

**Medico-legal**

### Case 1

This lady developed a foot drop and valgus heel after spinal surgery. Her surgeon proceeded to carry out a pantalar fusion. Critique the post operative X-ray, and in particular try to identify which principles of arthrodesis, outlined in this issue, have been unfulfilled at surgery?



- 1) There has been inadequate joint preparation, as there is clearly a significant amount of articular cartilage left in all the joints being fused. There is failure of coaptation of the surfaces being fused.
- 2) The ankle joint has been positioned in equinus during the fusion.
- 3) Proximal locking has been performed using a dynamic slot in the nail, with a resulting lack of rigidity and compression at the ankle arthrodesis site.

To cap it all, the calcaneal locking screw was inserted through a medial approach with consequent tibial nerve damage. She did not do well!

**Case 2**

This patient was referred to our unit following an attempted right ankle and subtalar fusion. Why is it likely that she has got such severe swelling 1 year after her surgery?

**Answer 2**

There is no scar visible to indicate that the ankle or subtalar joints were prepared either through an open or arthroscopic approach. Running fixation through a joint without removing the articular cartilage is termed 'phantom arthrodesis' in veterinary practice! We ruled out an infection by blood tests, joint aspiration and bone biopsy. The swelling was due to an effusion in the reamed ankle and subtalar joints. At revision surgery, we found that the cartilage was intact in both joints, apart from the nailing sites.

### Case 3

Why is this patient unhappy with his first metatarsophalangeal joint arthrodesis? What action would you take?



### Answer 3

The joint has been fused in extension with respect to the floor. The patient cannot therefore grip the ground with his big toe and the toe is rubbing in his shoe. The interphalangeal joint is painful.

Some textbooks recommend that the first metatarsophalangeal joint is fused in 20 degrees of extension, without clearly specifying that the extension is with respect to the axis of the first metatarsal, and some surgeons wrongly believe that this refers to extension with respect to the floor! Because the first metatarsal may differ in inclination in different patients, it is best practice to align the toe with respect to a simulated floor surface, for example using the cover of the implant set.

This patient's toe was realigned by means of an opening wedge osteotomy using bone graft and a wedge plate as depicted below – his symptoms were relieved.

**Case 4**

This patient has undergone an arthroscopic ankle arthrodesis, which has been fixed with differential pitch headless screws. Have the screws contributed to the non-union?

**Answer 4**

Coaptation of prepared joint surfaces is never perfect during arthroscopic ankle arthrodesis. In most circumstances, bony union can be achieved by fixation with differential pitch screws. However, union was delayed in this smoker and the headless, differential pitch screws did not subsequently allow compression of the surfaces upon weight-bearing – this problem is not encountered with standard partially threaded headed screws. We therefore prefer to use partially threaded headed screws. The differential pitch screws cannot be said to have caused the non-union, though they may perpetuate it.

**Case 5**

What principles have been ignored in the fusion of the third and fourth tarso-metatarsal joints?

**Answer 5**

Fusion of a joint should not lead to major loss of function. The fourth and fifth tarso-metatarsal joints need to be mobile so that the flat foot can adapt to the ground during the second rocker. Therefore, it is preferable to maintain the mobility of isolated arthritic fourth and fifth tarso-metatarsal joints by other procedures such as interposition arthroplasty. It is not advisable to attempt to fuse only the fourth tarso-metatarsal joint when the synovial joint cavity also connects to the fifth tarso-metatarsal joint.

There has been inadequate cartilage removal in both joints being fused.

A 1 mm staple does not provide adequate rigidity to the fusion surfaces.

**Case 6**

The second metatarso-phalangeal joint was fused in order to reduce the valgus deformity of the second toe in this rheumatoid patient. Is this a good idea? Explain your reasoning.

**Answer 6**

Movement at the metatarso-phalangeal joints is necessary for the third rocker. Patients with a fused great toe can redistribute their weight onto the lesser toes, but fusion of the lesser toe metatarso-phalangeal joints results in a patient who cannot do a third rocker movement during gait.