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4th September - Palazzo Bo (via VIII Febbraio 2, city centre) ; 5th and 6th September- Edificio Fiore di Botta (Via del Pescarotto 8), Padova

The modern human talus affected by cultural and behavioral factors.

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The primate talus is known to have a shape that varies according to differences in locomotion and substrate use^{1,2}. While the human (*Homo sapiens*) talus is morphologically specialized for bipedal walking, relatively little is known how its morphology varies in relation to cultural and behavioral differences across time³. Here, we investigate differences in external and internal structure of 142 tali belonging to modern human populations with different levels of mobility (e.g., sedentary vs. nomadic), shoes (e.g., unshod/minimally shod vs. stiff footwear) and substrate use (e.g., asphalt vs. rough terrain).

External talar morphology was investigated through 3D landmark-based geometric morphometric methods⁴. Individuals were Procrustes superimposed (GPA) and then Procrustes coordinates were subject to Principal Component Analysis based on the group mean covariance. ANOVA Post Hoc test was carried out to identify group differences while Procrustes ANOVA was performed to assess effects of shape variation due to footwear,

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substrate and levels of mobility. Moreover, a subsample was selected for whole bone trabecular analysis for evaluating bone volume fraction (BV/TV), degree of anisotropy (DA) and elastic modulus (E).

Our results show significant differences in both external and internal talar morphology between more sedentary groups (farmers and post-industrial individuals) and highly mobile hunter-gatherers. Morphological traits suggest that hunter-gatherers exhibit a more “flexible” talar shape providing broad range of joint motion while walking barefoot, or wearing minimalistic footwear, along uneven ground. Contrary, post-industrial people/farmers show a more “stable” profile reducing extensive foot motion by remaining constricted by the shoe. Differences in trabecular density and elastic modulus reflect a gracilization in sedentary people likely due to a decrease in daily physical activity, while talar robusticity in hunter-gatherers reflect highly mobility and distances travelled.

This study points out that the modern human talus varies according to differences in mobility strategy.

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