

Preface

Combat soldiers are being rigorously prepared to perform at extreme conditions, which expose them to various types of potentially-serious injuries. Life-threatening situations are understandable as part of combat scenarios, which motivates considerable efforts in developing guidelines and training protocols, as well as protective measures that are technologically-based (e.g. specialized clothing and footwear, protective gear and devices). These measures are all aimed at reducing the incidence of injuries and lessening their short-term and long-term effects, while minimally compromising performance in battle. Besides the aforementioned combat injuries, many of the other injuries reported among recruits and soldiers are a consequence of training under extreme physiological and environmental stressful conditions, and are in many cases, related with insufficient adaptation of the body and tissues to the requirements of training programs.

While epidemiological surveys highlight a clinical picture, the etiology is much more complicated to investigate, and more difficult to understand. Understanding the biophysics and biomechanics of injuries is a fundamental part in enhancing the survivability and performance of soldiers. Ultimately, better understanding contributes to development of improved guidelines, training protocols and programs as well as materials and other technologies for better body and tissue protection.

The present book in the series *Studies in Mechanobiology, Tissue Engineering and Biomaterials* focuses on the biomechanics, mechanobiology and bio-thermodynamics underlying common injuries which are encountered by recruits and soldiers during their service, either in training or at war.

In the various chapters of this multi-disciplinary book, we focus mostly on musculoskeletal, neurological and heat stress-related injuries. The book summarizes the efforts of an international group of expert authors, from military research institutes and universities in the United States, the United Kingdom, Germany, Australia, and Israel, countries that are all well-known for their massive collective experience in military medicine, military ergonomics and military biomechanics. Within the 11 chapters of the present book, the interested reader will find the most up-to-date knowledge with regard to military injuries and their prevention.

Importantly, this volume makes a unique contribution to the literature, being the first of its kind to describe the specific biomechanics and thermodynamics aspects of common military injuries. The authors, all leaders in their fields, together provide the state of science in understanding military-related injuries. We, the editors, are certain that military medicine experts, scientists and engineers working in the fields of injury biomechanics and development of soldier-oriented protective equipment, will find this book a primary source of knowledge. Finally, the relevant decision-makers in government bodies and militaries should make this book their primary reference, particularly for prioritizing research and scientific-based selection of technologies.

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