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## OUTCOME OF SPORTS INJURIES TREATED IN A CASUALTY DEPARTMENT

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### ABSTRACT

The present investigation analyses 2493 patients with a sports injury treated in a casualty department during a one-year period. Of the patients 73% were men, the age of the patients averaging 26 years and the mean follow-up time was 24 months. Soccer and indoor ball games caused 24% and 23% of the injuries respectively, these being followed by injuries in ice hockey in 14%. Track and field injuries scored low with 2% out of all injuries. Injuries to the lower extremity predominated.

At follow-up, ligamentous injuries of the lower extremity were the major cause of discomfort. Further, in the group of patients with persistent discomfort 36% had suffered a fracture or a dislocation, 13% a contusion and 10% a wound. The mean period of sports incapacity after a sustained injury was 3 weeks. In track and field events the injury seldom disturbed training for more than one week, but in soccer, indoor ball games, skiing and skating the mean sports incapacity period varied between 6 and 3 weeks. Out of the total injured, 2% had to give up their sports activity completely. An injury of the lower extremity demanded on average 4 weeks' rest, an injury of the upper extremity and the trunk 2 weeks and injuries of the head and neck one week's rest. According to the present investigation sports injuries were in the majority of cases of a relatively benign nature and sick leave from work seldom exceeded 2 weeks.

Key words: Sports injuries, Casualty department, Injury epidemiology.

### INTRODUCTION

Recent epidemiological investigations report that of the annual 1.5 million acute injuries in Finland 211,000 are sustained in sports (Lättilä et al, 1980). Thus sports injuries have proved to form a considerable national health and economic problem, since over 60% of the injured are in permanent employment. The number of sports injuries has increased constantly over the last three decades; we found 10% of the patients attending the casualty department to have sustained their injury in sports (Sandelin et al, 1980), this number being in accordance with those reported by several recent investigators (Biener and Fasler, 1978; Franke, 1980; Peterson and Renström, 1980).

The risk factors and specific features of sports injuries have been the subject of many comprehensive reports (O'Donoghue, 1976; Franke, 1980). More recently, surgeons interested in sports injuries have brought up the question of the outcome of these injuries (Ekstrand, 1982; Devereaux and Lachmann, 1983) and some researchers have been concerned about sportsmen not getting sufficient injury treatment in surgical units (Sperryn and Williams, 1975). Generally injuries in sports appear to be modest and require short sick leave (Groh and Groh, 1975; Ekstrand, 1982). Many athletes, however had to change their sporting events after sustaining an injury (Ekstrand, 1982; Johnson, 1982). The purpose of the present investigation is to analyse the outcome of sports injuries treated in a casualty department.

### MATERIALS AND METHODS

The present study analyses 2493 consecutive patients treated for an acute sports injury during the year 1978 in the casualty department of the Department of Orthopaedics and Traumatology, University Central Hospital, Helsinki. The total number of patients treated in this unit during the same period was 24,793; sports injuries hence accounted for 10% of all the injuries treated in the department. Sports injuries produced from overuse were omitted from this study. For the analyses, data was collected by examining the hospital records of all the patients with sports injuries; furthermore a questionnaire was designed to obtain specific information regarding the injury as well as the level of post-injury sports performance and working ability. On a randomised basis, the questionnaire was sent to every fourth patient with a sports injury, the response rate being 74%. The mean follow-up time was 24 months (range 18-30).

The material collected was analysed by using conventional computer techniques and the chi square test. Men outnumbered women in the sample by 73% to 27%. The mean age of the men was 25 years (range 14-69) and that of the women 27 (range 13-53). With 35% a major part of the sports injuries were sustained during the winter months, January to March. By location, injuries of the lower extremity predominated with 49%, 26% were in the upper extremities, 15% in the head and neck and 10% in the trunk. The most common type of sports injury were distortions (sprains) with 40%, followed by contusions (21%), fractures (20%), wounds (12%) and dislocations (5%).

Five sports events accounted for more than 75% of all the injuries treated (Table I). Most injuries were sustained in soccer (24%) and indoor ball games (23%). When injuries to specific body regions are recorded the majority seem to occur in the lower extremities (soccer 59%, other ball games 42%). However, in ice-hockey and horse-riding most injuries were found to be located in the head and neck (49% and 52%). In skating 60% of the injuries were in the upper extremities and in weight lifting 37% were in the trunk. Table II presents the most common diagnoses among the sports injuries in the present study.

The hospital has a catchment area with a population of about 800,000. Among people between 15 and 65 years of age 25% of the population participate at least twice a week in some type of sports activity, soccer being the most popular, with over 1,000 teams participating in different leagues. During the summer months sports participation increases by 60% compared with the winter months. During the winter 18% of the male population practice cross-country skiing and during the summer 28% practice jogging at least twice a week (Seppänen, 1977).

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**Table I** Distribution of the injured per event (N = 2493).

Event	N	%
Soccer	591	24
Indoor ball games	582	23
Ice-hockey	343	14
Jogging	173	7
Skiing	167	7
Judo, Karate	128	5
Tennis, Squash	122	5
Skating	118	5
Gymnastics	96	4
Athletics	62	2
Others	111	4
Total	2493	100

**Table II** Most common diagnoses among 2493 sports injuries.

Diagnoses	N	%
Ankle sprain	516	21
Contusion of lower extremity	167	7
Wounds in head and face	165	7
Sprained wrist	161	6
Sprained knee joint	122	5
Fracture of radius/ulna	101	4
Fracture of fingers	85	3
Contusion of foot	67	3
Others	1109	44
Total	2493	100

## RESULTS

At follow-up 1813 (73%) patients were free of any discomfort while 680 (27%) were still bothered by their sports injury (Table III). Pain during exercise was reported by 54% of those still suffering from the sequelae of their injury. Hence this symptom was significantly ( $p < 0.001$ ) the most common form of late discomfort, followed by limited motion of a joint (19%). Distorsions proved to be the type of injury causing most of the discomfort at follow-up (41%) ( $p < 0.001$ ), followed by fractures and dislocations (36%), contusions (13%) and wounds (10%). Consequently, most injuries causing discomfort at the time of follow-up were located in the lower extremities (56%) ( $p < 0.001$ ). Patients who had had an injury in the upper extremities comprised 36% of this group, those with the injury in the trunk 5%, while patients with a head or neck injury accounted for only 3% of this group.

**Table III** The injury still disturbing at follow-up.

No discomfort	1813 (73%)
Discomfort	680 (27%)
Total	2493 (100%)

Mode of discomfort at follow-up (N = 680).

Mode	%
Pain on straining	54
Limited motion of joint	19
Reduced muscle power	9
Pain at rest	4
Other	14
Total	100

The relative role of the type of injury on the outcome is presented in Table IV. The group of dislocations and fractures caused significantly more long-term discomfort than other injuries ( $p < 0.001$ ). These injuries occurred mostly in contact sports. Table V presents the role of the location of the injury on the outcome. Upper extremity injuries caused long-term discomfort significantly more often than other locations of injury ( $p < 0.001$ ).

When the type of injury and duration of sports incapacity were analysed, fractures were found to cause on average 10 weeks' incapacity, dislocation 4 weeks', sprains 3 weeks', contusions 2 weeks' and wounds

**Table IV** Type of injury and its relative importance on the outcome.

Type of Injury	Discomfort at Follow-up	Total Amount	Discomfort/Total Amount (%)
Luxations (dislocations)	53	125	42
Fractures	190	496	38
Distorsions (sprains)	279	1005	28
Wounds	70	297	23
Contusions	88	570	15
Total	680	2493	27

**Table V** Location of injury and its influence on the outcome.

Location of Injury	Discomfort at Follow-up	Total Amount	Discomfort/Total Amount (%)
Upper extremity	250	659	38
Lower extremity	363	1230	29
Trunk	35	262	13
Head and neck	32	342	9
Total	680	2493	27

1 week's incapacity respectively. Injuries in the lower extremities prevented practice on an average for 5 weeks, injuries in the upper extremity for 3 weeks, in the trunk for 2 weeks and in the head and neck for 1 week. The total group of sports injuries showed a 3-week average period of sports incapacity. The sports injuries in the present series were considered to be mild in 26% of the cases as they caused less than 7 days' interruption in practice, as moderate in 25% (1 to 4 weeks) and severe in 49% (pause longer than 4 weeks). Table VI presents the length of sick leave; 49% of the patients had no need for sick leave from their regular employment.

**Table VI** Length of sick leave from employment in weeks (N = 2493).

None	< 1	1-2	2-4	4-12	12-24	> 24
1222 (49%)	326 (13%)	431 (17%)	249 (10%)	176 (7%)	68 (3%)	21 (1%)

When analysing the relation between the type of injury and the length of sick leave, the longest sick leave was found after an injury to the lower extremities, the median was 3 weeks. The upper extremity injuries caused 2 weeks, injuries to the trunk 2 weeks and injuries to head and neck one week's absence from work.

The duration of sports incapacity varies from one sport to another (Table VII). Motor sports and skiing cause high energetic trauma with long duration of healing time (6 to 12 weeks on an average). Injuries resulting from athletics, weight lifting and jogging cause on average 1 week's absence from practice.

**Table VII** Sports incapacity in different events (weeks).

Event	Mean period of incapacity
Motor sports	12
Skiing	6
Soccer	4
Skating	4
Indoor ball games	3
Gymnastics	3
Ice-hockey	2
Judo & Karate	2
Tennis & Squash	2
Horse riding	2
Athletics	1
Weight lifting	1
Jogging	1
Total	3

Out of the 2493 sportsmen in the present series, 49 (2%) had to give up their sports activities as a result of the injury sustained. Of them, 14 had had a skiing accident, 10 were injured in soccer, 6 were injured in

indoor ball games and 4 in motor sports. The rest were injured in squash, athletics and ice-hockey. The type of trauma in these injuries resulting in permanent sports incapacity was in 28 cases a fracture or luxation, in 16 patients a sprain and in 5 cases there had initially been a contusion type of injury.

Sportsmen between 35-44 years of age had the longest period of absence from sports after the injury with an average of 4 weeks, in the age group 25-34 this absence was on average 3 weeks while in the rest of the age groups it was 1 to 2 weeks.

## DISCUSSION

In general, sports injuries are considered to be of a relatively mild character, this opinion being supported by the recent comprehensive investigation by Lättilä and his co-workers (1980) in which all the acute injuries in Finland during a one-year period were analysed. The average sick leave from work following a sports injury was between 4-7 days. Lättilä's analysis also includes however, some minor injuries not requiring treatment in the casualty dept. In our study the average period of sick leave was 3 weeks, this being in accordance with other investigators' reports on acute sports injuries treated by a physician at the acute stage (Biener, 1978; Groh and Groh, 1975). In a recent Swedish analysis of sports injuries at a casualty department, the average sick leave was almost three weeks, the injuries however being classified slightly differently than in this study (Lorenzon et al, 1984).

After rehabilitation most sportsmen return to the same level of sports activity as before injury; but according to many investigators the previous level may not be reached or the activity may be changed to a less active sport (Franke, 1980; Ekstrand, 1982; Johnson, 1982; Noyes et al, 1983). In the present study only 2% of the injured had to give up sports completely after sustaining an injury. One per cent of our patients had sick leave longer than one year, as has also been the case in Groh's and Groh's (1975) and Biener's and Fasler's (1978) reports.

The huge increase in the number of jogging activists in the late 1970's has brought up the great mass to participate in sports. Injuries in jogging accounted for 7% of the total number of traumas in the present study. Jogging is known to cause injuries which are mostly a result of overexertion (Brody, 1980; Orava, 1980) and hence are not included in this study. Jogging injuries may even result in a relatively long absence from practice, though these hardly ever require sick leave of long duration (Orava, 1980).

At the follow-up, on average two years after the injury, 27% of our patients still had problems and discomfort resulting from their sports injury. This is consistent with the common opinion that sportsmen are mostly thought to be bothered by some kind of physical discomfort as the price of their hobby. However, this type of discomfort is not often connected with real health problems; mostly these sequelae of sports injuries are pain on straining (54%) and limited joint motion (19%). In practically all cases in this study long term discomfort resulted from the original injury, this being in contrast with the statement of Bender et al (1964), confirmed by Ekstrand (1982) that long-term discomfort is due to re-injuries which again are due to a premature return to sports activities and inadequate rehabilitation after injury. High energetic injuries, such as fractures and dislocations, as might be expected, often caused long-term discomfort in the present series; in 38%-42% of cases.

Fractures of the lower leg are notoriously slow to heal (Karaharju et al, 1975) and they cause often a sports disability of one to two years. Thus prevention of these injuries is important. In skiing, recent improvements in the equipment have been effective in reducing the incidence of lower leg fractures (Eriksson, 1976; Johnson et al, 1979). Ekstrand (1982) has recently pointed out that the use of appropriate shin guards considerably reduces the number of lower leg fractures in soccer players.

Sprains of the joints of the lower limb are the commonest type of sports traumas (Biener and Fasler, 1978; Franke, 1980, Ekstrand, 1982) and are often relatively benign injuries (Groh and Groh, 1975). Sprains of the ankle joint generally cause a one- to two-week absence from practice. In this study, however, at follow-up 23% of the patients with sprains reported discomfort. Thus proper information about the injury's expected recovery would probably prevent many unnecessary consultations.

We treat grade III sprains in athletes with a primary operation and usually a 6-week postoperative plaster of Paris immobilisation. All patients were seen at the out-patients clinic postoperatively and a rehabilitation programme under the supervision of a physiotherapist or a doctor was begun before allowing the patients to return to sport after injury.

Sprains of the knee joint often cause definitive or long-term sports disability (Noyes et al, 1983) and in our series 25% had discomfort at follow-up. Most orthopaedic surgeons today agree that acute ligamentous injuries to the knee joint should be treated surgically in athletes, preferably at an early stage (Franke, 1980; Noyes et al, 1983; Johnson, 1982; Marshall and Rubin, 1977). When a ruptured ligament is treated conservatively there is no guarantee of reliable reduction and healing of the ligamentous structures. Since clinical diagnosis on ligament instability in acute knee injuries may be difficult we have, as pointed out by others, found acute arthroscopy and examination under anaesthesia to be valuable tools in making early diagnosis in sportsmen with knee injuries (Gillquist et al, 1977). However, acute surgery on ligamentous injuries of the knee joint does not always give excellent results and many patients fail to achieve their previous potential in sport even after vigorous rehabilitation programmes (Solonen and Rokkanen, 1967; Noyes et al, 1983; Johnson, 1982; Santavirta et al, 1982). An unstable knee definitely disables the active sportsman (Lysholm and Gillquist, 1980). We performed operative treatment in 15% of the knee injuries and recently even more active measures have been advocated by Ekstrand (1982) and Franke (1980).

A controlled adequate rehabilitation programme in knee injuries is one of the key factors in full recovery of the performance potential (Eriksson and Häggmark, 1979; Paulos et al, 1981; Steadman, 1980). Early postoperative mobilisation with special constructed cast braces has been advocated by Häggmark and Eriksson (1979). Since the operatively treated ligamentous injury need a minimum protection time of at least 6 weeks, the balance between early mobilisation and adequate immobilisation may provide a difficult puzzle for the surgeon to solve. Augmentation of torn ligaments with prosthetic material in acute knee injuries has recently been much discussed, but there is no evidence of long-lasting results (Kennedy et al, 1980; Rovere and Adair, 1983; Rushton et al, 1983).

Rather unexpectedly, we found at follow-up that injuries in the upper extremities cause more discomfort. Finger injuries are common among indoor ball players and they seem to cause long lasting discomfort, although the duration of absolute sports disability remains short (McCue et al, 1979; Ruby, 1980). Injuries to the distal radio-ulnar and antebraial region accounted for 9% of all fractures. Today fractures of the antebraium are best treated operatively with plate fixation (Franke, 1980). The injuries of the shoulder girdle are notoriously slow to heal and even successful surgery does not always restore full performance capacity of the arm (Leach and Schepsis, 1983; Paavolainen et al, 1984).

In conclusion we recorded sports injuries as being mainly of the modest type. Nevertheless the significance of adequate primary diagnosis must be emphasised. Especially in knee injuries, which among sports injuries, according to Franke,

form up to 30% of all injuries, acute arthroscopy seems to be a valuable tool in aiding correct treatment and producing a good outcome of the injury (O'Connor, 1974; Gillquist et al, 1977).

Acute sports injuries can effectively and correctly be treated in a general traumatological unit, although a good rehabilitation programme following the sports injury is one of the key factors for a good outcome.

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