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Achilles tendon structural integrity and functional tests among road and trail long distance runners

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Statement of the Problem: Running surface might influence and change load and joint kinematic. Differences in impact forces on the body during training on different surfaces, influence load and joint kinematic and may increase the risk of injury. The purpose of this study was to investigate Achilles tendon structure and functional tests in road compared with trail runners.

Methodology: The study included 26 road and 17 trail runners. All running at least 3 times per week with a minimum of 20km per week and had participated in running competitions over 2 years. Each participant was examined for: Achilles tendon structure via Ultrasound Tissue Characterization (UTC) imaging measuring the percentages of Echo types I, II, III and IV within the tendon, tendon length and width and tendon cross sectional area; Ankle inversion movement discrimination ability was assessed via AMEDA device; Dynamic postural balance was measured via Y balance test; Jumping performance by triple hop distance test and Hip muscles abduction strength by hand held dynamometer. **Findings:** Significant difference in the distributions of the four echo-types in the UTC examination was found between groups. Percentage of echo-types I was significantly lower while echo-types II was higher in the road group compared with trail group (67.3%, 28.9% and 74.15%, 22.1%, respectively) ($p < 0.001$). No significant differences between genders and groups were found for other tests.

Conclusion & Significance: Tendon integrity as examined with UTC is different between road and trail runners. This suggests an influence of running surface on Achilles tendon structure.

Recent Publications

1. Dar G, Waddington G, Stern M, Dotan N, Steinberg N. Differences Between Long Distance Road Runners and Trail Runners in Achilles Tendon Structure and Jumping and Balance Performance. *PM&R*. 2020 Aug;12(8):794-804.
2. Steinberg N, Pantanowitz M, Zeev A, Stern M, Dar G. Ultrasound Tissue Characterization (UTC) of the Achilles Tendon in Pre- and Post-Pubertal Dancers. *J Dance Med Sci*. 2020 Jun 15;24(2):51-58.
3. Dixon SJ, Collop AC, Batt ME. Surface effects on ground reaction forces and lower extremity kinematics in running. *Med Sci Sports Exerc* 2000;32:1919-26.

Biography

Gali Dar is a physical therapist (B.PT) and has completed her M.Sc. and PhD from the Department of Anatomy, Tel-Aviv University, Israel. She is a full member in the Department of Physical Therapy at Haifa University, Israel being the head of the department since 2019. She is also working as a physiotherapist at the "Wingate Institute" which is the national institute for physical education and sport in Israel. Her research focuses on the musculoskeletal system in order to better understand function, injuries and treatment.

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