

# The Biomechanical Properties of the Phalanx Assessed by an In-Vivo Quantitative Ultrasound Technique

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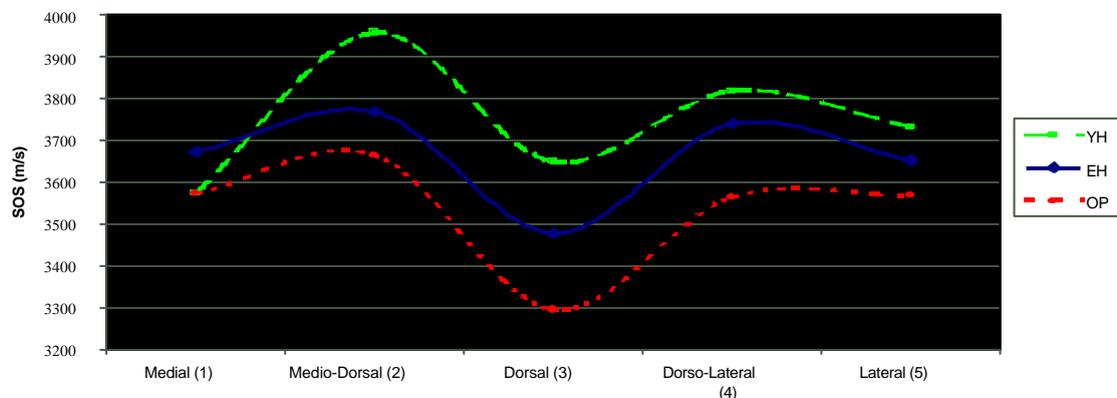
A previous study, performed with Sunlight Omnisense™ (Sunlight, Israel) and aimed at characterizing the SOS profile of the third proximal phalanx in young subjects, has shown that the bone has an SOS profile comprising of 2 maxima at the medio-dorsal and at the dorso-lateral aspects of the bone and a minimum SOS value at the dorsal aspect.

We have continued the study in order to compare the differences in the phalanx profile among 3 different groups: young healthy (YH), elderly apparent healthy (EH) and osteoporotic fractured patients (OP).

5 osteoporotic fractured patients (4 hip fractures, 1 colles', 73±5 years old), 5 elderly apparently healthy women (78±3 years old) and 7 young healthy adults (26 to 45 years old) were examined at their non-dominant hand. The SOS profile was determined by five separate measurements taken at the medial, dorso-medial, dorsal, dorso-lateral and lateral aspects of the bone. A probe was placed longitudinally to the bone measuring SOS. SOS values represent the mean of 3 repeated measurement cycles at each position.

The phalanges were found to have a similar profile: for all subjects measured, behavior of the bone profile in sections 2 to 4 were identical, comprising of 2 higher values at the dorso-medial and at the dorso-lateral aspect and a lower value (Minimum) at the dorsal aspect of the phalanx.

These findings suggest that the anisotropic SOS profile, that has been observed in the young population, is substantially similar to that of the elderly or the osteoporotic subjects. The SOS values decreased at about the same proportion at all bone aspects. This may imply that deterioration of cortical bone occurs at the same rate across the bone, and not at a different rate at each different aspect. However, it is important to note that this conclusion may not apply to other bones, such as weight bearing bones.



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