

Cross Sectional Area of the Achilles Tendon in a Prospective Cohort of an Elite Military Population

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Introduction/Purpose: The prevalence of Achilles tendon pathology is common in many sports and daily activities. From ruptures to overuse injuries resulting in tendonopathies, AT dysfunction can result in disability and reduced productivity. Continued research that increases our knowledge base of normal Achilles tendon properties can improve our ability to reduce and prevent future AT injuries. In this study, we examined the cross-sectional area (CSA) of the Achilles tendon (AT) at multiple levels in an asymptomatic population of elite American military service members that participate in greater than 20 hours of intense training per week.

Methods: We conducted a prospective cohort study composed of 41 active duty United States Army Rangers. The Rangers are a specialized infantry organization that participates in extensive military training and rigorous combat missions. The service members were voluntarily recruited to participate while deployed in a combat theater. All subjects were members of the Ranger Regiment participating in greater than 20 hours of intense bipedal non-sport weekly training with no history of AT pathology. In a standing position, each subject had bilateral Achilles insertion marked along with additional skin markings made at 2cm, 4cm, and 6cm above the AT insertion. At all four levels, the AT was measured in the coronal and sagittal plains using ultrasound.

Results: In 41 subjects, a total of 82 Achilles tendons were examined. The mean age of the cohort was 26 years, 70 inches tall, with a mean weight of 187 pounds. The mean sagittal thickness of the AT at the insertion was 4.3mm, 2cm above the insertion is was 4.3mm, 4cm above the insertion is was 4.2mm, and at 6cm above the insertion it was 4mm. In the coronal plain was 19.1mm, 14.3mm, 13.5mm, and 14.4mm respectively. The cross-sectional area was calculated at each respective level: 0.65cm², 0.48cm², 0.44cm² and 0.45cm². The non-dominant ankle was slightly larger at each level but was not found to be statistically significant.

Conclusion: These results provide the mean sagittal and coronal diameters of the Achilles tendon as measured by ultrasound throughout the watershed area of a young active adult male population. Our data also suggest that increased non-sport activity may not increase the cross-sectional area of the Achilles tendon. Identifying the normal diameter at multiple levels throughout the most commonly injured area can potentially improve the provider's ability to identify early disease processes and apply targeted interventions to help slow or prevent progression and possible rupture.