Osteopenia of prematurity is a complex bone disorder characterized by inadequate mineralization of the rapidly growing skeleton of infants who are born preterm. It is often associated with raised plasma alkaline phosphatase activity and fractures of ribs and long bones.

In post-menopausal women, Quantitative Ultrasound (QUS) parameters are known to predict fracture risk independently of bone mineral density, suggesting that they must be related to some aspect of bone strength. We used the Sunlight Omnisense™ QUS device (Sunlight Medical Ltd, Israel), to measure the speed of sound (SOS) in the axial transmission mode along the tibiae of term and preterm infants. The precision error was < 1%.

The aims of this cross-sectional study were:

To establish normal tibial SOS values in healthy term and preterm infants (n = 95) between 34 to 43 weeks gestation. The data for these infants, with 95% confidence intervals, is displayed as [x] in the graph.

To measure tibial SOS in nine infants who were born very pre-term (24 to 30 week gestation) and who had reached the corrected gestation age between 34 to 43 weeks. The data for these infants is displayed as [◆] in the graph. The median (range) plasma alkaline phosphatase activity of these infants at the time of tibial SOS measurements was 1551 IU/l (549 – 2814; normal <400 IU/l).

The mean tibial SOS in healthy infants (3103 ± 124 m/s) was significantly higher (p< 0.001) than in very preterm infants (2721 ± 116 m/s), when their corrected gestation age was between 34 to 43 weeks. From these data we conclude that tibial SOS measurements may allow radiation free assessment of osteopenia of prematurity.