

CONFERENCE PROCEEDINGS



BCIPCON-2020

“TEKNOLOGIA PHYSIOTHERAPY”

Title of the congress is Greek, but not Technology to Physiotherapy!!

Editor: Ms Nidhi Kalra

CONFERENCE PROCEEDINGS

BCIPCON-2020

“TEKHNOLOGIA PHYSIOTHERAPY”

Title of the congress is Greek, but not Technology to Physiotherapy!!



BANARSIDAS CHANDIWALA INSTITUTE OF PHYSIOTHERAPY

Chandiwala Estate, Maa Anandmai Marg, Kalkaji,
Near Govind Puri Metro Station, Gate no. 1

Published at:

BANARSIDAS CHANDIWALA INSTITUTE OF PHYSIOTHERAPY
Chandiwala Estate, Maa Aanadmai Marg, Kalkaji, New Delhi – 110019

Printed at:

Ushnak & Arvind (Offset Printers & Binders)
Patparganj Industrial Area, Patparganj, New Delhi - 110092

ISBN :

978-93-5406-156-1

First Edition:2020**Price:**

350/-

Disclaimer :

Statements of fact and opinion in the articles published in the Conference Proceeding are those of the respective authors and contributors and not of the Publisher or Ushnak and Arvind Printing Press. Neither the printing press nor the publisher make any representation, express or implied in respect to the accuracy of the material in the Proceeding and cannot accept any legal responsibility for any errors or omissions that may be made. The reader should make their own assessment as to the appropriateness or otherwise of any experimental technique described. The appearance of any advertisement in the proceeding is not a warranty, endorsement, or approval of product(s) or services(s) offered, or of their effectiveness, quality, or safety. The publisher or printing press disclaims any responsibility for any injury to persons or property resulting from any ideas or products referred to in articles or advertisement.

Copyright:

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transcribed in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without written permission from the publisher.

“TEKHNOLOGIA PHYSIOTHERAPY”

*Title of congress is Greek, but not technology to
physiotherapy!!*

EDITORIAL TEAM

Editor In - Chief

Nidhi Kalra (PT)

Officiating In-Charge

Banarsidas Chandiwala Institute of Physiotherapy

Associate Editor

Davinder Kumar Gaur (PT)

Assistant Professor

Banarsidas Chandiwala Institute of
Physiotherapy

Savita Tamaria (PT)

Assistant Professor

Banarsidas Chandiwala Institute of
Physiotherapy

Manuscript Editor

Priyanka Sharma (PT)

Assistant Professor

Banarsidas Chandiwala Institute of
Physiotherapy

Charu Chadha (PT)

Assistant Professor

Banarsidas Chandiwala Institute of
Physiotherapy

Section Editor

Avi Choudhary (PT)

Assistant Professor

Banarsidas Chandiwala Institute of
Physiotherapy

Mohd. Asif (PT)

Assistant Professor

Banarsidas Chandiwala Institute of
Physiotherapy

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 2020 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

Editorial

Physical therapy has evolved from the times of Per Henrik Ling, in the year 1813, from the era post World War 1 and from exercise, massage, and traction to the current scenario where Physiotherapy has become the front runner matching the technology boom...

Physical therapists were and are an important part of medical health care environment and are fundamental suppliers of recovery, performance development, and risk-reduction services. They additionally assume a significant job in creating gauges for the act of non-intrusive treatment and in improving social insurance approach to guarantee accessibility, availability, and the best conveyance of exercise based recuperation.

Physical specialists are vital to the structure, advancement, and the activity of detecting innovations and automated interfaces. Physical advisors are proactive accomplices, who work with specialists to empower disclosures that will improve best practice standards for patients.

While conventional therapy methods still yield results, recent research around motor learning interference and motor memory consolidation has shown that the optimal way to treat patients with neurological disorders is through a collaborative effort between robots and human therapists. The robots center on diminishing physical debilitations while the advisors help with interpreting the increases in impedance into work and henceforth their merger yield snappier and better execution

Assistive and therapeutic robotic devices are growing at an unmatched pace, including robots that help patients rehabilitate from serious neurological conditions like stroke. Rehabilitation robots play a significant role for people with disabilities, helping them recover mobility, strength, coordination, and quality of life.

Rehabilitation robots utilize sensors to examine human movement and positioning.

These assistive robotic devices are helpful both as assessment tool and as an intervention. Many of these devices are capable of measuring and storing patient's performance, which can help in long-term recovery planning. Able to detect and measure slight changes in movements and forces, these devices aid therapists in the management of treatment planning and goal setting.

Rehabilitation robots include exoskeleton devices, which are wearable devices that assist the user. Exoskeletons are positioned on the user's body and act as amplifiers that enhance, bolster or reestablish human performance. An autonomous robot does the work instead of the user.

They range from a simple brace to a treadmill gait trainer to a orthotic robotic arm to a virtual reality systems.

Human therapists have a need for help to put into practice evidence-based therapy during a patient's recuperation. This help comes from robotic physical therapy systems powered by artificial intelligence (AI). Robotic physical therapy systems are able to more precisely detect movements during therapy sessions and deliver individualized assistance as needed but Robots do not have the dexterity that is essential to provide a human touch, which is key to the role of a physical therapist and are essential attributes that make this profession inherently humanistic, and not fit for AI. Therefore, robots will augment a physical therapist's job and not replace it.

Nidhi
Nidhi Kalra

CHIEF GUEST MESSAGE



Dear Readers,

Over the years Banarsidas Chandiwala Institute of Physiotherapy, New Delhi, has grown from its humble beginnings to become an institution of excellence, imparting high quality education and contributing significantly towards the overall development of the students.

Technology has infiltrated every aspect of our lives thereby making changes at every step with better efficiency. The innovation of technology has brought about a revolution in the medical field. BCIPCON 2020 is a golden opportunity where you can witness the transition that medical technology has achieved from simple modalities to robotics. The role of the institute in nurturing and moulding the highly impressionable and inquisitive minds of children cannot be over emphasised. I am extremely happy to note that BCIP, New Delhi has done an excellent job of imparting a balanced mix of academics, extra-curricular, sports and developmental education to its students, preparing and enabling them to take on the rigours and challenges of modern-day world. And as we stand on the threshold of the next decade, it is indeed our youth who will come to the forefront of the events and valuable investment in them would be worth every penny and sweat. I take this opportunity to congratulate the Director and all the faculty members for their untiring efforts, patience and professionalism in taking the institute to the pinnacle of success. I wish and pray that our practices should be at par at any global standards or even better.

Dr. Arun Kumar Agarwal
President - Sound Hearing 2030
Ex-Dean, Professor of Excellence
Department of ENT, MAMC
Medical Advisor - Innovation, Education and Clinical Excellence, Apollo Hospitals
Honorary Advisor NBE - Faculty Development Program
Ex- Additional Director General Health Services Government of India
Ex- President Delhi Medical Council
President Delhi Council of Physiotherapy and Occupational Therapy

GUEST OF HONOR MESSAGE



I believe that learning is a never-ending phenomenon. Today, our children need to rediscover the joys of learning. In this growing materialistic world, children need education that fosters love for mankind, develops character and empowers them to contribute to the society as a whole. Education is a creative process and its objectives are to develop the capacities latent in an individual, help hone one's interest, capabilities and instil a sense of commitment to serve the best interest of the community.

It is laudable that Banarsidas Chandiwala Institute of Physiotherapy, New Delhi, provides myriad avenues which enable the students to become active participants in the creation of a just and harmonious world order.

It is our responsibility that our services should help the patients in remote area also and they should get benefited from physiotherapy. As one of the core health science stream, physiotherapy should be promoted equally at all levels of health care i.e for Prevention, for Treatment and for Rehabilitation equally.

I know it is a difficult job to do the conference of this level, but I am sure that due to strong continuous perseverance of Organizing committee this conference will achieve its goal of strengthening the base of physiotherapy..

The magazine of any institution mirrors its ethos and encapsulates the soul of the institution. The edition of the institute's magazine showcases the intrinsic potential and the innate feelings of the students. The plethora of activities undertaken during the course of the year has given them the impetus to give expression to their creative abilities and emerge holistically accomplished.

I congratulate the Director and all the faculty members and extend my best wishes to the institute as it forges ahead in its pursuit of excellence.

As the need of physiotherapy is growing day by day in our society I am sure this conference will prove a milestone in journey of physiotherapy and will help physiotherapists to learn new horizon, and many patients will also be benefitted by this event.

I wish all the best to the Organizing committee and everyone associated with this conference a great success

Prof. (Dr.) Sanjiv K. Jha

CONTENTS

SECTION – I : SPEAKERS ABSTRACTS - BCIPCON 2020

	Topic	Page No.
1.	Inspiratory Muscle Training: Advancement In Cardiopulmonary Physiotherapy Ms. V. P. Gupta (PT)	i
2.	Recent advances in sports sciences evaluation and technology Dr. Meenu Dhingra	i
3.	Physiotherapy & Telemedicine Ms. Seema Grover (PT)	ii
4.	Bringing 3D gait analysis from Labs to Clinics Dr. Monica Chhabra (PT)	ii
5.	Robotic Exoskeleton for post-stroke Neuro-rehabilitation Dr. Neha Singh	ii
6.	Gamification: Breaking the Stereotype Approach To Physiotherapy Ms. Nishat Quddus (PT)	iii
7.	Robotics in Lower Limb Neurorehabilitation Ms Tejaswitha Kanchan (PT)	iii
8.	Robotics and AI in Physiotherapy Ms. Aakash Sinha	iv

SECTION – II : RESEARCH ARTICLES PRESENTED

1.	Intra-Rater Reliability of Surface Electromyography Recordings of The Lumbar Multifidus during Prone Trunk Extension. Sumbul Ansari, Saurabh Sharma	1
2.	Addition of Inspiratory Muscle Training during Pulmonary Rehabilitation in People with Interstitial Lung Disease: A Feasibility Randomized Trial Saima Zaki , Jamal Ali Moiz, Mir Shad Ali	6
3.	Neuroprosthesis for Lower Limb: A Review Simran Naagar, Meena Gupta	13
4.	Is Acute Whole Body Vibration an Ideal Modality for Lower Extremity Power Enhancement? Nitin Kumar Arora, Saurabh Sharma	17
5.	Acute Effects Of Whole Body Vibration On Upper Quadrant Power In Overhead Athletes Sana Saifi, Saurabh Sharma	21
6.	Physical and psychological impact of advancing age on females and its physiotherapy treatment Jaswinder Kaur, Mansi Gupta, MeghaMasaun	24
7.	Effect of the height of shoe heels on muscle activation of cervical and lumbar spine in young women with or without neck pain: an EMG study Palak, Davinder Kumar Gaur	28
8.	Effect of Listening Music Using Personal Music Players on Dynamic Balance in College Students Wagisha Stuti, Priyanka Sharma	31
9.	Gender Differences in Hand Eye Coordination And Reaction Time in College Students. Aastha Jain, Savita Tamaria	36
10.	The Relationship between Physical Activity Levels And Mental Health Among undergraduates Physiotherapy Student Navya, Charu Chadha	40
11.	Effect of Fatigue Of Calf Muscles On Dynamic Balance In Females. Vidhu Tiwari, Nidhi Kalra	44
12.	Effects of sleep deprivation on cognitive performance among college students. Kartik Khanna, Avi Choudhary	48

SECTION – III : POSTER ABSTRACTS

SECTION – I
SPEAKERS ABSTRACTS : BCIPCON 2020

Inspiratory Muscle Training: Advancement In Cardiopulmonary Physiotherapy

Ms. V. P. Gupta (PT)

Chief Physiotherapist, Head- Physiotherapy Unit, CTVS Deptt., Additional Charge- CIMR
AIIMS, New Delhi-110029

Abstract

Cardiopulmonary Physiotherapy is the most challenging stream of Physiotherapy system. The therapeutic interventions by a cardiopulmonary physiotherapist are equally important part of the comprehensive therapeutic management of the cardiac patients. The most satisfying part of this speciality is that a cardiopulmonary physiotherapist is an integral component of life- saving team for the cardiac patients. Shouldering this responsibility is not an easy job and the extent of outcome depends upon how skillful and knowledgeable you are when the patient needs you. In the present scenario of the technological advancement and growth in the health care, cardiopulmonary physiotherapy is not far behind in adapting the available technology into the therapeutic management for an effective, timely and accessible healthcare for cardiac patients. Through this important event, in our endeavor of sharing our experience and views regarding the use of technology in preventive, diagnostic and therapeutic aspects of cardiopulmonary physiotherapy, we have chosen a small but significant component of cardiopulmonary physiotherapy for discussion. We are sure this will ignite the views of my fellow speakers and specialists in the field of physiotherapy system and health care technology- in pursuit of further advancements and technical modifications in the available technology in the cardiopulmonary physiotherapy, which will go a long way in the interest of the best possible patient care.

Recent advances in sports sciences evaluation and technology

Dr. Meenu Dhingra

Ph.D (Anthropology), Sr. Scientific Officer, Head Of Human Performance Lab, Sports Authority of India,
JLN Stadium , Delhi

Abstract

Sports performance, at both the elite and developmental levels, requires the coordinated efforts of athletes, coaches, scientists and support staff. Scientific inputs from nutritionists, physiologists, biomechanics and others would help the coaches in enhancing performance of their players and also come handy in reducing sports injuries due to overtraining/ fatigue. The prevention of sports injuries due to faulty biomechanics of sports movements , understanding hydration levels during training , eating right foods based on sports demands are some of the areas where sports scientists can readily assist coaches and athletes to take the scientific way of training.

It is observed that Athletes and coaches constantly try to balance the intensity and frequency of their training to obtain the greatest enhancement in performance. If the intensity and frequency is too low the maximum potential performance gains will not be achieved. If the training is too stressful the athlete can become ill and under perform. By monitoring the biomarkers of stress and overtraining, the intensity of training can be better managed and optimised for performance. Therefore, the physiological inputs from the scientists can assist the coach in formulating the training program and thereby achieve better results. In nutshell, the time is come wherein elite as well as developmental athletes can draw full advantage of the scientist's guidance during their training cycle.

The way to higher, stronger and faster in sports need to be athlete centric, coaches assisted and scientists supported training in coaching camps.

In order to achieve the above, SAI has taken firm steps to make the presence of sports scientists mandatory on the ground when the athlete is training hard along with the coach. Scientific team and support staff

Physiotherapy & Telemedicine

Ms. Seema Grover (PT)

MPT (Musculoskeletal), Certified Lymphedema Therapist (USA), HOD, Physiotherapy Department, Apollo Hospital, Delhi

Abstract

Telemedicine-“Virtual Care” is the remote delivery of healthcare services, such as health assessments or consultations, over the telecommunications infrastructure. It is continuously evolving field, adapting more sophisticated technology, prompting healthcare leaders to learn how to fully maximize virtual care potential. Moving from convenience consult to adopt more evidence based practice as remotely accessing patient records and collaborate with other providers for more accurate diagnosis and treatment plans to improve clinical outcomes. Patients deserve access to quality care, whether they are in metropolitan or rural community. Telemedicine enables physiotherapists to team up to deliver distant physiotherapy with video visits as an option to deliver high quality care, improving access, real time consultation and decision making thus reducing the burden on patient and careers even in remote areas. Modern tele-health software is an efficient way to provide care at less cost to the patient.

The literature regarding its utility in clinical practice continues to emerge. Despite increasing uptake, there is a need for framework for future development of telemedicine, ways to overcome implementation barriers and its integration in physiotherapy clinical practice at large.

Bringing 3D gait analysis from Labs to Clinics

Dr. Monica Chhabra (PT)

MPT, PhD, Senior Physiotherapist and Head of Gait Lab, PGIMER, Chandigarh, Research Scholar, Singhania University.

Abstract

Three dimensional gait analysis(3DGA) is a gold standard technology used for research .It is an important tool analyze the Gait deviations and compensations due to underlying disorders. We can obtain spatiotemporal, kinematic and kinetic parameters of an individual and do EMG evaluation of a select group of muscles during a single analysis. It is important for clinical decision making, yet the clinical use of 3DGA is not widespread.

The reasons range from need of a dedicated lab space, time-consuming measurement process and difficulties in understanding measurement results, which are often presented using a large number of graphs and numbers.

The aim of this talk is to understand what comprises of 3DGA ,what is its clinical importance, why is it a better tool than the other forms of gait analysis, how we can understand the reports obtained and interpret the results in the clinical perspective

Robotic Exoskeleton for post-stroke Neuro-rehabilitation

Dr. Neha Singh

Research Scientist in Centre for Biomedical Engineering at IIT, Delhi

Abstract

Robots have the potential to help provide exercise therapy in a repeatable and reproducible manner for stroke survivors. To facilitate rehabilitation of the wrist and fingers joint, an electromechanical exoskeleton was developed that simultaneously moves the wrist and metacarpophalangeal joints. The device was designed for the ease of manufacturing and maintenance, with specific considerations for countries with limited resources. Twelve stroke survivors, ranging from the subacute to chronic phases of recovery (mean 10.6 months post-stroke) participated in a pilot study with the device. Participants completed 20 sessions, each lasting 45 minutes. Overall, subjects exhibited statistically significant changes in clinical outcome measures following the treatment.

Gamification: Breaking the Stereotype Approach to Physiotherapy

Ms. Nishat Quddus (PT)

Associate Professor, Department of Rehab Sciences, Jamia Hamdard

Abstract

Gamification is gaining popularity in the field of physiotherapy. It is one of the boons of the technology linking the use of game mechanics to a non-game related field like physiotherapy. Gamification can replace the stereotype approach of physiotherapy intervention in various conditions which seems to be boring, painful, monotonous for patient/clients resulting in poor adherence to the treatment. Gamification is an innovative and interesting approach engaging patients in activities in a fun way generating motivational and cognitive benefits. The virtual setting involved in the treatment is attractive and challenging that stimulates participants to enhance their practical skill and activities of daily living with real time feedback.

Gamification has immersive and non immersive games. Immersive games are typically delivered through a head mounted device, creating a realistic environment for the user. The non immersive games come in the form of videogames. The auditory and visual stimulation helps to focus and control the attention more effectively.

This approach can benefit patients like cerebral palsy, autism, stroke and geriatric mental health issues. It helps to improve motor function, balance, coordination and combating depression. In athletes, it improves the performance in sports. Exercise tool such as dumbbells, therabands or weight cuff can be used while playing the game to incorporate muscle strengthening as well.

Using game evoked rewards facilitates dopamine release, which in turn facilitates neural plasticity. For gamification to reach its full potential, there is a need to build e-Health solution on well founded theories that exploit the core experience and psychological effect of game mechanics. Although gamification in e-Health has attracted a great deal of attention during the last few year, there is still a dearth of valid empirical evidence in this field.

Robotics in Lower Limb Neurorehabilitation

Tejaswitha Kanchan (PT)

Neurophysiotherapist, Kokilaben Dhirubhai Ambani Hospital, Mumbai

Abstract

To regain the ability to perform a functional task after a neurological insult is one of the main endeavors of neurological rehabilitation. Recovery of sensorimotor function after CNS damage is based on the exploitation of neuroplasticity, with a focus on the rehabilitation of movements needed for self-independence. Neuroplasticity is an ability of the nervous system to change its structure and function. Repetitive exercises increases the structural and functional changes in the nervous system, which greatly improve the patient's ability to handle the tasks presented. It is a form of remediation approach of neurological rehabilitation wherein, in an attempt to restore the function by minimizing the impairment, new or alternative circuits are formed.

Locomotor training is evidence based training method to regain/improve walking function that was developed based on the then-emerging knowledge that the nervous system is plastic and remains so after injury. Locomotor training follows the principle of motor learning such as task specificity, the power law of practice, variability of training, and challenge. The basis for any kind of locomotor training, be it with or without manual assistance, on the treadmill, over ground or in the community must be as per its principles maximize weight bearing through the lower extremities, optimize sensory cues to promote upright posture and normal stepping mechanics, optimize kinematics, and minimize compensation, in favor of more recovery-based strategies. Since their introduction, rehabilitation robots for the lower extremity have evolved from stiff industrial robot arms to guide the limb passively, without cognitive or physical involvement of the patient, to systems allowing for active engagement of patients through adapted support and body weight unloading in a vertical posture. Currently, wearable exoskeletons are being introduced into clinical practice, promoting even more active engagement of the patient, while balance is provided by crutches.

Advanced technology, including gait training devices such as LOKOMAT, is increasingly being integrated into neurorehabilitation. Training with a robotic treadmill system such as LOKOMAT enables repetitive training in complex walking cycles to take place as early as possible. The increased load of task specific training unmasks the reorganization of the neural circuits and leads to improved neurological/motor recovery.

When appropriately applied, robot assisted therapy can provide a number of advantages over conventional approaches, including a standardized training environment, adaptable support and the ability to increase therapy intensity and dose, while reducing the physical burden on therapists. Furthermore, augmented performance feedback maximizes the effect of gait training while increasing muscle activation and cardiovascular exertion. Feedback about movement performance can not only enhance motivation but also facilitate plasticity in the motor cortex if it arrives synchronously with motor output. Rehabilitation robots are thus an ideal means to complement conventional therapy in the clinic, and bear great potential for continued therapy. Robot-assisted therapy enables effective and intensive training and ensures the optimal exploitation of neuroplasticity and recovery.

Robotics and AI in Physiotherapy

Aakash Sinha, Founder & CEO at Omnipresent Robot Tech, Gold Medallist Lockheed martin India innovation growth Program 2013, Master in Comp Sc/ Robotics

Abstract

Robotics and AI will disrupt physiotherapy and rehabilitation care in the coming 3-5 years' time. I will cover some of the technologies that are going to revolutionize this area and how practical they are in India. Three broad segments where robotics would be most effective are; Robotics Rehabilitation using assistive tools, Exoskeletons for augmenting muscle and bone power, Augmented reality AI tools for optimising exercises and advanced robotics prosthetics for replacing the limbs.

Rehabilitation robotics should be designed to help patients undertake repetitive tasks and exercises for recovery and daily life. These systems can also gather quantitative data about a patient's performance of the patient and track their progress or condition. Robotic rehabilitation systems can also help stroke patients, treat children suffering from cerebral palsy and adults with coordination disorders. Hospital and clinical settings can incorporate processes that use robotic rehabilitation and assistive technologies during acute care.

Treatments including exoskeletons and soft robotics can help patients protect their health, enhance and prolong their independence. For instance, Kinova Inc. makes arm systems to provide upper-body mobility. A considerable number of people across the globe are suffering from chronic conditions or disabilities that have limited their physical capabilities. For example, this is extremely useful for old age people as well as people with a permanent disability in the limbs

Millions of people around the world undergo amputation because of vascular and circulatory problems. Complications arising due to cancer, diabetes, or trauma also force patients to undergo amputations. Intelligent prosthetics is a viable solution for such patients. These prosthetics are highly robust and adaptable to the changing situations. An example of such intelligent prosthetics is the Smart BioLeg being developed at the University of Leeds in the U.K.

An example of AI based physiotherapy is the SWORD program from Portugal. They provide users of their service with wireless motion trackers, that patients attach to their bodies, which feed data back to the company. AI physical therapist guides patient through a number of exercises, using the trackers to give feedback in real time — "move your leg higher this time," for example. The exercises are set by a remote team of human clinicians, who'll check in periodically. A study published in Nature Scientific Reports in July 2018, followed two groups of patients as they recovered from a knee injury. Half of them had traditional therapy, and the other half followed SWORD's program. Their recovery was measured with the Timed Up and Go Test, a CDC recommended mobility test. The group following SWORD's regime improved twice as much as the conventional physical therapy group.

Now these technologies are very promising, but they are prohibitively expensive for mass use in India. This is where Indian tech start-ups and medical community can come together to produce low cost scalable solutions for India. The cost reduction could be in the range of 1/10th the international price. But initial investment by Govt or medical bodies would be required to develop the products initially. This is feasible via a joint effort and would bring benefits of these expensive technologies to millions of Indians. One example of this is our start up Omnipresent Robot Tech, they have already signed agreements with AP govt to develop some of the Hi-tech medical robotics tools in India.