

## References

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## Comparison of Bone Density Measurements from Different Skeletal Sites

**TO THE EDITORS:** The interesting study of Seldin et al. reported in the February 1988 issue (*U Nucl Med* 1988; 29: 168-173), mainly confirms the findings of our own investigations we were able to carry out in cooperation with the University of Wisconsin, Madison (1). However, we would like to indicate some special points. Obviously the bone density values of the scattergram cover the whole range from extremely low to high densities and it is not said which group of patients represent which values. Only if all groups would have the same or at least similar regressions, the pooling of all values might be considered statistically meaningful. Furthermore most of the suspected "osteoporotic" patients, obviously the majority of the displayed values, seem to turn out as normal age matched values. It is not clear what criteria had been used to establish the diagnosis of osteoporosis independently from the bone density measurements. It is doubtful also, if statistical analysis of male and female subjects together in the same regression analysis is allowed. The authors probably were just trying to obtain a large span of values.

We have done similar comparisons of SPA and DPA with a particular focus on prediction of spinal bone density, obtained with DPA from measurements of purely trabecular bone at the distal radius obtained with our specially built iodine-125 (<sup>125</sup>I) QCT scanner (2). 146 individuals (patients and normals) were studied. We decided to indicate that pooling of our groups in order to extend the range of values might statistically not be meaningful, because different regressions between the groups were observed! The pooled correlations of course turned out significantly better.

In comparison Seldin's results our pooled results show correlations between peripheral sites and axial density not below 0.61, with the best correlation between radius trabecular bone density and spinal BMD ( $r = 0.72$ , s.e.e. was 10.7%). Although prediction ability of axial densities from peripheral measurements in our data was significantly better (s.e.e. 10–14%) than in Seldin's published data, our s.e.e.s still were too large to predict spinal BMD obtained with DPA.

It has to be considered that comparison of different sites

with different ratios of cortical to trabecular bone in general and in different diseases in particular would result in an unapplicable regression analysis. In vitro measurements indicate a much better correlation between purely trabecular bone of lumbar vertebra and the distal radius ( $r = 0.7-0.9$ ) (3,4). Our data suggest the same conclusion, assuming that lumbar vertebra represent the highest amount of trabecular bone when measured with DPA-equipment. Seldin et al indicate that the overall mineral content may be only one of several factors associated with fracture risk. Bone compound structure certainly is another. Therefore and for the reason of proportional bone turnover it is better to compare similar bone structures. It has to be emphasized not to generalize method-dependable findings like Seldin's and those of others (5,6,7) obtained with planar absorptiometric methods (SPA and DPA) which do not allow the selective analyzation of bone structures. As long as there is a lack of data on evaluation of more comparable equal bone structures (purely trabecular bone or cortical bone) at different sites with adequate methods—such as conventional QCT and special [<sup>125</sup>I]QCT—conclusions on data should expressively be limited to the methods they are obtained with. There is no gold standard existing yet.

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**REPLY:** We thank Drs. Schneider and Börner for their interest in our work. Their soon-to-be-published investigation supports our conclusions that SPA and DPA measurements