

treatment of the mentally disordered. This section is, however, skimmed and as Baddeley himself remarks "the conclusions that I draw . . . are, therefore, inevitably superficial". A second innovation is a chapter on treatment for amnesic patients, but the results are meagre. Persuading these people to associate names with visual imagery helps them remember the names, while their memory for the substance of a passage of text can be improved by the PQRS technique (preview the material; question to find the salient points; read carefully; state the main features of the text; and finally test oneself by checking memory for the text against it). Both techniques are of course known to help unaffected people a little, although they are based on common sense rather than psychological findings.

Although lacking in excitement, the book is for the most part competently written, provided you can bear the repeated misuse of the expression "as such". The same cannot be said for the index, which is a disgrace. The contents are not memorable: only readers adept at the PQRS technique are likely to commit them to mind. □

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## Forcing the tissue

R. H. T. Edwards

**Skeletal Muscle in Health and Disease. A Textbook of Muscle Physiology.** By D. A. Jones and J. M. Round. *Manchester University Press: 1990. Pp. 221. Hbk £29.95, \$49.95. Pbk £9.95, \$17.95.*

FOR hundreds of years, skeletal muscle has presented an intriguing challenge to those interested in understanding the generation of force and other physiological and metabolic properties of this tissue. The principal models that are the basis of our understanding of skeletal muscle structure, function and chemistry are largely derived from studies of muscle isolated from various animals. Over the past 20 years, the growth of methods of chemical analyses of needle biopsy samples and electrical stimulation techniques has been quite remarkable, allowing human muscle to be studied to something approaching a degree of precision similar to work on isolated muscle. The authors of this book have distilled in their short volume a wealth of experience in developing and applying techniques for the study of human muscle in health and disease.

The strength of the didactic account of the subject given here lies in the fact that both authors are laboratory researchers who have worked in clinical departments, with the result that discussions on basic mechanisms are extended to man by, for example, descriptions of a cross-section of muscle obtained by X-ray computerized tomography and a wealth of (admittedly monochrome) photomicrographs of muscle in various pathological states. The account of muscle structure and function is greatly helped by illustrations of the structure and inter-relations of particular cellular components. Classical muscle physiology is concisely but authoritatively covered with a profusion of specific examples on different isolated muscle preparations.

The growth and development of muscle and the implications for athletic performance lead on to an up-to-date account of modern concepts of physical training. This account is particularly interesting in view of the authors' own observations on the relationship between cross-sectional area measured by X-ray tomography and the increase in maximal isometric strength with training. Force has long been known to be proportional to cross-sectional area of muscle, but it has not been at all clear how muscles can become stronger with little or no increase in cross-sectional area. The authors suggest that tethering by new connective tissue increases force through

a reduction in effective fibre length. Also of interest to athletic performance is the section on the adaptations for endurance exercise, which covers well-documented work carried out in Scandinavia, the United Kingdom and in North America on the energy supply processes for muscular activity.

The sections on fatigue and pain are those in which the authors make their most original contributions. Their account of the complexities of the mechanisms underlying fatigue in isolated muscle and in human subjects is commendably clear and concise. Vigorous muscular activity is always at risk of causing muscle damage or pain, and it is refreshing to see the systematic analysis of the mechanisms underlying these based on experimental observations.

In the final section, the authors consider the reactions of muscle not only to mechanical damage but also to the consequences of disease. Muscle as a specialized tissue responds to insult in relatively few ways. What is seen as compatible with a particular clinical diagnosis comprises both primary features and (often more obviously) secondary adaptations to damage or compensatory use. Jones and Round provide examples of these adaptive responses obtained from biopsies from people with Duchenne muscular dystrophy, spinal muscular atrophy and inflammatory muscle diseases.

The value of percutaneous muscle biopsy as a tool to give a 'life vision' (*Bios, Opsis*) to supplement the physiological and metabolic study of human muscle disease is obvious. The recent, rapid increase in our knowledge of the muscular dystrophies obtained from molecular-biology methods is summarized here for Duchenne and Becker muscular dystrophies, together with reference to the possible physiological role of the cytoskeletal protein dystrophin which is absent in people with these types of muscular dystrophy.

This text is likely to become a standard for student courses on cell biology, physiology, sports sciences and research methods in physiotherapy. The book deserves a wider readership, however, as an exciting introduction to the rapidly expanding field of muscle biology and how it has influenced our understanding of human muscle performance and the pathophysiology of muscle disease. □

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■ Some of the techniques mentioned above are covered in *Scanning Electron Microscopy, X-Ray Microanalysis, and Analytical Electron Microscopy*, new from Plenum. This laboratory workbook, by Charles E. Lyman *et al.*, provides exercises for students developed at courses held annually for the past few years at Lehigh University. Spiral bound, price is \$29.95. □

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