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INVITED PAPERS

Indian orthopaedics: the past, present, and future

Ashok S. Gavaskar[1] · C. Mauffrey[2] · S. Babhulkar[3]

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Abstract
The editorial summarizes the Indian orthopaedic history in brief and provides an overview of the articles to be published in the Indian traumatology edition.

Keywords Orthopedics · Trauma · SICOT

India and SICOT have a strong bond through a long relationship spanning decades. India always had a strong representation in SICOT with more than 600 members. India has contributed two presidents so far, Dr. K.T. Dholakia (1978–1981) and Dr. S. Rajasekaran (2016–2018), and the current president elect Dr. Ashok Johari is also from India. I thank SICOT on behalf of the Trauma Society of India (TSI) for giving us an opportunity to present the Indian face of orthopaedics through an exclusive issue in their reputed journal.

India being one of the oldest civilizations in the world is also known for its early contributions to the field of medicine and orthopaedics. Records of suturing practices, prosthetic fitting, and fracture management can be found as early as the Vedic period (3500–1500 B.C.). Susruta known as the greatest surgeon and the father of Indian surgery contributed Susruta–Salya–Tantra in 6th century B.C., considered one of the earliest and greatest treatise in the field of surgery. The treatise had numerous references to techniques for treating fractures, bone infections, and amputations. He also classified bones, joints, and fracture dislocations into different types using primitive terminologies. Ancient Indian medicine also gave Ayurveda and Yoga to the world [1].

Following independence in 1947, the spurt in medical education was swift and strong resulting in emergence of specialized care in all facets of medicine. Some of the notable names in orthopaedics include Dr. R.J. Katrak, Dr. B.N. Sinha, Dr. K.S. Grewal, Dr. Mukhopadhya, and Dr. A.K. Gupta. These legendary names made sure orthopaedics too grew at a rapid pace with the establishment of the Indian Orthopedic Association (IOA) in 1966 and its official peer-reviewed publication, the Indian Journal of Orthopedics was started in 1967 with Prakash Chandra as the editor [2].

Dr. K.T. Dholakia, the first Indian president for SICOT, is considered one of the modern day greats in orthopaedics. He was a pioneer in hip arthroplasty and helped advance the field of joint replacement surgery in the 1970 and 1980s by teaching juniors and trainees. His teachings and techniques formed the base for the emergence and success of contemporary arthroplasty practices in India.

Dr. S. Rajasekaran, the immediate past president of SICOT, is another modern day legend in the field of orthopaedics. He started his career as a spine surgeon under the great Dr. T.K. Shanmugasundaram. Since then, he has excelled in all facets of orthopaedic surgery and is one of the biggest contributors to modern orthopaedics having presided over associations like AOSPINE, ISSLS, and IOA apart from SICOT. He heads an institution which is one of the biggest orthopaedic tertiary care centres in Asia known for the affordable, quality care for the underprivileged apart from top notch surgical training and research for younger orthopaedic surgeons. The center has been an inspiration and a template to replicate for other private institutions around the world.

Other notable names of repute in modern Indian orthopaedics include Dr. Baksi known for his work on elbow prosthesis (sloppy hinge) and his technique of pedicled bone grafting. Dr. Mathew Varghese runs the only dedicated polio ward in India known for his relentless work in polio-affected children. Dr. Shekar Bhojraj started the spine foundation to help in treatment and social

✉ Ashok S. Gavaskar
gavaskar.ortho@gmail.com

[1] Rela Institute of Orthopedics, Dr. Rela Institute and Medical Centre, 7, CLC Works Road, Chromepet, Chennai 600044, India

[2] Department of Orthopedics, Denver Health, Denver, CO, USA

[3] Sushrut Institute of Medical Sciences, Nagpur, India

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rehabilitation of unaffordable spinal injured patients. Drs. Benjamin Joseph and Ashok Johari are both known for their phenomenal and world-acclaimed work in pediatric orthopaedics. Dr. K.H. Sancheti gave the INDUS knee, the first of its kind knee prosthesis designed in India. Dr. Mayilvahananan Natarajan revolutionized the treatment of kids and adults affected by bone tumors in India and was instrumental in the development of orthopaedic oncology in India. Dr. Milind Chowdary is one of the pioneers in limb lengthening, deformity correction, and Ilizarov surgery in modern India.

No medical specialty could be more dependent on technology as orthopaedics. The technological advances in the field of medicine have led to a huge boom and change in the way orthopaedics is practiced both in the developed and the developing world. India with 20% of the world's population living in 2.5% of the world area is known not only for its cultural diversity but also the diversity in healthcare practices and delivery. Current Indian healthcare is primarily urbanized with more than 75% delivered by private institutions [3]. This leads to a skewing distribution in healthcare delivery with cities dominating and competing on par with the developed world as evident by the ever increasing medical tourism. Rural India however is fast catching up with increasing investments in the private healthcare sector, and the distribution is expected to get more even with access to high-quality tertiary care a realistic possibility across the whole of India. With a declining population and an increasing trend in the number of orthopaedic surgeons being trained, the future of orthopaedic healthcare delivery seems to be promising with numerous possibilities.

This current exclusive Indian issue will present evidence and provide insight on modern day orthopaedic practices and research in India. The issue will have a right mix of high-quality reviews, original articles in the field of general orthopaedics and trauma, and pertinent letters to the editors. Brought out in collaboration with TSI, majority of the articles in this issue will be on orthopaedic trauma and related problems. Hope the readers will find it useful and interesting.

Osteoarticular tuberculosis

No Indian edition can be complete without an article on osteoarticular tuberculosis. Indian orthopaedics has contributed tremendously for advancement of diagnosis and treatment of bone and joint tuberculosis. Given that the Indian subcontinent was endemic for tuberculosis, it is not surprising that most of the world's literature on osteoarticular tuberculosis has come from India. Dr. M. Natarajan, S.M. Tuli, Dr. A.K. Jain, and Dr. S. Rajasekaran to name a few have been instrumental in letting the world know about spinal, osteoarticular tuberculosis, and its sequela. In this edition, Prakash and colleagues [4] describe their experience with rare form of sternoclavicular tuberculosis which can masquerade as refractory shoulder pain. High index of suspicion is required for a prompt diagnosis followed by anti-tuberculous therapy for desired results.

Basic research

In contrast to couple of decades ago, there has been a huge spurt in the amount of basic and lab-based research being done in India in the recent past. This is made possible by inculcating a research attitude among trainees made possible by important roles played by organizations like Indian Council for Medical Research (ICMR), IOA, and academic institutions like the IJO which has been regularly conducting research workshops. This issue will carry a basic research paper from Dr. Shetty and his team who have done a great job with their CT-based study on morphometry of Indian clavicles [5]. Variations in clavicular anatomy are extremely common within and among races. This may have huge implications in designing appropriate surface implants. With an emergence of a very strong Indian orthopedic implant market, this study may pave the way to produce precisely designed clavicular implants for Indian and Asian patients.

Arthroplasty

Primary knee osteoarthritis is one of the most common reasons for disability in elderly Indian patients. Post-surgery alignment of the knee with the hip and ankle is one of the most important factors considered to be crucial for a long-term successful arthroplasty. Though this has been challenged by the concepts of constitutional varus and kinematic alignment, restoration of mechanical axis is still considered the standard. Dr. Dhanasekar Raja and his group have presented a well-done short-term analysis of correlating functional outcome to mechanical axis restoration in patients with severe varus [6]. Though the short-term (90 days) functional scores were better in knees with under correction, the outcome was same at one year in both undercorrected knees and ones which were restored to the mechanical axis. They concluded that mechanical axis restoration should be the goal even in severe varus knees which is absolutely logical given the better long-term survival in mechanically restored knees.

Trauma

Trochanteric fractures are a huge burden in the elderly population with high rates of morbidity and mortality. While internal fixation is the gold standard with intramedullary fixation favoured for unstable fractures, hemiarthroplasty is an accepted treatment for select fracture patterns. The evidence available on the topic is mixed with no clear-cut guidelines. Dr. Dhillon and his team try to answer this question by performing a good meta-analysis by searching through three high-quality databases. The results showing internal fixation with intramedullary nails provides better results in terms of function and overall mortality [7].

Dr. Kasha presents a brilliant review article on the various possible techniques that can be used for successful reduction of a sub-trochanteric fracture [8]. The paper gives a concise review of the different tools and techniques and can be a useful read for young surgeons to do a successful nailing for sub-trochanteric fracture which can be challenging even for an experienced surgeon.

Valgus osteotomy for failed femoral neck fractures is a reliable solution as shown in the literature. Most of the published results on the topic have come from India and other developing countries. Surgeons like Dr. N.K. Magu have done brilliant work on the subject and has contributed tremendously for understanding the problem and the high possibility of hip preservation with the technique. I and my colleagues (Figs. 1, 2, and 3) have written a review on the subject highlighting the biomechanic principles, variations in technique and implants, results, and possible limitations [9].

Open fractures are a common problem in India contributing to high morbidity in younger population. Dr. Jain presents a retrospective review of primary locked plating of open distal femoral fractures with good results [10]. Gunshot injuries are relatively rare in India, and hence, Khatri with his colleagues have done a great job publishing their experience from a single centre which will be beneficial for trauma surgeons from India and other countries to learn the principles involved in treatment, how different it is compared with an open fracture; results and complications that can be expected have been dealt with in great detail [11].

Fig. 2 Mauffrey C.

Articular nonunions in the elderly can be really difficult to treat. Lack of bone stock, osteoporosis, deformity, and comorbidities can preclude conventional techniques that are used in younger patients. Keeping early restoration of mobility in mind, arthroplasty can be a reliable option in select patient. Arthroplasty in these patients is not easy, and Dr. Rajasekaran and his team have published their results of nonunion excision, tumor prosthetic implantation followed by early mobilization with favorable short-term results in select elderly patients [12].

Letters to the editor

Letters to the editor (LTTE) presents a valuable medium of communication between the author and the reader. LTTEs can highlight major merits and demerits in an article and calls for further responses and introspection. The current issue has three LTTEs raising valuable concerns and queries on original manuscripts published in this issue. They have also highlighted the limitations in those papers and scope for further study on the subject [13–15].

Fig. 1 Ashok S. Gavaskar

Fig. 3 Babhulkar S.

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

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