Musculoskeletal disorders in former athletes

A cohort study in 114 track and field champions

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We studied the influence of elite track and field activities on the musculoskeletal system in a cohort of 114 Swedish men 50–80 years of age compared to 355 randomly selected referents in the same age group. Arthrosis of the hip was increased more than threefold among the athletes (8 percent) compared to the referents (2 percent). For other musculoskeletal disorders the distribution was similar between the groups but the prevalence of arthrosis of the knee tended to increase while that of neck/shoulder disorders tended to decrease in the athlete group.

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We investigated whether former male Swedish track and field athletes on the elite level suffer more or less from musculoskeletal disorders, especially arthrosis of the hip and knee, than the general population.

Subjects and methods

The Swedish Athletic Association registers all winners of an international or national championship in track and field sports. From the register, all persons 50–80 years of age were selected for this study. There were 143 former athletes in the register, including 114 men. The women were too few to include in the study. From the population register in Sweden, 355 male referents matched for age were randomly selected.

A questionnaire was mailed to all participants where disorders of the musculoskeletal system, including operations, general health status, occupational history, sports activities, exercise, height and weight now and at the age of 25 were asked about. 109 athletes (96 percent) and 302 referents (85 percent) answered the questionnaire.

Persons were classified as having arthrosis if they specified an exact diagnosis. For disorders other than arthrosis, strict diagnostic criteria do not exist and more descriptive explanations had to be accepted.

Statistics

For each investigated disorder and condition, the prevalence was compared between the athletes and the referents. Age-adjusted prevalence ratios and 95 percent confidence intervals were calculated according to Mantel and Haenszel.

Results (Table 1)

80 percent of the athletes felt they had a good health status, compared to 61 percent of the referents. Only 3 percent of the elite athletes complained of a very poor health status. Some kind of fitness training, from walking more than 30 minutes 2–3 times a week to vigorous exercises, was commoner among the athletes.

The athletes had a lower prevalence of neck/shoulder disorders than the referents, but low back disorders were evenly distributed in the 2 groups. The for-

Table 1. Results in percent for the former athlete group and the referents, as well as prevalence ratios (PR) with 95 percent confidence intervals (CI), comparing athletes to referents

	PR	95 percent CI
Good health	1.3	1.2–1.5
Fitness training regularly	1.4	1.2–1.6
Low-back disorders	0.8	0.6–1.3
Neck/shoulder disorders	0.6	0.3–1.0
Feet disorders	1.7	0.9–3.1
Other disorders	0.8	0.5–1.1
Heavy workload main part of occupational life	0.4	0.3–0.6
BMI > 30 at the age of 25	1.9	0.3–11
BMI > 30 now	0.2	0.1–0.8
Coxarthrosis	3.6	1.4–9.3
Gonarthrosis	2.8	0.7–11

mer athletes had more often arthrosis of the hip than the referents. All but 3 persons with arthrosis of the hip had undergone joint replacement. The frequency of arthrosis of the knee was also elevated, but not significant (Table 1).

Discussion

The register of the Swedish Athletic Association was probably not correctly updated, since wrong addresses and even dead persons were still included. More men may belong to the group than are covered by the register. However, it is not probable that inclusion in the register is related to subsequent health status. The answering rate was high in both groups but, as expected, a little lower in the referent group. Some of the refusals may have been caused by impaired health status but hardly by arthrosis of the hip and knee. Thus there is probably no bias due to selection, at least not for arthrosis.

The diagnosis and disorders were classified from self-reported data. Among these, arthrosis is rather straightforward and in the majority of the cases (all but 3) a hip replacement had been performed. The risk of misclassification of the diagnosis of arthrosis is considered to be low. Among the other diagnoses the risk of misclassification can be greater but most probably gives a bias towards unity.

The physical load in occupational activities may contribute to arthrosis of weight-bearing joints and thus be a potential confounding factor (Anderson and Felson 1988, Vingård 1991a). However, a stratified analysis was not meaningful since, in the referent group, almost all of the men with arthrosis of the hip have had physically demanding jobs, whereas most men with that disorder in the athlete group have had sedentary or slightly physically demanding work during their life. Thus, if a physical load at work is a risk factor and the observed prevalence ratio will be underestimated. The athletes with arthrosis had performed various track and field activities and the material is too small to draw any conclusions as to which activity is most harmful (Table 2).

Another potential confounding factor is an increase in body mass index, which has been shown to be associated with arthrosis, especially in the knees but also in the hips (Anderson and Felson 1988, Vingård 1991b). Few in the whole study group were overweight at the age of 25. The athletes had kept their weight low, but more referents had become overweight, which might have diluted the relationship between track and field activities and arthrosis. Therefore, potential systematic errors cannot explain the main observations in this study.

Table 2. Occupation and branch of athletics among the athletes and occupation among the referents with arthrosis of the hip

Athletes		Referents
Occupation	Branch	Occupation
Commercial traveller	Triple jump	Caretaker
Farmer	Longdistance	Forest worker
Shop keeper	Putting the shot	Farmer
Shop keeper	Javelin	Construction-worker
Office worker	Pentathlon	Metal worker
Office worker	Hurdle-race	Farmer
Office worker	Hurdle-race	Construction-worker
Salesman	Triple jump	
Salesman	Long jump	

Few studies have been done to determine whether sports activities are preventive or harmful to the joints, and studies with adequate referent groups and with interfering factors (like confounding and selection) under control are even fewer. In studies from Denmark and Sweden, former soccer players have been found to run an increased risk of arthrosis of the hip (Klünder et al. 1980, Lindberg et al. 1993). In the Swedish study (Lindberg et al. 1993), 14 percent of the former elite players had arthrosis of the hip, compared to 2.6 percent in an age-matched control group. In another Swedish study, the prevalence of arthrosis of the knee was elevated among soccer players both with and without trauma (Roos et al. 1994).

In a case-control study from Sweden, we found that men, 50–70 years of age, very active in sports of all kinds had a 5 times higher risk of developing arthrosis of the hip than had those with low exposure (Vingård et al. 1993); track and field sports and racket sports seemed to be the most hazardous.

Running has been investigated, with conflicting results. In a study from Switzerland, the entire national team in long-distance running (27 men) and bobsleigh (9 men) and a control group of 23 men were examined in 1973 and re-examined in 1988 (Marti et al. 1989). All were free from arthrosis in 1973 but, 15 years later, 5 of the runners and none of the controls showed radiographic signs of hip arthrosis. In an older study from Finland where 74 former elite runners were compared with 115 male patients, no difference in the prevalence of arthrosis of the hip was found (Puranen et al. 1975). In a recent population-based register study from Finland comparing 2049 male athletes who had represented Finland in international competitions in 1920–65 and 1403 referents, there was a slightly increased risk for the athletes to require hospitalization because of arthrosis of the hip,

knee and foot (Kujala et al. 1994). Ours is the first study confined to track and field athletes and our findings agree with most of the studies investigating various other sport activities.

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References

Anderson J J, Felson D T. Factors associated with osteoarthritis of the knee in the first National Health and Nutrition Examination Survey (HANES 1): evidence for an association with overweight, race and physical demands of work. Am J Epidemiol 1988; 128: 179–89.

Klünder K B, Rud B, Hansen J. Osteoarthritis of the hip and knee joint in retired football players. Acta Orthop Scand 1980; 51: 925–7.

Kujala U M, Kaprio J, Sarna S. Osteoarthritis of weight bearing joints of lower limbs in former elite male athletes. Br Med J 1994; 308: 231–4.

Lindberg H, Roos H, Gärdsell P. Prevalence of coxarthrosis in former soccer players. Acta Orthop Scand 1993; 64 (2): 165—7.

Marti B, Knobloch M, Tschopp A, Jucker A, Howald H. Is excessive running predictive of degenerative hip disease? Controlled study of former elite athletes. Br Med J 1989; 299: 91–3.

Puranen J, Ala-Keltola L, Peltokallio P, Saarela J. Running and primary arthrosis of the hip. Br Med J 1975; 285: 424–5.

Roos H, Lindberg H, Gärdsell P, Lomander L S, Wingstrand H. The prevalence of gonarthrosis and its relation to meniscectomy in former soccer players. Am J Sports Med 1994; 22: 219–22.

Vingård E. Work, sports, overweight and arthrosis of the hip. Thesis, Karolinska Institute, Stockholm, Sweden. Arbete och Hälsa 1991a: 25.

Vingård E. Overweight predisposes to coxarthrosis. Body mass index studied in 239 males with hip arthroplasty. Acta Orthop Scand 1991b; 62: 106–9.

Vingård E, Alfredsson L, Goldie I, Hogstedt C. Sports and arthrosis of the hip. Am J Sports Med 1993; 21: 195–200.