and cancellisation, trabecular bone volume (TBV), trabecular diameter and osteoid area were measured on a Kontron Image Analyser. Bone mineralisation was evaluated in undecalcified sections and on microradiographs.

The treatment was well tolerated by most of the patients; there were no significant changes in the blood biochemistry or metacarpal cortical indices and no increase in vertebral fractures (two fractures occurred in controls). The TBV improved in 71.4% of patients – increasing on average by 90.3% ($p < 0.05$). Cortical bone response was limited but there was no decrease in its bulk or mineralisation. The new post-fluoride bone tissue was well mineralised except in 2 patients due to its excessive overproduction (TBV increased by more than 300%). There is a fast, not generally recognised deterioration of the trabecular and cortical bone in untreated FNF patients with the danger of further fractures and a high mortality unless their bone mass can be effectively improved.

P3. Copper deficiency and fractures in infancy

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Copper is a component of the enzyme lysyl oxidase involved in the manufacture of collagen and skeletal abnormalities are recognised in copper deficiency in infancy. True fractures have been found only in a minority of the 60 reported cases of copper deficiency. This paper reports three infants with fractures and biochemical evidence of copper deficiency. The fractures were identified at 6 weeks, 4½ months and 5 months. Two patients had spontaneous fractures of the ribs and one a spontaneous fracture of the upper femur. One patient had osteopenia and widespread metaphyseal abnormalities. Two patients had iron-resistant anaemia. One patient had recurrent apnoeic attacks, muscular hypotonia and psychomotor retardation.

Some risk factors for copper deficiency are recognised; preterm birth, as in one case, is regarded as important since copper stores are predominantly laid down during the third trimester of pregnancy. In another patient diarrhoea led to the use of an elemental diet without copper and was the likely cause. In the third case possible contributory factors were thought to include diarrhoea, multiple pregnancy and maternal copper insufficiency. While copper deficiency is probably rare it needs to be included in the list of possible causes of fractures in infancy.

P4. Seasonal variation in serum 25-hydroxyvitamin D in London Asians: contribution of diet and risk of osteomalacia in different Asian subgroups

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Osteomalacia remains an important health problem amongst Britain's Asian community. Solar radiation is considered to be the major source of vitamin D but dietary sources may be important in individuals whose sunlight exposure is inadequate. The relative

contribution of ultra-violet irradiation and diet to vitamin D status in British Asians is unclear.

We have compared seasonal variation in serum 25-OH D in whites and Asians living in London. Samples were obtained from 293 unselected adult Asians (168 new attenders at a medical out-patient clinic and 125 volunteers from Asian community centres). Bone biopsy was accepted by 48 patients who fulfilled pre-defined clinical or laboratory criteria. 68 white subjects (hospital workers, visitors and unselected outpatients) acted as controls.

Asians showed significant seasonal variation in 25-OH D, but mean summer peak and winter trough levels were lower than in whites (peak 43.5 nmol/L v 69.2 nmol/L; $p<0.01$ and trough 19.5 nmol/L v 41.0 nmol/L; $p<0.001$). Asian vegetarians (predominantly Hindus) had significantly lower mean winter (12.8 nmol/L v 23.5 nmol/L; $p=0.001$) and summer (33.0 nmol/L v 50.8 nmol/L; $p<0.02$) 25-OH D concentrations than non-vegetarian Asians (predominantly Muslim). Mean summer 25-OH D concentrations were lower in Hindus than Muslims (34.1 nmol/L v 59.0 nmol/L; $p<0.05$). Histological osteomalacia was documented in 10 Hindus and only 1 Muslim ($X^2 = 7.28$; $p<0.01$).

Our results demonstrate a significant seasonal variation in serum 25-OH D in London Asians but we suggest that diet also effects vitamin D status throughout the year. Hindu Asians are at significantly greater risk of osteomalacia than Muslims.

P5. Osteopetrosis at Christ Church, Spitalfields

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Excavations in the crypt of Christ Church, Spitalfields, which was used for burial between 1729 and 1859, produced 986 skeletons, of which 387 had surviving coffin plates from which the name, sex and age at death could be determined.

Amongst the sample of known age and sex, three cases of juvenile osteopetrosis were found on radiogrpahy. The first case found was of a boy aged 2y and 6m at death. His disease showed an unequal distribution throughout the skeleton. The lower limb bones, pelvis, thoracic and lumbar vertebrae and the base of the skull were sclerotic but the upper limb bones, scapulae and mandible were barely affected.

The two other individuals both died aged about two weeks; one was a niece of the first case, the second his cousin. In the cousin the disease was widespread, the long bones, vertebrae, skull base and mandible all being