BOOK REVIEWS

Adult Articular Cartilage. Edited by M. A. R. FREEMAN, B.A., B.Ch., M.D., F.R.C.S., Consultant Orthopaedic Surgeon to the London Hospital. With seven other contributors. 26 × 18 cm. Pp. xiii + 341, with many figures and tables. Index. 1973. London: Pitman Medical. Price £9.50.

This first book on adult articular cartilage is the combined work of an eminent team of basic scientists and clinicians who have analysed current knowledge of its structure, ultra-structure, biochemistry, physiochemistry, nutrition and mechanical properties and the causes of its failure as a load-bearing material. Each chapter is an authoritative account which leads to a series of provocative conclusions.

The chapters on biochemistry and physiochemistry emphasise the importance of the interactions of proteoglycans and collagen with explanations of the influence of proteoglycan on collagen formation and the necessity for rapid turnover of proteoglycan to maintain bonding between the two, and hence the structural integrity of the whole matrix.

The knowledge that proteoglycan formed by the chondrocytes in response to matrix damage is structurally different from the original has important implications for studies of repair because such tissue may be an inadequate substitute for the original.

The chapters on mechanical properties have emerged as a result of several years of carefully executed engineering-orientated research. A clear exposition of the dependence of mechanical strength of cartilage in compression on proteoglycans and strength in tension on collagen is made which presages the hypothesis to explain cartilage breakdown later.

Certain points require comment. The statement that saline can lubricate joints "nearly as well as synovial fluid" is unlikely to be valid because injections of saline into normal living mammal joints produces rapid degeneration of articular cartilage.

The unique structure of synovial fluid in relationship to its lubricating properties requires explanation because alteration of the hyaluronic acid content by hyaluronidase injections causes cartilage fibrillation in experimental animals and alteration of synovial fluid by synovectomy of animal joints is followed by cartilage fibrillation in 20 per cent of cases. Hence results based on estimations of coefficients of friction on cadaver joint cartilage should be interpreted with caution and require further evaluation. Similarly, it is difficult to accept that friction in joints is unrelated to the extent of articular cartilage fibrillation, or even its presence, when one considers the irregular movement of a joint with clinically audible and palpable crepitus.

While recognising the multiple factors possibly responsible for cartilage surface fibrillation, the authors of the final chapter present a lucid hypothesis which incriminates cyclic loading on cartilage over many years as the cause of "fatigue failure" of the collagen mesh-work and consequent fibrillation. Whether such loading could produce chondrocyte death and lysosomal enzyme release and degradation of proteoglycans as a first event in cartilage matrix breakdown is not certain.

This book, which informs, questions and stimulates, is an invaluable contribution to the literature. It will interest and

provoke all clinicians and scientists involved with the problems of joint failure.—George BENTLEY.

Die Arthrodesse des Hüftgelenkes und ihre Problematik. By Rene LIECHTI. Preface by M. E. MÜLLER and B. G. WEBER. 27.5 × 20 cm. Pp. xviii + 270, with 266 figures. Index. 1974. Berlin, Heidelberg, New York: Springer-Verlag. Price DM 128, \$52.30.

Here is an expanded monograph of outstanding quality. The author, who trained under both Professor Maurice Müller and his successor at St Gallen Dr B. G. Weber, was presented by them with a series of 583 cases of arthrodesis of the hip in adults from the remarkably active orthopaedic clinic of that city. Their preface is warmly appreciative of the way this rich clinical material has been dealt with.

The main theme of the work is the development of a versatile technique of arthrodesis with internal fixation so firm that protection by a plaster cast can safely be dispensed with. The useful table of authors on page 108 serves to remind us that whereas Watson-Jones writing in 1956 firmly insisted on a double spica for four months, a number of workers—notably the late Ivar Alvik of Oslo—have used no such external splintage.

Dr Liechi describes in considerable detail the four main types of arthrodesis that have been practised at St Gallen. The first two, used in 156 and twenty cases respectively, lacked internal fixation, required a short single spica and elbow crutches during the second and third months of convalescence, and gave a relatively high incidence of pseudarthrosis.

Then in 1953 came Müller's technique of fixation by two long and strong plates, one lateral, the other anterior, applied after routine resection of the great trochanter and often a pelvic osteotomy with medial displacement. The after-care of these 108 patients was transformed—no plaster, up at ten days, and two sticks for three months.

Next came a refinement with Schneider's design of cobra head plate; the cluster of six screws through the head usually gave a hold on the upper fragment so firm, and compression gave such good apposition of cancellous bone, that the second anterior plate was seldom necessary. Bed rest for these 258 patients was now down to a mere five days and the stay in hospital only two or three weeks. Despite the early walking and the undoubted fact that many of the hips presented far more difficult problems than late osteoarthritis with a full amount of bone stock, the incidence of pseudarthrosis was low at 6.2 per cent. From 1967 the *kreuzplatte* or cross plate has been the method of choice.

It is a good theme and Dr Liechi has made the most of it. For example, the chapter on biomechanics alone extends to thirty pages and includes a run of seven pages, four in costly full colour, illustrating the compression of araldite models. The German text, however, is concise and crystal clear, the numerous diagrams and radiographs are truly excellent, and the high standard of production, on which no expense has been spared, does credit to the publishers. This full and frank record of surgical endeavour by two masters of the art of internal fixation deserves a place in every orthopaedic library.—K. I. NISSEN.