

Prevention, Early Detection  
and Management of  
**Spine Disability**

**A Patient-centric Integrated Approach**

Proceedings of the MGM-WSC Conference



# Prevention, Early Detection and Management of Spine Disability

## A Patient-centric Integrated Approach

Proceedings of the MGM-WSC Conference

*Editors*

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## Prevention, Early Detection and Management of Spine Disability

A Patient-centric Integrated Approach

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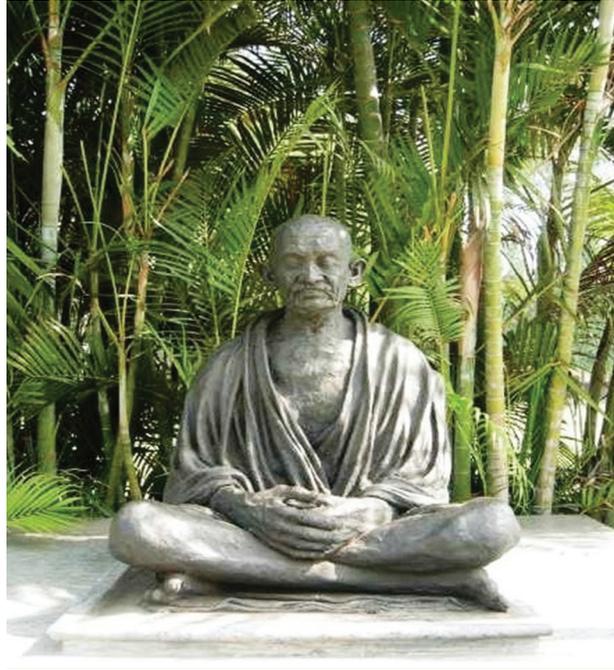
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*A balanced intellect presupposes a harmonious  
growth of body, mind and soul*

*—Mahatma Gandhi*



# Foreword

I am happy to write this Foreword to the proceedings of the *MGM-WSC Conference on Prevention, Early Detection, and Management of Spine Disability: A Patient-centric Integrated Approach* organized by MGM School of Physiotherapy, at MGMIHS from 18-19 January 2019. The objectives of the conference are: To understand the structure and function of the spine and its disabilities and find out effective clinical pathways and models of care for spine disorders. In fact, the spine is one of the most important parts of our body. Without it, we cannot keep ourselves upright or even stand up. It gives structure and support to our body. It allows us to move about freely and to bend with flexibility. The spine is also designed to protect our spinal cord. The spinal cord is a column of nerves that connects our brain with the rest of our body, allowing controlling movements. Without a spinal cord, it is not possible to move any part of the body, and our organs cannot function. To live an active life, it is basically vital to keep the spine healthy.



According to the data published in *The Lancet*, in 2010 musculoskeletal disorders were the cause of nearly 166 million years lived with disability (YLDs), with neck and low back pain accounting for 69.9% of the total. In Poland, in 2014 low back pain was self-reported by 28.4% of women and 21.2% of men aged 15 years and over, neck pain by 21% of women and 13% of men, and middle back pain by 19% of women and 12.9% of men. In 2015, nearly 33 million man-days were lost due to spine disorders and nearly 2.7 million medical certificates were issued for back pain (15% of the total). With the current demographic changes (population aging) and lifestyle-related factors increasing the potential for back problems, the demand for a wide range of medical services to treat disorders of the spine and their symptoms may be expected to increase substantially over the coming years.

It is not out of place to mention that an interdisciplinary approach is required for managing the spine disorders. For the purpose, a holding of scientific conferences is a basic need of the day as it provides a forum where participation of health care professionals representing different specialties, including a rheumatologist, a physiotherapist, a surgeon, a specialist in the treatment of osteoporosis and a psychologist can participate and discuss the issues at length to find out solutions encountered by the society on account of spine disability. No doubt, the following need-based awareness program is possible to design through participation and deliberations:

- *Raise awareness about spine disorders and their prevention amongst the general public, through health education and promotions in collaboration with the media,*
- *Develop new solutions for effective prevention of spine disorders,*
- *Initiate collaboration with specialists in occupational medicine and primary care physicians to develop new solutions for early diagnosis, treatment, and rehabilitation of spine disorders and painful back problems,*
- *Develop guidelines for the management of spine disorders in primary care,*
- *Develop guidelines for proper ergonomics of the workplace,*
- *Develop guidelines for proper ergonomics in schools and universities,*
- *Develop simple and easy-to-understand principles of spine disorder prevention for different social groups ("Spinal health tips"), and*
- *Raise awareness about spine disorders amongst public policy decision-makers.*

I am very pleased that the MGM School of Physiotherapy, Navi Mumbai, India, took initiative to provide a platform to distinguished international and national delegates to discuss debate and identify approaches and strategies to come over the spine disorders up to some extent which is being faced by worldwide. I am also impressed by the contributions of various researchers and specific methods and approaches for diagnosing, treating and preventing from spine disability. The organizers need applause for their vision and efforts made in the context of detecting, preventing and managing the spine disability.

  
**Dr Shashank D Dalvi**

Vice Chancellor  
MGM Institute of Health Sciences  
(Deemed to be University)  
Kamothe, Sector-1, Navi Mumbai



# Preface

**M**GM School of Physiotherapy, a constituent unit of MGM Institute of Health Sciences, Navi Mumbai, is engaged in academic, research and patient care activities. In the academic domain, the organization offers Bachelor, Masters, and Doctoral program in physiotherapy which is received well by students across the country.



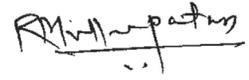
In the research domain, the Institute has been extensively involved to work together with national and international collaborators in both disciplines—health and device design to offer innovative, affordable health solutions to people from all sectors of the society through robust interdisciplinary research. Efforts are pumped to design patent care in such a way that we reach out to people at tertiary, primary and community health care level in both urban and rural regions of the country. Management of musculoskeletal disorders is a major area of work in patient care. Among musculoskeletal disorders, back pain is a leading worldwide cause of years lost to disability and its burden is growing alongside the increasing aging population. Findings of research studies undertaken in the recent past in India reveals that the prevalence of low back pain varies between 6.2 and 9.2%. Improved recognition of the growing burden of low back pain is essential to stimulate new, more effective, strategies of assessment, prevention, and care. A specialized laboratory with state-of-the-art facilities at par with global standards: MGM Centre of Human Movement Sciences (MGMCHMS), was established by MGM School of Physiotherapy, Navi Mumbai in 2015 in collaboration with BETiC, IIT-B and International Society of Biomechanics to address an urgent need to integrate clinical biomechanics in Indian healthcare at an affordable cost for better treatment planning. The centre works towards a mission to provide people with movement analysis facilities following neuromusculoskeletal dysfunction, prevent injury and enhance performance.

The vision is to generate a task force within the country to undertake research and develop the science of movement analysis further in India by conducting integrated training for clinicians and engineers. At MGMCHMS, original biomechanics work is carried out in the area of Yoga, traditional daily movements, dance, traditional sports along with training of students, research, device design and validation of the technology. Ongoing studies at MGMCHMS aim at generating evidence-based health care solutions for back pain by exploring biomechanical aspects of movement dysfunction using 3D motion analysis, muscle activity, energy expenditure and pressure distribution, to identify functional disability and institute targeted care. Further, taking cognizance of the spine health problem, MGM School of Physiotherapy has collaborated with World Spine Care (WSC), a Global Charity Organization and established MGM's WSC clinic to offer evidence-based, sustainable care and access to highest quality spine care to people across all socioeconomic strata.

With this background, a 2-day conference on 'Spine Care: Prevention, Early Detection and Management of Spine Disability: A Patient-centric Integrated Approach' was organized in collaboration with WSC at MGM Institute of Health Sciences, Navi Mumbai. The conference had offered a forum for spine surgeons, physiotherapists, general practitioners, and health care professionals working in the area of spine care to come together and share their experience and expertise to set goals for establishing a patient-centric integrated approach with a view to managing and prevent spine disability. The conference proceeding is a collection of 20 scientific papers presented by the invited speakers and participants at the conference. With a view to having active participation and deliberations, the papers were presented in 6 symposiums. A special feature of the proceeding is that it contains the profiles of world-fame, renowned and premier educationists and researchers whose contributions in the area of detection and management of spine disability has a great impact. To reflect on the outcome of the conference, interviews were conducted with speakers and participants. The feedback received from them has been presented suitably in the proceedings. I hope this conference proceeding will be useful for researchers, physiotherapists, educationists, program managers, policymakers, and non-governmental organizations for providing timely and effective preventive measures to get rid of back pain and spine disability.

I gratefully acknowledge eminent personalities like; Dr. Manohar M Panjabi who is a stalwart in spine research with more than 35 years in the area of spine biomechanics, Dr. Scott Haldeman, renowned spine care specialist and researcher and Dr. Margareta Nordin, Vice President, World Spine Care (WSC), and

President, Elect Euro Spine, who have graced the occasion. The conference provided an excellent opportunity for opening a new horizon of collaboration with WSC for making available need-based patient care in the area of spine disability.



**Rajani Mullerpatan** PhD

Professor and Director  
MGM School of Physiotherapy  
MGM Institute of Health Sciences  
(Deemed to be University)  
Navi Mumbai, India

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# Profile of Speakers

## Dr Manohar M Panjabi

Dr Manohar M Panjabi was Professor Emeritus at Department of Orthopedics and Rehabilitation and Mechanical Engineering, Yale University, New Haven, USA. He completed his bachelor's degree in Mechanical Engineering from BK Birla Institute of Engineering and Technology, Pilani, Rajasthan, India. After working several years, he received a fellowship from Volvo Motors and moved to Sweden. There he pursued a Doctorate in Machine Design at Chalmers University of Technology, Göteborg, Sweden.



He joined the Department of Orthopedics at Yale University in 1971 and has since lived in the United States. In his research laboratory, he designed machines that enabled his colleagues and him to focus on clinical problems of the human spine using engineering principles and methods—an approach now known as biomechanics. His work has benefited immensely from collaborations with Yale medical students, faculty and orthopedic residents in training. Clinicians, surgeons and engineers who came from outside the USA, especially spine surgeons from Japan, augmented his work with their engineering, clinical and surgical expertise. Dr Panjabi has published over 404 scientific papers. Dr Panjabi established himself as a world-renowned spine authority for his work on spinal joint function and its implications for motion-preserving implants. He has written two textbooks, viz. (i) *Clinical Biomechanics of the Spine*; and (ii) *Biomechanics in the Musculoskeletal System*. He is acknowledged as an authority on spinal joint function and its implications for implants. In 2006, he retired satisfying 35 years of career at Yale University.

## Dr Scott Haldeman

Dr Scott Haldeman holds a clinical faculty position in the Department of Neurology, University of California, Adjunct Professor, Department of Epidemiology, School of Public Health, University of California, Los Angeles, and Adjunct Professor, Southern California University of Health Sciences. He is Past President of the North American Spine Society, the American Back Society, and the North American Academy of Manipulative Therapy. He was appointed International Ambassador for the Decade of the Bone and Joint. He is the founder and currently serves as President of *World Spine Care*, a non-profit organization endorsed by the Decade of the Bone and Joint, an initiative of the WHO. This Foundation has the goal of helping people in underserved regions of the world who suffer from spinal disorders. He currently chairs the Global Spine Care Initiative to develop evidence—informed, practical, and sustainable, spine health care models for communities around the world. He has been on the editorial boards of 8 professional and scientific journals. He has published over 200 articles or book chapters and over 70 scientific abstracts and has authored or edited 8 textbooks. He is certified by the American Board of Neurology & Psychiatry, is a Fellow of the Royal College of Physicians of Canada and a Fellow of the American Academy of Neurology. He is Chairman Emeritus of the Research Council of the World Federation of Chiropractic. He was awarded the David Selby Award by North American Spine Society, the Patenge Distinguished Lecturer Award from Michigan State University and an honorary Doctor of Humanities degree from the Southern California University of Health Sciences.



### Dr Margareta Nordin

Dr Margareta Nordin is a Research Professor at Department of Orthopaedics and Environmental Medicine, Graduate School of Arts and Science and School of Medicine, New York University. She is the founder and past director of the Occupational and Industrial Orthopedic Center, Hospital for Joint Diseases, NYU Langone Medical Center, New York University. She has written five books published more than 200 peer-reviewed papers, participated in seven national or international based task forces on spine pain and received multiple awards among them The Volvo Award, The Woodbridge Award, The Grammer Award, Junior Nobel Faculty Lecturer. Dr. Nordin was the first woman President of ISSLS 1999-2000. She was Adjunct Professor at the Karolinska Institute (2008-2014), the Polytechnic University Hong Kong (2008-2010) and currently at the Chinese University of Hong Kong. She is the Chair of EuroSpine Taskforce Research (TFR), a member of the Bone and Joint Decade International Coordinating Council (ICC) as first physical therapist joining the ICC. The focus of her research is treatment and prevention of disability related to musculoskeletal injuries and disorders at work. She has a specific interest in disseminating evidence-based, low cost, effective and efficient non-surgical treatment for spine pain and to return individuals to work, to functional ability and participation in the community.



### Dr Alberto Zerbi

Dr Alberto Zerbi graduated from Milan University Medical School in 1982, and achieved the specialization in Radiology in the same University in 1986. From 1999 to the present time is Head, Department of Diagnostic and Interventional Radiology, at the Istituto Ortopedico Galeazzi, Milan. Dr Zerbi is an active member and faculty of National Associations: Società Italiana di Radiologia Medica; Società Italiana di Ortopedia e Traumatologia; former Board member of the Società Italiana di Chirurgia Vertebrale (SICV&GIS) and International Associations: European Society of Musculoskeletal Radiology; AO Trauma; AO Spine (former Board Member); Spine Society of Europe (EduCom Member), Arab Spine Course Diploma Board Member. Dr Zerbi is a reviewer for several international orthopaedic and spine journals and is Deputy Editor for Imaging for EuroSpine Journal. He is EFM Professor of Radiology in Universities of Milan, Pavia, Monza Bicocca. Author of more than 70 scientific articles published in National and International magazines and of many book chapters. Speaker in numerous National and International Congress on Radiology, Orthopaedic, Neurosurgery, and Odontiatry.



### Dr Adam Wilkey

Adam graduated in 1988 as a DC from the Anglo-European College of Chiropractic. He has primarily worked in private practice, whilst training newly graduated chiropractors for many years. He has also worked within the NHS providing chiropractic services and designing, implementing and publishing research, studying the effects of various forms of treatment for chronic lower back pain. Adam has presented at conferences in the UK, Europe, and the USA. In 2014 he received his Masters in Disaster Healthcare from the University of South Wales. From 2008-2009 Adam and his wife worked in Kenya as volunteers within the schools and orphanage of an educational charity. He was responsible for liaising with central and local government education departments to ensure that the school's educational policies were aligned with national policies and to protect the schools' safety and longevity. Over the past 5 years, he has organized and participated in events, such as marathons, ultramarathon, timed mountain walks, and long-distance cycle rides, to raise funds for a variety of charities. Adam has worked with the British Chiropractic Association and the National Back Pain Association (now Backcare) in both PR and educational roles to increase awareness of the potential causes and various evidence-based treatments for back pain. In this capacity, he has written numerous articles



for the national press and has appeared on television and radio on several occasions. He has worked with the British Red Cross as an educator in cultural diversity and acceptance. Adam was instrumental in establishing World Spine Care Europe and its registration as a charity with the Charity Commission.

### **Dr (Lt. Gen.) Kuldip R Salgotra**

Lt Gen Kuldip R Salgotra, a General Surgeon and an Orthopedic Surgeon of national repute, who specializes in Joint Replacement Surgery is the second doctor from the State of Jammu & Kashmir who has attained the coveted post of Lieutenant General in the Armed Forces Medical Services. Dr. Salgotra is Director-Professor of Orthopedics and Medical superintendent at MGM Medical College. He is a Consultant Orthopedic Surgeon with over 30 years of experience. He is the Deputy Chief, Integrated Defense Staff (Medical), Headquarters Integrated Defense Staff, Ministry of Defense.



He has presented more than 100 scientific papers in International and National conferences. He has more than 30 scientific papers. As Brigadier, he ably commanded 166 Military Hospital located in Jammu & Kashmir and introduced Joint Replacement Services. As Major General, he has held the coveted appointments of Major General (Medical) of South Western Command, Deputy Commandant and Chief Instructor of prestigious AMC Centre & College, Lucknow, a Cat 'A' establishment and Commandant of super-specialty Military Hospital (Cardio-Thoracic Centre) at Pune. The General Officer's services have won him appreciation and numerous accolades. He was awarded Commendation of GOC-in-C, Central Command in 1997 and Commendation of Chief of Army Staff (COAS) twice in 2004 and 2006. He was awarded Vishisht Seva Medal' in 2007 to recognize his "distinguished service in the field of orthopedics and for the introduction of Joint Replacement Services at the State of Jammu & Kashmir, India.

### **Dr Pierre Côté**

As Canada Research Chair in Disability Prevention and Rehabilitation, Pierre Côté is dedicated to understanding why individuals develop disabilities, how those disabilities can be prevented, and how individuals can be rehabilitated. Listed three times among the 100 Most Influential Publications in Cervical Spine Research, his work focuses on developing and testing evidence-based interventions that address the physical, psychosocial and societal issues associated with pain and disability. The economic impact of treating these types of musculoskeletal disabilities is enormous.



Dr Côté and his research team are taking a holistic approach to identifying key factors that lead to disability. By designing appropriate treatments and rehabilitation approaches, they believe they can make significant inroads into reducing the burden of disabilities related to musculoskeletal pain.

### **Dr Carol Cancelliere**

Carol is appointed at the University Of Ontario Institute Of Technology as the CCRF (Canadian Chiropractic Research Foundation), Research Chair in Knowledge Translation in the Faculty of Health Sciences.

She is the Project Lead for the Canadian Chiropractic Guideline Initiative. The objectives of this program are to develop clinical practice guidelines relevant to musculoskeletal health and disability and to engage in knowledge translation activities and research.



Carol graduated from the Canadian Memorial Chiropractic College in 2004 and practiced for 10 years. Carol received her Ph.D. in Clinical Epidemiology and Health Care Research from the University of Toronto in 2017.

### Dr Dollilur Rahman

Dr Dollilur Rahman is a clinician, educator and researcher with more than 18 years of professional experiences in clinical, academic such as teaching, training, research, journal editing, etc and administrative perspectives. He has completed his Master of Health Science of Physiotherapy from the University of Sydney and Bachelor of Physiotherapy from the University of Dhaka. He has been practising as a senior consultant and specialist musculoskeletal and sports physiotherapy for many years in private setting. He has worked in many senior posts for many renowned organizations such as National Teams of Bangladesh Football Federation, Gono University, East-West Medical College and Hospital, Dhaka South City Corporation and American Super Specialty Hospital, etc.



Dr Rahman has a special interest in clinical research for the advancement of knowledge. He has been serving as an editor of Journal of Physiotherapy and Rehabilitation. He has been regularly invited as a speaker, scientific session chair and participant in many national and international conferences such as Bangladesh, India, Malaysia, Iran, Sri Lanka, Nepal, etc. He has been directly involved in the strategic planning for professional development in nationwide as well as enhancement the skills and specialties of Physiotherapists from the President post of Bangladesh Physical Therapy Association during the last couple of years.

### Dr Satishchandra Gore

Dr Gore is the first surgeon in India to start endoscopic spine surgery in the year 1999. He has evolved this surgery and developed the Gore System of Surgery, which is a mathematical, precise and SAFE method of surgery under local anesthesia in an awake and aware patient. Satishchandra Gore, from the year 2000, has selflessly devoted himself to spreading the knowledge of "Accurate Analysis and Precise Diagnosis of Pain Generators" (which has resulted in the Gore System) for the benefit of the common man, who otherwise has to unnecessarily undergo unwanted and morbid treatment plans for his/her pain.



His endeavor to teach and spread his vast knowledge and his system of endoscopy stitchless spine surgery under local anesthesia to other doctors all over the world, has taken the shape of **MISSION SPINE**. His 19 years of tireless effort has enabled MISSION SPINE to spread its wings wide and is gaining more momentum day by day.

### Dr S Rajasekaran

Dr Rajasekaran has been instrumental in building and shaping the Orthopedic Department at Ganga Hospital, Coimbatore into a very busy clinical unit with strong academic and research components. He had a brilliant academic career and was the 'Best outgoing student' of Coimbatore Medical College and stood first in the University of Madras in the orthopedic postgraduate examinations. He was awarded the Khazenifer Gold Medal and Norman Roberts Medal for best performance during his MCh exams in Liverpool, UK. He completed his PhD in 2000. He has a special interest in spine surgery, arthroplasty and clinical research in major trauma. He has led the unit's basic science research in spinal deformities, disc nutrition and biology and genetics of disc degeneration which have been recognized with numerous awards and published in international journals. He was also instrumental in the evolution of 'Ganga Hospital Open Injury Severity Score' which guides critical decisions in saving and reconstructing severely-injured limbs. He is an adjunct professor of The Tamil Nadu Dr. MGR Medical University, and was awarded the Hunterian Professor, Royal College of Surgeons of England, 2011-12. He is also the Past President of Indian Orthopedic Association President, Association of Spine Surgeons of India, ISSLS, Canada and the Tamil Nadu Orthopedic Association. He is also the Chief Editor of ASSI Textbook of Spinal Infections & Trauma and the Ganga Video Atlas of Spine Surgery. He is the editor of European Spine Journal (Executive Editorial Board Member) and Spine Journal (Deputy Editor). He is also the reviewer of many scientific journals like Journal of Bone and Joint Surgery (B), INJURY Journal, UK, Journal of Orthopedic Surgery, Hong Kong, Journal of Orthopedic Science, Japan and the Indian Journal of Orthopedics.

