy of education-based physical therapy programs, multidisciplinary cognitive-behavioural therapy, and movement retraining interventions. Neuroimaging plays a critical role in the diagnostic process, elucidating structural and functional abnormalities within the central nervous system (CNS) associated with FMD. Although various treatment modalities have demonstrated improvements in functional abilities, mood, somatic symptoms, and quality of life, limitations persist. These include the need for detailed follow-up protocols, clarity regarding the number and duration of therapy sessions, and the effectiveness of telerehabilitation. Future research is essential to refine treatment strategies and optimize dosimetry tailored to individual patient needs.

Keywords: *Rehabilitation, Physiotherapy, Movement Disorders*

Introduction:

Functional Movement Disorder (FMD) is a condition affecting the voluntary and somatic nervous systems, presenting symptoms such as paralysis, tremors, dystonia, sensory alterations, speech disturbances, and seizures. These disorders fall under the broader category of Functional Neurological Disorders (FND), characterized by motor symptoms resulting from functional abnormalities within the nervous system, rather than structural issues (1,2).

FMD often leads to significant disability and poor prognosis, contributing to a considerable economic burden. Symptoms of FMD typically improve with distraction and worsen with focused attention. This suggests an underlying executive dysfunction in controlling attention during conflicting tasks . Patients with FMD tend to avoid negative emotions, particularly sadness, and exhibit impaired impulse control and global action inhibition (3-7).

Annually, the UK sees around 8000 new cases of

FMD, which is the most prevalent cause of neurological disability with an incidence rate of 4-12 cases per 100,000 individuals globally. The clinical presentation of FMD includes sudden onset of symptoms that can diminish with distraction and worsen with attention or fatigue. Diagnosis is based on neurological examinations revealing inconsistent motor function across tasks (8-10).

FMD syndromes extend beyond abnormal movements to chronic pain, fatigue, and other functional symptoms. Imaging studies have identified abnormal motor-limbic interfaces, sensorimotor disintegration, heightened self-directed attention, maladaptive conditioning, and neuroendocrine changes. Patients with FMD show a lack of Contingent Negative Variation (CNV), a cortical wave associated with motor preparation and anticipatory attention (11-14).

Disorders like Huntington's and Parkinson's are linked to basal ganglia dysfunction, crucial for controlling motor skills and daily activities. Risk factors for developing FMD include childhood trauma, alexithymia, older age, female gender, particularly those who have experienced sexual abuse, and depression. Functional MRI studies reveal increased activation in regions like the post-central gyrus and precuneus when patients view negative images. Diffusion Tensor Imaging (DTI) has shown white matter changes associated with emotional regulation and motor control in FMD patients (15-19).

Treatment for FMD includes various strategies such as movement retraining, cognitive-behavioral therapy (CBT), and physical therapy interventions. A multidisciplinary approach involving physiotherapists, occupational therapists, neuropsychologists, neurologists, speech and language therapists, and nursing staff has proven effective in improving functional abilities, mood, somatic symptoms, and overall quality of life. Outpatient multidisciplinary team-based therapy has shown sustained improvements in health and social functioning (20-23).

Utilizing a biopsychosocial framework, treatment aims to address abnormal habitual patterns, self-directed attention, and motor retraining, significantly reducing functional tremors and enhancing connectivity between motor regions and the amygdala. This indicates preliminary evidence of reorganization in motor and emotional pathways. Physiotherapy is essential in managing FMD, educating patients about their diagnosis and symptoms, normalizing movements in daily life, and reducing cognitive distractions (24-27).

Task-oriented exercises, biofeedback strategies, gradually increasing task difficulty, mirror training, videos, EMG, and self-management workbooks contribute to treatment progress. Outcome measures like the Psychogenic Movement Disorder Rating Scale and the Simplified Functional Movement Disorder Rating Scale help analyze motor symptoms, health status, cognitive and emotional states, and overall quality of life (28-30).

Aim:

This review aims to analyze evidence-based physiotherapy management for Functional

Movement Disorders.

Methodology:

This review utilized Google Scholar and PubMed search engines, employing terms like "functional movement disorders," "movement disorders," "physiotherapy for functional movement disorders," and "rehabilitation for movement disorders" to gather relevant articles.

Result & Discussion:

The specialized education-based physical therapy program included movement retraining, a self-management plan using a workbook, multidisciplinary cognitive-behavioural therapy, motor strategies to reduce tremors, and low to moderate-intensity walking progressions.

Neuroimaging has been crucial in diagnosing and analyzing FMD, revealing structural and functional abnormalities in the CNS, such as hypoactivation of motor symptoms and increased limbic system modulation, leading to impaired motor movement and emotional regulation(19). Functional MRI studies show increased activation in specific brain regions when patients view negative images. DTI reveals microstructural differences in limbic tracts associated with emotional regulation and motor control (31-33).

Various treatment strategies, including movement retraining, cognitive-behavioural therapy, and physical therapy, have been employed for FMD (20,21). A multidisciplinary approach improves functional abilities, mood, somatic symptoms, and quality of life. The biopsychosocial framework aims to reduce abnormal habitual patterns, enhance self-directed attention, and reorganize motor and emotional pathways. Physiotherapy plays a significant role in managing FMD by educating patients, normalizing movements, and reducing cognitive distractions (22-26). Task-oriented exercises, biofeedback, and self-management techniques contribute to treatment progress (28-30). Outcome measures help analyze the efficacy of treatments and overall quality of life. Recent advancements in telerehabilitation show promise but require further study to determine their effectiveness in a multidisciplinary context (34).

Limitations:

The follow-up plan for studying symptoms was not detailed. A limited number of studies were included. The number and duration of sessions were unclear. The efficacy of telerehabilitation remains uncertain.

Conclusion:

Physical therapy improves motor symptoms, daily activities, cognitive and emotional status, health, and quality of life for patients with FMD. Further studies are needed to determine the optimal treatment strategies and dosimetry for individual patients.

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8. REVIEW OF LITERATURE ON THE PREVALENCE AND PREVENTION OF MUSCULOSKELETAL DISORDERS AND POSTURAL ANOMALIES AMONG COMPUTER USERS

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ABSTRACT

This literature review aims to synthesize research findings on the prevalence of musculoskeletal disorders and postural anomalies among computer users. The review encompasses studies examining the occurrence of specific musculoskeletal issues such as neck pain, upper cross syndrome, and low back pain, as well as the impact of ergonomic interventions and training on mitigating these problems. Key findings indicate a high prevalence of musculoskeletal discomfort among computer users, with sore neck and shoulders, sore eyes, painful wrists and fingers, and forward head posture being common. Ergonomic principles and interventions, including ergonomic training, sit-stand desks, and individualized exercise programs, are shown to be effective in reducing these issues. The review highlights the importance of addressing ergonomic factors and promoting proper posture to prevent musculoskeletal disorders in computer users.

Keywords: *Musculoskeletal Disorders, Postural Anomalies, and Computer Users.*

Introduction

The rapid advancement of information technology has led to the widespread use of computers in various domains, including education, professional work, and daily activities. While computers have significantly enhanced productivity and accessibility, their prolonged use has been associated with a range of musculoskeletal disorders and postural anomalies.

Computer professionals often spend long hours in sedentary positions, frequently adopting poor posture at their desks. This prolonged static posture, combined with repetitive movements and inadequate ergonomic setups, can lead to musculoskeletal disorders.

Investigating cervical problems in computer professionals contributes to the broader field of occupational health, providing insights into the specific challenges faced by this population.

This literature review aims to investigate the prevalence of these issues among computer users and explore effective preventive measures. By examining a variety of studies, this review provides a comprehensive understanding of the common musculoskeletal problems and the role of ergonomic interventions in mitigating these risks.

This research can inform policies and guidelines to improve workplace ergonomics and well-being across the industry. Therefore, this study aims to fill the research gap by investigating the existing literatureavailable on the prevalence and Prevention of Musculoskeletal Disorders and Postural Anomalies Among Computer Users

By determining the extent of these conditions in this specific population, valuable insights can be gained to develop preventive measures, interventions, and ergonomic recommendations, ultimately enhancing the productivity and quality of life of computer professionals.

Importance of this review:

The proposed research work on the prevalence and prevention of Musculoskeletal Disorders and Postural Anomalies Among Computer Usersis important for several reasons:

Occupational Health Concern: With the increasing use of computers and prolonged sitting in the workplace, computer professionals are at a higher risk of developing cervical problems. This research sheds light on the prevalence and prevention of these conditions among this specific population, highlighting the importance of addressing occupational health concerns.

Public Health Impact: Cervical problems can lead to various musculoskeletal issues, including neck pain, headaches, and reduced quality of life. By studying the prevalence and prevention this research work can contribute to public health efforts in improving the well-being of computer professionals.

Prevention and Early Intervention: Understanding the prevalence and prevention of cervical problems in computer professionals can help identify the need for early prevention and intervention strategies.

Ergonomics and Workstation Modifications: The research can also explore the impact of ergonomics and workstation modifications on preventing and managing cervical problems in computer professionals. This can include evaluating the effectiveness of ergonomic interventions, such as proper chair and desk setup, monitor placement, and posture correction exercises.

Occupational Guidelines and Policies: The findings of this research work can contribute to developing occupational guidelines and policies focused on preventing and managing cervical problems in computer professionals. These guidelines can help employers and employees create a healthier and safer work environment.

Objective of study

The primary objective of this study is to study the prevalence and prevention of musculoskeletal disorders and postural anomalies among computer professionals.

Methods:

This review synthesizes findings from multiple studies on musculoskeletal disorders and postural anomalies among computer users. The studies included in this review were selected based on their focus on the prevalence, risk factors, and prevention of musculoskeletal issues in individuals using computers. The review includes both qualitative and quantitative research, encompassing diverse populations and settings. Key themes and patterns were identified and summarized to provide a holistic view of the current state of knowledge in this area.

Review of literature

The purpose of the study conducted by **Fathi A. (2016)** was to ascertain the prevalence rate of musculoskeletal injuries as well as postural abnormalities and disorders among people who use computers. According to the findings of the research, people who use computers often

experience discomfort in their neck and shoulders, as well as in their eyes, wrists, and fingers. It was discovered that the most common and fundamental postural issues among college students include a forward head posture, a drooping shoulder (that of the user's dominant hand), and knees that are bent or legs that are formed like an X. One of the most important risk factors that was discovered was inactivity, which was brought on by excessive labour and a failure to pay attention to ergonomic principles when working.

Fatima A., et. al. (2022) aimed to find the prevalence of upper cross syndrome and postural deviations in computer operators. A qualitative cross sectional study was conducted in Lahore and data was collected from various computer professionals in the age range of 25 to 50 years. The study findings revealed that upper cross syndrome was moderately prevalent in 67.7% computer users and postural deviations were mildly present in only 26.28% computer users.

An investigation of the frequency of neck discomfort among those who work in the computer industry was carried out by Bhalala S.H. (2019). The research was carried out in the city of Surat with one hundred knowledgeable computer specialists. The results of the research came to the conclusion that 55% of persons in the age range of 20 to 50 years old have neck discomfort that is mild to moderate in intensity.

McAviney J., Schulz D., Bock R., Harrison D. E., and Holland B. (2005) conducted research to determine whether or not there is a connection between cervical lordosis and neck symptoms. A thorough examination of the data revealed that patients with a lordosis of 208 or lower were much more likely to exhibit symptoms related to cervicogenic pain (P <.001). The statistical significance of the link between cervical discomfort and lordosis of 8 or less was well established (P <.0001). The research came to the conclusion that there is a statistically significant link between cervical discomfort and lordosis that is less than 200, and that the range of cervical lordosis that is considered clinically normal is between 310 and 400.

Hypolordosis (LHL) is a consequence of changes in demographics, as stated by **David Kaps and Hannah L. Siebers (2023)**, among others. The practice of exercise therapy is an efficient method that has the potential to lessen the associated expenses and difficulties. It is necessary to have an individualized exercise program that matches the severity of the disease tomaximize the likelihood of effective treatment. Nevertheless, there are not many categorization methods that are adequately suited. This study aimed to create and assess a severity classification that would be centered on exercise treatment for individuals diagnosed with THK or LHL. A multilayer severity categorization was established, and its effectiveness was assessed via the use of an online forum. The data obtained from video arteriography of 201 healthy people were used to create reference limits for the angles of the spinal form. For the purpose of establishing healthy benchmarks, a mean kyphosis angle of 50.03 degrees and an average lordosis angle of 40.72 degrees were determined. Approximately seventy percent of respondents agreed with the statement that the multilevel classification, which

is comprised of the combination of subjective pain and objective spinal shape elements, is a strong classification. A significant majority of the experts, namely 78%, believed that the pain characteristics that were included were pertinent. The present version of the classification system is still appropriate for use as therapeutic assistance, despite the fact that the findings of the survey give vital evidence for future analyses and optimization choices as they pertain to the classification system.

It was said by **Yakshi Bhardwaj and Richa Mahajan in 2015** that in this day and age of information technology, pupils make extensive use of computers. One of the most common reasons given for neck discomfort among college students is the prolonged use of computers, both in the course of everyday job duties and during leisure activities. Students at Galgotias University were the subjects of the study, and the purpose of the research was to determine the incidence of neck discomfort and impairment among computer users. The method consisted of 500 students who were computer users and freely participated in the research by filling out the Neck disability index questionnaire and the visual analogue scale and providing their responses. The end result was that 99.2% of people had neck discomfort, and 65.8% of people were disabled as a result of neck pain. Students who spend a significant amount of time in front of a computer have a much higher risk of experiencing neck discomfort. However, the number of people who are disabled as a result of it is not very significant.

The researchers **Ekinci, Y., Atasavun Uysal, S., Kabak, V. Y., and Duger, T. (2019)** evaluated the impact that getting ergonomics training in undergraduate teaching had on the posture of students while they were using any kind of computer. The study emphasized the importance of the long-term effects of ergonomics training for preventive purposes before musculoskeletal problems manifest.

Yektaei, T., Tabatabaei-Ghomsheh, F., & Piri, L. (2013)evaluate the education ergonomic principles on musculoskeletal disorders among computer users at Rasht welfare organization in 2011. 283 female computer users were randomly selected for the study. The results of the study showed that the highest prevalence rate of musculoskeletal disorders was reported in the right knee(27.91%), neck region (27.20%), lumbar and right shoulder (24.14%), left knee (25.79%), back (23.67%). The study concluded that Education of ergonomic principles for the computer users and ergonomic interventions have a significant effect on the decreasing musculoskeletal disorders prevalence among computer users.

Aarås, A., Horgen, G., Ro, O., Løken, E., Mathiasen, G., Bjørset, H. H., Thoresen, M., & Larsen, S. (1998) conducted a study on the impact of an ergonomic intervention on musculoskeletal pain among computer users. The study involved redesigning workstations to follow ergonomic principles and providing training on proper posture and equipment use. The findings revealed a significant reduction in musculoskeletal pain, particularly in the neck and shoulders, among participants who received the intervention compared to those who did not.

Waersted, M., Hanvold, T. N., &Veiersted, K. B. (2010) reviewed the literature on computer

work and musculoskeletal disorders. The study identified that static postures, repetitive movements, and prolonged computer use are significant risk factors for developing musculoskeletal disorders. The review also highlighted the importance of ergonomic interventions and regular breaks to mitigate these risks.

Szeto, G. P., Straker, L. M., & O'Sullivan, P. B. (2009) examined the effect of prolonged computer use on the development of upper limb and neck pain in a cohort of young adults. The study found that the prevalence of musculoskeletal pain increased with the duration of computer use, with the highest incidence reported in the neck and shoulders. The authors recommended ergonomic adjustments and posture education to prevent these issues.

Shieh, C. F., & Lin, K. C. (2017) conducted a study to assess the prevalence of low back pain among office workers using computers. The study involved 150 participants and used questionnaires to collect data on pain prevalence and ergonomic practices. Results indicated that low back pain was prevalent in 45% of the participants, with poor ergonomic practices and prolonged sitting being significant contributing factors.

Koepp, G. A., Snedden, B. J., Flynn, L., Puccinelli, D., Huntsman, B., & Levine, J. A. (2015) investigated the impact of sit-stand desks on musculoskeletal discomfort among office workers. The study found that participants using sit-stand desks reported significantly less discomfort in the neck, shoulders, and lower back compared to those using traditional seated desks. The findings suggest that sit-stand desks can be an effective ergonomic intervention to reduce musculoskeletal discomfort.

Bongers, P. M., Ijmker, S., van den Heuvel, S., & Blatter, B. M. (2006) reviewed epidemiological studies on musculoskeletal problems and computer use. The review identified a high prevalence of neck and upper limb disorders among computer users and emphasized the need for ergonomic workplace design and frequent breaks to alleviate these issues.

Cagnie, B., Danneels, L., Van Tiggelen, D., De Loose, V., & Cambier, D. (2007) conducted a study on the prevalence of neck pain among computer users and the impact of ergonomic interventions. The study found that neck pain was prevalent in 58% of the participants and that ergonomic interventions, such as adjusting monitor height and chair support, significantly reduced the incidence of pain.

Villanueva, M. B., Jonai, H., Sotoyama, M., Hisanaga, N., Takeuchi, Y., & Saito, S. (1997) evaluated the effectiveness of an ergonomic training program for reducing musculoskeletal discomfort among computer users. The program included education on proper posture, workstation adjustments, and regular breaks. The study reported a significant reduction in musculoskeletal discomfort, particularly in the neck and shoulders, among participants who completed the training.

Based on the findings of the literature research, it has been shown that those who use computers have a high frequency of musculoskeletal problems. Common problems include discomfort in the neck and shoulders, discomfort in the eyes, discomfort in the wrists and fingers, and positioning of the head forward. Fathi A. (2016), who identified aching neck and shoulders,

uncomfortable eyes, painful wrists and fingers, and forward head position as widespread difficulties among university students, is one of the specific research that was emphasised. 67.7% of people who use computers have upper cross syndrome, and 26.28 percent of them had modest postural abnormalities. This was discovered by Fatima A. and her colleagues in the year 2022.

Bhalala S.H. (2019): Reported that 55% of computer professionals aged 20 to 50 years experienced mild to moderate neck pain.**McAviney et al. (2005):** Established a significant association between cervical pain and reduced cervical lordosis.**Bhardwaj & Mahajan (2015):** Found a 99.2% prevalence of neck pain among students with prolonged computer use, with 65.8% experiencing disability due to neck pain.The review also identifies effective ergonomic interventions, including ergonomic training, sit-stand desks, and individualized exercise programs, which have been shown to reduce the prevalence of musculoskeletal discomfort.

Discussion

The high prevalence of musculoskeletal disorders among computer users underscores the need for preventive measures. Ergonomic interventions and education on proper posture and workstation setup are crucial in mitigating these risks. Studies have demonstrated the effectiveness of ergonomic training programs, sit-stand desks, and individualized exercise programs in reducing musculoskeletal discomfort. However, continued research is needed to refine these interventions and develop standardized guidelines for their implementation. Additionally, promoting awareness about the importance of regular breaks and ergonomic principles can further help prevent the onset of musculoskeletal issues among computer users.

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9. SPENCER MUSCLE ENESRGY TECHNIQUE VERSUS CONVENTIONAL TREATMENT IN FROZEN SHOULDER

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ABSTRACT

Background and need of research: The Spencer Muscle Energy Technique (SMET) is a physical therapy approach used to address various musculoskeletal conditions, including Frozen Shoulder also known as adhesive capsulitis. In addition to causing soreness and rigidity in the shoulder joint, adhesive capsulitis, additionally referred to as adhesive capsulitis, is a condition that restricts the ROM of the shoulder joint. The Spencer technique involves a compilation of manual therapy and therapeutic physical activities to target the underlying causes of adhesive capsulitis. The present review of literature aims to compare the SMET with Conventional treatment in Frozen Shoulder to know that which one is more effective. Method: Search was done on Google scholar and Pubmed using the keywords SMET, Spencer Technique, frozen shoulder and relevant literature was obtained. Result: It was observed that the Spencer Muscle Energy Technique is more beneficial than conventional treatment in Frozen Shoulder. Conclusion: According to the study, SMET is superior to standard treatment for individuals with adhesive capsulitis in terms of alleviating pain, lowering disability, and enhancing ROM.
Funding Acknowledgement: None

Key Words: *SMET, Spencer Technique, frozen shoulder, conventional treatment, adhesive capsulitis, MET.*

INTRODUCTION

Adhesive Capsulitis is a condition marked by shoulder joint pain, stiffness, and restricted range of motion (ROM). Despite its prevalence, its exact etiology remains unclear. However, it is often associated with factors such as age (typically above 40 years old) and gender (more common in females).

Clinically, individuals with adhesive capsulitis experience ongoing shoulder pain that worsens over time, leading to difficulty in performing everyday activities involving the upper extremity. Night pain, which disrupts sleep and often prompts individuals to favor one side while sleeping, is a common symptom.

Physical examination findings typically include tenderness along the anterior and lateral aspects of the shoulder joint, accompanied by trigger points and muscle spasms in surrounding muscles such as the pectoral, scapular, trapezius, and deltoid muscles. This can result in pain radiating around the neck and across the shoulder region. As the condition progresses, compensatory movements may develop, altering shoulder alignment and further restricting range of motion.[1]

Adhesive Capsulitis is classified based on its pathophysiology, particularly as idiopathic or primary, where the exact cause remains unclear. It is characterized by a gradual onset of stiffness and tenderness in the shoulder joint, often accompanied by muscle spasms. The condition progresses slowly over time to become fully developed as frozen shoulder.

Adhesive Capsulitis is typically divided into four distinct stages for diagnosis:

1. **Stage 1 - Pre-adhesive Stage (0-3 months):** During this stage, arthroscopic examination reveals fibrinous synovial inflammation, which causes pain and minor deficits in both active and passive ROM of the shoulder, resembling symptoms of impingement syndrome.
2. **Stage 2 - Adhesive/Freezing Stage (3-9 months):** Arthroscopic examination in this stage shows synovial inflammation along with a reduction in space between the capsular fold, humeral head, biceps tendon, and glenoid labrum. This results in chronic pain and significant restriction of shoulder ROM.
3. **Stage 3 - Frozen/Maturation Stage (9-15 months):** Characterized by minimal pain except at the furthest point of motion. The shoulder joint remains significantly restricted in movement.
4. **Stage 4 - Thawing Phase (15-25 months):** This phase is marked by minimal pain and significant improvement in shoulder ROM, indicating a gradual recovery.

Clinically, Adhesive Capsulitis is identified by the gradual onset of shoulder pain and progressive stiffness, leading to difficulties in upper limb activities, functional limitations, and significant disability. Nocturnal pain, particularly troublesome when trying to sleep on the affected shoulder.[2]

The Spencer Muscle Energy Technique (SMET) is a therapeutic approach wherein the client actively participates in the movement process while the practitioner assists and facilitates. Initially introduced by Dr. Spencer in 1916, this method has undergone continual refinement and evolution since its inception. It comprises a standardized series of treatments primarily targeting shoulder issues such as adhesive capsulitis, commonly known as frozen shoulder.[3]

This articulatory technique comprises seven specific procedures designed to address limitations and pain caused by conditions such as bursitis, tendinitis, synovitis, and capsulitis affecting the soft tissues of the shoulder. These procedures involve the application of passive, smooth, and rhythmic movements aimed at stretching and mobilizing contracted muscles, ligaments, capsules, and bursae within the shoulder joint.

The Spencer technique offers a wide range of therapeutic benefits:

1. **Improvement of Shoulder Mechanics:** By addressing restrictions and restoring normal motion patterns.

2. **Enhancement of Joint Range of Motion:** Through targeted stretching and mobilization techniques.
3. **Increase in Joint Mobility:** Facilitating smoother and more comfortable movement.
4. **Strengthening Weak Muscles:** By promoting balanced muscle engagement and function.
5. **Normalization of Muscle Tone:** Particularly beneficial for hypertonic (overly tense) muscles, promoting relaxation and balanced tone.
6. **Local Tissue Stretching:** Addressing stiffness and promoting flexibility in the shoulder tissues.
7. **Improvement in Lymphatic Flow:** Enhancing the drainage of fluid and waste products from the shoulder area.
8. **Enhancement of Proprioception:** Enhancing the body's ability to sense and control joint position and movement.
9. **Boost in Local Circulation:** Facilitating increased blood flow to promote healing and tissue repair.
10. **Optimization of Musculoskeletal Function:** Overall improvement in the functioning of the shoulder joint and surrounding structures.

The evolution of the Spencer technique since its inception reflects ongoing advancements in manipulative methods and therapeutic approaches in musculoskeletal care. Its continued relevance and application highlight its effectiveness in managing shoulder pathologies and improving patient outcomes through targeted, gentle, and effective therapeutic interventions.[4]

Steps of Technique

Step 1: Shoulder extension with elbow flexion: The patient's arm was extended until it reached the limited barrier while their elbow remained flexed.

Step 2: involved extending the patient's elbow flexed and moving them anteriorly into shoulder flexion until they reached the limited barrier.

Step 3: Circumduction with compression: Using a 90° abduction of the shoulder, grasp the patient's elbow and move it in tiny clockwise and counterclockwise circles while applying compression.

Step 4: Circumduction with Distraction: While holding the patient's shoulder joint in a 90° abduction traction, the therapist made minor clockwise and counterclockwise movements with the elbow or wrist.

Step 5: Shoulder abduction and internal rotation with elbow flexion: The therapist requested the patient to place his hand on his forearm for support before performing the desired movements on the patient's arm. Internal rotation (90°): The patient's elbow is rotated anteriorly by the therapist, who places the patient's hand dorsum behind the hip.

Step 6: Shoulder adduction and external rotation with elbow flexion: The therapist assumed the position of the patient's arm in adduction and external rotation after asking the patient to place his hand on his forearm for support.

Step 7: Extending the arm to pump fluids and stretch tissue The patient's hand was put over the therapist's fingertips while he interlaced them over the deltoid muscle.[5]

The primary treatment for adhesive capsulitis is often physical therapy, which utilizes various techniques to alleviate pain, preserve range of motion, and bring back functionality. Commonly used techniques for pain alleviation and stiffness reduction include cryotherapy, heat therapy, ultrasound, TENS, pulsed electromagnetic field treatment, interventional therapy, and laser therapy.

Exercise is an essential component in the care of adhesive capsulitis. Specific exercises that are emphasized include passive as well as active range of motion exercises, procedures for releasing and extending the capsule, activities for strengthening and stretching the shoulder girdle muscles, pendulum exercises, and mobilisation techniques. We also place an emphasis on patient education and exercises that may be performed at home in order to encourage managing oneself and compliance to treatment recommendations. One frequently used manual therapy technique is the Muscle Energy Technique (MET), which aims to increase joint range of motion by breaking adhesions within the joint, releasing muscle tension, and stretching tight muscles and fascia. MET involves the patient performing voluntary isometric contractions against the therapist's resistance at a pain-free range of motion for a specific duration, typically 7 to 10 seconds. Therapeutic exercises play a crucial role in the Spencer technique for adhesive capsulitis. The exercises recommended are designed to improve muscle strength surrounding the shoulder joint while also improving flexibility. This dual approach addresses both the immediate symptoms and the underlying factors contributing to the adhesive capsulitis condition. [6]

METHODOLOGY

Search was done through search engines. Google scholar, and Pubmed and literature was derived from them.

Inclusion Criteria

- Randomized Controlled trial
- Interventional studies, cross-sectional studies and surveys

Exclusion Criteria

- Systemic Review and Meta-analysis
- Case-studies

RESULT

From the above review of literature, the results were derived that SMET shows greater effectiveness compared to conventional treatment methods in adhesive capsulitis. Edrish Saifee Contractor et. al, conducted interventional research to evaluate the effect of the SMET compared to conventional treatment in improving functional ability among patients with adhesive capsulitis. Their findings indicate that Spencer MET is superior in enhancing functional ability when compared to conventional treatment methods for individuals with adhesive capsulitis.

DISCUSSION

This study delves into the efficacy of Shoulder Mobilization with External Therapy (SMET) as a more effective treatment option for frozen shoulder when compared to conventional methods. By meticulously examining existing literature, it

becomes evident that SMET consistently outperforms traditional therapies in managing the symptoms of adhesive capsulitis, such as alleviating pain, alleviating disability, and improving ROM.

Rimal Anil through his study concluded that both SMET and a conventional treatment protocol show significant effectiveness in alleviating pain, improving ROM, and reducing shoulder disability. However, when comparing these treatments directly, Spencer's MET was concluded to be more beneficial in reducing shoulder pain, whereas the conventional treatment protocol was more effective in improving shoulder ROM. This suggests that while both approaches yield positive outcomes in managing shoulder conditions, Spencer's MET excels in pain reduction, while conventional treatments are better suited for enhancing shoulder mobility.[2]

One prominent example illustrating the effectiveness of SMET is the research conducted by Edrish Saifee Contractor and colleagues, whose studies consistently demonstrate the significant advantages of SMET over conventional treatments in enhancing functional abilities among individuals with adhesive capsulitis. These findings are in line with the broader array of research scrutinized in this study, all of which consistently advocate for the efficacy of SMET in yielding positive outcomes for patients with frozen shoulder. [3]

The study provided by Phansopkar P compelling evidence that the SMET is highly effective in alleviating pain, improving shoulder range of motion (ROM), and reducing functional impairment among patients suffering from adhesive capsulitis. It demonstrated that applying the Spencer technique resulted in significant reductions in pain levels experienced by patients. Moreover, it facilitated notable improvements in the flexibility and movement capabilities of the shoulder joint, thereby enhancing overall shoulder ROM. Additionally, the technique contributed to reducing the limitations in daily activities and functional tasks that are typically associated with frozen shoulder, thereby improving the quality of life for affected individuals. These findings underscore the therapeutic value and comprehensive benefits of employing the Spencer technique as part of treatment for adhesive capsulitis.[5]

A study conducted by Raksha R. Jivani et al.,The study's findings indicate that both the SMET and Maitland Mobilization are beneficial in alleviating pain, reducing disability, and increasing range of motion (ROM) when combined with conventional exercises. Specifically, the Spencer Muscle Energy Technique was identified as more effective than Maitland Mobilization in enhancing these outcomes among patients suffering from frozen shoulder. This suggests that while both manual therapy approaches yield positive results, SMET may offer superior benefits in managing pain, reducing disability levels, and improving ROM in individuals with this specific shoulder condition.[6]

The study conducted by Chavan SE et al., found that both techniques demonstrated comparable effectiveness in improving pain and functional disability. However, the SMET was notably more effective than the Myofascial Arm Pull Technique in enhancing shoulder mobility. This suggests that

while both methods yield similar benefits in terms of pain relief and reducing functional limitations, Spencer MET specifically excels in increasing ROM and mobility of the shoulder joint.[7]

In essence, this research thoroughly evaluates the literature to underscore the substantial evidence supporting the superiority of SMET as a therapeutic intervention for Adhesive Capsulitis. It emphasizes SMET's capability to effectively alleviate pain, mitigate disability, and enhance ROM in individuals affected by this condition. Such findings underscore the potential for SMET to revolutionize the treatment landscape for adhesive capsulitis and Ultimately enhance the quality of life for patients struggling with this challenging condition.

CONCLUSION

The accumulated research that has been shown in this report provides great support for the notion that Spencer MET is an exceptional therapy choice for persons who are struggling with frozen shoulder.

Patients are provided with a more comprehensive and prospective avenue for recovery as a result of its capacity to effectively address pain, reduce disability, and enhance range of motion (ROM). This ability distinguishes it from conventional treatments. Therefore, it is possible to draw the conclusion that SMET is the best option for improving outcomes in patients who have frozen shoulder, based on the data of the studies that were examined.

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10. WORK RELATED MUSCULOSKELETAL DISCOMFORT AND VOCAL FATIGUE AMONG TEACHERS AND OTHER PROFESSIONAL - A COMPARATIVE STUDY

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ABSTRACT

Background: Teaching and office work are a profession that demands long hours standing, sitting and excessive voice use. Because of the daily routine these profession are more prevalent to musculoskeletal discomfort and vocal fatigue. This study purpose to determine the comparison of prevalence of work related musculoskeletal discomfort and vocal fatigue between school teachers and office employees. Materials and Methods: A group of 200 participants were involved in the cross-sectional study. Participants were separated into two categories- group A-100 school teachers and group B-100 office employees. Questionnaires, including Nordic Musculoskeletal Questionnaire and Vocal Fatigue Index were completed by the participants. The IBM SPSS version 22 software was utilized for conducting statistical analysis.Results: The musculoskeletal discomfort during the last 12 months, School teachers did report a higher number of complaints mainly in neck region (65%), shoulder(48%), hand/ wrists(44%),lower back (45%), ankles (54%), as compare office employees which report pain in neck (51%), shoulder(33%), hand/wrists(18%), lower back (44%), ankles (7%) region and in school teachers the mean VFI were (22.69±11.04) is higher than office employees (15.88±10.67). This study showed statistically significant difference between school teachers and office employees in terms of musculoskeletal discomfort and mean VFI score (p=0.05). Conclusion: The study concluded the work related musculoskeletal discomfort and vocal fatigue increases among school teachers as compared to office employees. It is important to reveal the associated factors which increase the risk of WMSDs and vocal fatigue for early diagnosis and measures for prevention.

Keywords: *Work related musculoskeletal discomfort, Vocal fatigue, Vocal fatigu, Vocal fatigue index*

1. INTRODUCTION

Musculoskeletal discomfort are conditions that impact the joints by causing inflammation or degeneration in muscles, bones, ligaments, tendons, peripheral nerves, and the supporting blood vessels.These circumstances are evolve gradually and lead to musculoskeletal pain and discomfort which can eventually result in functional limitations. WMSDs are injuries that affect the musculoskeletal system and are caused by work-related activities. (Tinubu et al,2010). Musculoskeletal pain is prevalent in various occupations. Teaching is a profession that demands a high degree of physical and psychological engagement. An educator spends most of the day standing and walking around the classroom. Educators get ready a lesson plan, reviewing, verifying the assignments, etc. Therefore, the teaching career requires endurance, long hours of standing, utilizing shoulder and wrist

movements while writing on a blackboard, excessive neck bending, moving on foot and improper body alignment leading to physical discomfort can result in musculoskeletal disorders (MSD) which are common occupational issue in the field of education and they are the embodiment of this issue occupation category where a high number of MSD cases seem to be common (Damyanti et al, 2017). Employees working in an office are a significant portion of the at-risk population for musculoskeletal issues. Discomfort is experienced due to the lengthy hours spent in front of a computer and working at a desk as required by their job (Ardahan et al,2016). MSDs are frequently reported by office employees engaged in stationary work or activities necessitating the continuous movement of the arms and long periods of working on the computer. Office employees are also group that could have an effect on long-term musculoskeletal health issues. Office work is a reflection of a complicated work environment, involving interactions across different dimensions of the physical space,workplace, tools and duties. (Mohammadipour et al,2018). MSDs are frequently reported by office employees engaged in stationary work or activities necessitating the continuous movement of the arms and long periods of working on the computer. Office employees are also group that could have an effect on long-term musculoskeletal health issues. Office work is a reflection of a complicated work environment, involving interactions across different dimensions of the physical space,workplace, tools and duties (Noroozi et al, 2015). Chronic musculoskeletal pain typically result in poor outcomes, decreased function and long-term disability resulting in decreased efficiency at work and lower productivity, impaired performance. Job loss or premature retirement due to health issues results in significant healthcare expenses and compensation costs for teachers (Fahmy et al,2022).

Vocal fatigue

Speaking is the primary way people express themselves. Vocal fatigue is especially intriguing within this context. Functional voice disorders are not well-defined and can only be identified through self-perception of symptoms related to the capability to create, project, and maintain vocal sounds (Gray et al,2018). Fatigue is a common sign of regular body operation, resulting from extended physical activity, bodily and mentally (Caraty et al,2014). Most commonly, these symptoms occur after a period of high vocal usage state (Aaronson et al,1999). The most common description of vocal fatigue is feeling tiredness in the voice following its extended usage along with other signs (Guzman et al,2013). In the field of profession, the greater level of vocal skill is needed to be considered a 'voice professional'. A growing need for verbal communication skills among educators resulted in heightened phonatory exertion (Porto et al,2020). Speaking too much without taking breaks, constantly shifting in vocal-related tasks leads to vocal fatigue, which is a common clinical symptom.

Adjusting the voice to a negative tone when paraphrasing the following text: Symptoms define vocal fatigue. The signs, consist of (1) effort and discomfort, (2) limited pitch range and flexibility, (3) decreased vocal projection or strength, (4) diminished command over voice tone, (5) a rise in

symptoms throughout the talking all day, and (6) Progress after taking a break (Solomon et al,2008). The improper usage of the commonly heard among educators. These professionals are at risk of experiencing voice misuse when they are exposed to improper vocal habits boost the level of vocal exertion (Porto et al,2020). Regular individuals have been given tasks that are physically tiring to the voice speakers, individuals in the professional singing industry, and those experiencing signs of vocal exhaustion. Women receive more attention in research. Women are more likely than men to experience voice disorders, they are more prevalent in females and are widely seen. (Roy et al, 2004). Professions that are predominantly held by women, particularly in the field of teaching demanding professions when it comes to verbal skills and vocal projection. significant category in the field of vocal arts commonly utilized system based on the extent of vocal usage. There is a higher incidence of vocal cord pathologies that have been documented in teachers more prevalent than in general population. Numerous factors are linked to vocal fatigue in teachers. These factors consist of

the amount of time spent teaching, years of experience in the field, and the size of the classroom

(Enver et al, 2021).

Office workers

Vocal exhaustion among office workers may present a notable concern, especially in settings where speaking is a fundamental aspect of the role, necessitating regular attendance at meetings and giving presentations. Various aspects contribute to vocal fatigue - extended speaking, bad vocal habits (incorrect breathing and speaking) inadequate hydration, stress, and fatigue, along with poor air quality and noisy surroundings (poor acoustics), can all have a negative impact on technique. irritation caused by quality affects the throat and vocal cords. Too much noise disrupts people's daily routines at work, school, home, and during rest times. Free time can also impact vocal behavior when speaking in loud environments. Comprehensive using your voice in noisy environments can lead to voice issues and has been referenced (Portela et al,2018). Limited information exists regarding the rates and potential causes of WRMSDs and Vocal fatigue within educators and staff working in schools and offices located in Delhi NCR. Therefore, it is important to prioritize and focus more on increasing understanding of potential harm from not following voice care guidelines and the risk involved

factors linked with WRMSDs in school teachers and office workers. Due to the limited availability of

information and studies on physical discomfort and voice strain in educators in schools and office settings workers, this research aimed to analyze the differences in frequency and related variables among school teachers and employees workers in an office setting.

2. METHODS AND MATERIALS

A study was carried out from 1st March 2024 to 30th April 2024, observing school teachers and office workers. The research lasted for a period of two months. The Ethics Committee of the Faculty of Physiotherapy, Delhi Pharmaceutical Sciences & Research University (No. 21050) reviewed and

approved the research. The permission to conduct research among school teachers and office employees in various Schools and Offices was signed by the Associate Dean of Academics at DPSRU University.

Participants

The research was carried out on a diverse group of teachers from schools and office workers. Convenience sampling was utilized. There were a total of 200 subjects in two groups: Group A consisted of 100 school teachers, while Group B consisted of 100 office employees, determined using G power software. Teachers and office workers were chosen based on specific criteria for both inclusion and exclusion. In order to prevent incomplete questionnaires and errors in data collection forms, more Teachers and office employees were added to the study.

(a) Inclusion criteria

1. School teachers
2. Office employees
3. Age- 22- 45 years
4. Gender- both male and female

(b) Exclusion criteria

1.Any pathological conditions and injuries
2. Age- above 45 years
3. Female participants during pregnancy Or lactation.
4. Hyperthyroid and hypothyroid
5. Diabetes.
6. Hypertension
7. Obese subject with BMI<30

Procedure

In this research, we create both the google form and printed forms. Obtain approval from the principal of each school and the manager of each office before sharing the forms in schools and offices. Teachers and staff members were given the chance to willingly fill out the survey. The teachers and office staff who met the requirements were informed about the study's necessity and assured that their information would only be used for scientific research purposes. Next, they were requested to complete the consent document in the language they comfortable. Participants were required to give their written consent prior to filling out a survey. If needed, the subjects were given extra information and clarifications regarding the questions. The form was utilized to gather initial details on subjects' age, weight, work hours, and medical history. To assess the occurrence of WMSDs and vocal fatigue issues, the Nordic musculoskeletal questionnaire and vocal fatigue index were utilized, respectively. The gathered information was organized in a table and presented as a percentage for both school teachers and office employees participants.The information that was gathered was examined to produce findings and draw conclusions.

Instrumentation

1. Nordic Musculoskeletal Questionnaire

”The initial version of the standardized NMQ was employed. The NMQ is a dependable and responsive screening tool commonly utilized in epidemiological research in numerous countries to assess the frequency of musculoskeletal symptoms in different areas of the body within the occupational health field, such as the teaching profession.This research includes a chart illustrating the back view of a person's body split into 9 distinct anatomical sections requesting

information on different body parts including neck, shoulders, upper back, lower back, elbows, wrists/hands, hips/thighs, knees, and ankles/feet, with a yes or no question for each. The survey examined how common it was for participants to experience musculoskeletal issues like pain, discomfort, or aches in various parts of the body in the past year.

Prevalence rates were determined by dividing the number of teachers reporting WRMSDs in any body part by the total number of respondents" (Crawford et al, 2007).

2. Vocal Fatigue Index

"The Vocal Fatigue Index is a self-report questionnaire that serves as a psychometric tool to detect vocal fatigue in individuals. The VFI is a trustworthy tool with high sensitivity and specificity in detecting individuals likely to have Vocal fatigue.

The Vocal Fatigue Inventory (VFI) includes 19 questions categorized into three sections: 11 on fatigue and vocal limitations, five on physical discomfort related to voice, and three on recovering with vocal rest. Each question was rated based on the presence of symptoms ranging from never (zero points) to always (four points).

The score in initial categories is calculated by adding up the questions. Consequently, the more points obtained, the more exhaustion experienced in the areas examined.

In contrast to the other items, the greater the score of the third area, the more significant the improvement of symptoms. Hence, the overall score ranges from 0 to 76, with fatigue and vocal restriction subscale (factor 1) ranging from 0 to 44, physical discomfort related to voice (factor 2) ranging from 0 to 20, and recovery with vocal rest (factor 3) ranging from 0 to 12" (Nanjundeswaran et al,2014).

Statistical analysis

Statistical analysis was conducted using the IBM SPSS version 22 software program. Mean ± standard deviation (SD) and percentage were used to present descriptive data. The Kruskal-Wallis test was employed to evaluate a categorical variable that is not normally distributed. A p value lower than 0.005 was deemed to be statistically significant.

OBSERVATION AND RESULTS

The study included total 200 participants which divided into two groups- Group A include 100 school teachers and Group B includes 100 office employees.

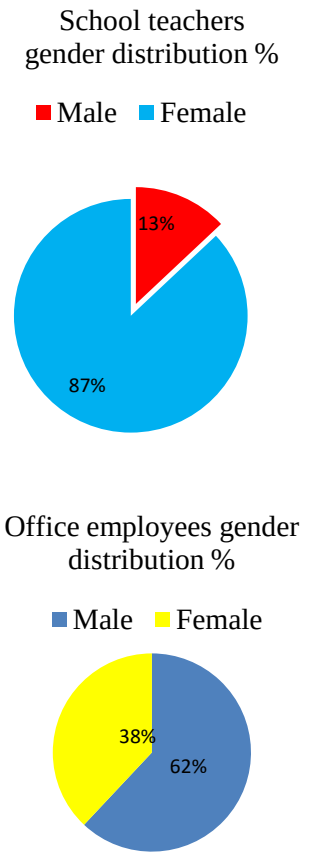
Table-1, shows the gender distribution consisted of school teachers group A included male (13%), female (87%) and office employees group B included male (62%), female (38%).

Table -1

Gender wise distribution (Percentage)

Gender	School teachers %	Office employees%
Male	13	62
Female	87	38
Total	100	100

Fig 1-



In table-2, The participants' socio-demographic characteristics are depicted.

The mean and standard deviation of group A school teachers age were (33.67±5.52), body mass index (23.76±2.55), hours of job per day (6.90±0.80), no. of years in job (7.00±3.24) and the group B-office employees Mean±S.D of age (31.46±6.22), BMI (24.06±2.84), hours of job /day (8.32±1.28), no. of years in job (5.18±3.45).

The age, body mass index, daily hours of work, and number of years of experience were similar between group A-school teachers and group B-office employees.

Table-2

Characteristics	School teachers (n=100)	Office employes (n=100)	P –value
Age (years) (Mean±SD)	33.67±5.52	31.46±6.22	0.81
Body mass index (kg/m2) (Mean±SD)	23.76±2.55	24.06±2.84	0.64
Hours of job /day (Mean±SD)	6.90±0.80	8.32±1.28	0.43
Experience (number of years in job) (Mean±SD)	7.00±3.24	5.18±3.45	0.32

According to table-3, a significant difference is observed in percentage value of musculoskeletal discomfort among group A-school teachers and group B- office employees. The musculoskeletal discomfort during the last 12 months, school teachers did report a higher number of complaints of musculoskeletal discomfort mainly in neck region (65%), shoulder (48%), hand/wrists (44%), lower back (45%), ankles (54%), as compare office employees neck (51%), shoulders (33%),hands/wrists(18%), lower back (44%), ankles (7%). There were no difference in lower

back region pain (45%) in school teachers and (44%) in office employees.

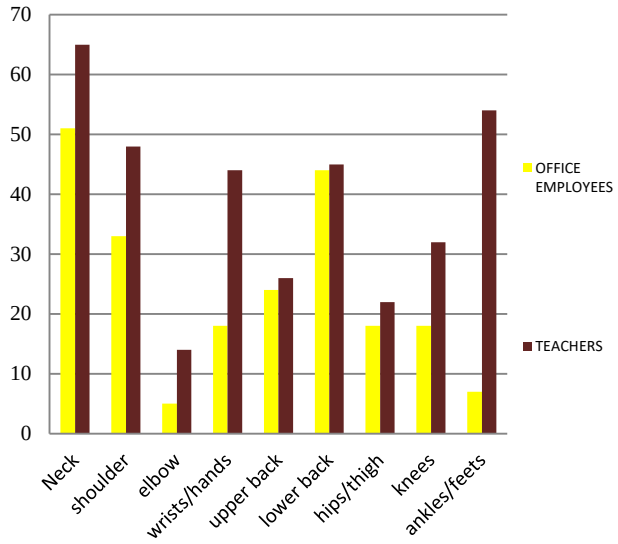
Table -3

Body Regions On The Basis Of NMQ	No. Of Affected Subjects During Previous 12 Months (In Percentage)	
	School Teachers (n=100)	Office Employees (n=100)
Neck	65 %	51 %
Shoulder	48 %	33 %
Elbow	14 %	5 %
Hand/Wrists	44 %	18 %
Upper Back	26 %	24 %
Lower Back	45 %	44 %
Hip/Thigh	22 %	18 %
Knees	32 %	18 %
Ankles/Feet	54 %	7 %

Fig-2, shows the musculoskeletal discomfort during the last 12 months among school teachers and office employees.

Fig 2-

Difference among teachers and office employees last 12 months



According to Table-4, It shows the work related musculoskeletal discomfort among school teachers and Office employees during previous 12 months been prevented from doing normal work specified by body region(in percentage).

Table- 4

Body Regions On The Basis Of NMQ	No. Of Affected Subjects During Previous 12 Months Prevention Period (In Percentage)	
	School Teachers (n=100)	Office Employees (n=100)
Neck	50 %	29 %
Shoulder	33 %	44 %
Elbow	4 %	1 %
Hand/Wrists	27 %	9 %
Upper Back	12 %	19 %
Lower Back	29 %	34 %
Hip/Thigh	16 %	9 %
Knees	13 %	7 %
Ankles/Feet	36 %	5 %

Fig 3-

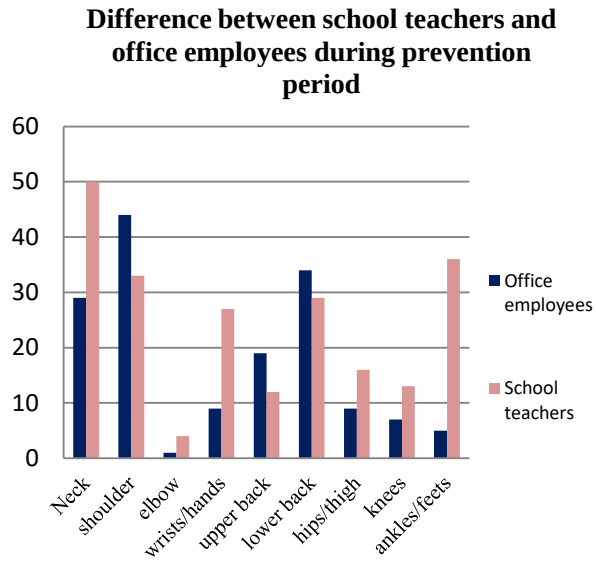


Fig-3 shows the significant difference in musculoskeletal pain during prevention period among group A- school teachers and group B- office employees. The musculoskeletal discomfort complaints were reduced during prevention period as compare to last 12 months complaints. Significant difference is observed in group A- school teachers who complaints neck region (50%), shoulders (33%), wrists (27%), lower back (29%), ankles (36%) whereas group B- office employees complaints only in neck (29%), shoulders (44%), lower back(34%) and ankles (5%).

Table-5, shows the Work related musculoskeletal discomfort among School teachers and Office employees during Last 7 Days specified by body region (in percentage).

Table-5

Body regions on the basis of NMQ	No. Of affected subjects during last 7 days (in percentage)	
	School Teachers (n=100)	Office Employees (n=100)
Neck	30 %	34 %
Shoulder	26 %	23 %
Elbow	4 %	1 %
Hand/wrists	22 %	12 %
Upper back	14 %	17 %
Lower back	34 %	31 %
Hip/thigh	12 %	3 %
Knees	18 %	8 %
Ankles/feet	44 %	7 %

Fig-4

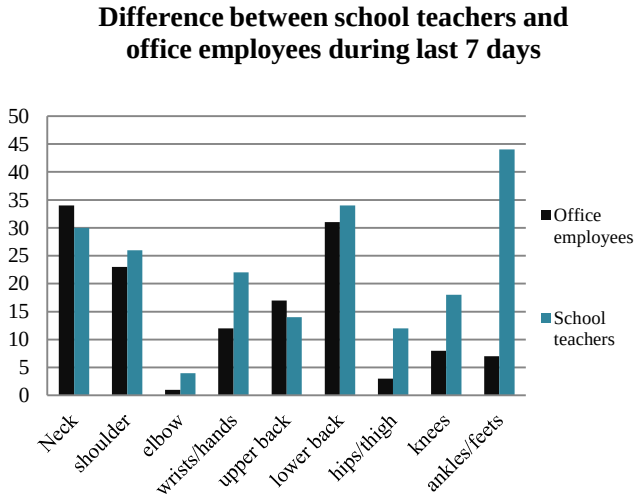


Fig-4 shows the significant difference in musculoskeletal pain during last 7 days among school teachers and office employees. The musculoskeletal discomfort complaints observed in school teachers neck region (30%), shoulders (26%), wrists (22%), lower back (34%), ankles (44%) whereas office employees complaints majorly in neck (34%), shoulders (23%), lower back(31%) and ankles (7%).

Table-6 shows a significant difference is observed in mean value and standard deviation of Vocal fatigue between group A- school teachers and group B- office employees.

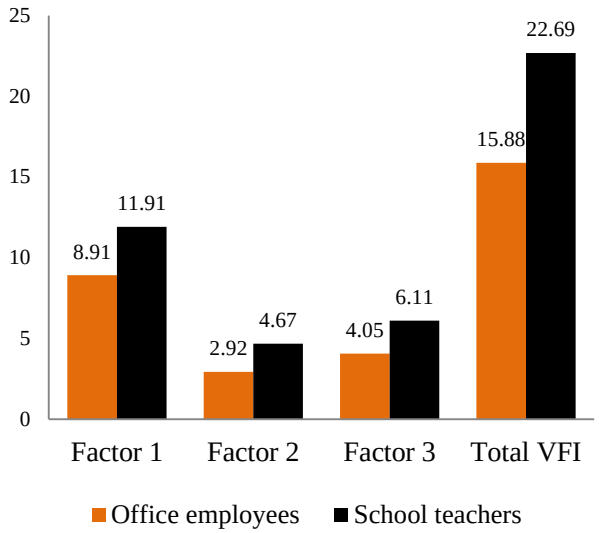
The tiredness and avoidance of voice use mean value and standard value were higher in group A-school teachers (11.91±7.25) as compare to group B-office employees (8.91±6.46) VFI score (p=0.01). The physical comfort of voice mean value and standard value were higher in group A-school teachers (4.67±3.46) as compare to group B- office employees (2.92±3.01) VFI score (p=0.04). The improvement of voice symptoms mean value and standard value were higher in group A-school teachers (6.11±3.03) as compare to group B-office employees (4.05±3.04) VFI score (p=0.03).

The mean total vocal fatigue score of group A-school teachers (22.69±11.04) showed a significant difference (p=0.05) as compared to group B-office employees (15.88±10.67).

Table -6

Vocal fatigue index	School teachers Mean±SD	Office employee Mean±SD	P - value
Factor 1 Performance	11.91±7.25	8.91± 6.46	0.01
Factor 2 (pain)	4.67± 3.46	2.92± 3.01	0.04
Factor 3 (Recovery)	6.11± 3.03	4.05± 3.04	0.03
Total VFI score	22.69±11.04	15.88±10.67	0.05

Fig-5



According to the data, there were a significant difference in musculoskeletal discomfort complaints and vocal fatigue score of school teachers were higher than office employees.

DISCUSSION

This research analyzes musculoskeletal discomfort and vocal fatigue in school teachers and office employees using the Nordic Musculoskeletal Questionnaire and Vocal Fatigue Index. The study found that school teachers reported higher levels of these issues compared to office employees. In the meantime, this study revealed that school teachers are more prone to experiencing vocal fatigue and musculoskeletal discomfort related to their work compared to office employees. The obtained outcome revealed that school teachers reported pain primarily in their neck, shoulder, hand/wrists, lower back, knees, and ankles/feet area. Office employees are more likely to complain about pain in their neck, shoulder, and lower back region than vocal fatigue during vocal performances. Comparatively, we discovered that work-related pain and fatigue are on the rise due to several associated factors such as prolonged

sitting, standing, walking in classrooms, bad posture, and lengthy inflexible work hours. This study shows that the average age of group A's school teachers is 33.67±5.52, while group B's office employees have an average age of 31.46±6.22. Both groups experience discomfort in body regions and vocal fatigue, indicating a young population.

Musculoskeletal discomfort among school teachers is increasing because of various factors associated with their work schedules. Prolonged standing, walking in the classroom, writing on a blackboard, repetitive wrist movements, checking notebooks with poor posture, and strict working hours are some factors. This may lead to various problems such as neck, back, shoulder, wrist, knee, and ankle discomfort.

Vocal fatigue is more common among school teachers as well. Using your voice for extended periods of time, speaking excessively causing hoarseness, and talking loudly in noisy surroundings can lead to strain and fatigue in the voice. Similarly, office employees experience musculoskeletal discomfort due to their work schedule, which includes prolonged sitting, poor posture while using a computer, and rigid working hours. It results in physical discomfort in various areas of the body. Various factors such as giving regular presentations, interacting with customers, and using the voice in a noisy environment can cause vocal fatigue in office employees. Most research indicates that teachers commonly suffer from musculoskeletal discomfort in the neck, shoulders, and lower back, while office workers typically experience discomfort in the neck and lower back regions. This research analyzed the occurrence of musculoskeletal discomfort and vocal fatigue in school teachers and office workers, using both the findings and relevant research.

Study recommendations

We faced certain restrictions while carrying out this study.

1. Subjective assessment of pain from the self reported information by the participants.
2. Small sample size.
3. Only healthy individuals was considered.
4. Does not provide any follow up and treatment of the subjects.

Future scope of the study

1. Provide long term follow up and treatment.
2. Need to identify the factors associated the cause, prevention and manage WMSDs and vocal Fatigue.
3. This study helps in improve ergonomics in schools and office.

CONCLUSION

This research indicates that school teachers experience work-related musculoskeletal discomfort and vocal fatigue more frequently than office employees. Increased risk of musculoskeletal discomfort and vocal fatigue indicates a higher likelihood of developing degenerative conditions later on.

The specific requirements of teaching, such as extended periods of standing or sitting in uncomfortable positions, repetitive actions, and a need for speaking loudly, increase the likelihood of health issues for teachers. Schools must acknowledge the influence of such occupational health problems on teachers and implement measures to decrease the factors that pose a risk.

Include ergonomic training, encourage taking regular breaks and doing stretching exercises, and introduce voice care techniques for teachers. Moreover, educating teachers on the significance of maintaining correct posture, vocal health, and practicing self-care can aid in avoiding musculoskeletal pain and vocal exhaustion.

It is important for office workers to consider ergonomic factors to reduce musculoskeletal discomfort by setting up desks correctly, using ergonomic chairs, and taking regular breaks to stretch. This research assists healthcare providers in raising awareness about risk factors, prevention strategies, and treatment methods to minimize underlying causes.

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11. EFFICACY OF PHYSIOTHERAPY REHABILITATION FOLLOWING DIABETIC NEUROPATHY: A LITERATURE REVIEW

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ABSTRACT

Introduction: The highest world public health emergencies of the centuries are Diabetes. The term neuropathy is related to dysfunction of the peripheral nerve which results in various deformities. The exercise therapy including aerobic exercise, balance training, strengthening exercise, gait training reduces the symptoms and signs of diabetic peripheral neuropathy Method: A literature review was conducted and from 2002-2023, the Pubmed database was utilized to search for 428 papers, of which 45 were examined based on the selection criteria. Result: Our results provided evidence that exercise therapies with multiple components, including aerobic exercise, strength, ROM, balance, and gait training, are particularly effective.

Keyword: *Diabetic peripheral neuropathy, Diabetic neuropathy, Quality of life, Physiotherapy intervention*

Introduction

Diabetes is a common metabolic disorder that has serious health repercussions and is becoming more prevalent. Diabetic peripheral neuropathy is a significant contributing factor for the chance of falling in diabetic individuals, along with vestibular dysfunction and diabetic retinopathy.[1]

It is a very common disease that has a significant impact on patients by raising the risk of falling, causing pain, and decreasing quality of life (QOL).[2] In people with type 2 diabetes (T2D), muscle-specific glucose absorption, microvascular perfusion. Variations in diabetes start age and changes in the underlying pathophysiology are likely a few secondary factors for the greater occurrence of neuropathy in T2DM patients compared to those with T1DM or T2DM.[2]Numbness, tingling, discomfort, weakness, and unsteadiness are the signs of diabetic neuropathy. These symptoms begin distally (at the toes), progress

proximally.

Two thirds of diabetic people, it is estimated, have clinical or subclinical neuropathy. Electro diagnostic tests, together with quantitative sensory and autonomic testing, are necessary for the diagnosis of subclinical DN.The evaluation of the intervention noted improvements in leg and ankle functionality, range of motion, gait speed, daily physical activity, and lifestyle pattern.

Need of the study

Exploring the effectiveness of physiotherapy rehabilitation in diabetic neuropathy is crucial to improve physical function, reducing pain and to prevent complications such as fall which can significantly impact their well — being.

Aim of the study

The aim of this literature to get the deepen understanding of physiotherapy interventions which will help to develop effective treatment plans for patient with diabetic neuropathy, leading to better outcomes

Search Strategy

Database: the databases have been searched from Google scholar, PubMed and Pedro.

Time period: The time period of taken articles was from between 2002-2023.

Selection of studies for the review

Inclusion criteria

- The articles included all the Participates diagnosed with diabetic neuropathy.
- Physiotherapy interventions like exercise therapy, electrotherapy, balance training are included in this study.

Exclusion criteria

- Articles with surgical interventions were excluded from this study.
- Articles included other conservative treatments like pharmacology.

Study Participants

In this study 45 articles were included among which 34 articles were extracted to give the final conclusion.

Comparators

Patient who does not received physiotherapy rehabilitation or standard care

Methodology

POPULATION	Patients with diabetic neuropathy with complication such as risk of fall, neuropathic pain, foot ulcers.
INTERVENTION	Exercise therapy Strength training Balance training Aerobic Exercises Task oriented exercises TENS Low-level laser therapy
COMPARATORS	No physiotherapy rehabilitation or standard care

OUTCOMES	Leeds Assessment of Neuropathic symptoms and signs (LANSS) Berg Balance scale (BBS) Functional Gait assessment (FGA) Activities- specific Balance Confidence Scale (ABC).

Result

This literature review on the efficacy of physiotherapy intervention in diabetic neuropathy has shown favourable results, particularly with exercise therapy.

Gait training has been shown to enhance proprioceptive feedback, which results in positive adjustments in the activity of the multifidus and muscles around the ankle during postural control and walkingExercise therapies with multiple components, including aerobic exercise, strength, ROM, balance, and gait training, are found to be particularly effective. The ideal exercise regimen and the long-term effects of exercise training on DPN, however, still require further study.[25]

Discussion

The study reviewed and discussed various physiotherapy interventions in patient with diabetic neuropathy. Sensory and motor deficiencies brought on by diabetic peripheral neuropathy (DPN) frequently result in mobility-related dysfunction and changes to gait characteristics. The most effective intervention was found to be exercise therapy, which included a variety ofexercises like task-oriented exercise, range-of-motionexercises, muscle strengthening, balance training, and gait Training delivery to patients' lower limbs, chests, and skin.

Limitations

There were some limitations in conducting this literature review, such as the patient populations in the studies varied in age, gender, duration of diabetes, and degree of neuropathy, which had an impact on the generalizability of the findings. The frequency, length, and intensity of the physiotherapy therapies utilised in the trials varied, making it challenging to compare the effectiveness of various interventions.

Future scope

There are a number of directions for further research in this field, even though this literature review offers insightful information about the effectiveness of exercise therapy in patients with DPN. Examining the long-term effects of exercise therapy on DPN patients is one possible area for additional research.

Length, frequency, and intensity of exercise therapy for DPN patients are another area that needs more investigation.

Conclusion

In conclusion, the literature review points to exercise therapy as a potentially effective treatment for alleviating diabetic neuropathy symptoms and signs. This treatment includes aerobic exercise, balance training,

strengthening exercise, and gait training.

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12. IMPACT OF AGE, DURATION OF DIABETES AND BMI ON COGNITION AND BALANCE IN DIABETIC POPULATION

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ABSTRACT

Background: Diabetes mellitus (DM) is a global health issue that increases mortality and morbidity through complications such as retinopathy, nephropathy, and cardiovascular disease. It is also associated with cognitive impairment due to vascular and neurodegenerative effects from recurrent hypoglycemia or hyperglycemia. In type 2 diabetics, Mild Cognitive Impairment affects 13.7% of those under 40 and 20.5% of those aged 41-50, impacting executive functions. This cognitive decline contributes to reduced mobility and balance, heightening fall risk. Objective: The purpose of this study was to explore the correlation of cognition and balance with age, diabetes duration, and BMI in middle-aged individuals with Type 2 Diabetes Mellitus Methods: This cross-sectional study examined the association between Age, Duration of Diabetes, and BMI with cognition using MoCA scale and balance using TUG test in T2DM patients aged 40-60. Inclusion criteria included regular medication use, with exclusions for neurological or psychological disorders. Result: Pearson's correlation test was used to find the correlation. The study revealed that as Cognition and balance impairment was negatively correlated. Age and duration of diabetes both showed significant negative correlations with MoCA scores while, no significant correlation was found between BMI and cognitive decline. TUG scores increased with age and duration of diabetes, reflecting more balance issues. However, there was no significant correlation between BMI and TUG scores as well. Linear regression confirmed that longer diabetes duration significantly impacts cognitive health, underscoring the importance of managing diabetes to mitigate cognitive decline improvement. Conclusions: A significant relation between longer diabetes duration and aging with cognitive and balance impairments, but not with BMI that underscores the need for integrated dual task training to enhance both cognition and balance in diabetic individuals.

Key words: *Type 2 Diabetes Mellitus, MoCA, TUG, Cognition, Balance,*

Introduction

Diabetes mellitus (DM) has emerged as a global health concern, affecting both developed and developing nations and leading to increased mortality and morbidity (1). Long-term complications of diabetes include retinopathy, nephropathy, peripheral vascular disease, and cardiovascular disease, which contribute to premature morbidity and mortality (2). Diabetes is also associated with cognitive impairment which is a less discussed complication arises due to vascular and neurodegenerative effects from recurrent hypoglycemia or hyperglycemia, affecting patients' daily activities (3). In type 2 diabetic population, the incidence of Mild Cognitive Impairment is 13.7% for those under 40 and 20.5% for those aged 41-50, potentially leading to difficulties with executive functions such as memory, decision-making, problem-solving, and medication adherence (4). Cognitive impairment has been linked to reduced mobility and balance, particularly due to the deterioration of the frontal regions of the cerebral cortex responsible for cognitive functions. This impairment in executive function significantly contributes to balance problems, along with sensory function decline (vestibular, somatosensory, and visual impairments) and reduced metabolic muscle function, collectively increasing fall risk in individuals with T2DM (5). The relationship between mild cognitive impairment and balance issues is especially evident during dual-task activities, where cognitive and motor tasks sharing neural circuits can become more challenging. Given its importance in daily activities, our study aimed to explore the correlation of cognition and balance with age, duration of diabetes, and BMI in middle-aged individuals with Type 2 Diabetes Mellitus.

Methodology

This study employed a cross-sectional analysis to determine the association, if any, between clinical characteristics like Age, Duration of Diabetes, and BMI with cognition assessed via Montreal Cognitive assessment tool (MoCA) and Balance using Timed up and Go test (TUG). Inclusion Criteria for the study were pre-diagnosed patients of T2DM on regular medications within age group 40-60 years both male and female. The exclusion criteria included any neurological disorder or any psychological disorder. The subjects were informed about the study and the written consent was signed. Readings of the Age, Duration of Diabetes, BMI, MoCA, TUG was taken and MoCA and TUG were assessed in a preliminary session.

Criterion measure-

Cognition- MoCA (reliability of 0.92, sensitivity – 90% and specificity – 87%) was used to assess the cognition, and scoring was done out of 30 points where 26 was considered to be normal. The assessment took about 10-15 minutes to complete.

Balance- The component of balance was assessed using TUG test where the individual arises from chair, walk for 3 meters, turn around the obstacle and walk back to sit again.

A TUG score of 10 seconds was considered to be normal.

Clinical characteristics- Clinical Characteristics like Demographic data including Age, Gender and Duration of Diabetes along with the medications were noted from patient's previous reports.

Statistical Analysis

Analysis of data was done by using SPSS Software version 21. The Mean ± standard deviations were calculated and mapped in the form of table to display the data's properties. Pearson's correlation test was used to evaluate the relationship between scores of MoCA and TUG with age, duration of diabetes and BMI. Then, to analyze the predictive ability of Duration of diabetes Linear regression analysis was done between the scores of MoCA and duration of diabetes.

Results

Correlation between the scores of MoCA and TUG with Age, Duration of Diabetes and BMI using carl Pearson's method of correlation was found. We found a negative correlation between the scores of MoCA and TUG which came to be negative indicating that as there is decrease in the scores of MoCA i.e, towards impaired cognition, the time required to complete the TUG test increases indicating impaired balance. The correlation analysis between Age and MoCA scores revealed a significant negative correlation (r=-0.730**), indicating that as individuals get older, their MoCA scores tend to decrease. This suggests that there is a higher likelihood of cognitive impairment in patients with diabetes as they age. The Analysis revealed a significant negative correlation ($r = -0.589^{**}$, $p < 0.01$) between the duration of diabetes and MoCA scores which implies that as the duration of diabetes increases, there is a greater decline in MoCA scores, indicating an increase in impaired cognition. The graph illustrates this relationship, where individuals with a duration of diabetes of approximately 5 years have MoCA scores of around 25 on the scale. However, as the duration of diabetes increases, the scores decrease. In this study, we did not find any significant correlation ($r = -0.169$) between BMI and cognitive decline. This indicates that an increase in BMI may or may not be associated with a likelihood of experiencing cognitive decline as there can be some other factors too. There is a clear pattern where the Scores of TUG increase with age revealing a linear relationship, with the value of r being 0.791**. This score indicates that as age increases, there is a higher likelihood of experiencing balance issues as measured by the TUG test in diabetic population. The data presented here also shows that the correlation between the duration of diabetes and the scores of TUG with r value of 0.589** which indicates that as the duration of diabetes increases, the scores of TUG also increase, representing worsening of balance in individuals with diabetes. In this study, we also observed a non-significant correlation ($r = 0.275$) between BMI and TUG scores. This indicates that there may not be a strong association between BMI and balance issues as measured by the TUG test. However, it's

important to note that this lack of significant correlation suggests that balance issues may or may not be associated with changes in BMI.

Table 1: Mean and standard deviation for baseline characteristics of experimental group and control group

Variables	Mean ± SD
Age (years)	52.50 ± 5.72
Duration of Diabetes (years)	8.25 ± 2.98
BMI (kg/m^2)	29.04 ± 3.9

Table 2: Table representing the correlation of age, duration of diabetes and BMI with scores of MoCA, TUG, 5XSST and SRT

SCREENING	AGE	DURATION OF DIABETES	BMI
MoCA	r = -0.730**	r = -0.589**	r = -0.169
TUG	r = 0.791**	r = 0.589**	r = 0.275

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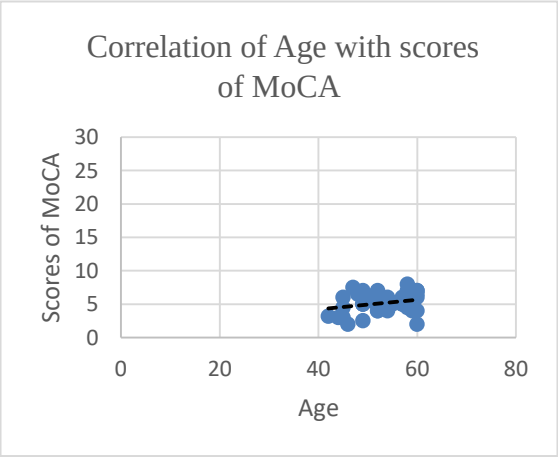
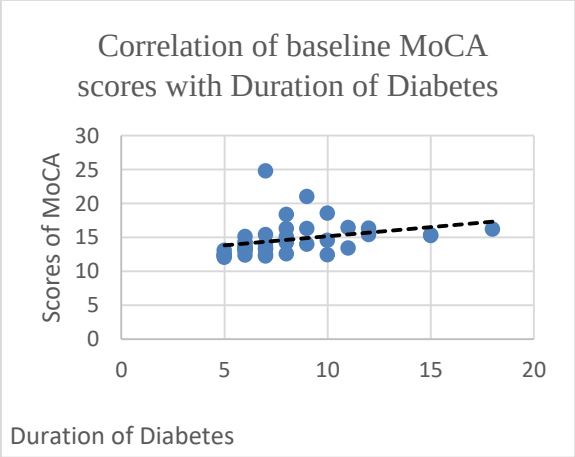
**.Correlation is significant at the 0.01 level (2-tailed).

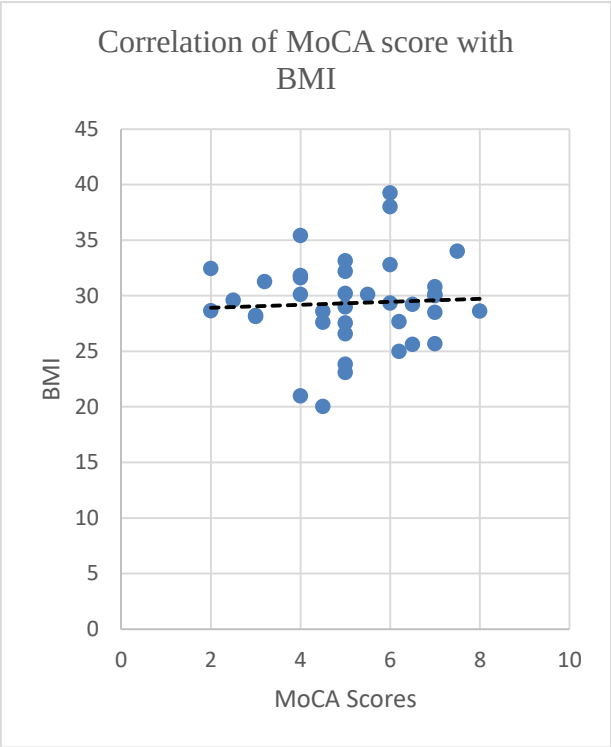
*. Correlation is significant at the 0.05 level (2-tailed).



Graph 1: Graph representing the correlation of Age with Cognition represented with the scores MoCA

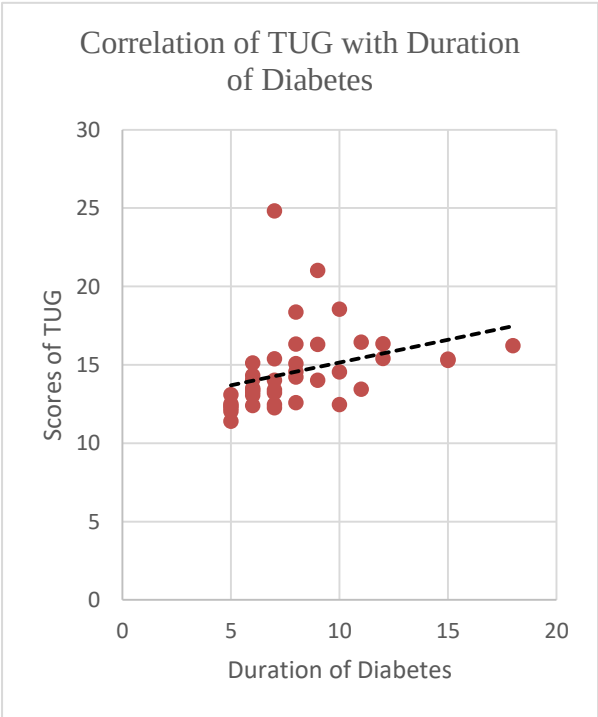


Graph 2: Graph representing correlation of duration of diabetes with Cognition represented with the scores MoCA

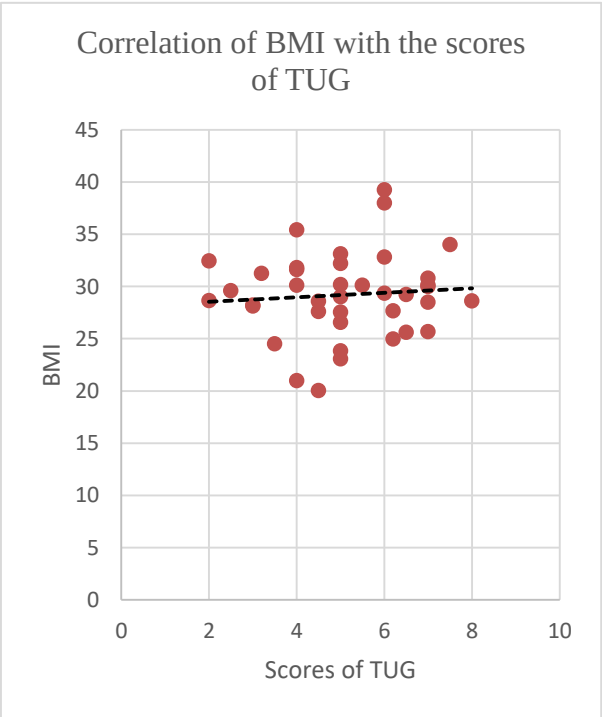


Graph 3: Graph representing correlation of BMI with Cognition represented with the scores MoCA

Graph 4: Graph representing correlation of Age with the scores of TUG



Graph 5: Graph representing correlation of Duration of Diabetes with the scores of TUG



Graph 6: Graph representing correlation of BMI with the scores of TUG

A linear regression analysis was conducted to investigate the relationship between the MoCA scores and the duration of diabetes in a diabetic population. The analysis revealed a significant inverse relationship between the MoCA scores and the duration of diabetes, with a p-value of <0.01, indicating a highly significant result. The r^2 value of 0.34 suggests that approximately 34% of the variability in cognitive function, as measured by the MoCA scores, can be explained by the duration of diabetes. Furthermore, the correlation coefficient of 0.58 signifies a moderate to strong negative correlation, indicating that longer durations of diabetes is moderate predictor of cognitive function. This analysis underscores the impact of prolonged diabetes on cognitive health and highlights the importance of managing diabetes duration to mitigate cognitive decline in this population.

Discussion

The study aimed to investigate the impact of Age, Duration of Diabetes and BMI on balance and cognitive function in middle-aged people with diabetes. We observed a negative correlation between MoCA scores and factors such as age and duration of diabetes. This means that as people grew older, there is a tendency for cognitive capabilities to diminish, the fact which is already proven but according to our study the decline is at a much faster rate in diabetic population and as early as the age of 40-45 years, which was also evidenced by a study that examined cognitive function in 1278 individuals diagnosed with T2DM in geriatric population using the MoCA (6). The inverse relationship observed in this study between MoCA scores and the time since diabetes is diagnosed is consistent with another study that identified the period of known diabetes as a noteworthy factor in cognitive impairment. Specifically, cognitive decline becomes more noticeable after a diabetes duration of over 5 years (7). Furthermore, it was also investigated that not just duration of the disease but the level of HbA1C also affects cognitive function, with a 57% increase in decline observed in individuals who have had diabetes for over 15 years and constant HbA1C levels above 7 (8). Similar results were observed in our study where patients with less than five years of duration of the disease scored in the normal range of MoCA while deterioration in the scores were significantly observed beyond 5-6 years of duration of diabetes. In our investigation, we discovered a noteworthy correlation between higher body mass index in individuals with diabetes and a decline in MoCA scores, indicating potential implications for cognitive function yet not that significant (6). Results of another study that investigated the correlation between obesity and diabetes in their study and found that it was not associated with cognitive impairment in people with diabetes aligns with the results of our study. However, they did find that

having diabetes can be a cause of obesity and can lead to an increase in BMI. This relationship could not conclude that diabetes alone can act as an independent factor contributing to cognitive decline, or it could be linked to the presence of obesity, as supported by another compelling study conducted by Xing Z. et al. (9). Their research demonstrated a positive association between obesity and cognitive performance using the symbol digit modality test. Furthermore, previous findings by Cournot M. et al. (10) have underscored the link between midlife obesity and an escalated vulnerability to cognitive decline or memory loss disorders. These findings highlight the importance of considering both diabetes and obesity in understanding the complex relationship between metabolic health and cognitive well-being. While talking about another outcome measure, Balance, assessed by TUG, we observed that older people beyond 55 years took longer to complete the TUG test than younger individuals, indicating a correlation between age and balance. The peripheral sensory receptors detect balance disturbances and trigger postural responses to restore balance, which becomes more pronounced as people age. When combined with physiological impairments related to diabetes, these age-related changes can alter the severity of balance control issues. (11). In another study, a correlation was found between the duration of diabetes and balance tests such as the Berg Balance Scale and TUG score was evaluated, which provided a negative correlation (12) where the subjects included more patients with diabetic neuropathy and shorter durations of diabetes. However, in our study, we found that longer durations of diabetes were associated with increased TUG scores, indicating more severe balance impairment with an increase in the duration of diabetes which was almost beyond 7 years. Another study examined the relationship between BMI and falls among community-dwelling elderly people and found that high BMI negatively affected fall efficacy and was significantly correlated with impaired balance. (13) Similarly, our findings revealed a linear relationship between BMI and balance impairment, indicating that as BMI increases, there is a corresponding increase in balance impairment in diabetic population.

Conclusion:

Our study uncovers a significant link between longer diabetes duration and cognitive decline, with aging and balance impairments. Surprisingly, BMI showed no strong connection to these issues, challenging common assumptions. These insights emphasize the need for proactive diabetes management and age-related interventions to safeguard cognitive and balance health. By addressing these factors, we can enhance the quality of life for individuals with diabetes.

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13. EXPLORING DERMATOGLYPHIC PATTERNS AS POTENTIAL BIOMARKERS FOR NEURODEVELOPMENTAL DISORDERS: A CROSS SECTIONAL STUDY

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ABSTRACT

Background: Dermatoglyphic patterns, the unique skin markings found on fingers, palms, and soles, have long been recognized for their potential diagnostic significance in various diseases. This study investigates the dermatoglyphic traits associated with Neurodevelopmental Disorders (NDD), a group of conditions affecting brain and nervous system function in children. The research explores the differences in dermatoglyphic patterns between individuals with NDD and healthy controls, aiming to identify potential biomarkers for early detection and screening. Materials and Methods: Using a case-control design, 150 participants were recruited, consisting of individuals diagnosed with NDD (the study group) and healthy controls. Participants aged 5-25 years were included, with exclusions for hand injuries, deformities, or spasticity affecting hands. Dermatoglyphic patterns were analyzed using electronic flatbed scanning, with data interpreted according to established classification systems. Results: Results indicate significant differences in dermatoglyphic patterns between the study and control groups. Ulnar loops were notably predominant in individuals with NDD across all digits, suggesting a potential association between specific fingerprint patterns and NDD. These findings support the use of dermatoglyphics as a non-invasive diagnostic tool for identifying genetic predispositions to NDD, enabling early intervention and prognosis. By further elucidating the link between dermatoglyphics and NDD, this research contributes to the development of more effective screening and diagnostic strategies in pediatric healthcare.

KEYWORDS: *Dermatoglyphics, Finger prints, developmental delay.*

INTRODUCTION

Dermatoglyphics is the scientific study of skin markings on specific body parts such as fingers, palms, and soles which are important in the diagnosis of various diseases. According to genetic research, people's dermatoglyphic patterns do not vary over the course of their lives. It aids in the early detection of various diseases.[1]

Dermatoglyphic variable characteristics are not identical in different people, even in monozygotic twins or the same individuals from region to region. Abnormalities in this area are altered by a combination of genetic and environmental factors, but these abnormalities are expected to appear only when the combined factors exceed a certain level.[2]

Digito-palmar dermatoglyphics, especially flexion creases, are known to offer hints about early fetal development; changed creases indicate early intrauterine problems and they are predictive of concealed lesions in newborns that initially appear healthy.[3]

Early childhood neurodevelopment is the study of how the central nervous system (CNS) develops and works. The CNS continues to develop for years after birth and develops so early in embryonic life. Early childhood occurs when certain processes, like dendritic pruning, myelination, and the formation of a large and complex network of connections, accelerate and last throughout maturity. The child's functional or perceptible performance and talents are the result of the brain's early, rapid, and complex development.[4]

Neurodevelopmental disorders are conditions that affect the brain and nervous system function. Neurodevelopmental disorders that impact children such as ADHD (Attention Deficit Hyperactive Disorder), autism, learning disabilities, intellectual disability, behavioral disorders, cerebral palsy, and visual and auditory abnormalities.[5]

Biological and environmental factors can influence neurodevelopmental trajectories in both positive and negative ways throughout the lifespan, beginning as early as the embryonic period, with observable differences in development and functioning as early as the antenatal period. For example, genetic disorders, chromosomal abnormalities, infections, perinatal brain injuries, and alterations in neuronal migration can all impact brain development and result in Neurodevelopmental delay.[5]

With a wide range of probable causes for developmental delay, a thorough medical examination can shed light on commonly related disorders. Certain diagnoses may be made based on physical exam results. (e.g., Down Syndrome). Genetic testing may include chromosomal microarray, whole exome sequencing, or karyotype analysis. Blood and urine specimens may be tested as part of the evaluation for various inborn metabolic defects. Neuroimaging (e.g., magnetic resonance imaging) may be useful in detecting neurologic abnormalities and/or injuries. Delays in specific areas, such as speech and language, may also be linked to other medical

issues, such as hearing loss.[6]

Dermatoglyphics, like the brain, develop from the ectoderm in the third week; therefore the factors influencing brain development can also be posited to influence dermatoglyphic development.[7]

The epithelium of the finger buds, that is the early fetal brain development, has an ectodermal origin and develops at the identical time of intrauterine life, in the sixth to seventh week of gestation, and completed by the twentieth to a twenty-fourth week of gestation. This suggests that the genetic message inherent in a person's genetic makeup, whether normal or disabled, is transferred during this period and resembled by dermatoglyphics. As a result, the resulting ridge structures are genetically meant, altered, and modified by prints have reduced in the examined boys, which was shown to be statistically significant. Girls in the investigation and control groups did not differ from one another. According to the control group, the investigation group's boys' and girls' total ridge counts were shown to be significantly lowering.[10]

In the present study, we intend to evaluate the dermatoglyphics traits associated with Neuro-Developmental Delay as dermatoglyphics has a direct with the development of the brain based on genetic factors.

Objectives of the study:

1. To study the characteristics of digitoplamar dermatoglyphics traits in individuals with Neuro-Developmental Delay.
2. To compare the differences in digitoplamar dermatoglyphics traits in external factors.[8]

Epidermal ridges only became popular in recent decades, because it has become clear that many people with chromosomal abnormalities had unusual ridge formations. Recently, patients with non-chromosomal disorder and other conditions whose cause may be altered directly or indirectly by genetic inheritance have also been shown to have unusual ridge trait formation.[2]

Dermatoglyphic analysis should be rigorously separated according to sex, because of the great impact of sex chromosomes and hormones on dermatoglyphic traits. Indeed, significant sex differences have been set up within the control group.[9] It was examined that, arch, radial loop, and whorl prints have grown and ulnar

individuals with Neurodevelopmental Delay with healthy individuals.

3. To compare the difference in the digitopalmar dermatoglyphic traits in males and females of individuals with Neuro-Developmental Delay.

MATERIALS AND METHODS

A cross-sectional study involving 150 participants, recruited through purposive sampling, was conducted to study the dermatoglyphic traits associated with NDD.

The study was conducted on the subjects diagnosed with Neuro-Developmental Delay which comprised the study group. The healthy individuals comprise the control group. Both male and female subjects of the age group 5-25 years were included in the study, whereas, any subject has an injury/bony

deformity/spasticity involving the hand were excluded.

Informed consent was taken from the subject or their guardian, after explaining the purpose and procedure of the study.

The participants were required to wash and dry their hands/sanitize their hands with a sanitizer and dry it completely using tissue paper.

Both palms (one by one) and the fingertips were kept flat on the flatbed of the electronic flatbed scanner (CanonLide 300), (palm down position) without overpressure. The scans of the thumbs were taken separately. The fingers were kept in an abducted position during the scanning of the palms.

The analysis of the fingerprint patterns was done by two researchers, blinded to the group allocation, according to the system given by Cummins and Midlo.

DATA ANALYSIS

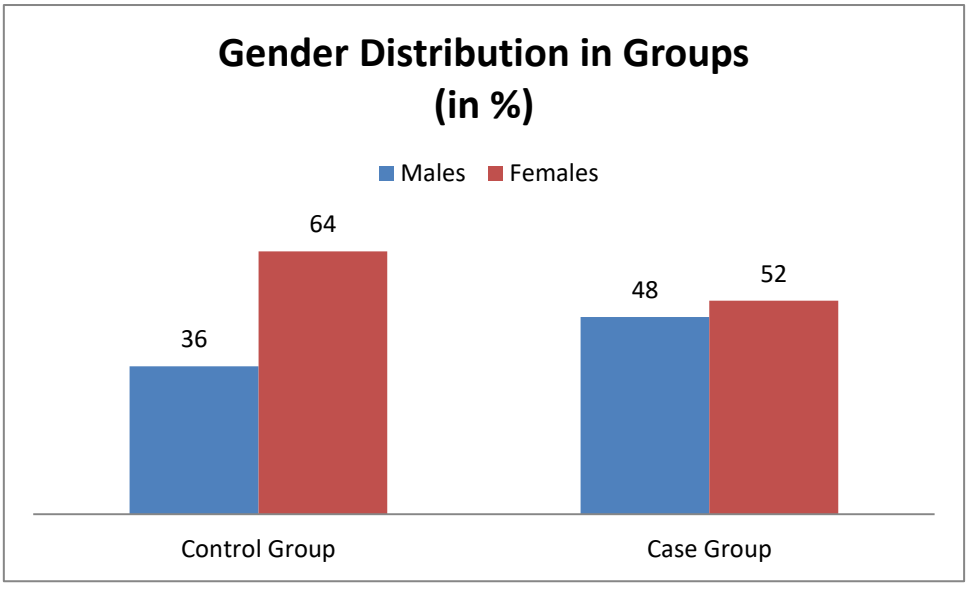
The data was analyzed using SPSS version 20 software. The digitopalmar fingerprint pattern was studied carefully. The result was represented in the form of the mean and standard deviation.

RESULTS

The mean age of the subjects in the control group was 21.80±1.94 years, while that in the experimental group was 16.38±3.59 years.

Table 1: Descriptive Statistics of Age in the groups

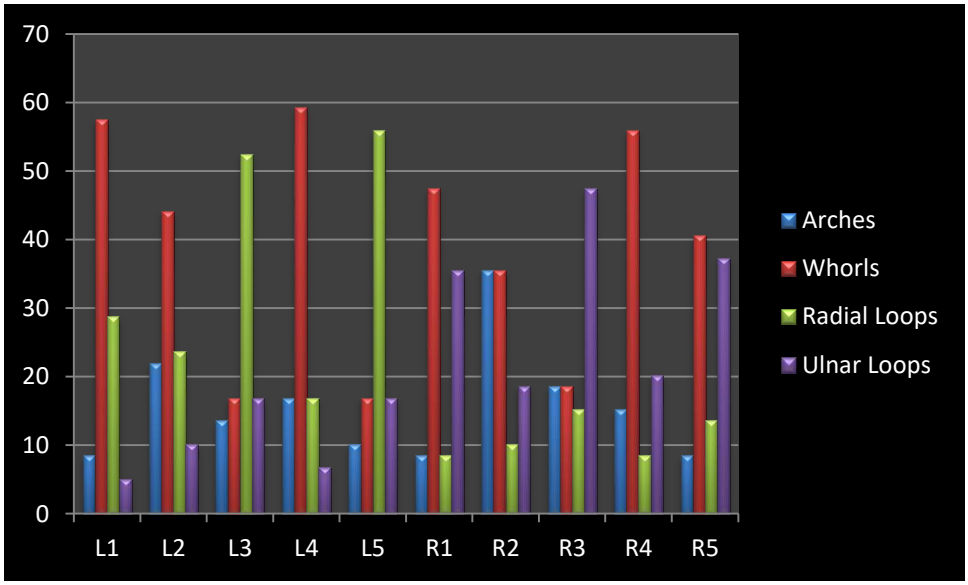
Age (in years)	Control Group	Case Group
Mean	21.80	16.38
S.D.	1.94	3.59



Graph1. Gender Distribution in Groups

Table 2: Descriptive Statistics of Fingerprint Patterns in Control Group

Digits	Arches		Whorls		Radial Loops		Ulnar Loops	
	N	%	N	%	N	%	N	%
L1	5	8.5	34	57.6	17	28.8	3	5.1
L2	13	22.0	26	44.1	14	23.7	6	10.2
L3	8	13.6	10	16.9	31	52.5	10	16.9
L4	10	16.9	35	59.3	10	16.9	4	6.8
L5	6	10.2	10	16.9	33	55.9	10	16.9
R1	5	8.5	28	47.5	5	8.5	21	35.6
R2	21	35.6	21	35.6	6	10.2	11	18.6
R3	11	18.6	11	18.6	9	15.3	28	47.5
R4	9	15.3	33	55.9	5	8.5	12	20.3
R5	5	8.5	24	40.7	8	13.6	22	37.3

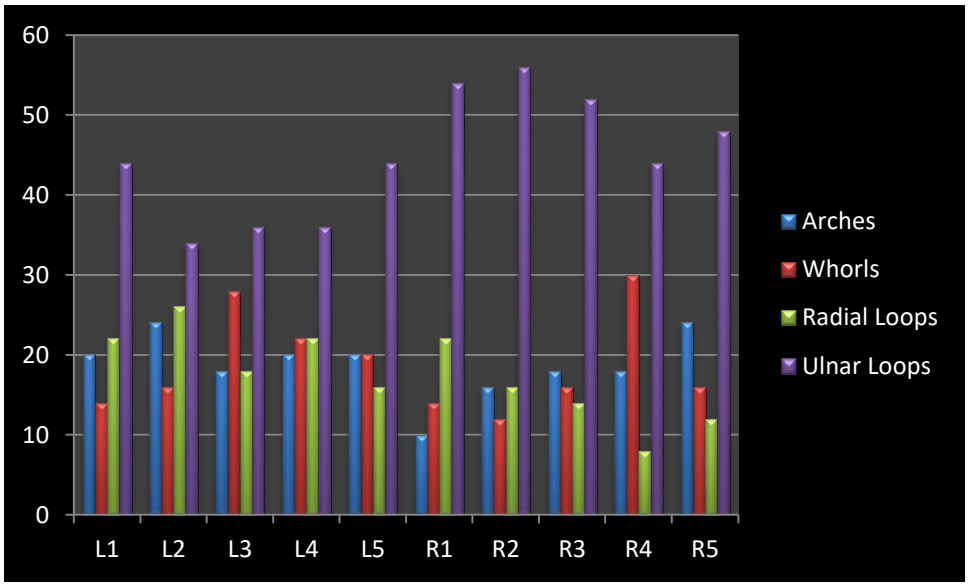


Graph 2: Descriptive Statistics of Fingerprint Patterns in Control Group

Table 3: Descriptive Statistics of Fingerprint Patterns in Case Group

Digits	Arches		Whorls		Radial Loops		Ulnar Loops	
	N	%	N	%	N	%	N	%
L1	10	20	7	14	11	22	22	44
L2	12	24	8	16	13	26	17	34
L3	9	18	14	28	9	18	18	36
L4	10	20	11	22	11	22	18	36
L5	10	20	10	20	8	16	22	44

R1	5	10	7	14	11	22	27	54
R2	8	16	6	12	8	16	28	56
R3	9	18	8	16	7	14	26	52
R4	9	18	15	30	4	8	22	44
R5	12	24	8	16	6	12	24	48



Graph 3: Descriptive Statistics of Fingerprint Patterns in Case Group

DISCUSSION:

This study was conducted to find the differences in the qualitative digitopalmar dermatoglyphics of the case group (NDD) as compared to those of the control group. By analysing the fingerprint patterns of people who have neurodevelopmental delay, this study explored the possibility of dermatoglyphic patterns serving as biomarkers for neurodevelopmental abnormalities.

The analysis of the data showed that the mean age of the control group was 21.80 ± 1.94 years and that of the case group was 16.38 ± 3.59 years. Here we have not taken age as a classifying feature because once formed these dermatoglyphic patterns do not change but remain same throughout the life. So, these prints do not reflect the changes happening because of the aging or the growth process and thus are independent of age.

The percentage of male subjects was 36% and female subjects were 64% in the control group and the percentage of the male subjects was 48% and the female subjects were 52% in the case group. Attempt was made to match the two groups to the maximum possible extent. This was done to eliminate the gender bias in the pattern characteristics which has been confirmed in the earlier researches.

The sample population's ulnar loop patterns were much more common across all digits, according to the results. The discovery that ulnar loops are the most common pattern is consistent with a number of other research

findings that hypothesised a link between neurodevelopmental disorders and dermatoglyphic patterns. For example, the notion that fingerprints patterns could be a reflection of prenatal developmental anomalies—which are also linked to neurodevelopmental disorders—was initially put up by Cummins and Midlo (1961). Our findings are further supported by more recent studies by Ravindranath and Thomas (1995), which likewise found increased frequency of ulnar loops in people with developmental problems. Previously research was done by Simsek S et al in 1998 to propose the diagnostic significance of dermatoglyphic features in cerebral palsy (CP) patients. It was discovered that arch, radial loop, and whorl prints were increased while ulnar prints decreased in the boys, which was statistically significant (p 0.001). There was no difference between the investigation and control groups of girls ($p > 0.05$). The overall ridge counts in the investigation group's boys and girls were found to be considerably lower than in the control group (p 0.001).[10]

According to Nand Lal et al in 2012, dermatoglyphic features like a-b ridge count, TFRC, AFRC, 'atd', 'tad' and 'tda' angles, lateral deviation, c-line, finger ridge count, and distal deviation show significant changes in patients of idiopathic epilepsy as compared to control, and the dermatoglyphic features of the present study may be used as a diagnostic tool for identifying cases at risk or suffering from epilepsy.[11]

Tajana Polovina-Prolo et al 2009 also stated the statistically significant differences in a number of variables between the father and their children suffering from cerebral palsy, with a greater number of variables involved in male children with cerebral palsy and also stated the differences in the dermatoglyphic pattern were significantly lower between mothers and girls with cerebral palsy.[6]

Milosav Adamoviü et al 2013 revealed that the autistic boys as compared with the healthy examinees had higher arch count on the fourth and fifth fingers of hands, lower TRC, and a-b RC as well as wider atd angle. Thus, we consider dermatoglyphic analysis helpful in diagnosing autism, but only as an additional method and never as a dominant diagnostic procedure.[12]

One possible indicator of early embryonic development problems in neurodevelopmentally delayed individuals is the preponderance of ulnar loop patterns. During the first trimester of pregnancy, which is crucial for the development of the central nervous system, dermatoglyphic patterns are created.[13] Therefore, the same developmental mechanisms that lead to neurodevelopmental problems may also be responsible for the emergence of ulnar loops. Furthermore, the observed link may be due to hereditary factors influencing both brain development and dermatoglyphic patterns.[14]

There is considerable therapeutic promise in identifying dermatoglyphic patterns—ulnar loops in particular—as viable indicators for neurodevelopmental diseases. A simple, affordable, and non-invasive screening method is provided by dermatoglyphics. Early detection of those who may experience

neurodevelopmental delays could allow for prompt assistance and treatments, which could enhance developmental outcomes.[15] Dermatoglyphic patterns, may be suggestive, but it's crucial to remember that they should not be utilised only for diagnosis. They ought to be taken into account as a component of an all-encompassing assessment plan.

LIMITATIONS AND FUTURE RECOMMENDATION

Although the results are encouraging, there are a few limitations to this study. Causal inferences cannot be drawn from a cross-sectional design, and the sample size might not be typical of the larger population. Furthermore, even though the study adjusted for a number of possible confounders, the outcomes could still be impacted by additional factors that were not examined. Subsequent studies ought to endeavour to duplicate these results in more extensive and heterogeneous cohorts and delve deeper into the fundamental genetic and environmental processes. Understanding the relationship between dermatoglyphic patterns and the course and consequences of neurodevelopmental disorders might also benefit from longitudinal research.

CONCLUSION

The study's findings point to a strong correlation between neurodevelopmental delay and ulnar loop dermatoglyphic patterns. These results add to the increasing amount of data that suggests dermatoglyphics may be useful as biomarkers for neurodevelopmental disorders. To verify these findings and investigate their potential uses in therapeutic contexts, more investigation is required.

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14. EFFECT OF MULTICOMPONENT TRAINING ON CARDIOVASCULAR ENDURANCE ON PATIENTS UNDERGONE CABG: A NARRATIVE REVIEW

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ABSTRACT

Introduction: The purpose of the narrative review is to investigate how well patients who had CABG responded to multicomponent training in terms of their cardiovascular endurance. Coronary artery bypass grafting patients may be at risk for problems following surgery, which could lead to extended hospital stays or even death. Method: The narrative review study was conducted using comprehensive search of electronic databases such as PubMed, Google scholar, and Cochrane database. The literature from over last 22 years was explored. The articles were searched over 40 in number and among all of them 25 articles were reviewed as per selection criteria. Result: The result of narrative review shows the cardiovascular endurance training have positive impact on Coronary Artery Bypass Graft patients. Various exercises (such as walking, swimming, stationary cycling, inspiratory muscle training) and therapy (hydrotherapy) have shown improving results on cardiac, respiratory and circulatory fitness of coronary Artery Bypass Graft patients. The improvement contributes to better cardiovascular health. Conclusion: On the basis of the findings, it can be concluded that including cardiovascular endurance training in rehabilitation protocol is beneficial for enhancing cardiovascular fitness of patients.

Keywords: *CABG, aerobic exercises, hydrotherapy and Inspiratory muscle training.*

INTRODUCTION

The most serious and quickly developing heath issue in India is heart disease, which is a serious cardiovascular disease. According to World Health Organisation research, the, main accounting 28% death is because of heart disease. The most serious risk of heart disease is Sedentary lifestyle. India has seen a sharp growth in the number of sedentary jobs and urbanisation, which has increased the country's physical inactivity. The government has implemented policies to promote healthy lifestyles and discourage tobacco use. Many initiatives have been implemented to increase awareness of heart disease and improve access to screening and treatment. In India, heart disease continues to be a major health concern despite continuous attempts to treat the problem and enhance population health outcomes.[1]

The salient feature of heart disease are chest pain or discomfort. The feeling of squeezing

and tightness in the chest pain the major indications of pain in the heart and it may come and go. are Heart palpitations:

This condition is characterised by a racing or fluttering feeling in the chest. Swelling in the feet, ankles, or legs: Swelling in the lower extremities may indicate heart failure. [3]

Purpose of CABG: The purpose is restoration of blood flow to the heart, relieves chest pain and ischemia, Improves the patient's quality of life, enable to resume a normal lifestyle of the patients, lowering the heart attack risk.[5]

AIM OF THE STUDY

To understand the effectiveness of multi component training on cardiovascular endurance of patients underwent CABG.

METHODOLOGY

Methodology

Search Strategy:

Database: The searched databases included PubMed, Web of Science, and google scholar.

Studies for the Review:

Screening of articles: The screening process for the literature review involves a two- step approach to identify relevant studies and publications.

The first step involves screening titles and abstracts, and the second step involves a full-text review of selected studies. During the first step, the abstracts and titles of all identified studies had been screened independently by two reviewers to determine their relevance to the researched question. In cases of disagreement, a third reviewer has been consulted to reach a consensus step. In the second step, 40 studies that cleared the first four screenings had their whole texts reviewed.

Based on preset inclusion and exclusion criteria, the same reviewers evaluated the studies' eligibility after individually reading through their entire texts. Any disagreements between the two reviewers had been resolved through discussion and consensus. 25 studies that met the inclusion criteria has been included in the final review, and data has been extracted and synthesized. Studies that did not meet the inclusion criteria have been excluded and the reasons for their exclusion have been documented.

Study Participants:

1. Inclusion criteria: Coronary artery bypass graft undergoing patients who received cardiovascular endurance training for post-operative rehabilitation.
2. Exclusion criteria: Individuals who have had coronary artery bypass grafting surgery but not participated in any post-CABG rehabilitation initiatives

PICO TABLE:

POPULATION	Coronary artery bypass graft patients who received cardiovascular endurance training for post-operative rehabilitation.
INTERVENTION	Multicomponent training for post-CABG
COMPARATORS	No physiotherapy rehabilitation or standard care
OUTCOMES	To understand and evaluate the best component of cardiac rehabilitation for post CABG.

RESULT

It is a surgical procedure performed for improving flow of blood to heart muscle in people having severe coronary artery disease. Multi-component training programs, which include aerobic exercise, resistance training, and flexibility exercises, have been used to improve cardiovascular endurance in patients who underwent CABG surgery.[47] Aerobic exercise applied early on coronary artery bypass grafting patients has promote maintenance of functional capacity, with no impact on pulmonary function and respiratory musclestrengt.

DISCUSSION

Studies have demonstrated the potential benefits of multicomponent training rehabilitation for patients having CABG surgery. Coronary artery disease is commonly treated with CABG surgery, and patients' post-operative physical and functional recovery is greatly enhanced by rehabilitation. Overall, research suggests that multicomponent rehabilitation training is an effective and comprehensive approach to support post-CABG recovery. It addresses multiple aspects of physical health, including cardiovascular fitness, muscle strength, flexibility, and patient education. By combining these components, patients can experience significant improvements in their physical function, overall well-being, and quality of life following CABG surgery.

Year date of publication	Author	Title of Study	Result
2007	Loe et al.	Exercise training after coronary artery bypass graft surgery improves endothelial function and increases peripheral blood flow capacity in elderly patients	Exercise training has been shown by the researchers to enhance endothelial function and peripheral blood flow capacity in patients, indicating that it may be a useful intervention for enhancing the physical function of older CABG patients.50
2013	Elina Mattila, Anna R. Tolppane, et.al.	The effects of resistance training on muscle strength, physical function, and fatigue in women with CABG	Resistance training was observed to increase patients' muscle strength, physical function, and decrease tiredness. These results imply that resistance training can be a useful intervention for enhancing the physical function of female CABG patients. individuals.[51]
2019	Nahid Nazari, Ali Akbar Hashemi-Javaheri, et.al.	"Effect of Cardiac Rehabilitation on Strength and Balance in Patients after Coronary Artery Bypass Graft"	The findings demonstrated that consistent exercise enhanced muscle strength, especially in the lower limbs, and may have also enhanced nervous system and proprioceptive awareness through training, leading to better balance in patients undergoing CABG.53
2021	Yu Fu, Qiaowei Liu, et al.	Effect of Aerobic Exercise Training on Functional Capacity, Quality of Life, and Depression in Patients With Coronary Artery Bypass Grafting	The final result showed that patients who had CABG surgery had significantly higher functional capacity as indicated by peak oxygen consumption, maximal workload, and six-minute walk distance after undergoing aerobic exercise training.54

LIMITATIONS

- We were not able to find much articles
- The optimal duration, frequency and intensity remains unclear.

Clinical Implications

Multi-component training programs that include aerobic exercise, resistance training, and flexibility training have been shown to be effective in improving cardiovascular endurance in patients who have undergone CABG. These programs can also help to improve other aspects of physical fitness, such as muscle strength and flexibility.

Future scope:

The future of cardiac rehabilitation will be greatly impacted by the study on the impact of multi-component training on cardiovascular endurance in individuals who had CABG surgery. The study of this research has already shed important light on the advantages of exercise regimens for enhancing cardiovascular endurance, there are still a number of areas in which more studies could expand on this knowledge and enhance patient outcomes.

CONCLUSION

Based on current research, patients who had this surgery may benefit from multi-component training regimens that incorporate flexibility, resistance, and aerobic workouts to increase their cardiovascular endurance. There are lots of studies which have shown betterment in this population's peak oxygen consumption (VO2peak) and other cardiovascular function measurements after exercise training.

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15. ASSOCIATION BETWEEN PHYSICAL ACTIVITY AND QUALITY OF LIFE AMONG MIDDLE AGED ADULTS: A REVIEW

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ABSTRACT

Introduction: - The association between physical activity and quality of life is of significant interest, especially among middle aged adults who are at a level for adopting health promotion. This reviews aims to examine existing literature on the relationship between physical activity and quality of life among middle aged adults (40-59 yearPurpose and Relevance: - This review aims to evaluate the current evidence on the relationship between physical activity and quality of life among middle aged adults. Methods and Materials:- A comprehensive literature search was conducted across electronic databases such as the PubMed, Scopus, Web of Science, Google Scholar, for studies between 2019 to 2023. Peer reviewed articles that assessed physical activity using standardized questionnaires and measured quality of life using validated tools were included. Studies targeting populations with specific interventions, or differing age ranges were excluded. Analysis: - This study reviewed data from the selected studies focusing on the relationship between physical activity and quality of life. Only 5 of the 30 studies that were screened were determined to be appropriate for the study, which included a total of 39,347 middle-aged adults. Result:- Most studies demonstrated that better overall quality of life scores were consistently linked to higher levels of physical activity. However the strength of the association varied, with some studies indicating moderate to weak but significant associations. Conclusion: - Promoting physical activity in this age group can enhance overall wellbeing as public health promotion strategies. Future research should focus on longitudinal design to establish cause and affect relationship.

Keywords: - *Middle Aged Adults, Physical Activity, Quality of Life.*

Introduction:- Regular physical activity has been shown to be beneficial since it improves a number of health outcomes for the general population and reduces the chance of mortality from all causes. (Esteban C. et al, 2010; Kesniemi Y.A. et al, 2001). Physical activity levels rise in the early decades of adulthood and then begin to fall in the middle and later years of life. (Landi F. et al, 2019). Participating in physical activity provides health advantages to individuals, including improved body composition, decreased risk of disease, and weight loss. (Fan, S. Y. et al, 2020). Many individuals should engage in more physical activity than the minimum advised, especially those who want to increase their level of personal fitness or lower their risk of developing chronic illnesses early in life and mortality from physical inactivity (Haskell W.L. et al, 2007). A common objective throughout the lifespan is to maintain or enhance one's well-being and quality of life (Marquez X. D. et al, 2020).

Several studies have examined the elements that influence quality of life (QOL) and shown that lifestyle factors like physical activity and socio demographic

characteristics like age, education, marital status, and family structure are associated with QOL. (Fredrick et al, 2021).

Methods:- A thorough search of the literature was done for research published between 2019 and 2023 using electronic databases like PubMed, Scopus, Web of Science, and Google Scholar.

Out of the thirty studies that were examined, only five were found to be suitable for the investigation. Included were peer-reviewed studies that used validated instruments to measure quality of life and standardized questionnaires to assess physical activity.

Excluded studies focused on populations with chronic illnesses, certain therapies, or age ranges that weren't comparable. The search terms that were used were "Exercise," "Physical activity," "Middle Aged Adults," and "Quality of Life."

These terms were combined with the Boolean operator "AND" in accordance with PubMed's guidelines, and with a filter that was part of the PubMed database itself, which limited the age stage to "middle-aged."

Result-

S.NO.	AUTHOR/YEAR	STUDY DESIGN	FINDINGS
1.	Saridi et al, 2019	Correlation	The relationship between physical activity and quality of life among 180 healthcare professionals suggests that it would be beneficial to establish strategies for managing leisure time, with formal policies that may result in the creation of hospital facilities that are PA-focused.
2.	Medrano-Ureña et al, 2020	Systematic Review	The relationship between physical activity and different aspects of quality of life is determined by exercise self-efficacy; the final sample consisted of 37 articles based on the findings in 493 articles.
3.	Yu An et al, 2020	Correlation	Physical activity was strongly correlated with pleasure and life satisfaction in all three age groups, even after adjusting for demographic factors.
4.	Li et al, 2024	Cross sectional	The association between various forms and intensities of PA and HRQoL in 7,518 older adults living in the community was mediated by depression.
5.	Hao et al, 2024	Cross sectional	Age is a significant component in the association between PA and HRQOL and helps people select the right sort of PA to improve HRQOL, according to research from 20 counties (districts) of 17 towns in Shandon, which included 65 households.

Discussion:-

This review summarize the findings of association between physical activity and quality of life, out of which a cross sectional study explains the positive

association between PA intensities and health related quality of life. Three Correlational studies showed that participants with a higher physical activity level tended to have positive association between PA and HRQOL of middle-aged adults. A systematic review showed a positive relationship between physical activity and quality of life.

Conclusion:- The effect of exercise on participants related to physical activity and quality of life adding the view that physical activity contributes to all aspects of quality of life – not just the physical. So promoting physical activity especially in middle aged adults improves the quality of life for better community health.

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16.BURNOUT IN HIGHER EDUCATION: EVALUATING ITS PREVALENCE AMONG STUDENTS

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ABSTRACT

Burnout syndrome is a state of extreme physical, mental, and emotional exhaustion brought on by prolonged exposure to stimuli, particularly at work. Burnout is mostly brought on by continuous stress at work, although it can also be brought on by other factors, such as difficulties in one's personal life or a lack of support from coworkers. Burnout often develops gradually over time. The symptoms of burnout syndrome are similar to those observed on the job but have specific characteristics, thus college students are not immune to its consequences. In a college setting, the high demands of coursework, extracurricular activities, part-time work, and social pressures can result in student burnout. The purpose of the study is to determine how common burnout syndrome is among kids who plan to attend college. To ensure representational diversity in the study, a carefully selected cohort of eighty people was selected through the use of a purposive sampling technique. The environment provided by the academic research setting was ideal for data collection and analysis. Numerous sources were consulted, including laboriously constructed questionnaires using the Kessler Psychological Distress Scale. With a mean score of 27.257, which falls into the high distress category on the Kessler Psychological Distress Scale, the author of this study discovered that college-bound kids experienced high levels of psychological discomfort. College burnout can be avoided and managed with a combination of self-care techniques and peer and academic assistance. College burnout can be avoided and managed with a combination of self-care techniques and peer and academic assistance. Learning efficient time management techniques, establishing reasonable goals, asking for assistance when necessary, upholding a positive work-life balance, and taking part in leisurely pursuits can all be beneficial to students. Universities and colleges can also contribute by offering resources like academic support services, counseling, and chances for community service and social interaction. Through addressing the root causes of burnout and creating a nurturing atmosphere, educational institutions can support students in achieving both academic and emotional success.

INTRODUCTION A common social and health problem that primarily

impacts workplaces is Burnout Syndrome (BOS). This field of study has significantly expanded globally due to the emergence of research in various professional sectors and, more recently, studies involving undergraduate university students. (Gale et al., 2011; Montero-Marin et al., 2011; Rosales-Ricardo et al., 2021). While there isn't yet a commonly accepted definition of burnout, the most common one is that it's a mental health condition that affects people who work with other people in some capacity and is characterized by emotional exhaustion, depersonalization, and a decline in one's sense of personal accomplishment (Galen et al., 2011).

Burnout and depression are now common mental health problems in medical training. An increasing body of evidence indicates that prospective medical professionals have extremely high rates of burnout and depression, and that these issues continue even after they graduate and start working (Mousa et al., 2016). By considering the various aspects of burnout and quality of life that each student experiences rather than concentrating on one aspect exclusively, a person-oriented approach may, in the context of burnout and quality of life, first promote an appreciation of students as unique individuals (Kusurkar et al., 2013). A sign of emotional exhaustion is depersonalization, which manifests as emotional exhaustion from overwork, a decline in professional efficacy—a term specific to the human services industry that describes a lowered sense of competence or accomplishment in one's work—and a feeling of being cold toward peers or patients (usually characterized by unpleasant, callous, and distant attitudes).

Academic life for medical students can be seen as psychologically risky, with curriculum requirements accounting for most of the stress (Yusoff et al., 2010; Yusoff et al., 2013; Yen et al., 2013; Dyrbye et al., 2016); This is supported by a recent meta-analysis that found a considerable incidence of depression in medical students globally; the estimated prevalence was 28.0% (24.2%–32.1%) (Puthran et al., 2016).

Research indicates that college students are not exempt from burnout, since they may also experience comparable symptoms of exhaustion and disinterest in their coursework. Study fatigue, a symptom of academic burnout, causes students to feel worse about themselves, have lower life satisfaction, be less engaged in their studies, and perform poorly on work obligations during their first year of employment. Following graduation from college, these individuals were more likely to quit their employment, felt unprepared, and frequently showed apathy in their careers. On the other hand, a survey of foreign college students revealed that those who did better academically, felt driven by their job, and were proficient in their studies also said they felt less stressed and more involved. (Schaufeli and colleagues, 2002; Rudman and colleagues, 2012). The COVID-19 pandemic has brought attention to problems with several impacted groups' mental health. Stressors like worry and anxiety for oneself or one's loved ones, restrictions on movement and social contacts due to quarantine, and sudden and extreme changes in lifestyle are all known to increase or appear during epidemics. With the exception of a few studies, mostly from China (Cao et al., 2020; Liu et al., 2020; Wang et al., 2020), there is little evidence of the psychological or mental health effects of the current pandemic on college students, who are thought to be a sensitive demographic (Bruffaerts et al., 2018).

Although all of this research's findings indicate that mental health issues are becoming more common among college students, it's likely that the fundamental causes don't apply to populations overseas. Several recent letters have stressed how urgently it is necessary to assess how the current epidemic is affecting college

students' mental health and well-being (Zhai et al., 2020; Zhai et al., 2020; De Oliveira Araujo et al., 2020; Holmes et al., 2020). First-year university students may have significant challenges (Hassel et al., 2018; Knoesen et al., 2018). Many factors, such as moving from secondary school to a university, the pressure to perform well on exams and at work, the lack of family support, and economic circumstances, can cause students to experience significant levels of stress that could lead to emotional exhaustion (Trigueros et al., 2020). Research done in Spain has looked at the prevalence of burnout in undergraduate and PhD students (Sorrel et al., 2018) as well as Duran et al., 2006, Salanova et al., 2005, Martinez et al., 2020, Navarro-Abal et al., 2018; Carvalho et al., 2018). None of these studies have looked at the relationship between psychological discomfort and burnout in college students. To the best of our knowledge, not much study has been done to compare the psychological symptoms, academic burnout, and academic accomplishment of university students.

LITERATURE REVIEW

According to Moreno-Jiménez et al. (2008), the assumption that undergraduate students face the same demands and workloads as professionals in the academic sector is the reason for the syndrome's generalization in this setting. Financial support, scholarships, rewards, or prizes are examples of how the aforementioned students, like any other employee, have a direct and indirect remuneration relationship with their university. This supposition enables us to look into how each person reacts to stress and what it means for this particular set of students who are unable to succeed academically.

Gil-Monte et al. (2005) discovered that a number of research indicate that physical and mental weariness, dropping out of school, and poor academic performance are the most prevalent signs of BOS among students.

According to Martínez Martínez et al. (2002), students who experience high degrees of burnout are worn out by the demands of their studies, see education with cynicism and distance, and feel incompetent as learners.

According to Chunming et al. (2017), gender may have a major role in predicting burnout or at least one of its dimensions, with male students reporting higher levels of suffering than female students. Men typically experience emotional weariness at a far higher rate than women do.Men typically experience emotional weariness at a far higher rate than women do. Santen and associates (2010) Medical students may become burned out for a variety of reasons, including as the curriculum, events in their personal lives, and the atmosphere in which they study. Important repercussions from Dyrbye et al. (2008) include unprofessional behavior, a higher likelihood of suicidal thoughts, and serious contemplation of dropping out. The good news is that the author of this study suggested that 26% of medical students who experience burnout can recover in less than a year.

Maslach C., and others (1998); According to traditional definitions, burnout syndrome is characterized by feelings of "emotional fatigue," "depersonalization," and "lack of personal achievement" in the affected individual. Due to a perceived lack of vitality, "emotional fatigue" keeps workers from emotionally investing in their task. The term "depersonalization" describes the emergence of unfavorable attitudes and actions against other people, which frequently include assigning blame for one's own issues to other people. The tendency to view one's own abilities unfavorably and associated feelings of discontent and dissatisfaction are referred to as "lack of achievement."

Botti, G., and others (2011) Burnout syndrome has been seen to be particularly common among college

students preparing for health-related jobs, such as nursing and medicine. According to Gorter RC et al. (2007), burnout syndrome is particularly severe for dentists entering the field for the first time.

Gorter, RC, and associates (2007) It has been observed that when dentists enter the workforce for the first time, their cases of burnout syndrome are particularly severe. Consequently, it has been suggested that dental universities include stress management skills education in their curricula. 2011; Montero-Marín J et al.Burnout can be defined by the three dimensions "overload," "lack of development," and "neglect," which correspond to the "frenetic," "under-challenged," and "worn-out" subtypes, respectively. These dimensions are close to the standard and typological methods.

RESEARCH GAP

A widespread problem that affects people of all ages and occupations is burnout syndrome. Even while a lot of study has been done all over the world to try and understand and lessen burnout, there is a significant lack of information in the literature, especially when it comes to Indian college students. There is little research on burnout syndrome in this population, despite the fact that academic stress and sociocultural elements specific to India are common. The lack of empirical research examining the issue in the unique cultural, educational, and sociological setting of India is what spurred the decision to conduct this study.

The Indian college student population suffers a unique combination of obstacles, including pressure from the classroom, social pressures, and pressures related to one's job. Furthermore, the structure of the Indian educational system and cultural quirks may contribute to burnout in ways that are distinct from those in Western societies. The literature lacks a deep knowledge of the complexities of burnout in the Indian college system, despite these particular circumstances. Our study intends to close this research gap and offer important new information about the type and frequency of burnout among Indian college students.

OBJECTIVE

The objective of the study is to assess the prevalence of burnout syndrome among college-bound students

HYPOTHESIS

Null hypothesis: There will be no prevalence of burnout syndrome in the students of higher education.

Alternate hypothesis: There will be a prevalence of burnout syndrome in the students of higher education.

RESEARCH METHODOLOGY

This study, which was carried out at various universities of the Delhi NCR region and focused on those who were proficient in written and spoken English between the ages of 18 and 25, used a survey-based methodology. Purposive sampling was used to choose an 80-person sample size. The main source of data for the study was the Kesler Psychological Distress Scale questionnaire. A popular 10-question screening tool for identifying people in psychological distress is the Kessler Psychological Distress Scale (K10). Regarding emotional states over the last four weeks, each question has a five-point rating system that goes from "none of the time" to "all of the time." A minimum of 10 and a maximum of 50 are calculated by adding the scores. Higher scores imply the possibility of further evaluation, whereas lower values indicate less distress. The K10 measures what it is intended to measure regularly and correctly represents underlying psychological discomfort, indicating strong reliability and validity. Scores of 19 and less usually reflect

minimal distress, 20–24 suggest moderate distress, 25–29 indicate strong discomfort, and 30 and above denote severe distress. But the K10 is not a diagnostic instrument; rather, it is a screening tool. Dependability of K10: Numerous research have shown the Kessler Psychological Distress Scale to have good dependability. With Cronbach's alpha coefficients typically ranging from 0.82 to 0.93, it has been demonstrated to have good internal consistency. This suggests that the 10 items on the scale are closely linked and measure the same underlying concept.

The K10 has also been found to have outstanding test-retest reliability, with correlation coefficients ranging from 0.79 to 0.86 across intervals of two to four weeks.

Validity of the K10: In a variety of situations and demographics, the Kessler Psychological Distress Scale has undergone substantial validation. Research has repeatedly demonstrated that the K10 has great convergent validity, which means that it has a strong correlation with other mental health and well-being measures like the Patient Health Questionnaire (PHQ) and the General Health Questionnaire (GHQ). All things considered, the Kessler Psychological Distress Scale is a very valid and reliable measure that has been widely used in clinical practice and research as an invaluable tool for evaluating and tracking psychological distress (Kessler et al., 2003).

RESULTS

Research indicates a disconcerting frequency of burnout syndrome among university attendees. After examining the data, the author arrived at an average mean score of 27.257. This score on the Kessler Psychological Suffering Scale (K10) usually denotes a high level of psychological suffering. The K10, a well-known instrument with a scoring range of 10 to 50, is used to evaluate psychological distress. Greater distress is indicated by higher scores; mild discomfort is suggested by scores between 20 and 24, and high distress is indicated by scores above 25. With a mean score of 27.257, most pupils appear to be seriously distressed psychologically. The tremendous demands imposed on students—including demanding coursework, participation in extracurricular activities, part-time employment, and social pressures—are probably the cause of this high degree of discomfort. These elements work together to produce a demanding and frequently stressful atmosphere that promotes widespread burnout.

Furthermore, there may be major repercussions for college student's mental health and academic performance due to the high prevalence of psychological discomfort among them. Persistent stress and burnout can result in a number of detrimental effects, such as depression, anxiety, and poor academic performance. It may also have an impact on students' physical health, which could result in problems including immune system weakness and disturbed sleep.

It is imperative that colleges and universities offer sufficient student support services in order to address this problem. Programs that support a good work-life balance, stress management classes, and mental health counseling may fall under this category.

Educational institutions can assist reduce the impacts of burnout and establish a more supportive and long-lasting academic environment by realizing the seriousness of the issue and adopting proactive measures to support students' well-being.

CONCLUSION

College students often struggle with burnout, but there are solutions available. Counseling and stress-reduction courses should be provided by colleges. By looking after students' mental health and fostering a positive atmosphere, we can all work together to improve everyone's college experience.

LIMITATIONS

The study's small sample size—it only included people from one university—makes it difficult to generalize the results to a larger population. Future research should strive for a more diverse sample that includes individuals from other universities in order to improve the study's external validity. This methodology would facilitate a more thorough comprehension of the phenomenon under investigation. In this study, the author used only a single questionnaire to assess the prevalence of burnout syndrome, which is another limitation of the research.

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17. ASSOCIATION BETWEEN FATIGUE AND WORK ABILITY IN WOMEN WITH PCOS: A CONCISE REVIEW

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ABSTRACT

Introduction: Polycystic ovary syndrome PCOS is a common endocrine disorder affecting women of reproductive age, characterize by menstrual dysfunction, cardiometabolic abnormalities and polycystic ovaries. Fatigue is a prevalent but often overlooked symptom of PCOS that can significantly impact work ability and productivity. This review aims to summarize current evidence on the association between fatigue and work ability in women with PCOS. Purpose and Relevance: The purpose of the review is to explore how fatigue affects work ability in women with PCOS. By identifying gaps in current research, this review provides direction for future study.Methods And Material: This concise review was conducted by searching peer review articles from electronic data bases such as google scholar, pubmed, web of science. Keywords included PCOS, fatigue, work ability. studies were included if they specifically addressed the impact of fatigue on work ability in women with PCOS. Analysis: This study reviewed data from the selected studies focuses on the the relationship between fatigue and work ability in women with PCOS. After screening 10 articles only 4 articles are found to be eligible for the study. Result: The review found evidence that fatigue significantly impaires work ability in women with PCOS. Fatigue was associated with reduce job performance and lower overall productivity.Conclusion: Fatigue is an important factor influencing work ability in women with PCOS. Addressing fatigue is essential for enhancing occupational health and productivity in this population, improving their quality of life.

Keywords: *Polycystic ovary syndrome, Fatigue, work ability*

Introduction: Polycystic ovary syndrome (PCOS) is multifactorial disorder seen in women (Ashraf S et al 2019). It is characterized by menstrual dysfunction, cardiometaboic abnormalities , polycystic ovaries and obesity (Ham K et al 2022). It is associated with infertility and reduced health related quality-of-life (HRQoL). Several studies have shown that women with PCOS have reduced HRQoL (Wright P et al 2023). PCOS is a disorder with a potential to lead to various diseases. Problems with ovulation and elevated androgen levels occur in the majority of women with PCOS. Moreover, hirsutism, acne, and alopecia are directly associated with elevated androgen levels (khan M et al 2019).

PCOS originally known as Stein-Leventhal syndrome, was discovered in 1935. Irving Stein and Michael Leventhal were the first to propose "polycystic ovarian disease," which they defined as the Triad of Amenorrhea, Obesity, and Hirsutism. It is hence also known as‘Stein-Leventhal Syndrome’ or ‘Hyperandrogenic Anovulation’. PCOS is also referred to as Syndrome O due to the overproduction of Insulin (Mathur A Tiwari A 2023). PCOS can be diagnosed by three sets of diagnostic criteria , the NIH , Rotterdam and the AE-PCOS. Out of these three Rotterdam is the most commonly used.

In 2003 The American Society of Reproductive Medicine / European Society of Human Reproduction and Embryology (ASRM/ESHRE) criteria or Rotterdam criteria incudes anovulation or oligo

ovulation, clinical and/or biochemical hyperandrogenism, and polycystic ovarian morphology . Later in 2003 Rotterdam Criteria used polycystic ovarian morphology on ultrasound as a new criterion to be added to the two previous criteria of NIH. The Androgen Excess and Polycystic Ovary Syndrome (AE-PCOS) Society considered that androgen excess is a central event in the development and pathogenesis of polycystic ovary syndrome, and 2 established that androgen excess should be present and accompanied by oligomenorrhea or PCOM or both of them (Mohammad M Seghinsara A 2017). The prevalence rate of PCOS is high among Indian women. The pooled prevalence of PCOS was close to 10% using Rotterdam's criteria and AES criteria, while it was 5.8% using NIH criteria (Bharali M et al 2022).

Fatigue is intrinsically linked with sleep, and women with PCOS have a higher prevalence of poor sleep quality and sleep disorders compared to women without PCOS.

fatigue as listlessness, lack of energy, exhaustion, tiredness, early fatigability, sleepiness, a tendency to fall asleep during the day, physical weakness, or a feeling of running on empty (Maisel P et al 2021).

Methods: This concise review was conducted by searching peer review articles from electronic data bases such as google scholar, pubmed, scopus, research gate, web of science. Keywords included PCOS, fatigue, work ability, cardiometabolic abnormalities, Rotterdam criteria, Amenorrhea, hirsutism . studies were included if they specifically addressed the impact of fatigue on work ability in women with PCOS.

Results:

S.no	Author/year	Study Design	Findings
1	Milani A et al/2024	cross-sectional study	Pcos significantly impacts employment-related productivity. . Factors such as race, mental health, appear to play a crucial role in the extent of this impact.
2	Pirotta S et al/2021	Meta analysis	PCOS does not cause fatigue directly, poor sleep quality, obstructive sleep apnoea, and depression causes fatigue.
3	Kujanpaa L et al/2022	cohort study	Pcos have poorer participation in working life by increasing the risks of disability based absences and unemployment.
4	Bharali M et al/2022	Meta Analysis	The prevalence of PCOS was close to 10% using Rotterdam's criteria and AES criteria, while it was 5.8% using NIH criteria.

Discussion: According to the author, women with PCOS have poor work abilities, which negatively impacts both their mental and physical health as well as their capacity for employment. These women also

have low participation in their working lives, which leads to a loss of self-confidence and worsens their mental health. Fatigue is not directly associated with PCOS, other factors like poor sleep quality, obstructive sleep apnea, and depression, can cause fatigue. So, addressing the issues like fatigue is important for enhancing womens mental health work productivity and improving their quality of life.

Conclusion: Fatigue is an important factor influencing work ability in women with PCOS. fatigue and poor work ability in pcos women becomes the major reason for depresion. Addressing fatigue is essential for enhancing occupational health and productivity in this population, improving their quality of life.

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18. ASSOCIATION OF BODY MASS INDEX WITH MUSCULOSKELETAL PAIN, SOCIOECONOMIC STATUS AND PSYCHOLOGICAL FACTORS IN GENERAL POPULATION

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ABSTRACT

Introduction: Obesity has become a prevalent metabolic disease worldwide, with Body Mass Index (BMI) serving as a widely used measure of obesity at the population level. Musculoskeletal disorders, often linked to BMI, pose significant health challenges in the general population. Stress, a known factor in obesity, is connected to body image and various behavioural and neuropsychiatric conditions. Method: This study investigates the association between BMI, musculoskeletal pain, stress, physical activity, eating habits, and socioeconomic status in 101 individuals aged 18-45. Result: Significant correlations were found between BMI and musculoskeletal disorders, as well as BMI and physical activity, highlighting the impact of BMI on these health factors. These findings underscore the importance of addressing obesity and its related health issues through a multifaceted approach. Discussion: Overall, this study emphasises the complex interplay between BMI, musculoskeletal health, physical activity, stress, and eating habits. A holistic approach to addressing obesity and its related health issues is essential, considering the multifaceted nature of the problem. Future research should focus on developing comprehensive interventions that consider the interconnectedness of these factors to promote better health outcomes for individuals with overweight or obesity.

Introduction:

Musculoskeletal Disorders (MSDs) are a prevalent health issue globally, affecting between 14% to 42% of the population.[1] Obesity, defined by the World Health Organization as a Body Mass Index (BMI) of 30 kg/m² or higher, is a significant contributing factor to MSD development.[2] Research has established a clear link between BMI and the occurrence of MSDs, particularly conditions like low back pain, which can result in disability. Low back pain affects a large proportion of the population in developed countries, with weight playing a crucial role in its development.[2-3] Individuals with a BMI of 25 kg/m² or higher are particularly susceptible to the effects of weight on back pain, regardless of their level of physical activity.[4]

Musculoskeletal disorders (MSDs) are a significant health concern that can have a profound impact on individuals, leading to pain and limitations in daily activities. It is suggested that a high Body Mass Index (BMI), particularly in cases of overweight and obesity, may be an independent risk factor for MSDs. [5-6]

Obese individuals often report adopting poor eating habits and avoiding physical activity in response to pain. While many studies have explored the association between BMI and musculoskeletal pain, factors other than sedentary lifestyle and physical inactivity that may contribute to altered BMI have not been thoroughly examined. Psychological factors, such as stress and anxiety, are prevalent in the general population and may play a role in BMI alterations.[7]

Stress, a common occurrence that affects individuals daily, has been linked to MSDs.[8] It can influence one's body image, leading to negative effects on psychological well-being. Body image, defined as thoughts, perceptions, and attitudes towards physical appearance, can be influenced by various triggers and societal pressures, especially regarding gender norms. Eating disorders, including Anorexia Nervosa, Bulimia Nervosa, and Binge Eating Disorder, can result from societal appearance ideals and pressures.[9-10] These

disorders affect people of all ages, genders, and backgrounds, with stress often exacerbating destructive behaviours. Stress from social and environmental factors can contribute to poor eating habits and worsen musculoskeletal issues in individuals with eating disorders.[11-12] Socioeconomic status (SES) is inversely associated with obesity in developed countries, where sedentary lifestyles are more prevalent due to technology use. In contrast, rural areas often have higher levels of physical activity due to outdoor engagement. While obesity rates are rising across all SES groups, there is variation in how SES and obesity are linked, emphasizing the complexity of this relationship.[13-15]

Limited research has focused on the association between body mass index (BMI) and musculoskeletal pain, specifically among patients seen by healthcare practitioners like physiotherapists. It is important to explore potential psychosocial factors that may contribute to musculoskeletal pain in these patients and determine if psychosocial issues are more prevalent in this population. This study also aims to investigate the correlation between socioeconomic status, BMI, and psychological factors. While some studies have examined the relationship between physical activity and stress, there is a gap in research regarding the links between psychological factors, BMI, and socioeconomic status. Thus, this study has been designed to explore the relationships between BMI, musculoskeletal pain, socioeconomic status, and psychological factors.

Method:

A cross-sectional correlation survey study was conducted. A survey of 5 questionnaires was prepared including the consent forms. A total of 101 subjects were recruited in the study, aged between 18 to 45 years with an equal ratio of men and women. The purpose of the study was explained to the participants. The places of recruitment were taken from Amity University, RML Hospital, and New Delhi. Inclusion criteria was young adults aged 18- 45 years, should understand English, both male and female. Exclusion criteria were history of neuromuscular disorder, current pregnancy or having delivered a child within the past year, cancer, other spinal disorders including metastatic disease, physical disability, non-cooperative patients, Cognitive impairment., history of any cardiovascular disorder, insufficient language skills or unable to follow the instructions.

Instruments used:

Body mass index formula (WHO): The body mass index (BMI) or Quetelet index is a value derived from the mass (weight) and height of an individual. The BMI is defined as the body mass divided by the square of the body height and is universally expressed in units of kg/m^2, resulting from mass in kilograms and height in meters.

Cohen's perception of stress: The Perceived Stress Scale was developed to measure the degree to which situations in one's life are appraised as stressful. Psychological stress has been defined as the extent to which persons perceive (appraise) that their demands exceed their ability to cope.

Modified Kuppuswamy socioeconomic status scale**:** socioeconomic factors questionnaire validated in both rural and urban population of India.

Orebro musculoskeletal pain questionnaire (OMPQ): The Orebro Musculoskeletal Pain Questionnaire (ÖMPQ), formerly known as the Acute Low Back Pain Screening Questionnaire (ALBPSQ), was developed to help identify patients at risk for developing persistent back pain problems and related disability.

IPAQ Short form Questionnaire: The International Physical Activity Questionnaire was developed to measure health-related physical activity (PA) in populations.

Eating disorder questionnaire: assess the abnormal eating habits. The higher the score, the higher the chances of symptoms.

Data Analysis

Data was collected and analysed on MS Excel sheet, with the help of statistical tools. The association between the categorical variables was analysed using a chi-square test and the level of significance was $p \leq 0.05$.

Result

The result compared the different variables like, musculoskeletal pain or complaints, perceived stress, physical activity, eating habits, body and weight perception and socioeconomic status with body mass index.

Result through correlation showed that, the correlation between body mass index and musculoskeletal pain is 0.231; a strong degree of correlation. The correlation between body mass index and perceived stress is 0.294; a strong degree of correlation. The correlation between body mass index and socioeconomic status is -0.032; a weak correlation and are inversely proportional. The correlation between body mass index and abnormal eating habits is 0.346; a strong correlation. The correlation between body mass index and physical activity is 0.379; a strong correlation The correlation between eating disorder and physical activity is 0.034; a weak correlation. The correlation between eating disorder and musculoskeletal pain is 0.1989; a very strong correlation. The correlation between eating disorder and perceived stress is 0.168; a very strong correlation. The correlation between eating disorder and socioeconomic status is 0.0295; a weak correlation.The correlation between perceived stress with physical activity is 0.296; a strong correlation. The correlation between perceived stress with socioeconomic status is 0.36; a very strong correlation.

STATUS	AVERAGE	SD	CR.(BMI/EDQ)	CR.(BMI/OMPQ)	CR.(BMI/PSS)	CR.(BMI/SES)	CR.(BMI/IPAQ)
IPAQ	4130	3932	-	-	-	-	**0.379®**
PSS	20	5.3	-	-	**0.2945®**	-	-
SES	23.6	3.97	-	-	-	**-0.032®**	-
EDQ	1.56	1.11	**0.3469®**	-	-	-	-
OMPQ	65.6	35.4	-	**0.2313®**	-	-	-
BMI	23.307	4.486	**0.3469®**	**0.2313®**	**0.2945®**	**-0.032®**	**0.379®**

Table 1: shows the correlation of body mass index with 5 different variables, i.e. EDQ, OMPQ, PSS, SES and IPAQ with their average and standard deviation

STATUS	AVERAGE	SD	CR.(EDQ/IPAQ)	CR.(EDQ/OMPQ)	CR.(EDQ/PSS)	CR.(EDQ/SES)
IPAQ	4130	3932	**0.034®**	-	-	-
PSS	20	5.3	-	-	**0.168®**	-
SES	23.6	3.97	-	-	-	**0.0295®**

EDQ	1.56	1.11	**0.034®**	**0.1989®**	**0.168®**	**0.0295®**
OMPQ	65.6	35.4	-	**0.1989®**	-	-
BMI	23.307	4.486	-	-	-	-

Table 2: shows the correlation of eating disorders with 4 different variables, i.e., OMPQ, PSS, SES and IPAQ with their average and standard deviation.

STATUS	AVERAGE	CR.(PSS/IPAQ)	CR.(PSS/SES)
IPAQ	4130	**0.296®**	-
PSS	20	**0.296®**	**0.36®**
SES	23.6	-	**0.36®**
EDQ	1.56	-	-
OMPQ	65.6	-	-
BMI	23.307	-	-

Table 3: shows the correlation of perceived stress with physical activity and socioeconomic status

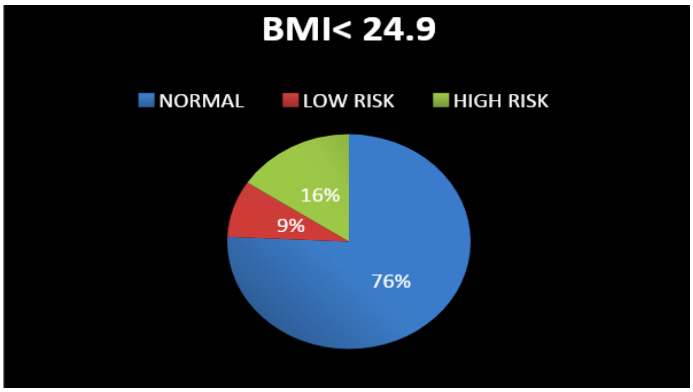

Figure 1. shows the association of BMI with musculoskeletal disorders among 69% of the population (normal BMI).

The association of body mass index with musculoskeletal disorder among 31% population (overweight/obese).The categorization out of 100% population (above 24.9): 18% of people lies under the safe category, 6% have high risk, and 7% with low risk.

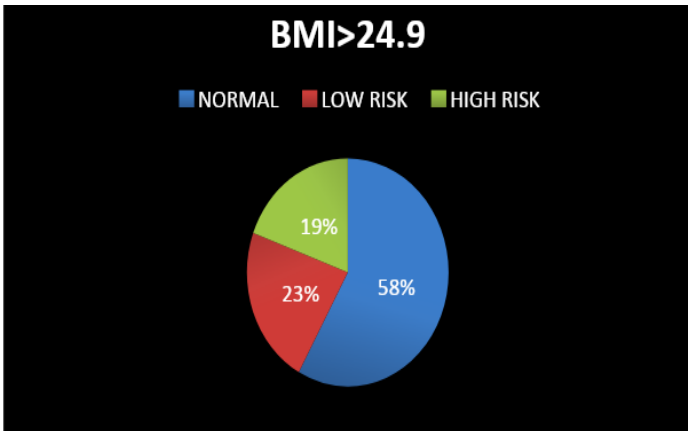

Figure 2. shows the association of body mass index with musculoskeletal disorders among 31% population (overweight/obese).

The correlation between body mass index and musculoskeletal disorder was 0.2313, indicating a positive correlation, with a significant result at P=0.00000063. The association of body mass index with perceived stress among 69% of the population (normal BMI).

The categorization out of 100% population (below 24.9) : 53 % of people lies under the average category, and 47% under high stress category

The association of body mass index with perceived stress among 31% population (overweight/obese).

The categorization out of 100% population (above 24.9) : 43% of people lie under the average category, and 57% of people lie under the high-stress category

The correlation between body mass index and perceived stress was 0.294, indicating a positive correlation, with the non-significant result at P=0.941The association of body mass index with physical activity among 69% population (normal BMI)

The categorization out of 100% population (below 24.9): 58% were physically active, 17% were moderately active, and 25% were under sedentary

The association of body mass index with physical activity among 31% population (obese/overweight)

The categorization out of 100% population (above 24.9): 63% were physically active, 12% were moderately active, and 25% were under sedentary

The correlation between body mass index and physical activity was 0.379, indicating a positive correlation, with a significant result at P=0.00000019. The association of body mass index with socioeconomic status among 69% population (normal BMI)

The categorization out of 100% population (below 24.9) : 46% of people lies in upper class, 37% upper middle class, and 17% lower class

Discussion

The study was conducted to find the correlation between body mass index with musculoskeletal pain, perceived stress, physical activity and socioeconomic status, the secondary aim of the study was to find the association between socioeconomic status and psychological factors, in 101 general populations. To achieve this, research was carried out and explored the effects of, BMI, musculoskeletal pain, abnormal eating patterns, physical activity, perceived stress and socioeconomic using different questionnaires. The strength of the study is that many studies have been done on the correlation of BMI and musculoskeletal disorder or BMI and physical activity and stress but, none of the studies directly emphasized the relationship of three different variables with BMI i.e., musculoskeletal disorder, socioeconomic status and psychological factors.

According to the findings of this study, it was concluded that there was a statistically significant and positive relationship between body mass index and musculoskeletal disorders. It was considered that high BMI was related to more musculoskeletal pain and complaints. The association of body mass index with musculoskeletal disorder and physical activity is the most important finding in this review. Increased body mass has a direct impact on individual due to problems such as pain and limitation of daily activities.

Disability and limitation of daily activity due to pain in the neck, shoulder and weight-bearing joints can cause significant musculoskeletal complaints among people

with high BMI. Viester L. et al 2013 conducted a study of the relationship between obesity and musculoskeletal disorder in the working population, which carried out the result that obesity (high BMI), was related to developing musculoskeletal symptoms. [16-17] Variation in body mass index from the normal value not only causes musculoskeletal disorders or pain among obese or overweight individuals but can also cause fractures due to low BMI, i.e. people under the category of underweight.[18] According to a study by Xiang BY.et al 2017, low BMI increases the risk of fractures because of low bone mineral density.[19] Hill JO. Et al 2005 conducted a study on the effects of physical activity in preventing and treating obesity. It carried out the result that weight gain and physical activity level are inversely proportional and high levels of physical activity may provide an advantage in helping achieve energy balance at a healthy weight. Similarly, the outcomes of this study concluded that people with normal or near normal body mass index were more physically active than people who were under the category of obese and overweight.[20] The study also concluded the relationship between body mass index and perceived stress. It was considered that people who were obese or overweight were suffering from high levels of stress. Supporting the study of Scott KA. et al (2012) which carried out the result that chronic social stress, often arising from poor interpersonal relationships, job or unemployment stress, poor self-esteem, and low socioeconomic status has been associated with obesity and its associated illnesses.[21-22]

Conclusion:

The study aimed to find the association between body mass index with musculoskeletal disorders, psychological factors and socioeconomic status. Through the study, it was concluded that there is a relationship between body mass index with musculoskeletal pain, with abnormal eating habits and level of physical activity. Stress level is linked with both body mass index and socioeconomic status. People having high symptoms of eating disorders were directly linked with a lack of physical activity and high-stress levels. Individuals with high body mass index are prone to develop musculoskeletal disorders and issues with weight and shape issues. Socioeconomic status was reported to be linked with high perceived stress levels.

Limitations:

The limitations of the study were small sample size, study duration, the use of body mass index category above and below 24.9 for convenience, vague analysis of eating disorder, the study did not test bone mineral density to check for low body mass, Orebro musculoskeletal pain questionnaire is more inclined towards low back ache, biochemical parameters would have been adopted such as vitamin D, and other disorders such as cardiovascular disorder or metabolic disorder would have also been considered. Therefore, although taking in consideration the limitations of the study, it can be considered that this research might be useful to study the association of body mass index and three variables, i.e musculoskeletal disorder, socioeconomic status and psychological factors

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19. "UNVEILING NEW HORIZONS IN FEMALE INFERTILITY CARE: THE PHYSIOTHERAPY PARADIGM"

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ABSTRACT

Female Infertility (F.I) is more common than most people think. Recent studies show as many as one inseven couples trying to have a baby will experience infertility. Physiological factors include obesity, irregular menses, pelvic adhesions due to abdominal pelvic surgery, inflammatory diseases.Psychological factors like stress, depression, anxiety were also seen. Physiotherapeutic management were specifically designed to address biomechanical dysfunction of the pelvic,sacrum, coccyx and restricted soft tissue and visceral mobility due to adhesion or microadhesions affecting reproductive organs and adjacent structures. Techniques including HIIT, WURN, Manual therapy was used to treat patient. Google Scholar, PUBMED, CINHAL, WoS were searched for eligible studies. The data across thestudies suggest that physiotherapeutic management decreases pain and facilitates fertility in women with wide array of adhesion related infertility and restore mobility by improving soft tissue mobility, elasticity and distensibility.

Keywords: *Female Infertility, WURN techniques, Microadhesions, Reproductive organ*

INTRODUCTION

According to WHO Infertility is "Inability to conceive a child after 2 years of regular sexual intercourse without contraception".In India, the prevalence ranges from 3.9%-16.8% which translates almost 27.5 million Indian couples suffering from this condition.Internationally one in every four couples in developing countries is affected by infertility.The current study will tell you how physiotherapy helps in female infertility care and the paradigm,our research underscores the potential of physiotherapy as a promising adjunctive approach to conventional infertility treatments. Through a comprehensive review of literature and clinical studies, we have observed the multifaceted contributions of physiotherapy techniques,electrotherapy also including pelvic floor exercises, manual therapy, and specialized exercise programs, in addressing various factors contributing to female infertility.

METHODOLOGY-

Google Scholar, PUBMED, CINHAL, WoS were searched for eligible studies. The data across the studies suggest that physiotherapeutic management decreases pain and facilitates fertility in women with wide

array of adhesion related infertility and restore mobility by improving soft tissue mobility, elasticity and distensibility.

The positive results of this study bridges the gap between new paradigm specially designed for holistic rehabilitation.

RESULTS

Result of this study mainly focuses at correcting Mechanical Infertility by using different physiotherapeutic approaches with safe precautions.

The whole study showed a positive result by the following ways

- Cost effective treatment
- Improve fertility.
- Improves soft tissue mobility, elasticity and distensibility.
- Increase inhibited Orgasm,dyspareunia & other sexual dysfunctions.
- Improve circulation & restore balance, functional ability of reproductive organs.

DISCUSSION-

The current study was performed to know how physiotherapy helps in female infertility care and the paradigm,our research underscores the potential of physiotherapy as a promising adjunctive approach to conventional infertility treatments. Through a comprehensive review of literature and clinical studies, we have observed the multifaceted contributions of physiotherapy techniques, including pelvic floor exercises, manual therapy, and specialized exercise programs, in addressing various factors contributing to female infertility.

Our findings highlight the significance of a holistic approach to infertility care, recognizing the interconnectedness of physical, emotional, and physiological aspects of reproductive health. Physiotherapy interventions not only target specific anatomical and biomechanical dysfunctions but also address broader factors such as stress management, hormonal balance, and overall well-being,with the help of physiotherapy techniques, including pelvic floor exercises, manual therapy, and specialized exercise programs, in addressing various factors contributing to female infertility which are crucial for optimizing fertility outcomes.

Furthermore, our research underscores the importance of interdisciplinary collaboration between physiotherapists, gynecologists, reproductive endocrinologists, and mental health professionals in delivering comprehensive care for women experiencing infertility. By integrating physiotherapy into existing fertility treatment protocols, we can enhance the efficacy, sustainability, and patient-centeredness of infertility care.

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20. COMPARATIVE EFFECT BETWEEN MET WITH K-TAPING VERSUS MET ALONE ON TRAPEZIUS MYALGIA ON PAIN, RANGE OF MOTION AND QUALITY OF LIFE AMONG YOUNG FEMALES. A RANDOMIZED CONTROLLED TRIAL

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ABSTRACT

INTRODUCTION: These days the vast majority of people are suffering from neck pain and one of the main causes of neck pain is myalgia.. Trapezius myalgia is known as muscle ache and pain is localized in the superior fibres of trapezius muscle.It is a chronic muscular pain in superior muscle fibers of trapezius muscles. Trapezius myalgia is commonly found among females. Kinesio taping and MET are also introduced in physiotherapy as a novel method which has recently emerged as a viable option to treat various musculoskeletal deficits. Therefore, the aim of this study is to evaluate the effects of K-Taping versus thermotherapy along with MET on trapezius myalgia (superior fibers) among young females. METHODOLOGY: It is a comparative study design. Study contains two groups with randomly assigned subjects- 15 each group (Group 1: kinesio taping, Group 2: MET). Inclusion Criteria: Adult Females of 18-30 years, history of pain in last from last 6 months. Exclusion Criteria: Recent cervical injury, Recent shoulder injury, History of Congenital disorder such as torticollis, sprengel shoulder,etc.Recent history of dental issues, patient on NSAID or Analgesics. The experimental group (I) will receive MET of trapezius, Hot pack for 10 minutes and k-taping for 3 days in a week. The controlled group (II) receives MET of trapezius, Hot pack for 10 minutes for 3 days in a week. Patients were assessed for Pain via VAS, ROM via Goniometer and QoL via NDI Scale. RESULT: There is a significant effect of K-tape and MET on Pain, ROM and QoL when with $p > 0.05$. MET alone has also shown significant effect on ROM with $p>0.05$ but has shown no effect of VAS and Qol with $p<0.05$. CONCLUSION: There is a significant effect of K-tape and MET on Pain, ROM and QoL when compared with MET alone on trapezius myalgia.

KEYWORDS: *Trapezius Myalgia AND MET AND K-Tape AND Physiotherapy AND Neck Pain*

INTRODUCTION

These days the vast majority of people are suffering from neck pain and one of the main causes of neck pain is myalgia1. Myalgia or Fibromyalgia is also termed as fibromyalgia syndrome (FMS) is a chronic widespread musculoskeletal disorder with aching pain, and stiffness, as well as tenderness on palpation at multiple sites, called tender points2,3.It occur most commonly among women in the 20-60 year old age group; 80-90% patients are women3. Trapezius myalgia(TM),is known as muscle ache and pain is localized in the superior fibers of trapezius muscle.It is a

chronic muscular pain in superior muscle fibers of trapezius muscles. Trapezius myalgia is commonly found among the Japanese, South African and Indian subcontinent. Gender seems to play an important role in the development of neck disorders, since the prevalence is much higher among women4.

Both pharmacological and non-pharmacological treatment is given to trapezius myalgia patients. Different medications which are useful in management are paracetamol, NSAID and antidepressant. But as per studies medication have a limited role in trapezius myalgia treatment to limit symptoms as they have some side effects. Therefore physical exercise is considered beneficial non pharmacological management for treating patients with trapezius myalgia5.

Physical therapy may aid to decrease the pain, stiffness, fatigue, functional disability and help in increasing quality of life, sleep cycle, range of motion, strength, etc. Numerous physical therapies are widely used in treating patients with trapezius myalgia. Exercises that can be done are:- shoulder shrugs, one-arm row, upright row and lateral raises6. Physical modalities such as TENS, LASER, thermotherapy and EMG biofeedback. Other manual therapies such as Ischemic compression, stretching of the upper trapezius muscle, transverse friction massage are manual techniques such as stretching exercises, strengthening exercises, etc to help patients with trapezius myalgia7.

Beside from the conservative method of physiotherapy, Kinesio taping (KT) is also introduced in physiotherapy as a novel method which has recently emerged as a viable option to treat various musculoskeletal deficits such as myalgia. It may reduce pain, regulate (facilitate or inhibit) muscle function, provide proprioceptive feedback, and stabilize joint8.

Both muscle energy technique (MET) and stretching are widely used techniques in the field of physiotherapy. MET is an advanced stretching technique. MET is a method of treatment that involves the voluntary contraction of a subject's muscle(s) in a precisely controlled direction, against a counterforce provided by the operator9. MET may be used to decrease pain, stretch tight muscles and fascia, reduce muscle tonus, improve local circulation, strengthen weak musculature and mobilize joint restrictions9.

From this study we will identify the comparative effects of k-tape and MET along with on pain and range of motion and QoL in patients of trapezius myalgia.

METHODOLOGY

Procedure:

It is a comparative study. The subjects were screened according to inclusion and exclusion criteria. Participants who fall under inclusion criteria and willing to be a part of research were asked to sign the informed consent. Inclusion Criteria: Adult Females of 18-30 years, history of pain in the last 6 months. Exclusion Criteria: Recent cervical injury, Recent shoulder injury, History of Congenital disorder such as torticollis, sprengel shoulder,etc.Recent history of dental issues, patient on NSAID or Analgesics.

After the baseline assessment of all the participants for range of motion by goniometer,

pain via NPRS and Qol via neck disability index (NDI) prio treatment. The subjects were randomly divided into groups via chit allocation method. Group 1 was the experimental group and group 2 was the controlled group.

GROUP 1: All the participants received MET for upper trapezius muscle , Hot pack for 10 minutes and k-taping (once a week) for 3 alternative days in a week for 2 weeks. GROUP 2: All the participants received MET of upper trapezius muscle, Hot pack for 10 minutes for 3 alternative days in a week for 2 weeks. (Fig 1,2)

All the participants were assessed at baseline and after 2 weeks of sessions.

DATA ANALYSIS

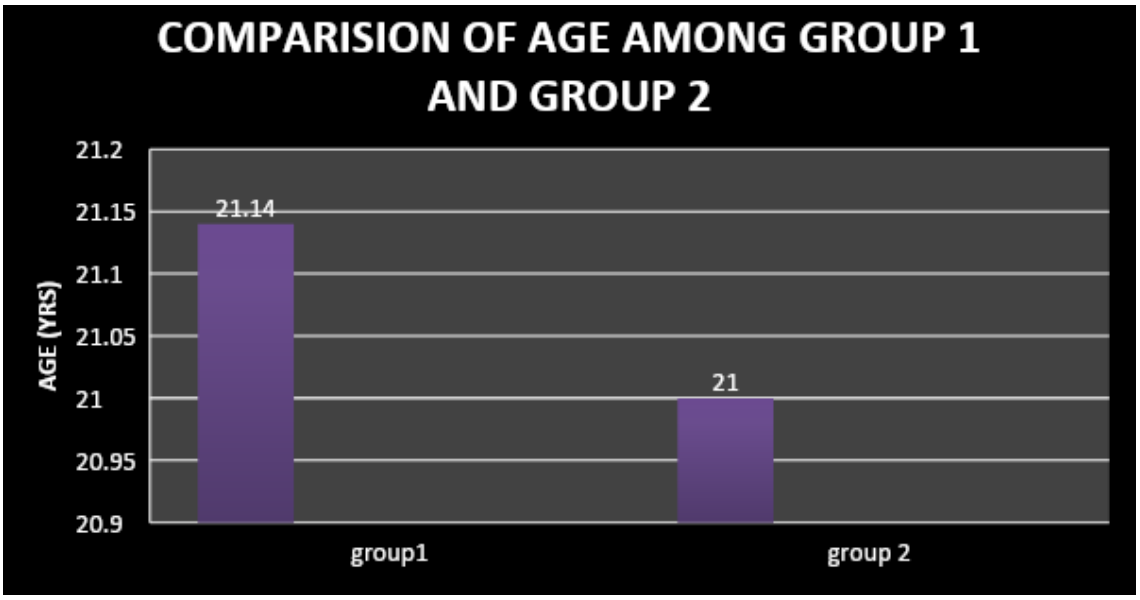
Data was analyzed using SPSS (Statistical Package for Social Sciences for windows) software, version 16. Paired + - test was used to compare the changes in the ROM, NPRS and NDI.

RESULT

Demographic data: Group 1 had 15 subjects with mean age 21.14. Group 2 along with had 15 subjects with mean age 21

	MEAN		SD	
	GROUP 1	GROUP 2	GROUP 1	GROUP 2
AGE	21.14	21	0.690066	0.57735

Table 1: Demographic data: depicting the mean and standard deviation of subject population in different groups



Graph 1: comparison of mean age among group 1 and group 2

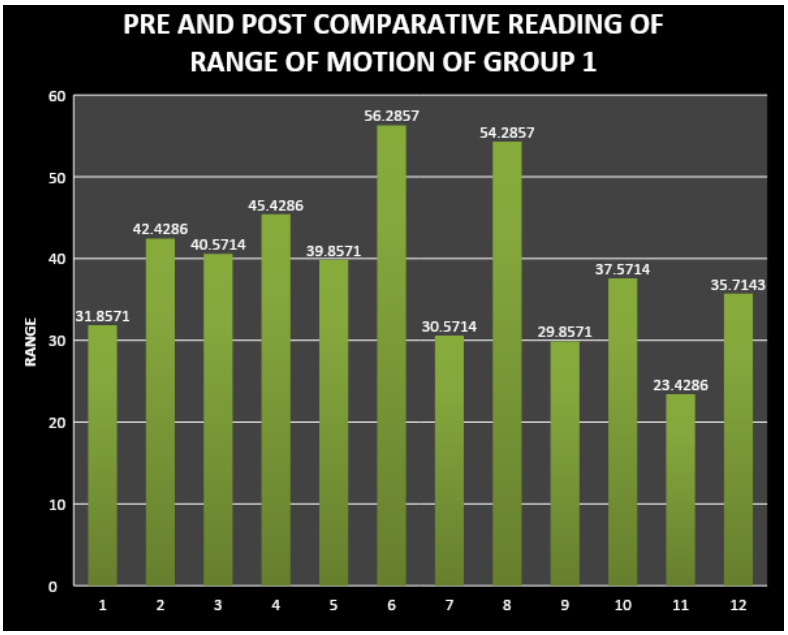
WITHIN GROUPS RESULT

GROUP 1

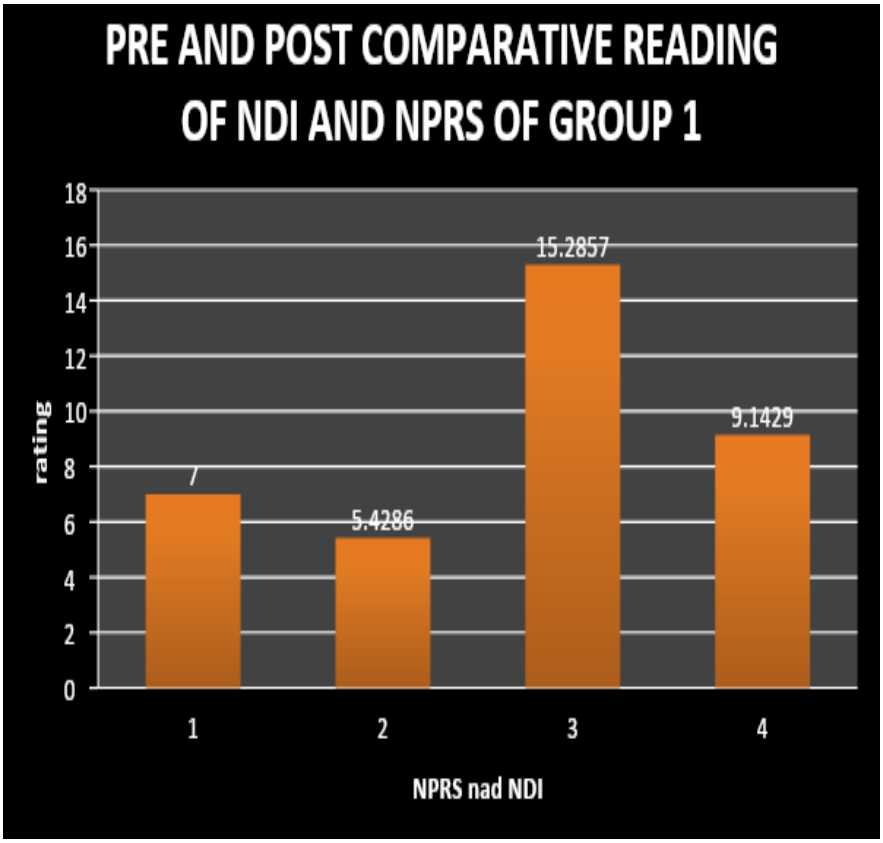
The analysis of cervical range of motion was done by analyzing the pre and post range of motion, NPRS and NDI are listed in table 2

		Std. Deviation	t	P
Pair 1	PREFLEXION	12.33462	-3.750	0.01
	POSTFLEXION	8.67673		
Pair 2	PRE EXTENSION	6.47707	-4.503	0.004
	POST EXTENSION	4.96176		
Pair 3	PRELATRORIGHT	10.55823	-5.136	0.002
	POSTLATRORIGHT	12.82854		
Pair 4	PRELATROLEFT	8.32380	-8.493	0.000
	POSTLATROLEFT	9.79310		
Pair 5	PRESIDERORIGHT	5.14550	-3.330	0.16
	POSTSIDERORIGHT	2.43975		
Pair 6	PRESIDEROLEFT	6.05137	-3.683	0.10
	POSTSIDEROLEFT	9.28645		
Pair 7	PRENPRS	.81650	7.783	0.00
	POSTNORD	.53452		
Pair 8	PRENDI	8.32094	4.088	0.05
	POSTNDI	7.33550		

Table 2: Depicting the comparison of mean values of range of motion, NPRS and NDI among group 1



GRAPH 2: Pre and post comparative reading of range of motion of group 1



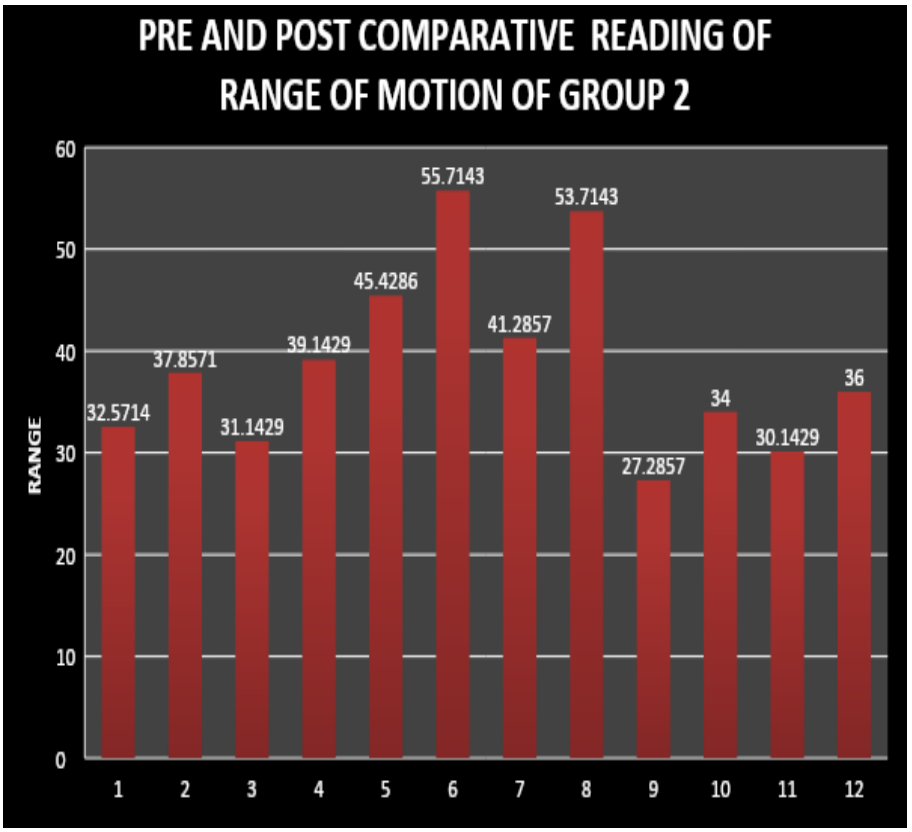
GRAPH 3: Pre and post comparative reading of NPRS and NDI of group 1

GROUP 2

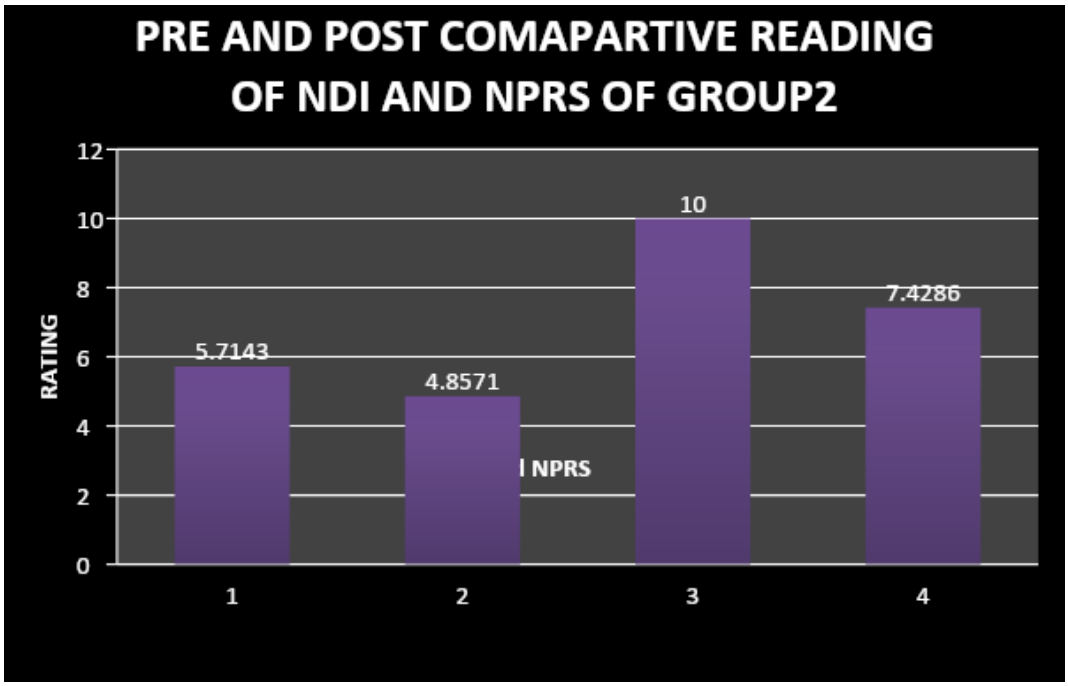
The analysis of cervical range of motion was done by analyzing the pre and post range of motion, NPRS and NDI are listed in table 3

		Std. Deviation	t	p
Pair 1	PREFLEXION	9.91392	-5.198	0.002
	POSTFLEXION	11.15689		
Pair 2	PRE EXTENSION	6.44020	-3.279	0.017
	POST EXTENSION	5.36745		
Pair 3	PRELATRORIGHT	8.56071	-3.224	0.018
	POSTLATRORIGHT	8.88284		
Pair 4	PRELATROLEFT	14.09154	-4.577	0.004
	POSTLATROLEFT	13.25034		
Pair 5	PRESIDERORIGHT	5.37631	-2.166	0.073
	POSTSIDERORIGHT	8.94427		
Pair 6	PRESIDEROLEFT	10.13950	-3.605	0.011
	POSTSIDEROLEFT	6.70820		
Pair 7	PRENPRS	1.11270	1.549	0.172
	POSTNORD	1.34519		
Pair 8	PRENDI	3.55903	2.274	0.063
	POSTNDI	3.90969		

Table 3: Depicting the comparison of mean values of range of motion, NPRS and NDI among group2



GRAPH 4: Pre and post comparative reading of range of motion of group 2



GRAPH 5: Pre and post comparative reading of NPRS and NDI of group 2

BETWEEN THE GROUP

The mean for flexion for group 1 and 2 are -10.57143, -5.28571 respectively. The comparison of flexion between the groups revealed that MET with K-taping is not significant with p value 0.10 whereas MET alone is significant with p value 0.02 on trapezius myalgia.

The mean for extension for group 1 and 2 are -4.85714, -8.0000 respectively. The comparison of extension between the groups revealed that MET with K-taping is significant with p value 0.004 whereas MET alone is not significant with p value 0.17 on trapezius myalgia.

The mean for lateral rotation (R) for group 1 and 2 are -16.42857,-10.28571 respectively. The comparison of lat. Rotation (R) between the groups revealed that MET with K-taping is significant with p value 0.002 whereas MET alone is not significant with p value 0.18 on trapezius myalgia.

The mean for lateral rotation (L) for group 1 and 2 are -23.71429,-12.42851 respectively.

The comparison of lateral rotation (L) between the groups revealed that MET with K-taping is significant with p value 0.000 whereas MET alone is significant with p value 0.04 on trapezius myalgia.

The mean for side rotation (R) for group 1 and 2 are -7.71429,-6.71429 respectively. The comparison of side Rotation (R) between the groups revealed that both groups are not significant with p value 0.16 and 0.73 on trapezius myalgia.

The mean for side rotation (L) for group 1 and 2 are -12.28571,-5.85714 respectively. The comparison of side Rotation (L) between the groups revealed that both groups are not significant with p value 0.10 and 0.11 on

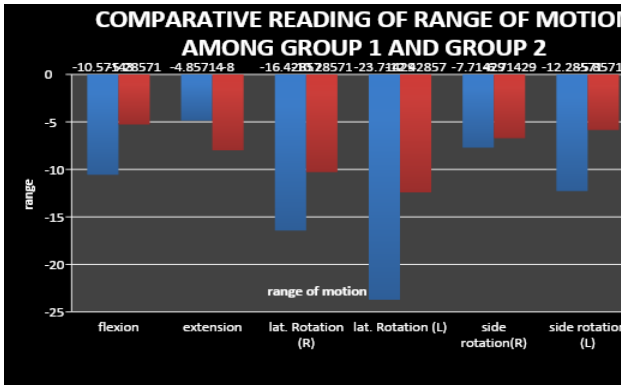
trapezius myalgia.

The mean for NPRS for group 1 and 2 are 1.5714, 0.85714 respectively. The comparison of NPRS between the groups revealed that

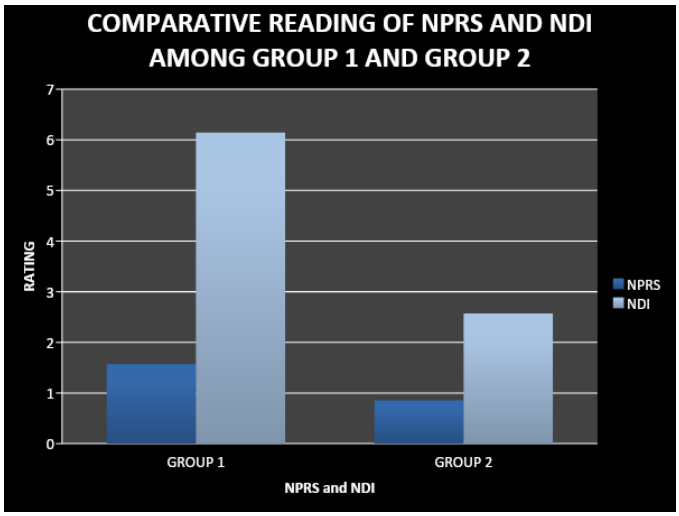
MET with K-taping is significant with p value 0.000 whereas MET alone is not significant with p value 0.172 on trapezius myalgia.

The mean for NDI for group 1 and 2 are 6.14286, 2.57143 respectively.

The comparison of NDI between the groups revealed that MET with K-taping is significant with p value 0.05 whereas MET alone is not significant with p value 0.63 on trapezius myalgia.



GRAPH 6: Comparative range of motion among group 1 and group 2



GRAPH 7: Comparative reading of NPRS and NDI among group 1 and group 2

DISCUSSION

The purpose of conducting this study is to find out the comparative effect of K-taping versus thermotherapy along with stretching on trapezius myalgia. It is observed that MET along with K-taping is more effective as compared to MET alone on trapezius myalgia.

According to a number of ideas, K-tape activates cutaneous mechanoreceptors in the taped area, which may have an impact on range of motion. The use of K-tape may help activate muscles, which may have caused tension in the trapezius muscle, affecting range of motion. It also preserves normal alignment, providing a sustained stretch to the tight tissues surrounding the neck and shoulder. Additionally, kinesio tape lengthens and positions short, hyperactive muscles; it also shifts the length-tension curve to the right, reduces the amount of actin-myosin overlap in the cross-bridge cycle, diminishes the creation of muscular force, and enhances range of motion. These two hypotheses don't explain why side rotation and flexion are

affected by kinesio tape. [10]

The possible reason behind the significance of MET alone on flexion ROM, studies reveal that heat is able to potentiate the ability of stretching to increase flexibility. Increased ROM could result from one or a combination of the following: 1) improved flexibility of connective tissue,2) altered viscoelastic properties, 3) addition of sarcomeres or 4) altered sensation of stretch [11].

According to published research, the K-tape mechanism might be connected to the skin's lowered subcutaneous nociceptor pressure. According to a different theory, afferent impulses applied to the soft tissue structures may facilitate a pain-inhibiting mechanism and activate the gait control system, all of which would lower the patient's degree of discomfort [12].

Its provision of appropriate sensory feedback during cervical spine motions may have contributed to the relative decrease in NDI by reducing mechanical irritation of the soft tissues. By increasing patient awareness and compliance with ergonomic principles, this sensory input may help. When the patient brought their head back to a neutral posture, the strain in the tape could have also caused tension in the soft tissue structures. Furthermore, it's also likely that the patients' pain levels were lowered by the tension in the tape acting as an afferent stimulus and enabling pain inhibitory systems (gate control hypothesis). It's conceivable that inhibitory processes helped the tape reduce discomfort. The potential exists for Kinesio Tape application to give patients appropriate sensory feedback, thus reducing [12].

LIMITATION AND FUTURE SCOPE

- Size of the sample was small.
- Number of days of session should be increased to check further results.
- Other perspectives can be added in the study to make appropriate research.

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21. "STRENGTH, STABILITY AND SUPPORT: PHYSIOTHERAPY MANAGEMENT FOR SARCOPENIA AND GRAVITATIONAL INSECURITY IN ACUTE LYMPHOBLASTIC LEUKEMIA"

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ABSTRACT

Acute lymphoblastic leukemia (ALL) affects mainly leukocytes and is most prevalent among children, often with a favorable prognosis. However, it can also occur in adults with poorer outcomes. Symptoms include bleeding gums, bone pain, fever, frequent infections, nosebleeds, and fatigue. Cancer and its treatment can significantly impact muscle mass, function, and quality of life in children with ALL. Research indicates an 8.5 times higher risk of musculoskeletal issues and 1.9 times greater likelihood of performance limitations in these patients. This study aims to explore various physiotherapy techniques for managing ALL. A case study involving a 4-year-old child receiving physiotherapy interventions for two months showed positive outcomes, including improved gait pattern, muscle strength, range of motion (ROM), and reduced gravitational insecurity. The study reviewed relevant literature from sources like Google Scholar and PubMed. Both the literature and our case study suggest that techniques such as resistance training, circuit training, balance training, trunk control exercises, swing use, and gait training are effective in preventing or mitigating sarcopenia and gravitational insecurity in ALL patients.

Keywords: *Sarcopenia, Acute Lymphoblastic Leukemia, Gravitational insecurity*

INTRODUCTION

Acute lymphoblastic leukemia (ALL) is a blood cancer primarily affecting leukocytes, most commonly found in children with generally favorable outcomes.

However, adults diagnosed with ALL tend to have a poorer prognosis. The treatment of cancer can profoundly affect muscle mass, function, and overall physical performance, significantly impacting the quality of life in children with ALL.

Research indicates that ALL patients are 8.5 times more likely to experience musculoskeletal problems and 1.9 times more likely to face performance limitations.During cancer treatment, secondary sarcopenia often develops, particularly in patients who are bedridden and lack physical activity, resulting in a daily muscle mass loss of around 2%, primarily affecting muscles like the quadriceps femoris which undergo atrophy.

Muscle weakness is a critical issue during chemotherapy for childhood hematological cancers, exacerbated by prolonged hospitalization, unfavorable physical conditions, and restricted mobility.

While sarcopenia is well-documented in geriatric medicine, there is limited literature on its occurrence in pediatric patients with hematological malignancies.

Gravitational insecurity is characterized by a fearful or anxious response to seemingly benign movements such as changes in head position, being off balance, or not having both feet firmly on the ground.

METHODS

We conducted searches on Google Scholar, PUBMED, and CINHAL to identify relevant studies. The findings from these studies indicate that physiotherapy interventions aimed at managing secondary sarcopenia in ALL patients can mitigate muscle atrophy risks and contribute to enhanced muscle girth and strength. Additionally, strategies such as balance training and the use of swings were found beneficial in addressing gravitational insecurity, helping patients regain confidence in their movements.

RESULTS

While doing the case report, we found that different types of exercise, stretching, balance training, gait training, have positive effects in significantly reducing tightness and improving mobility. It shows that the resistance training, circuit training, balance training, trunk control, use of swing & gait training can significantly prevent/reduce sarcopenia and gravitational insecurity as well. After 2 months of intervention, she is able to stand without support & able to walk with rollator. Her muscle strength and ROM improved. Now she is more active than before

DISCUSSION

The resistance and circuit training emphasis on muscle strength. Balance training & trunk control exercises to improve her balance & that's help her a lot in gaining confidence & fight with her gravitational insecurity. Nutrition plays very important role in treating secondary sarcopenia. Standing with swiss ball (wall supported) with the help of equipments the gait training, side walking with rail to promote walking. We can use electrostimulation in sarcopenia as well according to some studies but in this case report we have not used electrostimulation

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SECTION III-CASE STUDY

CASE STUDY ON TENNIS ELBOW

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ABSTRACT

Introduction: In everyday activities or occupations requiring repetitive hand movements, individuals may experience discomfort in their arms, particularly the elbows, which is considered a significant risk factor for tennis elbow. Tennis Elbow is a disorder impacting the muscles and tendons located on the outer part of the elbow, typically caused by repetitive stress or overuse. This condition results in pain and tenderness on the exterior of the elbow joint., caused by inflammation where the forearm extensor muscles attach to the humerus. It ranks as the second most prevalent musculoskeletal issue in the upper extremity, affecting among 1-3% of the general population, with higher prevalence among individuals aged 35-55, particularly men. Case Presentation: A 46year old housewife reports experiencing persistent pain in left elbow in the last 6 months, affecting her ability to grip, lift objects, knead dough, and wring clothes. Management and Outcomes: The patient undergoes through weekly assessment and management by focusing on pain relief through modalities including ultrasound, TENS, cryotherapy, passive range of motion exercises, gentle static stretching, and home care emphasizing rest, icing, and activity modification. Discussion: This case study provides a comprehensive overview of the presentation, diagnosis, and management of Tennis Elbow. It emphasizes the significance of a precise diagnosis through detailed history-taking and specialized tests like Cozen's and Mill's tests. Treatment focused on conservative modalities aligns with conventional best practices, aiming to relieve pain, restore function, and anticipate recurrence. Ongoing evaluation and adjustment of treatment underscore the complexity of controlling Tennis Elbow effectively, highlighting the necessity of a tailored, multidisciplinary strategy for optimal patient outcomes. Conclusion: Management of Tennis Elbow in this patient underscores the comprehensive approach necessary to manage this common musculoskeletal condition effectively. Through a comprehensive assessment encompassing subjective complaints, objective evaluations, and differential diagnoses, a tailored treatment plan was formulated, emphasizing conservative modalities to alleviatepain, enhance functional capacity, and mitigate the risk of recurrence

Keywords - *Tennis elbow, lateral epicondylitis, comprehensive approach, exercise protocol, conservative treatment, and elbow pain management, musculoskeletal disorder, repetitive stress injury*

Introduction

Lateral epicondylitis, colloquially referred to as Tennis Elbow, manifests as an injury to the intricate network of muscles and tendons enveloping the outer aspect (lateral) of the elbow. This condition typically arises from the cumulative strain or repetitive stress imposed on these structures, eliciting symptoms such as pain and tenderness localized at the lateral epicondyle of the humerus. This discomfort stems from a non-specific inflammatory response occurring at the origin of the forearm's extensor muscles. Notably, Tennis Elbow is characterized as a degenerative condition rather than an inflammatory one, wherein the merging of forearm muscle bellies into tendons creates heightened stress points upon insertion into the elbow bone.

Epidemiologically, Tennis Elbow ranks as the second most prevalent musculoskeletal ailment

affecting the upper extremities, with a greater incidence observed in males compared to females., (Gliedt and Daniels, 2014). It primarily afflicts individuals aged between 35 to 55 years, with a predilection for the dominant arm over the non-dominant one., (Jones, 2009a) Prevalence rates among the general populace range from 1 to 3%, (Gliedt and Daniels, 2014) escalating with advancing age to approximately 10%. (Richer et al., 2017).

Symptoms such as heightened discomfort in the evening, morning stiffness accompanied by a burning sensation, and exacerbated pain during gripping activities are typical features of TE, as noted by Bisset and Vicenzino, 2015). The primary cause of tennis elbow is the tendency of the extensor carpi radialis brevis muscle tendon to get injured due to poor blood supply, especially where the tendons are closer to the insertion point at the lateral epicondyle. Recent studies suggest that conservative treatments could potentially restrict the progression of this tendinosis (do Nascimento et al., 2019; Marchand et al., 2014), Limited mobility of a nerve caused by entrapment can result in changes in sensitivity to mechanical stimuli (Boyd et al., 2017; Jefferson-Falardeau and Houle, 2019), which may present as reduced blood flow, pain, and inflammation (Dilley et al., 2005).Radial nerve entrapment at three distinct anatomical sites implicates neural tissue involvement in patients with tennis elbow (Arumugam et al., 2014). Previous research has linked adverse radial tension to tennis elbow pain. Therefore, evaluating radial nerve mobility is recommended for patients with this condition. Certain manual therapy techniques, due to their neurophysiological effects, have shown superior efficacy compared to other physiotherapeutic methods in improving grip strength and alleviating pain.

Case Presentation

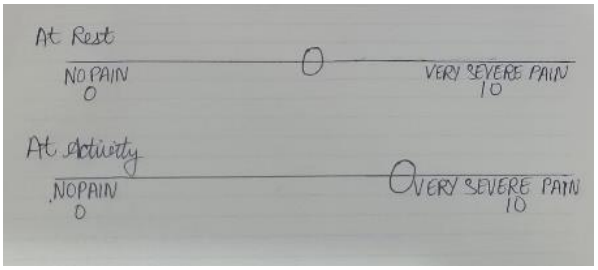
A 46-year-old woman homemaker, residing in Kamla Nagar, Delhi, presents with a predominant right-hand dominance expresses distress regarding persistent pain along the left elbow's lateral aspect for six months, precipitating difficulties in gripping objects, lifting weights, and performing manual tasks such as dough kneading and cloth squeezing.

HISTORY

Patient history revealed gradual onset of left lateral epicondylar pain since past six months, which has significantly impacted her manual dexterity and caused discomfort that has aggravated by specific activities such as wringing cloths, making dough, gripping, and lifting objects and relieved by rest. Severity of Pain: Level 6 (constant dull aching pain at rest that does not disturb sleep).

Intensity of Pain (VAS):

At Rest: 5/10



During Activity: 7/10

No significant past surgical or medical history was noted, except for a similar issue in the right elbow, for which intra-articular steroid injection was administered. Occupational history revealed repetitive twisting movements of the wrist and forearm.

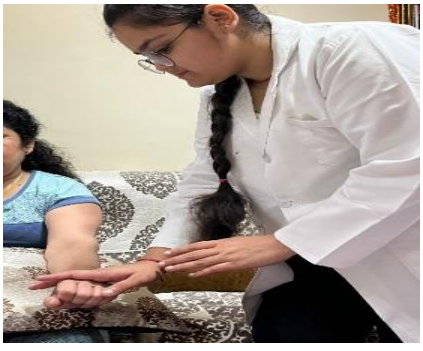
OBJECTIVE ASSESSMENT

ON OBSERVATION

General observations indicated normal psychological status, posture, gait, and absence of external appliances. Local examination revealed no swelling, deformity, or muscle wasting, with normal skin characteristics. On palpation, vital signs were within normal limits, with tenderness present over the left lateral epicondyle graded as 2. No spasm or scar tissue was noted.

ON EXAMINATION

Motor examination unveiled limited range of motion and muscle strength, particularly in wrist and elbow movements, with positive results on special tests like Cozen's, Mill's, Maudsley's, and Wringing tests, all yielded positive findings supporting the provisional diagnosis of lateral epicondylitis.



Cozen's Test – Positive

Mill's Test – Positive

Maudsley's Test – Positive
Differential diagnosis included cervical radiculopathy, elbow and forearm overuse injuries, and radial nerve entrapment.

INVESTIGATIONS
X-rays showed no apparent pathology, while MRI revealed degenerative changes in the elbow extensors.

PROVISIONAL DIAGNOSIS
Tennis elbow
FUNCTIONAL ASSESSMENT:
Functional Scale (PRTEE): Function subscale score is 42, total score is 90.

Patient-Rated Tennis Elbow Evaluation:
Detailed questionnaire completed by the patient assessing pain and functional disability.

Detailed questionnaire completed by the patient assessing pain and functional disability.

1. PAIN in your affected arm

*Rate the average amount of pain in your arm **over the past week** by circling the number that best describes your pain on a scale from 0-10. A **zero** (0) means that you **did not have any pain** and a **ten** (10) means that you had **the worst pain imaginable.***

RATE YOUR PAIN:	No Pain										Worst Imaginable
When your are at rest	0	1	2	3	4	5	6	7	8	9	10
When doing a task with repeated arm movement	0	1	2	3	4	5	6	7	8	9	10
When carrying a plastic bag of groceries	0	1	2	3	4	5	6	7	8	9	10
When your pain was at its least	0	1	2	3	4	5	6	7	8	9	10
When your pain was at its worst	0	1	2	3	4	5	6	7	8	9	10

2. FUNCTIONAL DISABILITY

A. SPECIFIC ACTIVITIES

*Rate the **amount of difficulty** you experienced performing each of the tasks listed below, over the past week, by circling the number that best describes your difficulty on a scale of 0-10. A zero (0) means you did not experience any difficulty and a **ten (10)** means it was **so difficult you were unable to do it at all**.*

	No Difficulty										Unable To Do
Turn a doorknob or key	0	1	2	3	4	5	6	7	8	9	10
Carry a grocery bag or briefcase by the handle	0	1	2	3	4	5	6	7	8	9	10
Lift a full coffee cup or glass of milk to your mouth	0	1	2	3	4	5	6	7	8	9	10
Open a jar	0	1	2	3	4	5	6	7	8	9	10
Pull up pants	0	1	2	3	4	5	6	7	8	9	10
Wring out a washcloth or wet towel	0	1	2	3	4	5	6	7	8	9	10

B. USUAL ACTIVITIES

*Rate the **amount of difficulty** you experienced performing your **usual** activities in each of the areas listed below, over the past week, by circling the number that best describes your difficulty on a scale of 0-10. By "usual activities", we mean the activities that you performed **before** you started having a problem with your arm. A **zero** (0) means you did not experience any difficulty and a **ten** (10) means it was so difficulty you were unable to do any of your usual activities.*

1. Personal activities (dressing, washing)	0	1	2	3	4	5	6	7	8	9	10
2. Household work (cleaning, maintenance)	0	1	2	3	4	5	6	7	8	9	10
3. Work (your job or everyday work)	0	1	2	3	4	5	6	7	8	9	10
4. Recreational or sporting activities	0	1	2	3	4	5	6	7	8	9	10

ELBOW SPLINTING

ULTRASOUND

CRYOTHERAPY

TREATMENT GOALS:

Short Term Goals:

- Pain relief.
- Increased range of motion (ROM).
- Improved flexibility.

Long Term Goals:

- Maintenance of joint and structural integrity.
- Improvement in muscle strength.
- Cardiovascular conditioning.

TREATMENT:

- Non-Conservative Treatment: Surgery not indicated.

- Conservative Treatment:
- Medical: Ibuprofen, Diclofenac gel.

- Physiotherapy:
  Modalities (ultrasound, TENS, cryotherapy)
  - Elbow splint
  - Cryotherapy – For 10 mins after every 2 hours
  - Ultrasound - For 5 mins for 3 weeks (Intensity-1.5 W/cm2, Frequency-1 Mhz)
  - TENS (4 pole) – For 15 mins

Exercises

Deep Friction Massage – For 10 mins for 3 weeks
Radial Nerve Mobilisation – For 3 weeks

Stretching:
Wrist Flexor Stretching

Weeks	Dosage
Week 1	1 Set 10 Repetitions 10 Secs hold
Week 2	2 Set 10 Repetitions 10 Secs hold
Week 3	3 Set 10 Repetitions 10 Secs hold

Wrist Extensor Stretching

Weeks	Dosage
Week 1	1 Set 10 Repetitions 10 Secs hold
Week 2	2 Set 10 Repetitions 10 Secs hold
Week 3	3 Set 10 Repetitions 10 Secs hold

Note: 1 min break is given between every sets

Strengthening:
Wrist Flexor Strengthening

Weeks	Dosage
Week 1	-
Week 2	1 Set 10 Repetitions 3 Secs hold
Week 3	3 Set 10 Repetitions 10 Secs hold

Wrist Extensor Strengthening

Weeks	Dosage
Week 1	-
Week 2	1 Set 10 Repetitions 3 Secs hold
Week 3	3 Set 10 Repetitions 10 Secs hold

Supinator Strengthening

Weeks	Dosage
Week 1	-
Week 2	1 Set 10 Repetitions 3 Secs hold
Week 3	3 Set 10 Repetitions 10 Secs hold

Pronator Strengthening

Weeks	Dosage
Week 1	-
Week 2	1 Set 10 Repetitions 3 Secs hold
Week 3	3 Set 10 Repetitions 10 Secs hold

Grip Strengthening

Weeks	Dosage
Week 1	-
Week 2	1 Set 10 Repetitions 3 Secs hold
Week 3	3 Set 10 Repetitions 10 Secs hold

Note: 1 min break is given between every sets

Deep transverse friction massage

Stretching of elbow flexors & extensors

Wrist flexor and extensor strengthening Pronator and supinator strengthening

Grip Strenthning

HOME ADVICE

- Give rest to your elbow.
- Use cold pack regularly.
- Avoid activities that aggravate the pain.
- Use elbow splint.

DISCUSSION:

This case study highlights several pertinent aspects regarding the presentation, diagnosis, and management of lateral epicondylitis. Firstly, the clinical presentation of Tennis Elbow often mirrors patient's experience, characterized by gradual onset, localized pain, and functional limitations, particularly during activities necessitating repetitive wrist and forearm motions. Such manifestations underscore the importance of a thorough history-taking and clinical examination to elucidate the underlying pathology accurately.

Furthermore, the differential diagnosis considered in this case underscores the necessity of ruling out alternative etiologies, such as cervical radiculopathy or radial nerve entrapment, to

ensure accurate diagnosis and tailored treatment planning. The utilization of specialized tests, including Cozen's and Mill's tests, proved instrumental in confirming the diagnosis of lateral epicondylitis, thereby informing the subsequent management strategy.

The treatment approach adopted for this patient, predominantly comprising conservative modalities such as pharmacotherapy, physiotherapy, and home-based interventions, aligns with current best practices in managing Tennis Elbow. Emphasis on pain relief, restoration of range of motion, strengthening exercises, and preventive measures underscores the holistic nature of treatment, aiming not only to alleviate symptoms but also to address underlying biomechanical imbalances and prevent disease recurrence.

Moreover, the phased approach to treatment evaluation, as evidenced by patient's progression over successive weeks, highlights the importance of ongoing monitoring and adjustment of management strategies based on individual patient responses. Healthcare providers can optimize patient outcomes and enhance functional recovery by continuously evaluating the effectiveness of treatments and adjusting interventions as needed.

In summary, the case study of this patient underscores the complexity inherent in managing Tennis Elbow, emphasizing the need for a comprehensive and individualized approach encompassing accurate diagnosis, targeted interventions, and ongoing evaluation. Through a collaborative effort between patients, healthcare providers, and allied professionals, optimal outcomes can be achieved, facilitating a return to pain-free functionality and improved quality of life for individuals afflicted with this common musculoskeletal ailment.

CONCLUSION:

In conclusion, the management of Tennis Elbow in this patient underscores the multifaceted approach required to address this prevalent musculoskeletal condition effectively. Through a comprehensive assessment encompassing subjective complaints, objective evaluations, and differential diagnoses, a tailored treatment plan was formulated, emphasizing conservative modalities to alleviate pain, enhance functional capacity, and mitigate the risk of recurrence.

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EFFECTIVE PHYSIOTHERAPY INTERVENTIONS FOR BICEPS TENDINITIS: A CASE STUDY

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ABSTRACT

A 52-year-old man visited physiotherapy department complaining pain in his right shoulder . The pain worsens when he lies on that shoulder, engages in overhead activities, or rides a motorcycle for extended periods. These symptoms have gradually worsened, causing significant discomfort and hindering his daily activities. Upon physical examination, tenderness was noted in the front of the shoulder, and the patient exhibited restricted shoulder movement: difficulty with raising the arm, moving it away from the body, and rotating it internally, with slight limitations in external rotation and backward movement. He has been prescribed a six-week rehabilitation protocol at our outpatient department. The physiotherapy treatment plan takes a comprehensive approach, incorporating exercise therapy, manual techniques, electrotherapy, ergonomic advice, and guidance on self-care for managing his condition

KEYWORDS–*Long head of biceps tendon, biceps tendinitis, eccentric concentric exercises, proprioception, rotator cuff strengthening.*

INTRODUCTION

The supraglenoid tubercle and superior glenoid labrum are the origins of the long head of the biceps brachii tendon. The tendon, which passes obliquely towards the bicipital groove, is extra synovial inside the shoulder joint. After leaving the distal bicipital groove, the long head tendon in the biceps joins the short head tendon. In the middle portion of the upper arm, each tendon transitions into its corresponding muscle belly. The biceps brachii continues as the bicipital aponeurosis after crossing the cubital fossa, inserting on the medial forearm fascia 1 and radial tuberosity. A deep, throbbing pain in the anterior shoulder is the typical complaint of patients with biceps tendinitis. The symptoms are brought on by or made worse by repetitive arm motions overhead. When biceps tendinitis is isolated, the most frequent clinical result is bicipital groove point tenderness with the arm in 10 degrees of internal rotation[14]

Biomechanics

The biceps brachii is mostly a weak elbow flexor and a powerful forearm supinator. The principal forearm flexor is the brachialis.
In terms of function, the biceps are a weak elbow flexor and a powerful forearm supinator. It is, nevertheless, more active when the forearm is supinated than when it is pronated. 1.

Blood supply

The brachial artery's muscular branches provide the main arterial blood supply to the brachial muscle in the biceps.[1.]

Nerve supply

The biceps receive their sensory and motor innervation from the musculocutaneous nerve. This nerve is a terminal branch of the lateral cord of the brachial plexus, originating from the C5 and C6 spinal roots.

ETIOLOGY

A clinical form of inflammatory tenosynovitis known as "biceps tendonitis" typically affects the tendinous region of the long head of the bone as it passes through the proximal humerus' bicipital groove. Acute inflammatory tendinitis to degenerative tendinopathy are on the spectrum of clinical pathology.

Primary biceps tendinitis is the inflammation of the biceps tendon within the intertubercular (bicipital) groove. Patients between the ages of 18 and 35 who participate in sports, such as throwing and contact sports, swimming, gymnastics, and martial arts, are more likely to have biceps tendon pathology. Secondary impingement of the biceps tendon is common in these patients and can be attributed to laxity of the anterior capsule, tightness of the posterior capsule, scapular instability, or instability of the shoulder ligaments. Soft tissue labral tears or rotator cuff tears that expose the biceps tendon to the coraco-cromial arch can also result in secondary impingement.[14]Volleyball, softball, and baseball are among the provocative sports.[2]

Other associated shoulder pathologies include

- Rotator cuff tendinitis and tendinopathy
- Subscapularis injuries
- LHB tendon instability or dislocation
- Subscapularis tears
- Direct or indirect trauma
- Inflammatory conditions
- Internal impingement of the shoulder
- Glenohumeral internal rotation deficit (GIRD)
- Superior labral lesions
- Subacromial impingement syndrome (SIS)
- Glenohumeral arthritis

PATHOPHYSIOLOGY

The early stages of tenosynovitis and inflammation brought on by repeated traction, friction, and shoulder rotation are the starting point for the pathogenesis of LHB tendinitis/tendinopathy. Early on, inflammation appears in the tendinous area of the bicipital groove. The tendon becomes more prone to mechanical irritation in its limited space due to an increase in diameter caused by edema or accompanying haemorrhage.

Vascular compromise, fibrosis, and thickening of the long head of biceps sheath follow an increase in pathophysiology. Under advanced, end-stage conditions, the long head of biceps tendon experiences degenerative changes that lead to scarring, fibrosis, and adhesions that impair the tendon's mobility. Eventually, the tendon may rupture at its origin, close to the superior glenoid tubercle, or as it exits the bicipital groove, close to its musculotendinous junction.[2]

CASE REPORT

HISTORY

A 52-year-old man who works as a hospital medicine delivery driver came to the physiotherapy department complaining of soreness in his right shoulder. Patient's main complaint upon arriving at the physiotherapy outpatient department was right shoulder ache. A dull, excruciating pain over the anterior region of the left shoulder joint, spreading to the upper arm, was experienced during movement. This pain made it difficult to do overhead tasks and prevented the person from pushing, pulling, or lifting large objects. There was discomfort when performing ADLs and vocational chores. When he sleeps on the affected shoulder, lifts heavy objects, or rides a motorbike for extended periods of time, the agony gets worse.

Upon examination, he showed little forward flexion and had trouble rotating internally. A palpation indicated pain that went to the elbow but not below the bicipital tendon. Scapular, deltoid, pectoralis major, and trapezius muscles were all shown to be tense. When the patient was first observed, their right upper arm was adducted, their shoulder joint was shrugging, and they had a somewhat internally rotated posture. When the patient's right shoulder was palpated, they felt grade 3 soreness across the anterior region of them. The results of Yergason's test was positive for the right

shoulder joint assessment.

OUTCOME MEASURE

The Visual Analogue Scale was used to measure the degree of pain, and a universal goniometer was used to measure the shoulder's range of motion.

Certain special tests which were performed and came out to be positive to rule out the diagnosis were as follows:-

SPECIAL TEST

Yeargason's test: The patient is instructed to try supination of the forearm while the doctor holds the wrist and resists the motion while the patient is seated with the elbow bent to 90° and the forearm fully pronated.The patient was instructed to try to supinate their forearm against resistance while keeping their elbow and shoulder in the proper positions.[3]

Speed's test: In order to perform Speed's test, the patient's arm is first placed in shoulder flexion, then external rotation, complete elbow extension, and lastly forearm supination. The examiner creates resistance by lowering the patient's arm. If the patient has discomfort in the bicipital tendon or bicipital groove, the test will be positive.[4]

Neer's test: In this test, pain is shown when the arm is passively abducted while the scapula is stabilised. The arm is internally rotated and positioned in the scapular plane by the examiner. If there is a noticeable decrease in or elimination of discomfort, the test is considered successful.[4]

FUNCTIONAL ASSESSMENT

The purpose of the SPADI was to allow patients to assess their own level of shoulder pain and discomfort when engaging in daily activities. There are 13 elements total, with 5 related to pain and 8 related to disability.[5]

SPADI Score – 40 points i.e equal to 30% (moderate shoulder pain and disability)

TREATMENT

Acute recovery phase [0-1 week]

- Cryotherapy over the bicipital groove[6]
- Ultrasound therapy with intensity of 0.8 watt/cm² , frequency – 1MHz and time duration of 6 minutes [6]
- Myofascial release - The therapist will apply pressure and stretching to the myofascial tissues in question, as well as remove trigger points and knots from the muscle and tendon.[7]

Intermediate Recovery phase [2-3WEEK]

- Taping - Participants sit with their affected arm at a 45° abduction angle, their elbow extended, and their palm facing forward. The first strip will be utilised in a "Y" shape, with the radial tuberosity serving as the anchor point. The two tails of the first strip extend naturally under tension over the long and short heads of the biceps, ending at the acromion and coracoid process, respectively. The second strip will be used in a "I" shape. Two ends of the "I" strip expand naturally while the centre segment fixes laterally to the intertubercular sulcus with a lot of stress [6]
- Mobilisation - Grade III and IV mobilization were performed

  Anterior-posterior, lateral, and inferior glides were the techniques used on the GH joint. The AC joint was glided anteriorly and posteriorly. The sternoclavicular joint was glided anteriorly, posteriorly, and caudally. Every technique was used for 30 seconds, with a 30-second break in between each application at a rate of around one mobilisation every 1 to 2 seconds. Three sets of mobilisation lasting 30 seconds each were used.[8]

- ROM Exercises
- Shoulder pulley exercises in available ROM
- Pendulum [10]
- Wand exercises [10]

Strengthening Phase [3-4 weeks]

- Initiate scapular stabilization.
- Scapular retraction in seated position with upper extremity in neutral.
- Scapular protraction [11] (Serratus anterior)
- Strengthening of scapular muscles.[9]
- Upper trapezius
- Pectoralis minor,
- Serratus anterior
- Lower trapezius.
- Strengthening of the rotator cuff muscles- is crucial for providing precise glenoid fossa alignment and stabilisation of the humeral head, preventing the humerus from being elevated too high.[10]
- Initiate rotator cuff strengthening with upper extremity in neutral [11]
    - Supraspinatus
    - Infraspinatus
    - Teres minor
    - Subscapularis
- Eccentric concentric exercises - Concentric and Eccentric exercises were performed with extra focus on eccentric component of the movement.[15]
- Stretching exercises
- Cross body stretch of the posterior capsule[10]
- Anterior capsule or pectoralis minor stretch using a door[10]
- Sleeper stretch –to achieve end range internal rotation [11]
- Wall stretch [11]
- Dynamic stabilization exercises (rhythmic stabilization)[13]

ADVANCED STRENGTHENING PHASE [4-6 week]

- Strengthening exercises of the serratus anterior, that includes
- Supine protraction
- Progressive resistance exercises.
- Scapular "T" and "Y" exercise in prone lying with the shoulder in abducted and thumbs turned up position, following this raised the arms towards the ceiling, while contracting scapula together towards spine.[2]
- Wall push-up exercises [10]
- Chair press in sitting position tried to lift the buttocks off the chair [12]
- Protraction plank - In a prone plank position, perform a protraction plank by pushing down through the forearm to create an upper trunk spinal flexion position, then gently return to the beginning position[12]
- Dynamic hugs and push-up[10]
- Proprioception training
- PNF's movement patterns [13]
- Closed- kinetic chain exercises[13]

Return to activity (6 to 8 weeks)

1. Continued eccentric concentric exercises for biceps brachii muscle.
2. Continued strengthening program for rotator cuff and scapular muscles
3. Continued stretching programs including – sleeper stretch, cross arm stretch, pectoralis major stretch
4. Advanced proprioception exercises – resisted PNF exercises

OUTCOME MEASURE

After the treatment, the patient was able to raise his hand. and was able to perform ADL's without any discomfort. Improvement was seen on SPADI (Shoulder Pain and Disability Scale) and the score was very good.

OUTCOME MEASURES	**PRE INTERVENTION**		**POST INTERVENTION**	
1. VAS	7		0	
2. ROM (SHOULDER)	**AROM**	**PROM**	**AROM**	**PROM**
FLEXION	130º	140º	170º	175º
EXTENSION	30º	35º	45º	50º
ABDUCTION	140º	145º	170º	175º
ADDUCTION	40º	45º	50º	50º
INTERNAL ROTATION	60º	65º	85º	90º
EXTERNAL ROTATION	70º	75º	85º	90º
(ELBOW)				
FLEXION	140º	145º	145º	150º
EXTENSION	10º	10º	10º	10º
SUPINATION	70º	75º	75º	80º
PRONATION	75º	80º	75º	80º

OUTCOME MEASURES	**PRE INTERVENTION**	**POST INTERVENTION**
3. MMT(shoulder)		
FLEXORS	3+	4+
EXTENSORS	4+	5
ABDUCTORS	3+	4+
ADDDUCTORS	4+	5
INTERNAL ROTATORS	3+	4+
EXTERNAL ROTATORS	4+	5
(ELBOW)		
FLEXORS	4+	5
EXTENSORS	4+	5
SUPINATORS	3+	4+
PRONATORS	4+	5

DISCUSSION

Common orthopaedic conditions like shoulder discomfort are frequently accompanied by partial symptom relief and persistent pain.[1] Shoulder discomfort brought on by the pathophysiology of the biceps tendons, which can be brought on by bad posture, rotator cuff and scapular dysfunction, overuse, and capsular tightness. It is said that diagnosing long head of biceps tendinopathy is challenging and frequently entails a number of clinical procedures, such as feeling for discomfort in the long head of biceps tendon. It has been demonstrated that the clinical tests (such as the Yergason's and Speed tests) used to diagnose tendinopathy have a high sensitivity but a poor to mediocre specificity.

Physical therapy management for patients suspected of having biceps tendonitis may include a multimodal strategy that uses exercise, joint and soft tissue mobilisation, and movement retraining to address impairments of the shoulder, scapular area, and cervicothoracic spine.

Exercises that target specific muscle groups can include scapular and rotator cuff strengthening as well as stretching exercises that target tight muscles that contribute to pain.

Overall, the current research on tendinopathy describes physical therapy interventions that highlight the necessity of mechanical loading of the tendon, such as heavy slow-load exercises and eccentric exercise (EE), as an efficient part of an exercise programme aimed at promoting tendon healing, which is ultimately the goal of a safe return to functional activities.

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END OF CONFERENCE PROCEEDINGS