Ultrasound imaging is a predictor for the development of Achilles tendinopathy in athletes.

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Clinical bottom line

Ultrasound imaging (US) can predict the development of Achilles tendinopathy in asymptomatic athletes. Athletes with asymptomatic abnormalities have a 7.3 times increased risk for developing symptomatic Achilles tendinopathy. The number of normal tendons that developed problems was small (1.5%), so the actual risk of asymptomatic athletes with an abnormal Achilles tendon developing problems was only 11%. Although effective training programs to prevent the development of symptomatic Achilles tendinopathies exists, a consequent implementation of these (diagnostic and therapeutic) strategies based on abnormal US findings alone, may only have meaning in professional sports at risk. A quantification of additional factors may define a bigger group at risk who might have benefit of preventive strategies.

As I examined a professional male soccer player, suffering from pain around the left Achilles tendon, I didn’t only found abnormalities in the left- but also in the right Achilles tendon. Although an acute overuse seemed to be the key trigger in this patient, the question rises if abnormal findings in the Achilles tendon are risk factors in developing symptomatic tendinopathy in an athletic population.

Clinical question: Can ultrasound findings of asymptomatic abnormalities of the Achilles tendon predict the development of symptomatic Achilles tendinopathy in athletes?

Search terms: resulted in one (recent) systematic review.

The study:

This systematic review consists of prospective studies investigating the predictive value of patellar or Achilles tendon structure, viewed at baseline using ultrasound imaging. In each study patient characteristics and clinical measurement had to be reported. The selection was limited to publications in the past 20 years and to the English language. The extracted data included the number of tendons (patellar or Achilles) that became symptomatic among those with normal or abnormal imaging at baseline. For the clinical question, only the studies of the Achilles tendon are considered. The population of the meta-analysis was done in professional, resp. elite soccer players and long-distance runners with a mean age of 32 years. 71% were male, 29% female. Follow up was made within 5 days to 4 years, but unknown in detail
for each separated study. Data extraction was done by two reviewers and included patient characteristics (demographic, sex, age, sports), clinical measurement, definition of normal and abnormal tendons, number of tendons that became symptomatic among those with normal and abnormal imaging at baseline. Low levels of heterogeneity were assessed and described using $I^2$ statistic. Assessment of methodological quality was done with the Critical Appraisal Skills Programme (CASP)\(^3\) by two independent reviewers. A third reviewer mediated disagreements. Results were presented in a table. Ultrasound findings were the only considered variable, there was made no adjustment for any other prognostic factor, although it was known that the developing of symptomatic Achilles tendinopathy is multifactorial\(^3\).

The evidence
Nine studies investigated the predictive role of US imaging in the development of Achilles tendinopathy. Five of these studies were considered in a meta-analysis (table 1). A total of 274 asymptomatic Achilles tendons were screened with ultrasound imaging. 70 showed abnormalities (prevalence 25,5%) and 16 of the abnormal and 3 of the normal tendons became symptomatic. The likelihood of developing Achilles tendinopathy was more than seven times higher in those with baseline tendon abnormalities (RR 7.33).

<table>
<thead>
<tr>
<th>Study</th>
<th>Abnormal events/total</th>
<th>Normal events/total</th>
<th>Relative risk</th>
<th>Risk difference</th>
<th>95% CI</th>
<th>z</th>
<th>P</th>
<th>Weight (%)</th>
</tr>
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<tbody>
<tr>
<td></td>
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<td></td>
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<tr>
<td>Fredberg 2002</td>
<td>5/11</td>
<td>1/85</td>
<td>38,636</td>
<td>0,443</td>
<td>4,96 to 301,08</td>
<td>4,96</td>
<td>0,001</td>
<td>25,92</td>
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<td>Giombiri 2013</td>
<td>1/4</td>
<td>0/70</td>
<td>42,600</td>
<td>0,250</td>
<td>1,98 to 917,23</td>
<td>1,98</td>
<td>0,059</td>
<td>11,60</td>
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<td>Jhingan 2011</td>
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<td>1/13</td>
<td>2,826</td>
<td>0,140</td>
<td>0,37 to 21,66</td>
<td>0,37</td>
<td>0,08</td>
<td>26,35</td>
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<td>Khan 2003</td>
<td>1/17</td>
<td>0/9</td>
<td>1,667</td>
<td>0,059</td>
<td>0,08 to 37,22</td>
<td>0,08</td>
<td>0,37</td>
<td>11,33</td>
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<tr>
<td>Ooi 2015</td>
<td>4/15</td>
<td>1/27</td>
<td>7,200</td>
<td>0,230</td>
<td>0,88 to 58,71</td>
<td>0,88</td>
<td>0,37</td>
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<td>3/204</td>
<td>7,332</td>
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<td>2,95 to 18,24</td>
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<td>0,001</td>
<td>&lt;0,001</td>
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<tr>
<td>Total (random effects)</td>
<td>16/70</td>
<td>3/204</td>
<td>9,033</td>
<td>0,202</td>
<td>2,60 to 31,42</td>
<td>2,60</td>
<td>0,001</td>
<td>100,00</td>
</tr>
</tbody>
</table>

Table 1; Meta-analysis results for studies investigating the prediction of Achilles tendinopathy.

Comments
For interpreting the clinical relevance of a relative risk ratio, the number of normal Achilles tendons that developed symptoms has to be taken in to account. This review indicates that 1.5% of the normal tendons developed symptoms (3/204) and the relative risk of developing symptoms with abnormal tendons was 7.33 times higher. The authors referred to a study, in which the prevalence of abnormalities in various tendons in asymptomatic individuals was 59%\(^4\). In this review the prevalence of abnormalities in asymptomatic Achilles tendons was 25.5% (70/274). It is not clear why the authors take all the numbers and statistics from their meta-analysis, except for the prevalence. Being consequent and using the prevalence in this review, 25.5 out of 100 individuals will have asymptomatic tendon abnormalities and of them will have future symptoms. In other words, 33 athletes has to be examined, to find 8.5 athletes with an abnormal Achilles tendon, and these 8.5 athletes have to be threatened to possibly prevent one from getting symptoms. Thus, it must be considered if the effort, burden, effectivity, costs of diagnosis and therapy are in relationship to the possible prevention of having an athlete with a symptomatic Achilles tendinopathy. There are recent studies with positive effects of preventive training programmes for tendinopathy in a sports population at risk\(^5\). If these training programmes also have positive (or at least no negative) side effects on the major group not at risk, a professional sport team may take advantage of its integration in their training sessions.

As the development of symptomatic Achilles tendinopathy depends only for a small amount on the presence of abnormal ultrasound findings, more prospective studies should focus on quantifying multiple risk factors in order to predict and prevent them in the future. It should also be considered that unnecessary imaging and findings of not relevant abnormalities might be harmful by effects on patient’s beliefs and behaviours as known by imaging low back pain\(^6\).
Citations


