

# Assessment of peroneal muscles based on quantitative and qualitative sonographic descriptors: a literature review

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## Abstract

**Background and Aims** The use of ultrasound in physiotherapy helps to increase the precision and effectiveness of different techniques and provide a more objective assessment. Standardized clinical practice guidelines are needed to enable an appropriate reproducibility. The aims of this study were to perform a literature review to identify studies using ultrasound for the assessment of peroneal muscles. Also, to establish whether reliable and reproducible assessment protocols exist, and analyze these protocols to determine both reliability as well as methodology.

**Material and Methods** A literature search was performed in PubMed, Cochrane Library, PEDro and ScienceDirect databases over the last 10 years (2009-2018). The descriptors "Ultrasonography" and "Peroneus Muscle" were used, restricting the search to publications in English and Spanish for studies performed in humans.

The two main researchers revised the results and selected those that were most relevant. The data were then extracted individually and blindly. The third researcher shared the data obtained, verifying the exactness of the same and commenting the differences. There were no disagreements.

**Results** Initially, 92 studies were retrieved. After the analysis of the title, abstract and full-text (when necessary), 12 studies were selected for the analysis. Seven studies used ultrasound in B mode. In total, 10 morphometric descriptors were identified. Eight descriptors presented a very good reliability (CCI >90) and two descriptors had good reliability (CCI 0.71-0.90). Of the measurements performed in the cross-sectional plane, the cross-sectional area (CSA) and circular perimeter (CP) demonstrated a CCI >90 both in the analysis of the peroneus longus as well as the peroneus brevis, jointly or individually. The measurements of the CSA and CP demonstrated a CCI between 0.71-0.90 when these were performed upon the connective tissue of these muscles. The measurement of the anterior-posterior thickness presented a CCI >90. In the longitudinal plane, the measurement of muscle thickness presented a CCI >90. Five studies employed elastography to analyze muscle stiffness using Shear Wave Elastography and providing very good CCI results (>0.90) or good results (0.71-0.90) in peroneus muscles. Only one study reported a moderate CCI (0.51-0.70) for the measurement of the peroneus brevis. Sufficient data were obtained to perform a standardized measurement protocol based on good or very good reliability criteria.

## Keywords

- anatomy
- cross-sectional area
- ankle
- ultrasonography
- muscles

**Conclusions** It is possible to perform a sonographic exploration with reliability and reproducibility in the peroneal muscles for descriptors in B mode. Although some studies analyzed echogenicity, the authors recognized that this technique depends on the echographer and the operator and values of reliability are not reported. Although shear wave elastography has demonstrated to be reproducible, with moderate to good reliability, further studies are required to enable an objective interpretation of these results in clinical practice.