Continuing asymptomatic scaphoid bone loss in scaphoid–trapezium–trapezoid joint pyrocarbon implants

Dear Sir,

We would like to draw your attention to our preliminary results of 24 pyrocarbon interposition arthroplasties for scaphoid–trapezium–trapezoid joint osteoarthritis. The authors observed 58% (14/24) to have asymptomatic bone loss on the decorticated (distal scaphoid) side at 9 months. Long-term surveillance of patients with pyrocarbon arthroplasties is therefore essential to monitor for symptomatic and functional decline (see Figure 1).

The STT joint is the second most common site of arthritis of the wrist after the radioscapholunate joint.1 Patients presenting with pain over the base of the thumb can often be challenging to diagnose. A study of 73 cadavers with an average age of 84 years revealed that 90.4% were affected with CMC joint arthritis and 83.3% with STT arthritis.2 Image guided Depomedrone injections can help to diagnose the most symptomatic joint.

Initial management of STT arthritis includes rest, activity modification, splints, corticosteroid injections and hand therapy. Surgical options include excision of distal scaphoid +/− interposition (soft tissue interposition, silicon, implant replacement); and STT fusion. There is an associated risk of carpal instability with scaphoid excision3 and in our unit it is the preferred option to replace rather than excise.

Pyrocarbon, or pyrolytic carbon, was first created at the French Atomic Energy Commission with General Atomic in Grenoble in the 1960s. It is an inert, isotropic material that has low wear properties making it a good implant for hand surgery.

Between 2006 and 2009, 20 consecutive patients underwent 24 pyrocarbon interposition arthroplasties; four patients had bilateral STT joint replacements. The data was collected retrospectively by the first two authors: all patients had their clinical details recorded onto a database including response to previous depomedrone injections. Surgical data included surgical approach, perioperative complications and postoperative treatment. The procedure was performed by a dedicated team (one case was performed by a Hand Fellow, the rest by the Senior Authors). An above elbow tourniquet applied and the approach, either dorsal or volar, via an incision made obliquely over the anatomical snuffbox. The superficial branch of the radial nerve and radial artery identified and protected; 3−4 mm of the distal pole of the scaphoid excised; trial implant inserted and stability tested through wrist flexion and extension; the selected implant inserted and tested for stability; the capsule and overlying skin closed. Tourniquet deflated and backslab applied.

The mean age was 62 years (range, 50−72 years), eighteen were female with a mean follow-up of 18 months. 8/20 patients (40%) had symptomatic ipsilateral CMC joint arthritis. 23 procedures were via a dorsal approach.

There were four complications (4/24, 16%): one patient, injury to the superficial branch of the radial nerve; another patient, acute dislocation of STPI following a volar approach; and two patients ongoing pain, one requiring wrist arthroplasty.

Function was assessed by the first and second authors using Mayo and QuickDASH scores; goniometers to measure wrist extension flexion arc; dynamometer for grip and pinch strengths (bilaterally). The average Mayo score 63; QuickDASH 23.9; wrist flexion extension arc 130°; grip strength 85%; pinch strength 80%. Radiographs were reviewed by the Senior Authors and they observed that 58% (14/24) of patients have bone loss on the decorticated side.

While the operation is technically straightforward, our morbidity rate is higher than that reported in the literature. One explanation may be the larger patient numbers in our study. Previous studies have included smaller numbers, between 10 and 15 patients, over a longer study period of up to 8 years and with a longer follow-up period of four years.2,4

This case series also highlights the importance of pre-operative counselling: patients with CMC joint arthritis must be forewarned that surgery to the STT joint will not improve CMC joint symptoms. The authors acknowledge...
that shortfalls of this study include lack of a control group and the short-term follow-up period.

Conflicts of interest statement

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References


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Autogenous bone peg fixation of the fibula flap in recurrent tibial osteomyelitis

Dear Sir,

Chronic osteomyelitis is a difficult problem to treat, often being resistant to antibiotic treatment.1 A prolonged course of antibiotics and surgical intervention is required.2 In the case of limb salvage surgery, there is often a large bone defect that requires a vascularised bone flap for reconstruction.2 The conundrum is the choice of bone fixation, as internal fixation may foster a recurrence of infection.1,2 In the case of tibial osteomyelitis, the contralateral fibular bone flap is frequently one of the first and possibly the last choice for stabilization of the tibia. Often, if reconstruction at this stage fails due to re-infection, the patient runs a high risk of requiring a limb amputation.3 Thus, there exists a need for an alternative to metal implant fixation of the bone flap.

In this paper, we present a novel method of using autogenous bone pegs with a bone plate as a form of “plate and screw” fixation, which allows stabilization of the fibula flap without the use of foreign material.

The patient had a Gustillo 3B proximal tibial fracture treated initially with external fixator stabilization followed by open reduction and internal fixation. However, the patient developed osteomyelitis and finally underwent radical excisional debridement of the infected bone and removal of the metal implants. The final bone defect was 12 cm long. The bone defect was reconstructed with a free contralateral fibula bone flap.

Ten 3 cm long bone pegs with a diameter of 0.3 cm and a bone plate of 4 × 2 cm were fashioned out of healthy autogenous cortical bone from the fibular flap and used as “plate and screws” for fixation, in lieu of standard metal implants (Figure 1). A standard 2.4 mm drill was used to make screw tracts for placement of the bone pegs. This was performed in a multidirectional manner to create multi-vector stabilization of the fibula bone; this technique of drilling and bone peg fixation is key to the overall functional stability of our fibula bone/bone peg construct. The limb was stabilized in a cast until bone union was certain via serial X-rays in the follow-up period.

There was radiological evidence of bone union at the junction between the fibula bone and the tibial bone ends, as well as osseointegration of the bone pegs (Figure 2). At the follow-up visit two and a half years post-operatively, there was no evidence of recurrence of the infection (Figure 3).

Chronic or recurrent osteomyelitis is a recalcitrant infection of the bone that is almost always refractory to simple long-term antibiotic therapy. One issue with chronic osteomyelitis is the persistence of a large proportion of the offending micro-organism on the surface of metal implants used for fixation.1,4

Chronic osteomyelitis can be classified using the Cierny/Mader system.2 For our patient, he falls into the diffuse osteomyelitis (Type IV) group. The treatment protocol for this group as recommended by Cierny includes limb salvage surgery where possible. Debridement of a type IV lesion always results in an unstable bony segment, which in our case is due to segmental bony defect.3 A single-stage procedure is possible with a vascularised bone graft.5 In such single-stage reconstructions, where there has been long-standing infection or where definitive micro-organism clearance is uncertain, the use of metal implants, Figure 1 On the right are the cortical bone fragments shaped into a nail-like fashion. On the left are the fragments used to constitute the bone plate.