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Correlations between physical and ultrasound findings in congenital clubfoot at birth☆

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ABSTRACT

Background: At birth, clinical classifications are the only available tools for evaluating the severity of congenital clubfoot. Ultrasound provides an assessment of the anatomical abnormalities. The objective of this study was to assess correlations between physical and ultrasound findings at birth.
Hypothesis: Physical and ultrasonography provide different findings in congenital clubfoot and should therefore be used in conjunction.
Material and method: One hundred and forty-five clubfeet in 108 patients born between 2006 and 2010 were included in a retrospective study. Clubfoot severity was classified using two methods, the modified Dimeglio classification based on physical findings and an ultrasound score based on the talo-navicular angle (TNA) and metaphyso-talo-calcaneal angle (MTCA). Each of these two methods distinguished three severity grades. Agreement between the two methods was assessed by computing the κ coefficient.
Results: The results confirmed the hypothesis by showing low agreement between the clinical and ultrasound classifications. The severity grades were identical with the two methods for only 83/145 (57%) feet. The κ coefficient was 0.086.
Discussion: The two ultrasound views used to measure the TNA and MTCA, respectively, added an assessment of the three main deformities that characterise congenital clubfoot (equinus, adduction of the forefoot, and adduction of the calcaneo-pedal unit). Ultrasonography complements the physical examination at birth. In the future, using both physical examination and ultrasound scanning to monitor babies with clubfoot may allow early treatment adjustments aimed at optimising the outcome.
Level of evidence: IV, retrospective observational study.

1. Introduction

Several methods are available for assessing the severity of congenital clubfoot (CC). Among them, the classifications developed by Dimeglio and Pirani are the most widely used [1–5]. These classifications produce reproducible results [6,7] but do not allow retrospective re-evaluation. Ultrasonography at birth provides accurate and objective information on the deformities present at birth in babies with CC [8,9]. The ultrasound projections used to assess CC are standardised and reproducible, and they can be reviewed retrospectively [10]. To our knowledge, no studies have assessed the correlations between clinical and ultrasound classifications at birth before treatment.

The objective of this study was to assess correlations between physical and ultrasound findings at birth. The working hypothesis was that physical and ultrasonography provided different findings in CC and should therefore be used in conjunction.

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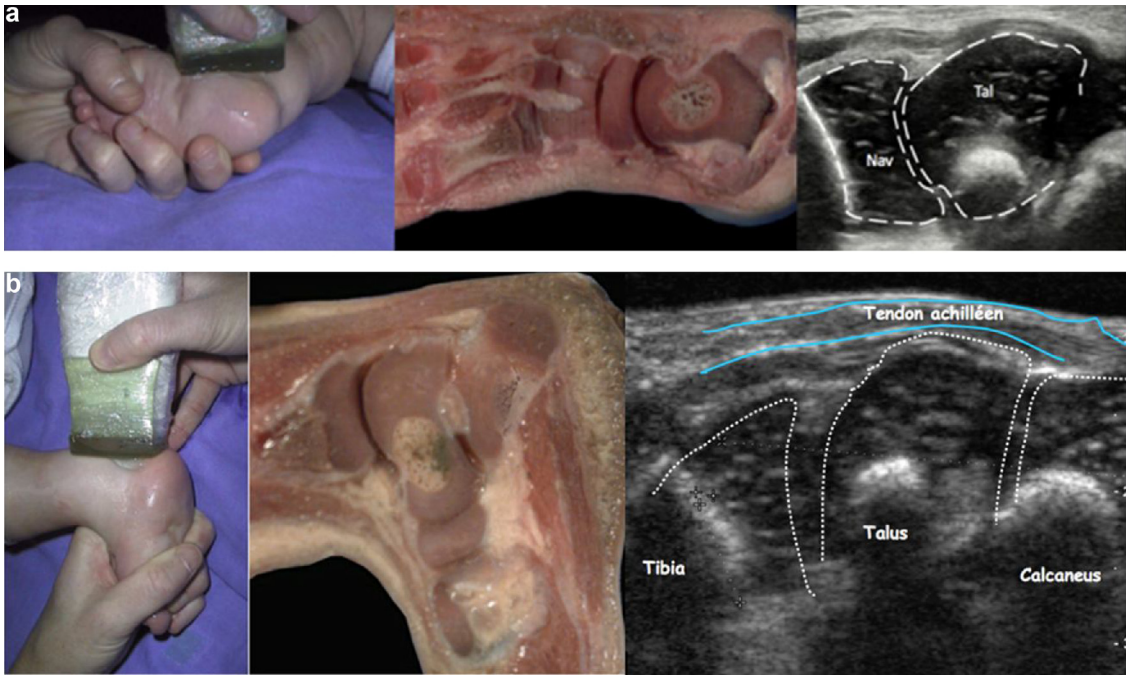

Fig. 1. a: position for acquiring the medial axial ultrasound projection, anatomic model, and ultrasound image showing the navicular (Nav) and talus (Tal); b: position for acquiring the sagittal posterior ultrasound projection, anatomic model, and ultrasound image showing the tibia, talus, and calcaneus.

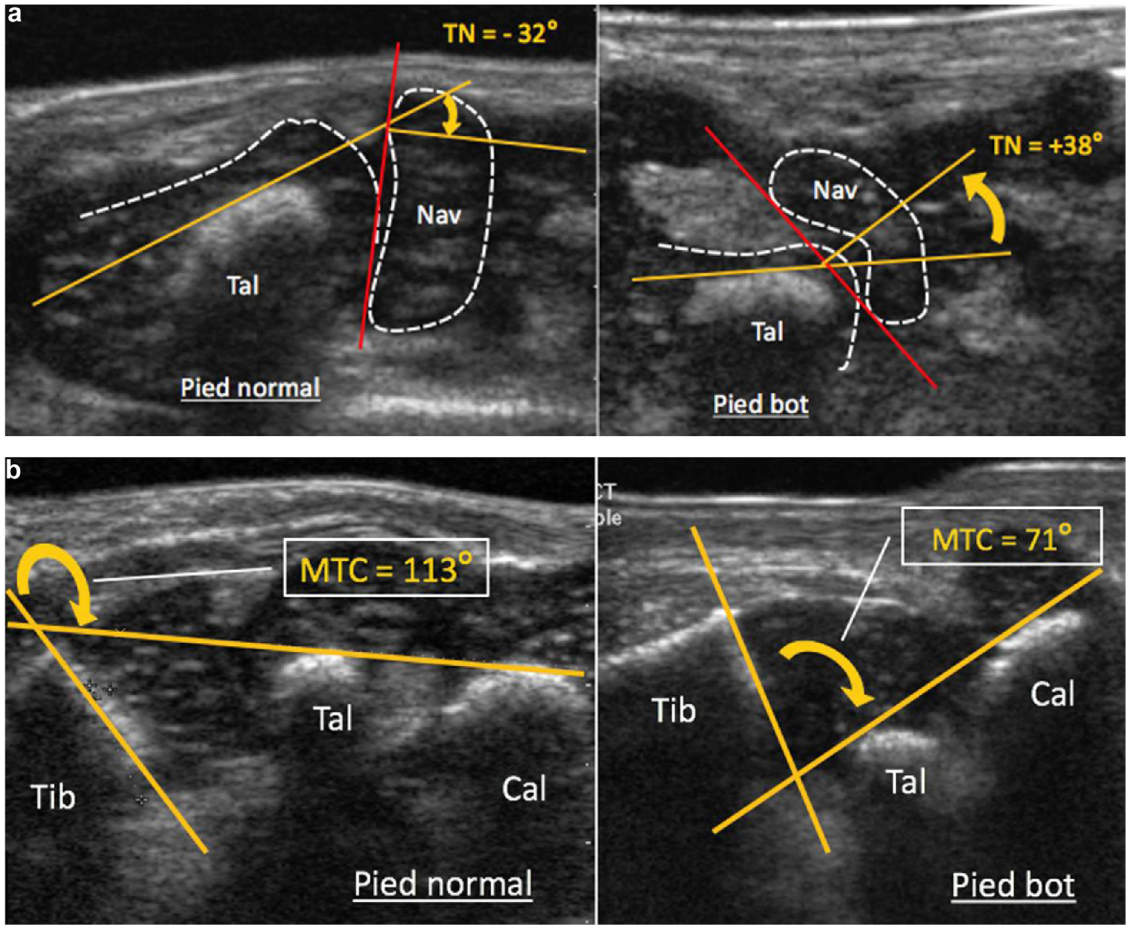

Fig. 2. a: medial axial ultrasound projection allowing measurement of the talo-navicular (TN) angle. Normal foot on the left and clubfoot on the right. Tal: talus; Nav: navicular; TN: talo-navicular angle. b: Sagittal posterior ultrasound projection allowing measurement of the metaphyso- talo-calcaneal angle. Normal foot on the left and clubfoot on the right. Tib: tibia; Tal: talus; Cal: calcaneus.

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