

PANEL COMMUNICATION (MATHEMATICS AND MEDICINE)

Statistical tool to identify pathologies in patellar tendons from ultrasonographic images

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Abstract

The objective of this study was to develop a statistical tool to identify patterns of healthy and pathological tendons from ultrasound images. Ultrasounds are widely used due to its safety and affordability, but a correct subjective decision about injuries depends on the medical expertise of a specialist. Previous work [1] was devoted to presenting the image processing tool and the discriminant capacity of the measurements extracted from the image. Here, the aim is to fit statistical mixed-effects logistic regression models and evaluate their capability as an expert decision support tool. The database includes healthy controls and patients with patellar tendinopathy, involving participants with asymptomatic and symptomatic patellar tendons, with diagnostics based on the assessments of an expert with a very long professional career, considered a golden rule. Each person was evaluated by three different expert clinicians, that take ultrasonographic image in five regions of interest (ROI). Images were assessed twice in every ROI and 61 variables per image were recorded. The reliability and prediction accuracy of the statistical models are analyzed using cross-validation. The robustness of the statistical image procedure is evaluated with respect to the different experts. The results show that the quantitative variables extracted from the images are capable of predicting a subjective assessment by an expert.

References

- [1] I. Albarova-Corral, J. Segovia-Burillo, M. Malo-Urriés, I. Ríos-Asín, J. Asín, J. Castillo-Mateo, Z. Gracia-Tabuenca, M. Morales-Hernández: *A new quantitative tool for the ultrasonographic assessment of tendons: A reliability and validity study on the patellar tendon*. *Diagnostics* **14** (11), 1067 (2024)