Correspondence

Osteoarthritis of the hip: the patient behind the disease

SIR, Solomon *et al.*¹ found that bone mass measured by radiogrammetry was equal to the normal mean between 50 and 70 years and thus did not confirm previous findings of a significantly higher bone mass in osteoarthritis cases.

The discrepancy between these results is based on differences in expressing the data of bone mass measurements. Solomon *et al.*¹ express their data as a ratio % cortical area, while Foss and Byers² express their data in cortical surface area and Roh *et al.*³ and Dequeker *et al.*⁴ express their data in absolute values of cortical area and cortical thickness.

When the relative bone mass indices were introduced, it was assumed that the ratio compact bone/total bone would be the same for different sizes of bones and that variation in body size would in this way be corrected. In mechanics, however, it is well known that resistance of tubular structures to flexion can be maintained with a lower wall-area/total-area ratio provided the total diameter of the tube is larger. The effect of skeletal size, periosteal diameter, and bone length on indices of bone mass is shown in Table 1. While cortical thickness, cortical area and cortical-area/surface-area ratio increase, the percentage of cortisol area to total-area decreases with increasing periosteal diameter.⁵

Since bone remodelling in osteoarthrotics differs from normal controls matched for age and sex by a significantly greater apposition rate at the periosteal surface (D),³ it is not surprising that Solomon *et al.*,¹ using a relative index ($D^2 - d^2/D^2$), find a low value, while in the papers where the absolute values $D - d$ or $D^2 - d^2$ are used a significantly larger mean bone mass is found in osteoarthrotics.

Studies using other measuring techniques at another site

(radius) confirmed the radiogrammetric finding of an increased absolute bone mass in osteoarthritis.^{6,7}

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SIR, Unfortunately there is no wholly satisfactory and agreed-upon formula for calculating 'bone density' from metacarpal cortical measurements, and this inevitably reduces the value of comparisons between the results of different workers.

Because of the significant differences in somatotype of our osteoarthritic and osteoporotic patients, we sought to neutralise the effect of bone size by using an index of relative bone mass rather than absolute bone mass. We readily acknowledge that the 'ratio index' has certain drawbacks,

Table 1 Indices of bone mass for different sizes of second metacarpal bone at midpoint in the age group 25-34 years

L	D	d	D-d	$\frac{D-d}{D} \%$	D^2-d^2	$\frac{D^2-d^2}{D^2}$	$\frac{D^2-d^2}{D L}$
Females							
6-10	7-0	2-20	4-80	68-57	44-16	90-12	0-1034
6-30	8-0	2-80	5-20	65-00	56-16	87-75	0-1114
6-55	9-0	3-45	5-55	61-66	69-10	85-30	0-1172
Males							
6-80	8-0	3-35	4-65	58-12	52-78	82-46	0-0970
7-00	9-0	3-85	5-15	57-22	66-18	81-70	0-1050
7-25	10-0	4-40	5-60	56-00	80-64	80-64	0-1112

L=length; D=outer diameter; d=inner diameter; D-d=cortical thickness; $\frac{D-d}{D} \%$ =%cortical thickness; D^2-d^2 =cortical area; $\frac{D^2-d^2}{D^2}$ =% cortical area/total area; $\frac{D^2-d^2}{D L}$ =cortical area/surface area.

referred to by Dequeker and Verstraeten. However, so has the absolute parameter 'cortical area', which they advocate. Meema and Meema¹ have recently pointed out that this is not a sensitive measure of endosteal bone resorption, because the calculation of cortical area ($D^2 - d^2$) is more dependent on the external width (D) than the marrow cavity width (d).

Fig. 1 Mean values for total metacarpal width (D) and medullary width (d) in normal women (solid lines) and in osteoarthritic women (dotted lines).

As it happens, our own deductions were not materially affected by the application of any single parameter. Whether expressed in terms of relative bone mass (as in our paper) or absolute bone mass (cross-sectional cortical area), the results in our osteoarthritic patients showed the same trend: a slight increase above the normal means for males and no significant increase in females. This is predictable from straightforward values for the external width (D) and

the medullary width (d), with the representation of cortical thickness as shown in Fig. 1.

A point ignored by Dequeker and Verstraeten is that there are considerable differences in the 'normal' curves presented in various studies. Our own female population—a true random sample obtained in field studies of socially active suburban families—has a mean bone mass and bone density greater than those reported in several European studies, where the elderly 'normals' were selected from hospitals or other institutions. This could account for the fact that our osteoarthritic patients do not show the remarkable increase above 'normal' bone density reported by Dequeker and others.

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Identification of antibodies to acidic antigens by counterimmunoelectrophoresis

SIR, Counterimmunoelectrophoresis (CIE) is a rapid and sensitive method for the detection of precipitating antibodies to a variety of nuclear and cytoplasmic antigens, such as Sm, RNP, Ro, and La. Usually these precipitins are then identified by Ouchterlony immunodiffusion, although Kurata and Tan described a modified form of CIE for this purpose.¹ In our laboratory we employ an alternative modification to the standard method of CIE that has enabled us to identify over a dozen recurring precipitin systems in SLE² and autoimmune liver disease.³

10 ml of 1% agarose in 0.05 M barbitone/sodium barbitone buffer pH 8.4 is poured on to 80 × 80 mm glass

Fig. 1 Area of glass plate showing arrangement of wells and trough. Human spleen extract (HSE) has been used as the source of antigens. Precipitin lines merge or cross according to the identity or nonidentity of antibodies in adjacent wells.