

Editorial

Paradigm shifts, orthopaedics, and clinical research

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A paradigm shift refers to a change in perceptions and frames of mind. Humans, being creatures of habit, do not like their perceptions jarred unexpectedly. Medical practitioners are no exception. It is our natural tendency to resist changes. This innate resistance met the birth of orthopaedics: its emergence as a specialty was complicated not only by circumstances but also by physician colleagues.¹ Only the single-mindedness of our forefathers altered the medical mindset, paving the way for our specialty's eventual recognition as an independent surgical discipline. Today, fortunately, our positions are not as precarious and our battles not as difficult; but in the evolution of our young specialty, the need to confront set paradigms and frames of mind—both within and outside ourselves—continues.

In a scientific community, paradigm shifts can only be effected through time and with evidence collected to support the new paradigm. Prevailing methods of treatment, be they based on science or anecdote, have often become routine, unquestioned, and considered infallible. Not very long ago, the patient with an extremity malignancy was treated with nothing but radical ablative surgery in a sense of desperation and surrender. Tumours were lumped together as a single entity (or more aptly, 'problem'), largely misunderstood, then ignored. It took the concerted efforts of a multidisciplinary team, often led by an orthopaedic surgeon, to gradually and patiently alter that frame of mind. Such efforts took the form of long, tedious hours in operating theatres and clinics, meticulous collection and input of data, and diligent follow-up of patients. Between surgeries and out-

patient queues, meetings and conferences were held to discuss everything from histopathology to tumour necrosis to chemotherapy.

Despite the extensive amount accumulated, the data remained idle, unable to change perceptions, until they had been translated into information relevant to the specific population and the medical milieu. Useful knowledge (a tremendous amount of it) can be generated by carefully reviewing and analysing records. How do the long-term functional results of several reconstructions compare? What are the survival rates and what are the prognosticators for different sarcomas? What complications are most prevalent in specific surgeries? What is the sensitivity and specificity of the most commonly used biopsy procedure? Such reviews of collected data contribute to the establishment of baseline values, burden of illness figures, complication rates, survival rates, etc. Data analysis, at the same time, offers the unique opportunity to critically assess one's own treatment methods and results. These results are in turn evaluated in relation to the clinician's working environment, just as they can also be compared with those in the literature from other surgeons and institutions. When such a combination of new knowledge and critical evaluation is brought back to the wards, it allows further improvement of the services delivered to patients, representing one of the main purposes of clinical research: patient service. Taken a step further, information generated from clinical research is scientific knowledge that can be shared with colleagues, patients, and other stakeholders. Through collaboration, dissemination,

and communication, the level of awareness is raised, perceptions modified, and mindsets gradually altered.

The process of clinical research is not always simple, but there are always solutions. Obstacles crop up at different stages, in forms unique to different situations and different clinicians. The development of a database may require reorganisation and reformatting of established records and data-collection forms. The collection of data itself can be also challenging, as when following up patients, many of whom in less industrialised countries do not have easy access to communication or transportation. Researchers have been known to trek into distant villages in search of long-lost patients (and having interviewed and examined them, enjoyed the rest of the weekend on the village beaches). Missing radiographs, on the other hand, are a reality even in the most technically advanced hospitals in the world. However, new technologies continually provide new solutions. Thanks to the digital camera, we now can preserve and file that elusive initial preoperative image of the hip. The clinician's mind used to go blank in the face of all the collected data; today there are clinical epidemiology and research units available to help make sense of the rows and columns of figures and reduce them to single comprehensible rates and ratios.

Although technology has made the collection and analysis of data easier, the purchase of expensive computer and digital equipment is not required for clinical research. Research can be done on ruled paper or a laptop; it can be done with a digital or a film camera; it can be done with a landline or a cellular phone; it can be done with a PDA or a pencil. Clinical research is a mindset that seeks new knowledge, challenges the traditional, and evaluates the current.

The trauma surgeon who assesses the risk factors for infections in patients with open fractures is doing research; so is the spine surgeon who analyses the successes (and failures) of his spinal instrumentations. The young doctor who enthusiastically reviews his modified suturing technique is doing research; so is the wizened, retiring physician who critically reviews his surgeries amassed over 4 decades.

In the past few decades of orthopaedic development, it has been through clinical research that paradigms have continued to evolve on international, national, and even local scales. Professor John Goodfellow remarks that this "youthful unreflective enthusiasm [for orthopaedic innovation] is now giving way to the maturity of introspection".² Professor Kleinert's controversial new concept of tendon motion was finally received with much enthusiasm because of the data he supported it with. Professor Watanabe could not have introduced arthroscopy without his collated *Atlas of Arthroscopy* just as the Hong Kong anterior approach could not have gained popularity without a carefully studied cohort of spine patients. In the same way, subspecialties today gain acceptance into our local orthopaedic community only after a body of evidence has been collated and presented to colleagues. The Philippine Musculoskeletal Tumor Society, although just established in the last year, represents more than a decade of meticulously collected and critically reviewed Filipino data on orthopaedic oncology. The future of orthopaedics will bring waves of new devices, original ideas, and innovative techniques, continuously challenging old and traditional concepts, but without the backbone of clinical research, there can be no effective paradigm shifts to better concepts of patient care.

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