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Review article

Critical review on the socio-economic impact of tendinopathy

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Abstract

There are currently no studies that determine the total burden that tendinopathy places on patients and society. A systematic search was conducted to understand the impact of tendinopathy. It demonstrated that the current prevalence is underestimated, particularly in active populations, such as athletes and workers. Search results demonstrate that due to the high prevalence, impact on patients' daily lives and the economic impact due to work-loss, treatments are significantly higher than currently observed. A well-accepted definition by medical professionals and the public will improve documentation and increase awareness, in order to better tackle the disease burden.

Keywords: incidence; prevalence; quality-of-life; socio-economic; tendinopathy

Introduction

Clinicians obtain insight into the burden of tendinopathy from their patients, yet their ability to alleviate this burden remains limited. From their observations, it is to be believed that tendinopathy has a significant socio-economic impact, but there is no direct evidence to support this claim. This review aims to determine the socio-economic burden of tendinopathy and how this burden may be alleviated. The definition and classification of tendinopathy currently adopted by medical subject headings are displayed in Figure 1. Tendinopathy is a blanket term for “tendinitis”, “tendinosis”, and “tenosynovitis”. “Tendinitis” was the original term to define pain and inflammation within the tendon, and “tendinosis” was the preferential term to describe the degenerative changes observed. Strictly speaking, “tenosynovitis” refers to inflammation of the synovial sheath surrounding the tendon, thus it should not be regarded as tendinopathy in which degenerative changes are mainly observed in the tendon itself. By contrast, spontaneous tendon rupture, which occurs without prior symptoms, is attributed to mechanical weakness of tendons due to tendinopathic changes.[1] In summary, tendinopathy is characterised by chronic tendon degeneration, resulting in pain and rupture, which are the basic criteria used when searching for relevant information.

The disease burden of tendinopathy can be primarily reflected by the number of patients, the effect on the patients' quality-of-life, cost effectiveness of treatments, and the

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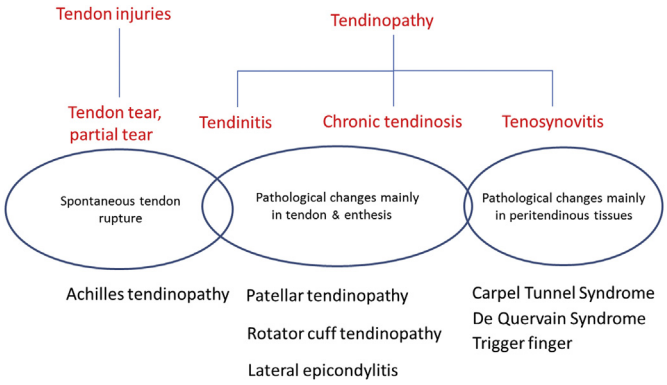

Figure 1. Nomenclature, definitions, and types of tendon disorders.

economic implications of work disability. Therefore, we performed a systematic search of prevalence and incidence data of tendinopathy, and gathered information about quality-of-life, work disability, and treatments specific to tendinopathy.

Prevalence and incidence of tendinopathy

A literature search was performed in PubMed in October 2015 using the search strategy: (Tendinopathy OR tendinitis OR tendonitis OR tendinosis OR tendon rupture OR tendon tear OR jumper's knee OR Sinding-Larsen-Johansson OR epicondylitis OR tennis elbow) AND (prevalence OR incidence OR epidemiology). Studies are included if prevalence or incidence of tendinopathy was reported. Studies on tenosynovitis and traumatic injuries were excluded. Non-English studies, reviews, animal, and cadaveric studies were also excluded. The search returned 1819 articles, of which 132 were included based on the selection criteria. The search results were tabulated according to the nature of the cohort (athletes, workers, general population, and patients with comorbidities), sample size, age group, type of tendinopathy involved, and the reported prevalence and incidence data.

Of the cohorts identified, athletes formed the major cohort with 42 studies, followed by workers (36 studies), individuals in the general population (35 studies), and individuals with comorbidities (19 studies). Achilles' tendinopathy, patellar tendinopathy, epicondylitis, and rotator cuff tendinopathy are identified as four major types of tendinopathy according to numbers of studies and the reported prevalence. The results are shown in Table 1.

Results

Athletes

The high intensity and frequency of physical activities in athletes exposes this group to overuse injuries due to the high stress exerted on the tendons. Records of medical attendance in the 2004 Olympics[2] and 2007 Pan-American Games[3] show that tendinopathy was within the top three most treated conditions in athletes. This record represents the significance of tendinopathy as a widespread condition in this group.

Studies on the prevalence of upper extremity tendinopathy in athletes have observed small cohorts, yet data from studies with the largest sample sizes place the prevalence for rotator cuff tendinopathy at 23.7% in volleyball players, and epicondylitis at 13.1% in climbers.[4,5] Older age may also play a role as evidenced in a study on elderly athletes where prevalence was seen to be as high as 48.2%.[6] There is no study on upper extremity tendinopathy in adolescents to our knowledge. A study on patellar tendinopathy reported a prevalence of approximately 17% in adults and 5.6% in adolescents.[7–10] Similarly, Achilles' tendinopathy was reported to be 12.5% in adults and 7.8% in adolescents.[11,12] Adolescents are seemingly less affected by tendinopathy based on these values alone. There is however no clear evidence that age influences tendinopathy.[13] In agreement with previous studies,[13,14] no clear trend is observed when comparing the prevalence or incidence between male and female athletes.

Lower extremity tendinopathy, particularly that of the patellar tendon, is the most frequently studied and arguably the most commonly affected. However, sports-related tendinopathy is challenging to generalise due to the difference in anatomical sites affected and the degree of exposure. For instance, dancers present with higher prevalence of Achilles' tendinopathy, while rowers would more frequently present with rotator cuff tendinopathy or epicondylitis. In addition, the degree of sport participation would differ widely between recreational athletes and professional athletes, but professional or elite athletes may suffer greater economic losses from injury as compared to recreational athletes. Studies on the degree of participation, the associated risk of tendinopathy development, and the associated impact would be valuable further studies.

Workers

Occupational exposure is of particular relevance because of the high economic impact procured by productivity-loss and compensation for disease. Highly repetitive movements are commonly observed in daily work tasks, and coupled with poor workplace ergonomics, workers are placed at an increased risk of developing tendinopathy. A distinction can be made between workers and athletes in that occupational exposure typically consists of relatively low demand and highly repetitive movements over a longer period of time compared to athletic exposure. Worker cohorts have generally been larger than the athlete cohort. Many of these cohorts have been merged from different workplaces and may possibly be highly heterogeneous even within the same study. Tendinopathy in workers is almost exclusively observed in the upper extremity. The most common and arguably most prevalent of which is lateral epicondylitis. A prevalence of 2–3% have been observed, but rates as high as 18% and 41% have also been reported in spine surgeons and coal miners, respectively.[15–17] Similar to athletic exposures, it is evident that the type of work influences the prevalence of tendinopathy.[17] Relative risk in occupational exposure with regards to frequency of repetitive motion, length of exposure, and ergonomic factors may be worthwhile studies.