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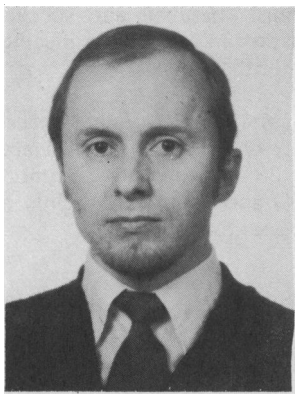

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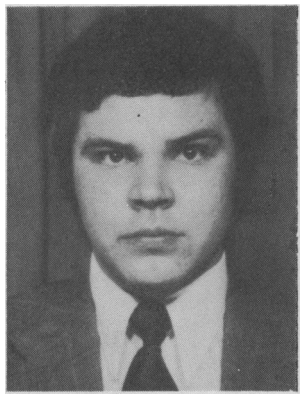

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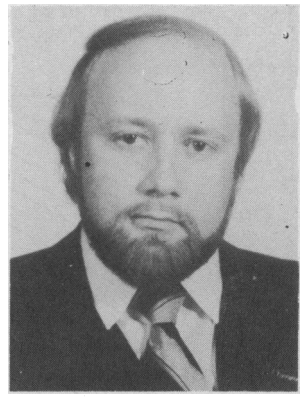

E. Jormakka

EXERTION INJURIES IN FEMALE ATHLETES

S. ORAVA, A. HULKKO and E. JORMAKKA

Keski-Pohjanmaa Central Hospital, Kokkola and Sports Clinic of Deaconess Institute of Oulu, Finland

ABSTRACT

Because sports injuries in men form most of the available statistics, the reportage of injuries in female athletes is sparce. We describe exertion injuries and disorders in 281 women athletes, all of which hampered athletic training or performances. Sixty per cent of the injuries occurred to girls aged between 12-19 years, and about forty-eight per cent were track and field athletes. The most common sites of injury were the ankle, foot, heel and leg. Osteochondritic disorders were the most typical injuries in the series, and the chronic medial tibial syndrome was the injury that needed surgical treatment most frequently. Overuse injuries seem to differ very little from each other in the events included in this survey.

INTRODUCTION

Exertion or overuse injuries form an interesting and sometimes puzzling aspect of sports injuries. In number they are commoner than acute athletic injuries (Sperryn and Williams, 1975; Kvist, 1977 and Orava, 1980). The number of female athletes seen among the injured is small compared with men. Only a few reports are available on the exertion pain syndromes of female athletes (Schwerdtner and Schobert, 1973; Tütsch and Ulrich, 1974; Miller et al, 1975), as usually only acute sports injuries and very disabling chronic overuse injuries are recorded and treated (Biener, 1968; Robey et al, 1971). This may depend on the difficulties, which arise in the diagnosis and classification of athletic exertion injuries.

METHODS, PATIENTS AND RESULTS

In the past eight years 281 exertion injuries were seen in female athletes. Of these 228 injuries occurred in competitive, and 53 in non-competitive "keep-fit" athletes. Only chronic overuse syndromes that followed hard physical activity (athletic exercises) were included. Acute injuries, post-traumatic states or inflammatory and rheumatic diseases were excluded from the series. Only overuse injuries that hampered athletic training and competitions were included.

Exertion injuries occurred to 238 patients, some of whom had two or even three overuse syndromes. The age distribution (Fig. 1) shows that the majority of the patients were from 12 to 19 years old. About 25% of the patients who were more than 25 years old were non-competitive keep-fit athletes. More than half trained six times a week or more and the rest from two to five times a week. About 68% had been involved in regular training for two years or more, in 32% it had been for less than two years.

The distribution of exertion injuries according to the sports events is shown in Table I. Almost 50% of the injuries occurred in track and field athletes, 50% in long and middle distance running, 35% sprinting and hurdling and 15% in other events such as jumps, throws and pentathlon. The ball games of the series comprised

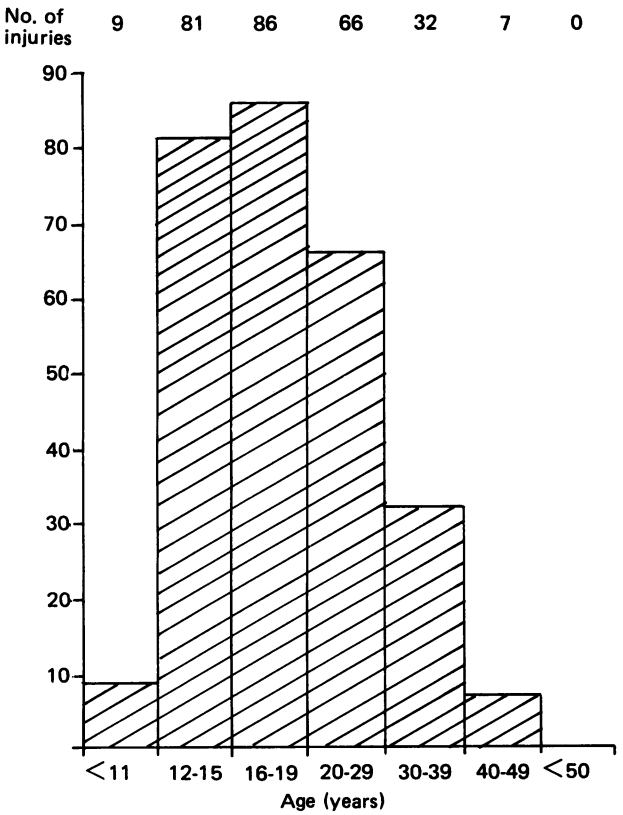

Figure 1.

TABLE I

The number and percentage of the female athletes with overuse injuries in various sports events. Many had more than one injury.

Sports events	Number of women	%	Number of injuries	%
Track and field	107	45.4	136	48.4
Cross country skiing	38	15.9	46	16.4
Jogging	32	13.4	36	12.8
Ball games	18	7.6	18	6.4
Gymnastics	9	3.8	10	3.6
Swimming	9	3.8	9	3.2
Orienteering	7	2.9	8	2.8
Shooting	6	2.5	6	2.1
Skating	3	1.3	3	1.1
String jumping	3	1.3	3	1.1
Bowling	2	0.8	2	0.7
Cycling	2	0.8	2	0.7
Dancing — Ballet	2	0.8	2	0.7
Total number of women	238	100%	281	

volley ball, basket ball, Finnish baseball and soccer. The keep-fit athletes were most often involved in jogging and less often in ball games and other events.

The anatomical location of the injuries (Table II and Fig. 2) shows that the majority of the injuries were located in the ankle region (38%) and other common sites were the lower leg (21%) and knee (18%). Only a few injuries were seen in the upper extremities.

TABLE II

Distribution of 281 female athletes' exertion injuries according to the anatomical site of injury.

Site of injury	N	Per cent
Spine, trunk	14	5.0
Shoulder, upper arm	11	3.9
Elbow	6	2.1
Forearm, hand	4	1.4
Hip, pelvis, groin	21	7.5
Thigh	8	2.8
Knee	51	18.2
Leg (shin)	59	21.0
Ankle, foot, heel	107	38.1
Total	281	100

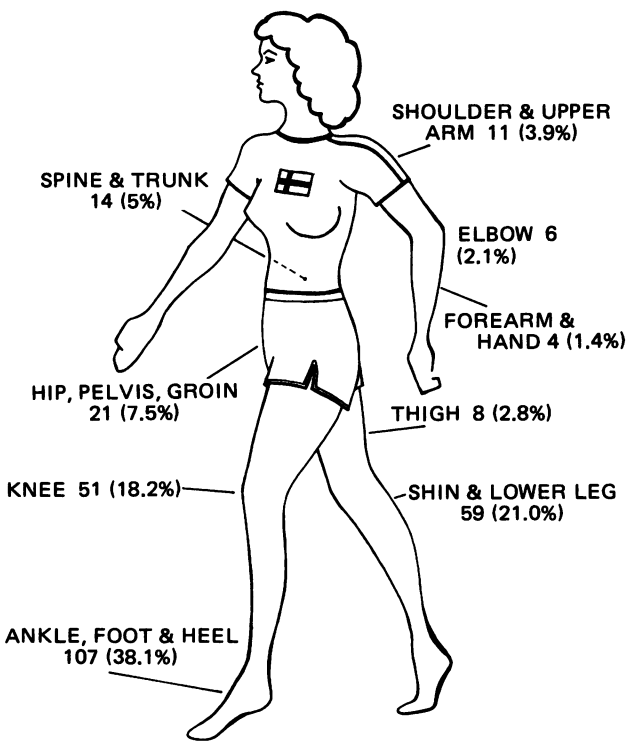

Fig. 2: Distribution of 281 female athletes' exertion injuries according to the anatomical site of injury.

The injuries were divided into subgroups according to the tissue or structure affected (Table III). The number of osteochondritic disorders in the series was 61 cases or about 22%. In addition, some twenty cases could be defined as "apophysitis" or pains at the insertion points of the muscles and tendons in the adolescent athletes' skeleton.

TABLE III

The estimated tissue or structure in 281 cases of female athletes' exertion injuries (per cent).

Tissue/structure	Per cent
Bone	21
Muscle, fascia	20
Muscle or tendon insertion	7
Tendon, tendon sheath	9
Joint, ligament	12
Bursa	3
Nerve	1
Apophysis, epiphysis	23
Unknown	4
Total	100

Treatment was conservative in about 91% of the cases consisting of rest from physical activity or reduction in its level, physiotherapy, coaching advice and medication with anti-inflammatory drugs. About 9% of the cases were treated surgically (Table IV). The cases that needed surgery most often were the medial tibial syndrome and chronic Achilles peritendinitis. The mean age of the patients treated surgically was about 15 years, clearly lower than that of the whole series, (19 years). The final results of these patients were good, and after surgery the symptoms usually disappeared. In two cases the patients continued to have slight symptoms and in one case (habitual patellar luxation with chondromalacia of the patella) the patient had to end her active athletic career. The injuries seldom caused temporary absence from work or school, and no permanent invalidity was found. In about 50% of all cases the training disability lasted for two months or more and in the rest for less than that time.

TABLE IV

The surgically treated cases in the series of 281 female athletes' exertion injuries.

Diagnosis	N
Medial tibial syndrome	7
Achilles tendon peritendinitis	6
Anterior tibial syndrome	2
Painful external tibial bone (accessor navicular)	2
Habitual patellar luxation	2
Carpal ganglion	2
Osteochondritis dissecans of the knee	1
Chronic retrocalcaneal bursitis	1
de Quervain's disease	1
Freiberg's disease	1
Total	25 (= 8.9%)

DISCUSSION

The term "exertion" or "overuse" injury is generally regarded as including both the pain that follows overuse of the musculoskeletal system during athletic exercises, as well as pain syndromes arising in the presence of normal structural anatomy and those that arise in the presence of structural abnormalities which are unveiled by athletic activity, (Williams and Sperryn, 1972; Orava, 1980). As to the aetiology of overuse injuries, mechanical overload and fatigue of the tissues, with the summation of microscopically small lesions, "Microtrauma", are consequent upon the disproportion between the strength of the connective tissue and the total strain of training (Franke, 1977; Orava, 1980). The relative high number of female athletes' exertion injuries corresponds to the general interest in sport and physical activity among the women in Finland, (Orava, 1980). Overuse injuries are commoner than acute sports injuries in our series. Women form a small minority in surveys concerning athletic injuries (Vuori et al, 1972; Biener, 1968). In a survey of adolescent athletes exertion injuries Orava and Puranen (1978) found that about 45% of these occurred to girls, but only 9.5% among the older athletes, however, were women (Orava, 1980). In Finland, the majority of women athletes' overuse injuries occur to adolescents and at this age the exertion injuries seem to be relatively more common in girls than in boys.

TABLE V

The estimated amount of women of various age groups participating in competitive sports in Finland.

Age group	Percentage of active athletes
⩽15 years	4%
16-19 years	2%
20-39 years	⩽1%
all women	ABOUT 0.5%

The distribution of exertion injuries in various sports events reflects both the interest in these sports in the country as well as the total stress of training for the events. The two most popular sports in the series, track and field athletics and cross-country skiing, are sports in which Finnish women have succeeded best internationally. These events require intense training through-

out the year. Although the number of top level athletes was small, there were in our series 30 injuries in Olympic and world championship winners and medallists.

TABLE VI

Estimated risk of developing overuse injuries in female athletes in various sports.

Sports event	Percentage of the incidence of overuse injuries
Track and field	5%
Cross country skiing	3-4%
Volley ball	3-4%
Swimming	2%
Other sports	0.5-3%
All women	4%

Characteristic overuse pain syndromes in women have been examined and described in some sports, for example in gymnastics and ballet (Schwerdtner and Schobert, 1973; Meyer, 1975; Miller et al, 1975). According to this report the two most common exertion injuries in endurance type sports are chronic compartment syndromes of the leg and Achilles tendon peritendinitis, but osteochondritic disorders, however, were the most typical overuse injuries in their material.

The anatomical location of overuse injuries is somewhat different in males and females. The exertion injuries of the ankle, foot and heel were relatively more common in female than male athletes, but Achilles tendon peritendinitis occurred more often in men than women (Orava, 1980). Metatarsal stress fractures in women athletes were commoner than in men, but those of the tibia, which was the most common site in both sexes, were found more often in men than in women (Orava et al, 1978). The number of exertion injuries located in the upper limbs seem to be lower in female than in male athletes. The high incidence of osteochondroses was a typical feature in female athletes. One important point in the aetiology of these disorders is said to be the increased quantity of physical exercise in present-day competition training (Williams and Sperryn, 1976; Franke, 1977).

The only treatment needed for most exertion injuries is rest from excessive activity. The majority of the osteochondroses need no specific treatment. Athletes usually desire to return to full training as soon as possible after both acute and chronic injuries, and demand that sports physicians minimise the rest period. This requires both clinical experience and knowledge of athletic training. Top level athletes should have all forms of physiotherapy available immediately after their injuries. Active surgical treatment of some exertion injuries has produced successes (Puranen, 1974; Peltokallio, 1974; Williams and Sperryn, 1976; Franke, 1977; Orava, 1980). In this series we report 9% of the cases who were treated surgically, a somewhat higher number than in a larger series of exertion injuries in athletes that we reported previously (Orava, 1980).

This paper describes exertion injuries to women athletes in Finland. Due to the fact that often only male athletes are usually represented in sports injury statistics, this review was considered to be timely. The types of exertion injuries in male and female athletes differ surprisingly little.

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OBITUARY

Mrs. Thelma Puddifoot, MCSP, SRP

Thelma Puddifoot, a very dedicated physiotherapist in private practice in Kingston Vale, London, died on September 28th after two years of fighting against impossible odds. Her very many friends, colleagues, and patients, already miss her deeply, but people like Thelma have a long lasting influence. For thirteen years, following the death of her husband, she had built up her practice and educated her two boys, giving the best of herself to patients and family. Over these years there were many sports men and women, including some of top rank, who had reason to be very grateful to Thelma, she well understood that a physiotherapist's greatest asset is her hands, and she used them with exceptional intelligence.

She joined the British Association of Sport and Medicine in 1977, and was also a member of the Association of Chartered Physiotherapists in Sports Medicine, taking part in the residential conference held at the University of Sussex in 1977.

A Physiotherapy Department at the New Victoria Hospital, where she had worked for many years, is to be set up and named after her.

Pam Woods