

SPORTS INJURIES

Their prevention and treatment



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SPORTS INJURIES

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Foreword

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The work that follows should be of specific interest, and is strongly recommended, to coaches, trainers, physical therapists, school nurses, physicians, athletes, and all others interested in the varied problems of sports medicine. The thrust of the book is to provide, in an organized manner, the general principles of care for most injuries and conditions that afflict athletes. It provides, in a clear fashion, the major treatment options available to the physician as well as the athlete and allied health personnel. Specific valuable advice is provided concerning the diagnosis of both common and unusual conditions. Much emphasis is placed on the rehabilitation of athletes following injury and, of equal importance, the means of preventing injury.

The authors are well-known authorities on many facets of sports medicine in Scandinavia; and are well respected worldwide by their colleagues. Dr Peterson is presently Associate Professor of Orthopedic Surgery, as well as a boarded General Surgeon at the University of Gothenburg's Eastern Hospital. He is currently President of the Swedish Sports Medicine Society, and a member of the International Soccer Federation's (FIFA) medical committee. He is a member of the Swedish Sports Research Council, as well as other national and international sports medicine organizations. Dr Renström is an Associate Professor of Orthopedic Surgery at the University of Gothenburg's Sahlgren's Hospital. He is Vice-President of the Swedish Sports Medicine Society, and is a member of the International University Sports Federation's scientific committee. Both Dr Peterson and Dr Renström have published numerous articles and scientific papers on sports medicine subjects. They also pursue vigorous and athletic endeavors themselves and have cared for numerous sports teams, both regionally and internationally.

This unusually well-illustrated text was originally published in Swedish in 1977, and was extensively revised in 1983, and again in 1986 for this translated edition. It has previously been published in Russian, Danish, Finnish, Dutch and German. In addition to this English translation, it is presently being translated into French and Japanese. To date, over 100,000 copies have been printed, attesting to its popular appeal in the various countries. This work has been utilized as a text in the education of physical therapists, trainers and nurses. I believe that Dr Renström and Dr Peterson are to be congratulated heartily for their efforts in providing the sports medicine world with a text of this quality, and I know that readers will find it enjoyable and informative.

INTRODUCTION

Sports injuries occur as a result of physical activities carried out either for general recreational purposes or with more professional goals in mind. They may be caused by accidents or by overuse, and they do not necessarily differ from injuries sustained in non-sporting activities.

Most sports injuries are minor and would not prevent the average athlete from continuing his daily work, but as many people become more seriously committed to sporting activities, continuing daily work is no longer the only consideration. The injury must be treated effectively so that leisure activity can also be resumed at the earliest opportunity.

Those athletes who participate at championship level require not only correct diagnosis of their injuries but also early treatment with complete healing so that they can continue to produce good performances with as short an absence as possible from their sporting activity. Even the more casual enthusiast, upon whom demands are not so great, may suffer both physically and psychologically as a result of minor injuries and may be prevented from pursuing the sport which usually contributes significantly to his sense of well-being and to the quality of his life.

Progress in diagnosis and treatment is rapid in the field of sports medicine, and to keep this book abreast of recent developments we have revised it extensively since it was first written. Our thanks are due to the many people who have contributed their expertise towards this new edition which we hope will satisfy a need in the world of sport and be of use to athletes, their trainers and their medical advisers.

In a complex subject such as sports medicine, good illustrations are of greatest importance. Illustrations in the first edition of this book were prepared by Tommy Bolic Eriksson who fulfilled our intentions skillfully and with great imagination. These illustrations are retained in this book and have been coloured by Tommy Berglund who has also produced a large number of excellent additional coloured illustrations. Tommy Berglund has shown his great ability to understand and illustrate our ideas.

Our friend, Ole Roos, who is the photographer at the Sahlgren's Hospital in Göteborg, has given us his support and professional help at all times of the day with the photographs in the book. His professional skills are gratefully acknowledged.

A basic knowledge of biomechanics is necessary in order to understand the mechanism behind injuries. Our friend and colleague, Dr Olle Bunke-torp, has written the chapter on biomechanics and for this we are very grateful.

Careful and planned rehabilitation is essential after an injury. We therefore considered a detailed description of rehabilitative training to be of importance in this book. Eva Faxén, RPT, who is working with us at the Skåtas Sports Medicine Clinic and at the hospitals, has put much work, ideas and energy into the rehabilitation chapter and we are extremely grateful to her for her work. Valuable advice has also been given by Roland Thomée, RPT.

In managing the original Swedish edition, Editor Kerstin M. Stålbrand made an invaluable contribution with her excellent scrutinizing of the language and for her numerous and intelligent comments.

The second edition, which has been widely extended with the inclusion of coloured photographs, would not have been published in this way without the imagination, risk-taking and whole-hearted support from Ebbe Carlsson, former head of Tidens Förlag Publishing House in Sweden.

For work on this English edition, we want to thank Dr Kate Hope, Great Britain for her valuable contributions to editorial details and for her suggestions on the realistic treatment of sports injuries in Great Britain. We gratefully appreciate her beautiful language.

We would also like to thank Editor Sally Jones for her continuous support, careful scrutinizing of every detail, and for her patience with all our comments and delays.

Our colleague and friend, Dr Mark Pitman in New York, has read the manuscript and given many valuable suggestions. Mark has also been kind enough to write a section on throwing injuries, making particular reference to baseball injuries which are more of a problem in the United States than in Scandinavia. We are grateful to Mark for his support.

We would also like to thank Professor Robert J. Johnson, Burlington, Vermont for his support and for his kind foreword to the American edition.

Professor Moira O'Brien, Dublin, Ireland has carefully read the whole manuscript. She has given many valuable comments based on her long experience in sports medicine and for this we are very grateful.

We would like to thank the Swedish Sports Federation and Folksam Insurance Company for their help in the production of this book.

Many other friends and colleagues have given their views on parts of the manuscript and we want to thank Professor Bengt Saltin, Dr Ann-Sofie Saltin, Professor Nils Svedmyr, Associate Professor Tore Mellstrand, Associate Professor Bengt Eriksson, Professor Bertil Stener, Professor Ian Goldie, Dr Ake Andien-Sandberg, Bengt Sevelius – Managing Director of the Swedish Sports Federation and Nils Stjernfeldt, Arne Brundell, Yngve Tillborg and Tore Brodd for their assistance and constructive criticism.

We are happy that this book has caught the interest of so many people. The contents of this book may sometimes be controversial. A book like this contains a large number of facts which are based and coloured by our own philosophy and by our personal experiences.

Göteborg in February, 1986

Lars Peterson

Per Renström

SPORTS AND INJURIES

'If we could give every individual the right amount of nourishment and exercise, not too little and not too much, we would have found the safest way to health.' Hippocrates 460—377 BC

Despite Hippocrates' statement made almost twenty-five centuries ago, it is only recently that sport has been widely accepted as an integral part of keeping fit. Enthusiasts rightly encourage participation in sport as one aspect of leading a healthy life, but it should be remembered that 'fitness' is not the same as 'good health' and that physical activity can only contribute to fitness when undertaken on a regular basis and supported by good dietary habits.

Sport — the essence of keeping fit

Even in the absence of scientific proof, few people doubt the beneficial effects of sport on their fitness and sense of well-being. They see physical effects in the strengthening of muscles, improved mobility and balance, increased stamina and better weight control; and at the same time it extends their recreational and social lives. In medical terms there are strong indications that regular physical activity contributes towards preventing cardiovascular disease and delaying the onset of those degenerative disorders which are an inevitable part of ageing.

Awareness of the potential benefits of exercise, together with a changing social and economic climate, has meant that most of us now have a considerable amount of leisure time at our disposal, and has led to an explosion in the numbers of people participating in sports on a regular basis. Simultaneously there has been a change in attitudes in competitive sport which has meant greater pressure upon individuals to produce ever more spectacular results. Both developments have involved increased pressure on medical services. Fortunately, there has not been a marked increase in the incidence of injuries caused by accidents, perhaps because basic training and equipment have improved. The incidence of injuries caused by overuse, however, has increased as more people have started jogging and taking part in events such as marathons which were once regarded as being suitable only for experienced athletes. Many overuse injuries can and should be prevented by a wider knowledge of preventive measures and their application.

Although this book deals with the injuries which are one of sport's drawbacks, it is worthwhile remembering that, overall, the advantages gained from sporting activity both by the individual and by society as a whole, far outweigh the disadvantages. Add to this the fact that many athletes are young and active individuals, and it becomes clear that increased resources in sports medicine for prevention, treatment and rehabilitation make sound economic sense.

Physical activity is of value to all the tissues of the body, providing it is performed correctly.

IMPORTANT FACTORS IN RELATION TO SPORTS INJURIES

For every sport, a number of factors of varying degrees of importance must be considered in relation to injury.

1. The athlete's qualifications

- *Age* affects the strength and resilience of the tissues. Muscular strength begins to decline at the relatively early age of thirty to forty years, while elasticity in tendons and ligaments decreases from the age of thirty and the strength of bone after the age of fifty.

Inactivity accelerates the natural degeneration of muscles, tendons, ligaments, articular surfaces and bone structure, while activity tends to delay it. Physical achievement reaches its peak between the ages of twenty and forty, unlike intellectual ability which is at its best between thirty and sixty years of age.
- *Personal characteristics* such as temperament and maturity may affect the athlete's tendency to take or to avoid risks.
- *Experience* is important. Beginners often suffer more injuries than experienced athletes.
- *Level of training* is significant since injuries occur more often at the beginning of the season and towards the end of matches and are caused by inadequate basic physical fitness. Too much training, on the other hand, may cause injuries as a result of overuse.
- *Technique* is of the greatest importance to anyone taking part in such sports as high jump, javelin throwing and tennis. Faulty technique can contribute to overuse syndromes and cause traumatic injuries, for example, in Alpine skiing.
- *An insufficient warm-up period* may contribute to muscle and tendon injuries.
- *Intensive competition and training programmes* which do not allow a sufficient recovery period after maximum effort increase the risk of injury.
- *Health problems* (for example, infections and flu-like illnesses) increase the risk of complications such as inflammation of cardiac muscle. No athlete should participate in training or competition until his temperature has returned to normal after an illness.
- *A balanced and nutritious diet*, including adequate fluids, is a prerequisite for sporting activities.
- *General measures*, including sufficient rest and sleep, and avoiding alcohol, reduce the risk of injury.

2. Sports equipment and facilities

- *Equipment* used in any sport may be inadequate, poorly designed and/or defective.
- *Protective clothing* can be faulty, insufficient or even discarded.
- *Sports facilities* are not always suitable for the activities for which they are used.
- *Lighting* of the sports area may affect the judgement of distances, the perception of colours and the athlete's visual acuity.
- *Unsuitable weather conditions* increase the risk of injury.

3. Characteristics of sports

Different sports make different demands on the athlete. Competitive sport perhaps involves an increased risk of injury, but some people have a positive need to participate at this level and gain great satisfaction from doing so. Top athletes are often held up as examples to the young who are encouraged to attend sports grounds and running tracks as a result. Also, top level sport arouses great public interest and plays an important part in the everyday life of many people, so is not to be discouraged.

Regardless of the level at which it is played, each sport is unique in terms of the demands it places on participants and its special characteristics which can cause both overuse and traumatic injuries.



Sport for all. Photo: All-Sport/Trevor Jones.

Right: sport for all. *Photo: Per Renström* **Below:** top-level sport. *Photo: Pressens bild*



SPORTS MEDICINE — A DEFINITION

Sports medicine encompasses the following elements: preparation and training, prevention of injuries and illness, diagnosis and treatment of injuries and illness, and rehabilitation and return to active participation in sport. This definition relates to the athlete, the sport, sporting equipment and diagnostic instrumentation.

Preparation and training

Preparation and training includes instruction in training methods, technique, dietary requirements, the negative effects of drugs and alcohol, and psychological preparation for competition.

Training methods

A good, general conditioning achieved through, for example interval and endurance training programmes, is the basis of all sporting activities, though there are many other factors involved in creating a good athlete.

Strength training includes isometric exercise and different types of dynamic training. A good example of an effective dynamic strength training

method which has been developed in recent years is isokinetic strength training in which muscles are made to work against accommodating resistance. Increased flexibility can be achieved by stretching exercises — a modern form of mobility training which has proved to be very effective in preventing injuries to muscles, tendons and joints. General conditioning, strength and flexibility exercises are essential for all sport-specific training and aim to improve skill in each sport.

Technique

Technique is improving constantly in most sports. As sport becomes more demanding, correct techniques are crucial if inadvertent overuse injury is to be avoided.

Diet

Physiologists have described how important it is for the athlete to follow a balanced diet before and after training sessions and competitions and to compensate for fluid loss during and after exercise. It is surprising how many athletes are unaware of these facts. It is important to maintain a well-balanced diet before, during and after practice and competition.

Drugs and alcohol

Taking drugs to improve performance is nothing short of cheating and can increase the risk of injury. All forms of drug-taking in connection with sport are to be deplored.

Alcohol has deleterious effects upon performance for up to 48 hours after consumption, which again increases the risk of injury and tends to cancel out the beneficial effects of training. Sport and alcohol should not be combined.

Tobacco, too, has a detrimental effect on performance in addition to its other harmful side-effects.

Psychological preparation

Performance is in many ways dependent upon psychological preparation, and a well-balanced and motivated athlete will usually perform well even though psychological effects may be difficult to evaluate scientifically.

Prevention of injury and illness

The prevention of illness and injury in sport depends, at least in part, on appropriate clothing (including protective clothing), equipment, rules, facilities and health controls.

Clothing

In many sports, shoes or boots are the most important items of clothing. They should be designed to meet the demands made on the foot by each particular sport; today's market offers plenty of choice for all types of sporting activity. Joggers, for example, require shoes which give adequate support and a sole thick enough to provide shock absorption on hard running surfaces, whereas those involved in court games such as squash require shoes which provide them with a closer contact with the court surface. In Alpine skiing, the design of boots, bindings and skis has improved significantly to decrease the incidence of injury, but has resulted in a changed injury panorama.