MECHANISMS OF INJURY — A PICTORIAL RECORD

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INTRODUCTION

It is only on rare occasions that it is possible to record the exact mechanism of sporting injuries. The incident must occur within the field of view of a camera, at a time when the photographer is shooting, and in a position which is not obscured by crowds or other participants. In this article we illustrate the mechanism of two separate injuries as recorded in a series of still photographs.

CASE 1

An International Rugby Union Centre whilst running with the ball was tackled from behind (Fig. 1 and Fig. 2). As he begins to fall, Fig. 3 shows his tibia being fixed to the ground by a member of the opposition. The photograph also demonstrates that his upper body is forced backwards by the momentum of another opponent, causing the tibia to be driven forward with a valgus force imparted to the fixed knee.

Fig. 1: Pre-incident photograph showing player being tackled from behind.

Fig. 2: Moment of impact. Body is driven backwards and the tibia is fixed to the ground by an opponent.

Fig. 3: Close-up of the knee demonstrating the marked anterior translocation of the tibia resulting in the internal derangement.

During this sequence there was an audible crack, he experienced excruciating pain and was unable to move the limb without marked discomfort.

He was removed from the field on a stretcher and taken to hospital where, under anaesthetic, examination revealed a grossly unstable knee. The stress radiographs showed marked anterior cruciate and medial collateral ligament instability.

At operation he was found to have a complete tear of the medial collateral ligament complex and a mid-substance tear of the anterior cruciate. In addition he had also torn the tibial and femoral attachments of the medial meniscus.

The findings were in keeping with the flexion/rotation injury illustrated by the photographic sequence, which serves to highlight the substantial forces involved in the production of major knee ligament disruptions.

CASE 2

An International Rugby League Prop Forward whilst attempting to burst through a tackle by the opposing Loose Forward drops his shoulder onto the tackler (Fig. 4). The momentum of the runner, combined with the bad position of the tackler has produced a situation where the spine is being flexed forcibly.

Fig. 4: Forward about to tackle with his spine flexed through dropping his shoulder.

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The tackler was aware of severe pain and a doctor was called onto the field. Examination of the injured player revealed a tender bony lump in the lower dorsal spine but no evidence of neurological damage. The injured man was treated as a potential fractured spine, and X-rays taken on arrival at hospital showed an unstable fracture/dislocation of D11 (Fig. 5) requiring internal fixation.

Fig. 5: Lateral X-ray of thoraco-lumbar spine demonstrating the unstable fracture dislocation of T12.

Sporting photographs courtesy of the South Wales Echo.

SUMMARY

The illustrations of both these incidents show, with extraordinary detail, the mechanism of injury involved in the production of these lesions. It is often difficult, when dealing with the end product of trauma of any description, to appreciate its mechanism of occurrence and gain an accurate estimate of the amount of force which has produced the damage.

The two photographic sequences highlight the problem of attempting to prevent sporting injuries, as in both cases the incidents illustrated (Fig. 1 and Fig. 4) would not necessarily be interpreted as ones which precede major sporting injuries.

In the case of the knee injury, the forcible anterior translocation of the tibia, as pictured, demonstrates well the mechanism of the tear produced in the anterior cruciate.

In the case showing the injury to the spine, the position of the back prior to impact is exactly in keeping with the flexion/rotation forces which cause such spinal damage.

The camera has recorded with impassionate accuracy the fact that major injuries, far from always having a preventable cause, are inherent in all high-velocity body-contact sports.

BOOK REVIEW

Title: EXERCISE IN PREGNANCY
Editors: Raul Artal and Robert A. Wiswell
Publishers: Williams and Wilkins. 1985
 Price: £31.00   241 pages. Hard cover   ISBN 0-683-00257-0

In recent years there has been a change in the exercise patterns of women of childbearing age, with an increasing number of women realising the benefits of regular exercise. Naturally, such women wish to continue with a programme of planned exercise during pregnancy and ask how best they can do this. Advice on exercise in pregnancy is largely rooted in folklore and personal experience, both of which are notoriously unreliable. This book looks at the problem objectively and scientifically. The chapters on "Exercise Physiology" and "Exercise in Pregnancy in the Experimental Animal" provide an extensive review of the subject on a scientific basis on which to assess the overall problem of the effects of exercise on the woman who is pregnant, and the possible effects on her baby.

The physiological and endocrine adjustments to pregnancy are described in such a way that it becomes obvious why certain problems occur commonly in pregnancy and why sports requiring agility, balance and strength, especially the hands, like skiing, horseriding, gymnastics and tennis can be more injury-producing to the pregnant woman, particularly after the first trimester of pregnancy, whereas swimming is not affected in a similar way. The book contains chapters dealing with the nutritional needs of physically active pregnant women, changes in maternal haemodynamics during pregnancy and the cardiovascular, hormonal and pulmonary responses to exercises in pregnancy.

Of particular interest to the obstetrician are chapters dealing with placental oxygen transfer, the effect of maternal exercise on foetal circulation, and foetal responses to maternal exercise. At first sight this book may seem to have placed too much emphasis on exercise physiology to be of interest to the practicing obstetrician, but the detail it contains is necessary for the obstetrician to understand fully those changes in pregnancy which on the one hand limit the pregnant woman's ability to lead her life as if she were not pregnant but on the other hand allow and encourage her to exercise in such a way that benefits not only her but her baby.

The final chapter is entitled "Exercise Prescription in Pregnancy" and even if obstetricians do not wish to read the whole book (which would be a pity) this chapter would tell them how to advise, and indeed encourage, their pregnant patients to use exercise to the benefit of all concerned. Indeed having read the final chapter one would wish to read the whole book!

J. A. Jordan