

High cholesterol linked to heightened risk of tendon abnormalities and pain

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High levels of total cholesterol are linked to a heightened risk of tendon abnormalities and pain, reveals a pooled analysis of the available evidence published online in the *British Journal of Sports Medicine*.

Chronic low level inflammation, prompted by cholesterol build-up in immune system cells, may have a key role, the findings suggest.

Tendons are the tough fibres connecting muscles and bones in the body. Mechanical stress as a result of obesity or excess body fat distribution, and overuse during the course of exercise or work, are thought to be among the leading causes of tendon injuries (tendinopathy). But these factors don't explain a significant proportion of cases, say the researchers.

People with genetically determined very [high cholesterol levels](#) (familial hypercholesterolaemia) seem to be at greater risk of tendon pain, but it's not clear if those with lower, but still high levels, might also be vulnerable to tendon injuries.

The authors therefore trawled six medical research databases, looking for studies investigating links between blood fats and tendon abnormalities/pain.

They came up with 1607 relevant articles, of which 17, involving 2612 participants, and published between 1973 and 2014, were suitable for inclusion in the analysis.

The results showed that compared with people whose tendon structure was normal, those with abnormal tendon structure had a significantly more unfavourable blood fat (lipid) profile.

They had significantly higher total cholesterol, including higher low density ('bad') cholesterol and lower high density ('good') cholesterol, and higher triglyceride levels.

Furthermore, people with an unfavourable lipid profile were much more likely to have tendon injuries and higher levels of pain associated with musculoskeletal problems in their arms.

And two of the three studies, which looked at Achilles tendon thickness, found that people with an unfavourable lipid profile had thicker tendons than those with lipid levels in the normal range.

"Together, these findings provide significant support for a metabolic hypothesis of [tendon injury](#) and implicate lipid parameters as a potential link," write the researchers.

But they point out that as this was an observational study no definitive conclusions can be drawn about cause and effect, especially as the findings might have been the result of reverse causation—whereby those with tendon injuries did less exercise, so raising their cholesterol levels.

Nevertheless, there is good evidence to suggest that a poor blood lipid profile may be harmful to tendons, they say, as people with familial hypercholesterolaemia have altered tendon structure throughout childhood and adolescence, while aggressive [lipid](#) lowering treatment reduces tendon thickness.

High cholesterol levels are also known to stimulate the build-up of [cholesterol](#) in immune system cells, which in turn leads to low level

chronic inflammation. Compared with people without tendon injuries, those with tendinopathy have increased numbers of these immune cells in their tendons.

More information: Is higher serum cholesterol associated with altered tendon structure or tendon pain? A systematic review, [DOI: 10.1136/bjsports-2015-095100](https://doi.org/10.1136/bjsports-2015-095100)

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