The relationship between adipose tissue and bone mineral density (BMD) is still being debated. The purpose of our study was to evaluate whether the pattern of abdomen adipose tissue is correlated to trabecular BMD of the lumbar spine. In this cross-sectional study, we studied 89 premenopausal and 231 postmenopausal Chinese women aged 19–86 years. Quantitative computed tomography (QCT) was used to measure the average trabecular BMD of L2–L4, visceral adipose tissue (VAT) and subcutaneous adipose tissue (SAT). Height and weight were measured. In the premenopausal sample, multiple linear regression analyses indicated that VAT was negatively correlated to trabecular BMD (P value = 0.0003) and SAT had no correlation to trabecular BMD. In contrast, there was no significant correlation between VAT and BMD or SAT and BMD in the postmenopausal sample. Our results indicate that VAT may be deleterious to trabecular BMD and SAT has no correlation with BMD in the premenopausal Chinese women, and there is no correlation between abdominal adipose tissue and trabecular BMD in the postmenopausal Chinese women.

MRI FOR MARROW FAT ASSESSMENT IN BONE METABOLIC DISORDERS
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The confined space of the medullary cavity of bone is filled with trabecular bone (<20%) and bone marrow (~80%). Bone marrow is comprised of fatty marrow and functioning (red) marrow (comprising red blood cells, platelets, lymphocytes, plasma cells and their pre-cursors). An increase in one component of the medullary canal can only occur at the expense of another component. Lifelong changes which occur in the volume of trabecular bone are relatively small compared to those which occur in fatty or red marrow. Marrow fat content increases throughout life from about 20% marrow fat content at 20 years of age to about 60% marrow fat content at 60 years of age. This fat content can be accurately quantified with MR spectroscopy using the fat: water ratio with high reliability. An alternative method is in-phase:out-phase imaging (Dixon technique) though this does not provide spectroscopic detail. In men, marrow fat content is generally about 10% higher than in females, though around the time of the menopause there is a dramatic increase in marrow fat content in females such that after this time, marrow fat content is about 10% higher in females. Marrow fat content increases but what about marrow fat composition — does that change with increasing age or change in BMD. Marrow fat contains both saturated and unsaturated fat and at least 22 different fatty acids. Current clinical MR spectroscopy has the ability to measure the unsaturated and saturated components of marrow fat with the potential for providing near-complete non-invasive spectroscopic detail. Some studies suggest that there is a change in fat composition with osteoporosis, a highly relevant finding since some fats can inhibit bone metabolism in vivo. Studies have begun to look at marrow fat and its...
relationship to other metabolic parameters in osteoporosis, diabetes, metabolic syndrome and anorexia nervosa.

Brief CV
Research Area(s): Marrow changes in osteoporosis
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Professor James F Griffith MB, BCh, BAO, MRCP, FRCR, HKFAM (radiology), MD, studied medicine in University College Cork Ireland, practiced clinical medicine in the UK and underwent radiological training in the West Midlands UK. His current clinical practice comprises all aspects of musculoskeletal imaging. He has published almost 300 peer-reviewed papers with particular research interests being glenoid bone loss in shoulder dislocation and the imaging of marrow fat and bone vascularity with a view to the early detection of osteoporosis.

Some representative papers are:

RADII-STEREOMETRIC ANALYSIS IN RESURFACING HIP ARTHROPLASTY
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RSA is a method which can measure small migration of prosthetic components in bone and wear of e.g. polyethylene. The radiographic method has been developed in Sweden during the 1970’s and is today used as a tool documenting new implants in order to verify a stable implant in bone. Studies using the method have shown that early and continuous migration is one of the most important predictors of implant loosening and is thus a surrogate indicator for survival of the implant.

RSA requires simultaneous exposure of two X-ray tube creating two images (fig. 1 and 2). In addition, a calibration cage, implant and bone markers are needed. A software program will translate these projections into a 3D coordinate system, calculate the distance between the rigid bodies of the cage, bone and implant. Changes, during follow-up between the relative position of bone and implant, mean that the implant is migrating in one or more directions.

The RSA method has in the present study been used to evaluate different types of hip arthroplasties.

Resurfacing hip arthroplasty (RHA) versus a standard total hip arthroplasty (THA) with a large diameter metal on metal heads (LDH-THA) stable. The primary aim of this study was evaluate the implant stability of the DePuy ASR™ Hip Resurfacing by use of RSA, and secondly to compare it to a cup from a LDH-THA

Results
Cup:
The mean (sd) micro motion over the first two years of 18 ASR cups was a lateral movement of -0.115 (0.60) mm (p = 0.82), proximal migration of 0.075 (0.14) mm (p = 0.01), and anterior movement of 0.438 (0.88) mm (p = 0.04). 16 ReCap cups migrated 0.307 (0.53) mm (p = 0.01) medially, 0.282 (0.36) mm (p = 0.001) proximally and 0.343 (0.63) mm (p = 0.03) posteriorly. On the z axis, both cups moved in opposite directions at 2 years (p < 0.01). No difference between the cups was found at 2 years for the X and Y axis. Fig. 2.

The proximal migration for the ReCap cup places it in an “at risk” group, whereas RSA failed to identify ASR cup as a problematic implant. We conclude that early migration is not the mode of failure for the ASR implant.

Stem.