PROLONGED RUNNING STIMULATES COLLAGEN SYNTHESIS IN BOTH ACHILLES AND PATELLA TENDON
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Introduction
Overuse injuries in Achilles and Patella tendons represents a major problem within sports. At present it is not known if the high incidence is a result of a slow adaptation of the tissue to changes in loading. The aim of the present study was to analyse the effect of a prolonged run (36 km) on the collagen synthesis of the Achilles and patella tendons in humans. In addition the correlation between the running time and the running speed and the collagen metabolism was investigated.

Design
Ten healthy well trained men participated in this study (age 20-31 Y; 26±4Y). By the use of the microdialysis method the collagen synthesis around the Achilles tendon and the Patella tendon before and 72 h post running was determined.

Results
The present study shows that 36 km of running significantly increases the collagen synthesis in both the Achilles tendon (p=0.03) and the Patella tendon (p=0.01) 72 h after the exercise. The increase around the Achilles tendon was 350% and around the Patella tendon 300%.

In addition the study shows that there is a linear relationship between the running speed and the collagen synthesis (increasing speed leads to increased synthesis) in the peritendinous tissue around the Patella tendon (r²=0.85; p<0.05). In contrast to this the collagen synthesis of the Achilles tendon increased the most in the subjects that used the longest time to complete the 36 km running (r²=0.76; p<0.05).

Conclusion
We found that collagen synthesis was stimulated in as well the Achilles tendon as the Patella tendon in response to a prolonged run and that the two tendons responded differently to running speed and exercise duration with the duration being important for the Achilles tendons and the speed (and maybe load) being related to Patella tendons adaptation. These findings fits nicely with previous studies showing increased collagen synthesis of the Achilles tendon in response to prolonged exercise (Langberg 2000). In addition the discrepancy between the two tendons fits with the fact that runners suffer from overloading of the Achilles tendon where as volleyball players more often sustain a overloading injury in the Patella tendons (jumpers knees).

In the future it will be crucial to gain more knowledge about the adaptive response of the human tendons in order to prevent and treat tendon overuse injuries even better that to day.

Keywords: Tendon, Adaptation, Exercise