

## Research Article

# The Epidemiology of Tendo Achilles Rupture: A Regional Perspective

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**Abstract**

We report regional epidemiological data for Tendo Achilles rupture over a 13 year period in the South Eastern Health and Social Care Trust, Northern Ireland.

**Materials and Methods:** We performed a retrospective review of 1044 patient referred between the periods of 1996 to 2008 inclusive.

**Results:** 975 (93.4%) patients were confirmed as having a Tendo Achilles rupture, with a mean incidence of 75 Tendo Achilles ruptures per year. We found a 3:1 ratio in Male vs. Female ruptures respectively. The average age of rupture was 48 years. Patients with ruptures from sport were significantly younger than those who ruptured from non-sporting means, 42.8 and 53.5 years respectively. Most common sporting injuries were from rugby, football and racquet sport. Co morbid illness such as cardiovascular disease, steroid use and diabetes appear to be associated with rupture.

**Conclusion:** The data in this study highlights at risk individuals as those who are male, in their 5<sup>th</sup> decade and who participate in sport particularly activities with regular vigorous leg push off.

**ABBREVIATIONS**

TA: Tendo Achilles

**INTRODUCTION**

The Tendo Achilles (TA) is the strongest tendon in the body yet it is also the most frequently ruptured [1,2]. Despite this there are currently only a few epidemiological studies evaluating the events leading up to TA rupture [3-6]. Recently studies have found that the incidence of TA rupture in industrial nations is increasing [4-9]. Many find it is due to a rise in recreational sporting activity; however epidemiological data is skewed by a propensity to capture data from sporting injury only rather than also including data concerning general population TA ruptures [3,10-12].

Many factors have been identified that may precipitate rupture. Those given local steroid injections may be at increased risk as they have been reported to speed up the degenerative process through fibroblast suppression and growth inhibition [13-14]. Other associated factors reported are; alcohol, anabolic steroids, systemic corticosteroids, antihypertensives, fluoroquinolones, eye drops, diuretics, cocaine, marijuana, gout, diabetes, rheumatoid arthritis, hyperparathyroidism and

systemic lupus erythematosus [15-24]. Racial differences have also been implicated following the observation of a greater prevalence of TA rupture in African American service men [25].

We have the opportunity to report epidemiological data from a single TA clinic, which predominantly serves the South East Health and Social Care Trust of Northern Ireland estimated at over 350 000 inhabitants [26]. We collected data from 1996 to 2008 inclusive.

**MATERIALS AND METHODS**

Data was collected retrospectively by review of consecutive patient notes. All those suspected to have a TA rupture were referred by local Accident and Emergency units directly to our clinic. The diagnosis was made by our senior author (RGHW) and based specifically on history, classical bruising and a palpable gap in the tendon with no plantar flexion of the ankle produced on the calf-squeeze test. All confirmed TA ruptures were included in this study regardless of whether they were acute, chronic, unilateral, bilateral or recurrent ruptures.

Statistical analysis was performed using SPSS v20 (IBM, USA). Pearson correlation coefficients and binary logistic regression

methods were used to analyze the data and a p value of <0.05 was regarded as significant.

**RESULTS AND DISCUSSION**

1044 patients were referred to the unit during the study time frame. Of those, 69 (6.6%) were misdiagnoses; including Achilles tendonitis, calf muscle tear, tear of adhesions, plantar fasciitis and muscle strain. In total there was 975 confirmed TA ruptures managed over the 13 year period.

There were 712 male ruptures (73%) and 263 female ruptures (27%), demonstrating a 3:1 ratio. Five patients presented with bilateral ruptures and 5 patients had ruptures on the contralateral side following a previous injury. There were 509 left sided ruptures (52.5%) and 461 right sided ruptures (47.5%), which demonstrated no statistical difference (p=0.126). The mean annual incidence of ruptures was 75. A total of 117 patients (12.1%) presented to hospital 14 or more days following injury. The literature refers to these patients as delayed presenters [27].

Figure 1 demonstrates the annual incidence of TA rupture compared to mean annual incidence, incidence per 100 000 persons and linear progression of the study period. The incidence per 100 000 was calculated using census information for the hospital catchment area over the study period [28]. The correlation co-efficient was 0.92 demonstrating good correlation between year and increasing incidence. The mean age appears to be static during the study period.

The range of patient age during rupture was between 12-86 years, with an overall mean of 48 years. Table 1 demonstrates a significant difference in the age of those who rupture during sporting activity and those who ruptured during non-sporting

activity. Male patients presented with TA ruptures at a younger age than females, however this was not found to be significant.

Figure 2 represents the age distribution of TA ruptures including subdivisions for sporting and non sporting mechanism of injury. The age range distribution demonstrates positive skew of Overall and Sporting age groups towards 40-49 and 50-59 age groups. All other injury mechanisms follow a normal distribution with no evidence of skew.

Figure 3 demonstrates the Mechanism of TA rupture and Figure 4 demonstrates associated illnesses and other factors that may have contributed to rupture.

Our incidence of TA rupture is increasing each year, this has been observed in other European countries and New Zealand [4-6,11,12]. The peak decade for ruptures in our sporting group is 40-49 years and in the non sporting group 60-69 years. Overall peak incidence remains in the 40-49 years age group. Our results demonstrate a similar age of rupture to other European countries [2,11,12,29].

Normal TA tendons can withstand a load of 400kg, therefore many hypothesised that in order to rupture either a huge force to the tendon is required or a degenerative process must be present to weaken the tendon at time of rupture [30]. It has also been reported that up to 33% of people have a prodrome of posterior ankle pain prior to rupture, this may be a herald sign of an active degenerative process and impending rupture [30]. Subsequently this has been confirmed by the presence of chronic inflammatory cells and degenerative tissue on histopathological testing. This finding is also felt to be more common as age progresses and while patients are still active they are at particular risk of rupture [7,30-34].

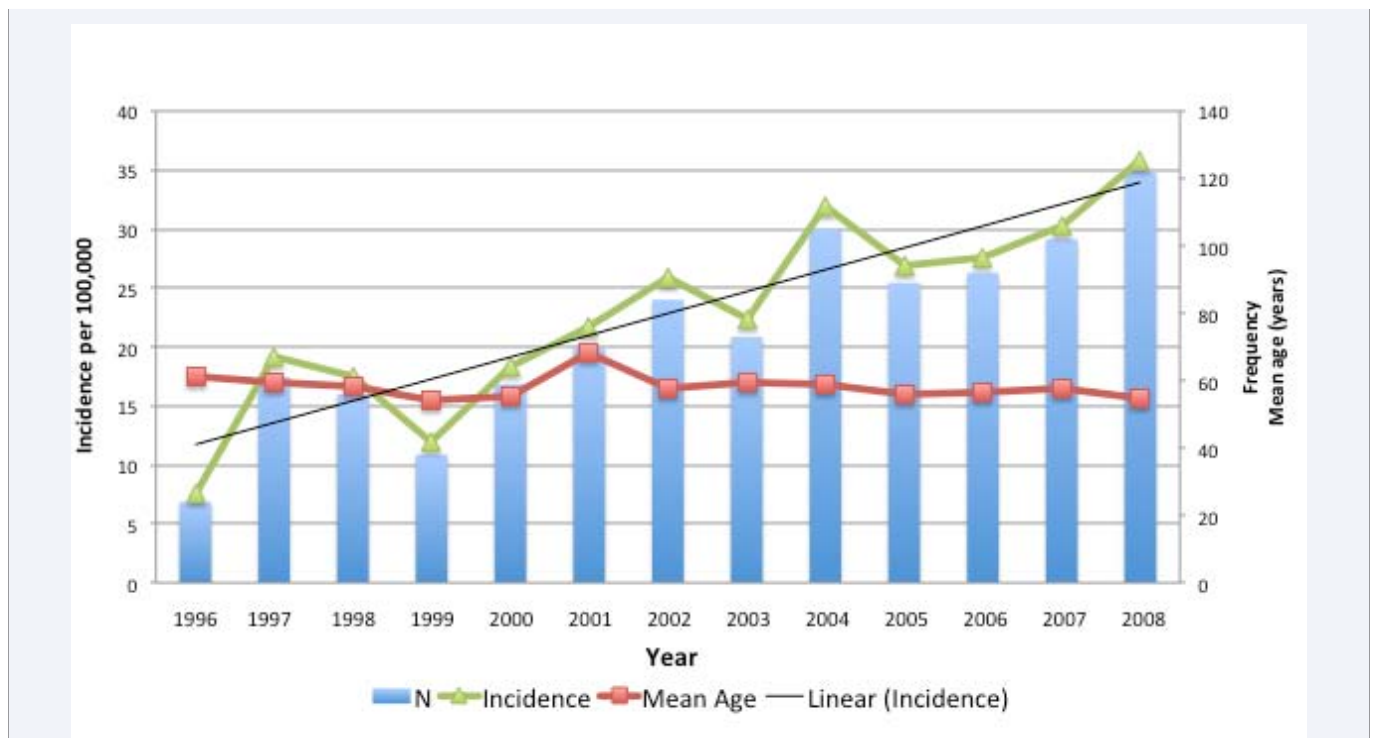
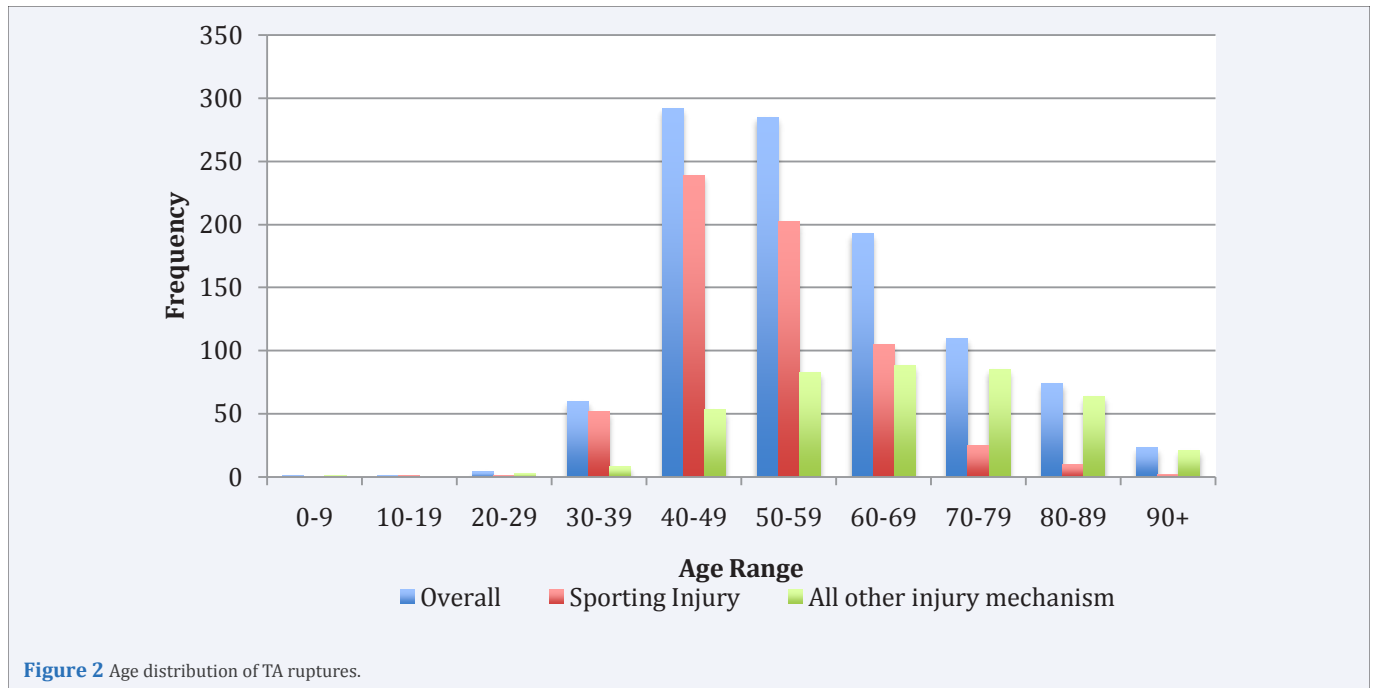


Figure 1 The annual incidence of TA rupture compared to mean annual incidence.

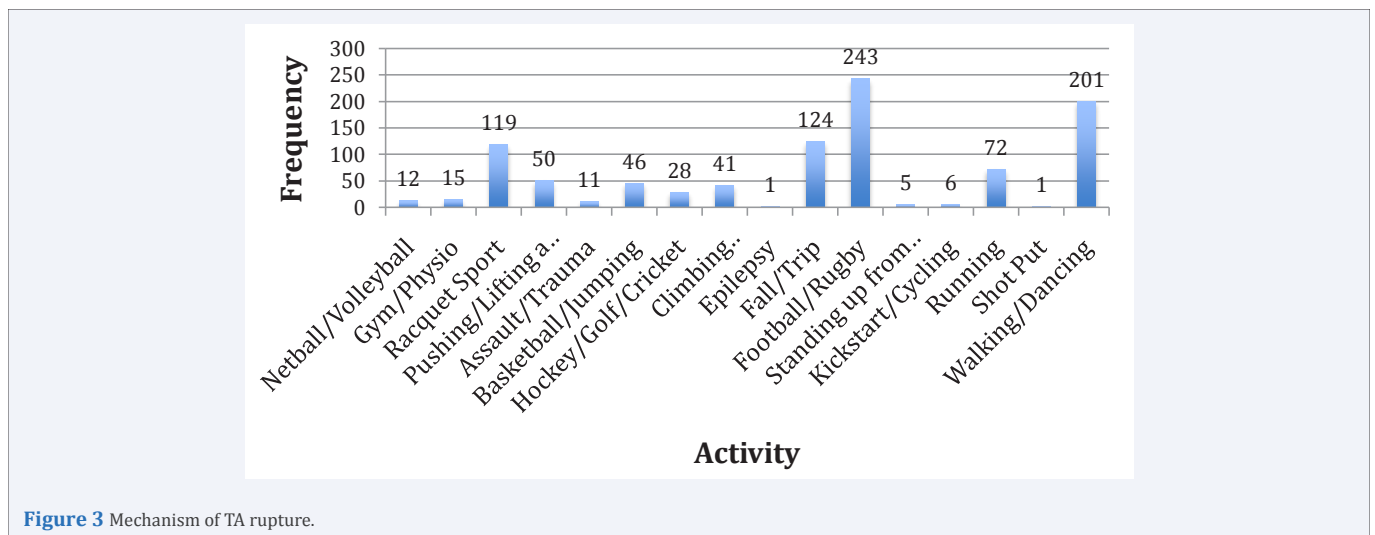
**Table 1:** Mean age of rupture by mechanism of injury and gender.

Age distribution of TA ruptures		
	Mean Age	P value (age)
Sporting activity	42.8	0.007
Non sporting Activity	53.5	
Male	48	0.12
Female	49	

Abbreviations: TA: Tendo Achilles



**Figure 2** Age distribution of TA ruptures.



**Figure 3** Mechanism of TA rupture.

In those who participate in sport, incidence is highest where frequent explosive push off is required, for example badminton, tennis, squash, rugby and football. This reflects findings in other studies which also report sports with regular vigorous leg push off as a peak cause of injury [11,12,35]. Identifying a single sport that is consistently a peak cause of rupture in the literature is not possible as regional and national pastimes differ in each region [35].

Our results represent data from a large TA clinic serving the South East Health and Social Services Trust. According to the Northern Ireland Statistics and Research Agency census results each trust has similar rates of migration, co-morbid illness, death rates, age of death and cause of death. Northern Ireland has no clear data on sports club membership, rate or frequency of sporting activity within trusts, however given the census

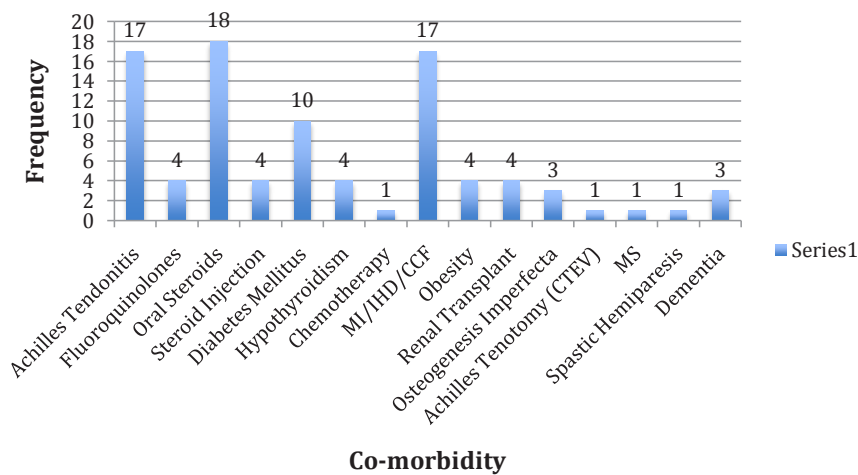


Figure 4 Associated risk factors.

findings it could be assumed that our data is also representative of Northern Ireland as a whole [28].

Included on our results were two children aged 12 and 14 years. These patients were otherwise fit and well with no underlying medical comorbidity prior to TA rupture. TA ruptures at this age is uncommon and has only been mentioned in case reports [36].

Several associated factors recognized in the literature were identified within the co-morbid illnesses of those who sustained TA ruptures. Steroid use was the most prominent co morbid risk factor and it is well recognised in the literature for its association with tendon injuries [29].

## CONCLUSION

The data in this study highlights at risk individuals as those in the 5<sup>th</sup> decade who participate in sport. Overall the incidence of TA rupture is increasing each year. Rupture occurs more frequently in males. Results reflect those reported in countries with similar temperate climate and population demographics as Northern Ireland [4-6,36].

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