

The treatment of disorders of calcium metabolism in children on the data of osteodensitometry

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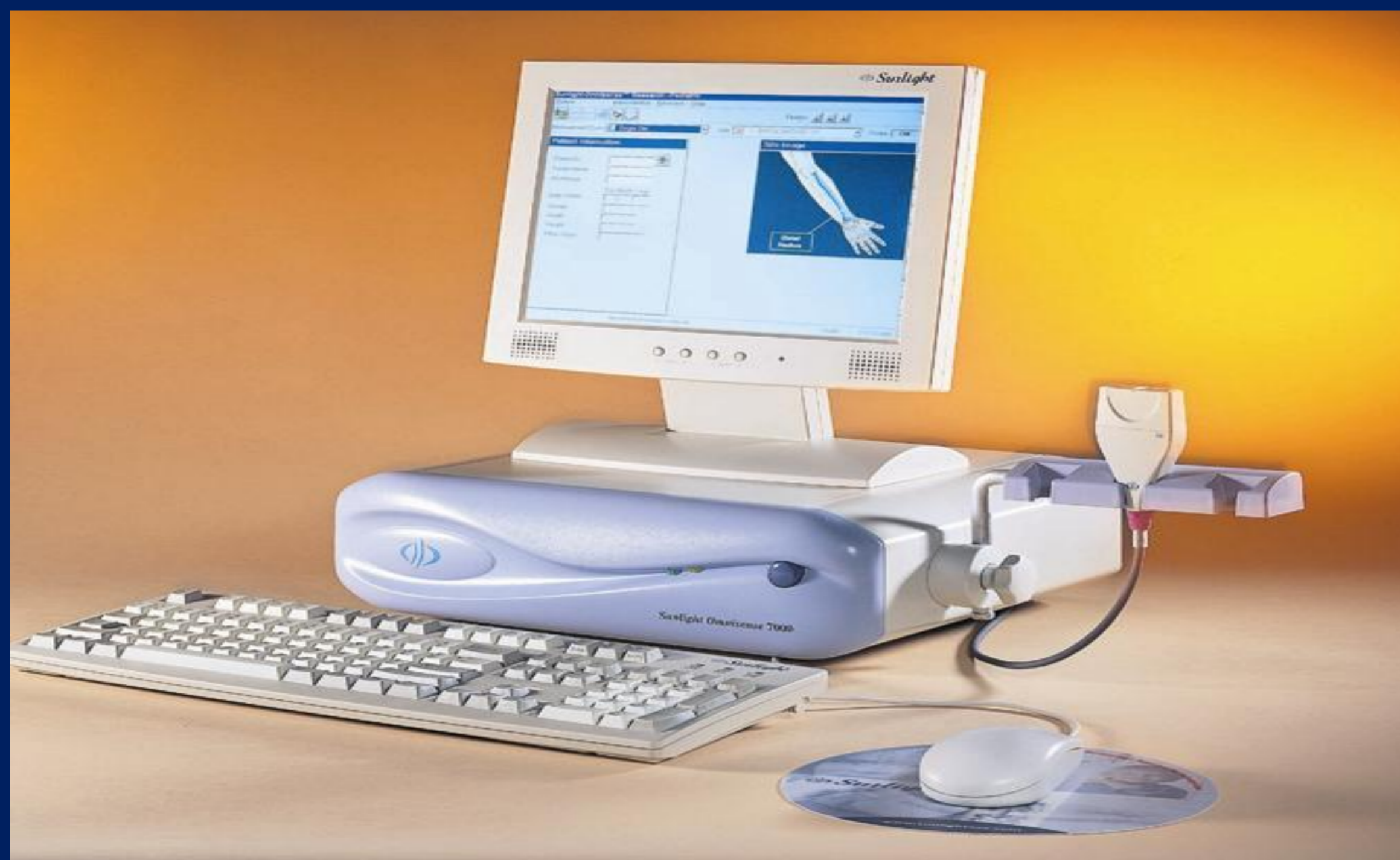


Introduction

Over the past ten years, attention has been paid to the problem of osteoporosis and osteopenia in children because up to 30% of children have a decrease in bone mineral density. Insufficient rates of bone calcium are accompanied by a decrease in the thickness of the cortical layer and require administration of calcium and vitamin D. To assess the "quality" of the bone and administer proper drugs, a quantitative ultrasound method is of value, based on registering the speed of the passage of an ultrasonic wave along the cortical layer of tubular bones. It has high sensitivity, safety without chances for subjective interpretation of results.

Material and methods

316 children



«Omni sense 7000S "(SunlightMedicalLtd, Israel

We participated in a cross-sectional study involved 316 children aged 1 day to 3 years and used an ultrasonic densitometer «Omni sense 7000S "(SunlightMedicalLtd, Israel) with a software and a sensor for children. The duration of one measurement of one section of the skeleton was 1 minute. Ultrasound diagnostics is a short-lived, painless and repeated procedure without contraindications. The method can catch even minor changes in the density of biological media and can be used for early diagnosis of bone loss in newborns and young children. Mechanical properties of bone tissue change with a decrease in bone mineral density, so from a physical point of view, the method is more efficient than x-ray methods.

Results

The examination based on the axial transmission of an ultrasonic wave along the cortical layer of tubular bones allowed assessing bone tissue by the speed of passage of an ultrasonic wave. The speed of the ultrasonic wave passing along the cortical layer of the tibia was calculated in absolute rates (SOS, m/s) or as an integral indicator (SOS, Z-score). Z-score-the value that characterizes the deviation of the actual values of bone strength in a child from the average values for a specific age group, expressed in units of standard deviation. Decreased bone strength was diagnosed at a sound speed below 10 percentile (Z-score below -1 SD). A decrease in the speed of sound less than five percentiles (Z-score below -2 SD) is considered a pathology.

Conclusions

We designed recommendations on the use of quantitative osteodensitometry data and administration of calcium:

- 1)for early diagnosis of bone metabolism disorders in young children, it is recommended to include quantitative ultrasound examination of bones in routine medical examination of the children;
- 2)decreased rates of bone strength below 10 percentile (Z less than -1.0 SD) require calcium preparations in preventive doses and vitamin D at a dose of 2000 IU. Children with low bone strength below three percentiles (z-score less than -2 SD) should take calcium in therapeutic doses according to their age and vitamin D at a dose of 3000 IU.