

The elements of fracture fixation. Second ed.

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Those of a certain vintage, who learnt the use of carpentry tools through their use and through error, will find much in this book which is delightful. All their hard-learned lessons are here confirmed and put into clear instructional words. It must be astonishing to the carpentry trade, with which orthopaedics is often disparagingly compared, that it has taken most of a century for the use of their tools in the performance of 'joinery' to be displayed and explained. We came from an era in orthopaedics yet to learn about the chisel; and it is clear that our understanding of screws and screwdrivers was crude.

This then, an analysis of *The Elements of Fracture Fixation*, is at least timely. As an instructional work, it comes with the authority of the AO Foundation, according to the several forewords. Ample space is given to the principles which inspired the technique of compression plating; passing reference is also made to the benefits of distraction, but without explanation. As stated in one foreword, the science of fracture fixation does not stand still.

Dr. Thakur has made a thorough study of the subject, commencing with excellent chapters on the nomenclature and principles of simple mechanics, employing many words foreign to medicine. The text is illustrated with clear line drawings, derived from a number of sources, scrupulously attributed, but mostly 'redrawn' for clarity, using computer graphics. In fact there is a curious feature about this book; there are regular alterations in the typeface from page to page, for no obvious reason, suggesting that chunks of text have been transposed in bulk from other sources, doubtless from the author's own publications. This gives the impression of a 'copy-and-paste' table-top job, but this should not detract from the value of the book.

The biology of bone formation is touched on, showing the classic curves of force vectors which, for instance, give the neck and shaft of the femur their characteristic internal structure. Questions might be asked as to how it is that trabeculae are laid down in response to loading on the medial side of the calcar, and on its lateral side in response to tension. This is a misunderstanding, of course, because no consideration is given to the effect of the muscles about the hip, not to mention those of the whole trunk, active in the course of balance and movement. This feeling of discomfort is repeated throughout the book because there is little reference to the soft tissues which have such a huge effect on loading the skeleton. The chapter on metals and materials is detailed and profound, possibly beyond the title of Elementary.

The most interesting chapters are those on screws and plates. It is important to understand the meaning and value of strain and stress and torque and elastic forces. The examination of pitch of the thread of a screw, and its rake and core and lead and root and run-out, may not be essential as an unfamiliar nomenclature, but the concepts are crucial. It is upon them that the hold of a screw to bone, depends. In fact the more one reads about these 'Elements', the more one begins to realise the awful omission from this book. Dr. Thakur devotes the entire volume to only one half of the subject. Fixation surely depends upon the security of the hold of one material to the other. The variation of texture of bone is not addressed until the end of the book, and then only in regard to osteoporosis in most general terms. Everyone who fulfils a trauma duty, is familiar with the fact that the majority of fractures occur in soft, thin, insubstantial bone, in undernourished, aged, ailing patients. Of course that is not the subject of this work, but to refer to it so slightly will lead to misapplication of the principles of fixation. For all the measurements of mechanical engineering, the surgeon with the drill in his hand proprioceptively feels the quality of the bone being drilled and adjusts his selection of drill-bit thickness and screw size accordingly. We are on the borderline between art and science in traumatology. Perhaps 'craft' is the appropriate word.

Nothing is worse for a patient than to have an operation to fix a fracture which fails to do so. Structural failure of an implant is a rare cause. Much more commonly it is the bone which fails. Dr. Thakur's solution is to employ bigger and better metallic implants with greater capacity to hold on, to what? Little attention is given to the tissue to be fixed. In his chapter on locked internal fixation plates, 16 pages are devoted to this piece of precise engineering, the benefit of which has yet to be demonstrated in clinical as well as economic terms. Some anxieties are expressed, but I was concerned to learn that (on page 302) there are "no absolute contraindications" to its use in osteoporosis. One feels that there must come a time at which consideration is given to conservative, non-operative management of fractures which are actually incapable of fixation. We have come a long way in the past 70 years, but there remain cases in which the overstated remark of Watson Jones still rings a bell: "There is no such thing as internal fixation of bone, only internal suture". But is the answer for failure to hold onto porous, comminuted bone, always to put in even more numerous and bigger pieces of metal?

This valuable work requires a measure of circumspection. Dr. Thakur has presented most if not all the mechanical possibilities, including intramedullary nails, external fixators and frames and flexible devices, but this book does not emphasise judgement as to what should be done. The experience of failure to fix will be reduced by the knowledge here presented, but it will not be eliminated. To include this aspect in future editions, together with some examination of dangers, disadvantages and salvage procedures, would lift this work from the level of doctrinaire polemics, and justify the prefix Bio- in front of mechanics.

M. Laurence