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## Current Research in Sports Biomechanics

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# Medicine and Sport Science

Founder and Editor from 1969 to 1984

*E. Jokl*, Lexington, Ky.

Vol. 25

Series Editors

*M. Hebbelinck*, Brussels

*R.J. Shephard*, Toronto, Ont.



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Basel · München · Paris · London · New York · New Delhi · Singapore · Tokyo · Sydney

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Volume Editors

*B. Van Gheluwe*, Brussels

*J. Atha*, Loughborough

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## Preface

The emergence of biomechanics as a modern discipline may reasonably be said to date from the time of the First International Biomechanics Seminar at Zürich in 1967. By that date, a general awareness had developed that biomechanics was no longer the esoteric domain of a few scattered pioneers, but an applied science with an honourable history and a respected capacity for attracting the sustained attention of research scientists throughout the developed world. Based firmly upon the biological and applied mathematical sciences, biomechanics counts among its devotees anatomists and physiologists, mathematicians and physicists, sports scientists and ergonomists, space scientists and medical practitioners. Its focus is on the properties of materials and the characteristics of biological tissues; on the testing of consumer products, protective clothing and equipment; on the movements of animals and the flight of birds; on the activities of the disabled, the behaviour of industrial workers and the performance of elite athletes; on safety, workplace design, therapeutics and medical diagnosis.

The persistent quest for the ultimate performance, the holy grail for athlete and coach, has long fuelled the drive to apply sound quantitative techniques to the analysis of sports performance, and this has made sports biomechanics a lusty limb of its parent discipline. At the same time, the needs of the ordinary individual undertaking recreational activities have not been entirely neglected, and benchmarks of broad scientific interest as well as of narrow specialist application have been established. Furthermore, the recent and burgeoning commercial interest in sports technology (the leisure and sports industry in Britain has a turnover of over one billion pounds sterling) has led to the allocation of some resources for scientific research in commercially profitable areas. Such forces as these are acting to carry sports biomechanics to a healthy maturity.

Nonetheless much development has still to occur. In particular, few textbooks are yet in print, and these are characteristically written for readers with modest levels of numeracy. Journal or conference papers, although

often excellent, are typically short and tightly focussed. This publication seeks to fill the gap between them by providing an opportunity for a select group of rising young individuals and established figures to engage in a fuller discussion of topics currently under research scrutiny. In the following pages, attention is given to the biomechanics of particular events such as running or gymnastics, to analytical techniques such as the measurement of power or the quantification of dynamic muscle activity, and to the pragmatic process of combining quantitative analysis with athlete guidance such as might appeal to the coach. In addition theoretical and physical models are presented that have direct, practical relevance.

It is our sincere hope that in representing the ideas and endeavours of a few outstanding individuals currently working at the leading edge of sports biomechanics research, this book will be welcomed as a source of interest and perhaps even of inspiration by those actively engaged in the field.

*The editors*