

Increasing incidence of Achilles tendon rupture

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During the period 1987–91, 153 cases of total Achilles tendon rupture were diagnosed in the city of Malmö (population 230,000). Almost two thirds were caused by sporting activities, notably badminton. Ruptures caused by nonsports injuries were found in older subjects. Compared to the age-specific incidence in 1950–73, a marked increase in both sports and nonsports injuries was found and patients in the

latter group were older than in the former period. Patients with Achilles tendon ruptures can be classified into two subgroups with partly different etiologies: young or middle-aged athletes and older non-athletic persons. The increase in the former group is mostly explained by increased participation in recreational sports; the cause of increase in the latter group is unknown.

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Several authors have reported an increasing frequency of Achilles tendon rupture (Barfred 1973). Most of these observations have been made in hospitals which serve undefined populations, thus making it difficult to calculate the incidence.

Malmö University Hospital serves a well defined population in the city of Malmö. All cases of Achilles tendon rupture in the city are treated here. Nillius et al. (1976) made a study of the incidence of Achilles tendon rupture in Malmö during the years 1950–1973 and found an increased incidence over time.

We studied the incidence and the distribution with regard to gender, age and trauma of Achilles tendon rupture in the city of Malmö in recent years.

Patients and method

All 153 patients 20–89 years of age who had been treated because of a total subcutaneous Achilles tendon rupture in the city of Malmö during the years 1987–1991 were included. All data were retrieved from the medical records. The injuries were divided into sports and other injuries. The average annual incidence per 10⁵ residents was calculated for each 10-year age interval from 20–89 years. The result was compared to the incidence of total Achilles tendon rupture during the period 1950–1973, reported in a previous study based on the same population (Nillius et al. 1976). Data on membership in local sports associations since 1950 were obtained from the local union of sports associations.

Statistics

A Poisson regression was used to analyze changes in the incidence of ruptures over time. Age was analyzed by the Student's t-test and the distribution of gender and sporting events by the X²-test. P-values < 0.05 were regarded as significant.

Results

The age distribution was bimodal, with a maximum incidence of sports injuries in the fourth decade of life followed by a second, but lower, peak of other injuries in the eighth decade. The mean age of patients having sports injuries was 37 (24–63) years compared to 56 (20–80) years in those with other injuries ($p < 0.001$, Student's t-test). The incidence in the fourth decade showed a threefold increase and in the eighth decade a more than fourfold increase, as compared to the period 1950–73 (Nillius et al. 1976) (Figure 1). The Poisson regression analysis, adjusted for changes in age distribution, showed an increase in the overall incidence ($p < 0.006$), but the annual variations were too large and the numbers of individuals in each group too small to demonstrate statistically significant changes in each decade of age (Table 1).

The average age of men was 42 (20–80) years and of women 52 (25–80) years ($p < 0.01$, Student's t-test). Sports injuries were almost twice as common as other injuries and men dominated, especially in the former group (Table 2). The proportion of sports injuries and the male dominance had changed little since the study by Nillius et al. (1976). Badminton, soccer

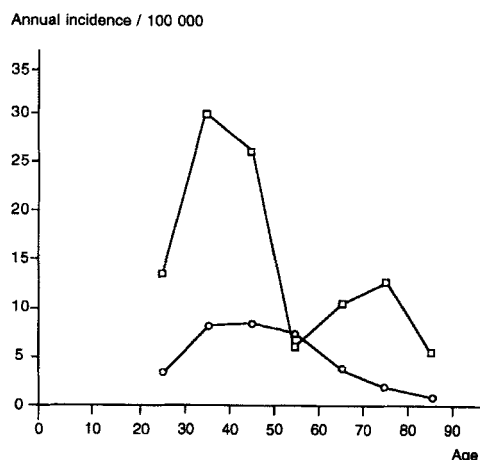


Figure 1. Annual incidence of Achilles tendon rupture per 10⁵ residents in 1987-91 (□) and in 1950-73 (○) (Nillius et al. 1976).

Table 1. The average annual age-specific incidence of total Achilles tendon rupture in Malmö 1987-1991

Age	Incidence ($\times 10^{-5}$)	95% confidence interval
20-29	13.7	5.7-32.8
30-39	30.4	17.1-59.1
40-49	26.2	13.5-53.8
50-59	6.3	2.0-31.4
60-69	10.6	3.4-32.6
70-79	12.9	4.2-40.6
80-89	5.6	0.8-39.9

and tennis were most often responsible (Table 3). Badminton had increased from one fourth of the total number of sports injuries in the study by Nillius et al. (1976) to more than half in the present series ($p < 0.001$, χ^2). The relative numbers of soccer and tennis injuries were largely unchanged, but calisthenics, which in 1950-73 accounted for 14%, was not responsible for any in the present series. The membership in sports associations has increased continuously and, in the period 1950-1989, a fourfold increase in soccer, a sixfold in badminton and a more than eightfold increase in tennis was noted.

Discussion

The increase in the incidence of total Achilles tendon rupture has continued over the past decade and now shows a distinct bimodal age distribution; the maximum incidence in the patients with non-sports injuries occurred in the eighth decade of life, as compared to the sixth decade in the previous study by Nillius et

al. (1976), whereas in sports injuries, the maximum incidence remained unchanged at 37 years. Leppilähti et al. (1996) recently presented results similar to ours but noted a higher proportion of sports injuries.

The male dominance was similar to that in Nillius' study (1976) and agreed with the sex distribution in 22 other studies, each including over 50 cases (Nistor 1979). The average age reported in the literature varies between 33 and 46 years, which is consistent with our findings. Women were older than men, which relates to the fact that most of them had nonsports injuries.

Jozsa et al. (1989) found that Achilles tendon ruptures were more associated with recreational sports than other tendon ruptures and the absolute increase in sports injuries found in our study parallels the increased membership in various sports associations. Patients with sports injuries had a relatively high average age (37 years), which indicates that a majority were recreational athletes, as competitive athletes are likely to be younger. Recreational athletes may be prone to injury for several reasons. Their exercise is often interrupted by periods of inactivity (Jozsa et al. 1989) and preventive measures such as warming up, stretching and attention to proper technique are often disregarded, because of lack of competent coaching (Kvist 1994).

Badminton is notorious as a cause of Achilles tendon rupture, a fact reported already by Nillius et al. (1976). The relative number of badminton injuries

Table 2. Total Achilles tendon ruptures, subdivided according to gender and type of injury

	Men	Women	Total
Sport	91	7	98
Other	41	14	55
Total	132	21	153

Table 3. Achilles tendon ruptures due to sports injuries, subdivided according to gender and sport

	Men	Women
Badminton	48	2
Soccer	18	1
Tennis	10	2
Squash	5	0
Skating	3	0
Volleyball	3	0
Floorball	1	1
Other sports	3	1
Total	91	7

has almost doubled since then and it now accounts for almost one third of all Achilles tendon ruptures. Basically, this is probably due to frequent eccentric loading of the tendon and the current increase in the rate of injuries can be ascribed to the growing popularity of badminton as a recreational sport. The increasing incidence of Achilles tendon rupture due to nonsports injuries, also noted by Nillius et al. (1976), is more complex and difficult to explain. These injuries appear to be more common in elderly patients but the present data are insufficient to determine if they represent the same frail subset of the population as those plagued by an increasing incidence of fractures due to osteoporosis (Begnér 1987).

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