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Using patient-specific Beta Tricalcium Phosphate synthetic bone graft in distal radius osteotomy – surgical technique illustrated with a case report

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Aims: Deformity due to malunion of distal radius can result in limited function. Correction of the deformity where there was shortening of the radius from malunion may need a large bone graft. Beta-Tricalcium Phosphate (ß-TCP) is a commonly used synthetic bone graft substitute to help bridge the defect. The substitute has osteoconductive and osteoinductive properties, acting as a scaffold for bone regeneration. In the short term the presence of the bone substitute also gives mechanical support for fixation, and can allow earlier return to function. This bone substitute is usually used 'off-the-shelf' and shaped by the surgeon as required. We present a case of a patient specific distal radius osteotomy with a specifically shaped ß-TCP bone substitute implant.

Technique: A 69-year-old lady with a left dorsally angulated and shortened distal radius fracture malunion presented with significant reduction in movement and limited function. For correction of the deformity, she had patient specific fixation using KLS Martin Individual Patient Solution software and implants. During the pre-operative planning it was noted that to correct the deformity, a substantial bone defect would occur, and bone graft would be required to bridge the gap. As part of the pre-operative planning the shape and size of the bone graft was deduced. A bespoke ß-TCP graft was made for the defect.

Patient specific jigs were made using the software. This jig was applied to the distal radius using wires and the distal holes along with the slotted proximal shaft holes were predrilled. The osteotomy was done using a saw. The patient specific plate as formulated using the pre-operative planning software was fixed distally and then reduced down and fixed onto the shaft with the patient specific ß-TCP bone graft in situ. No post-operative immobilization was required.

Post-operative result: The patient made good progress. At 8 weeks post-operative review, the patient had full range of movement and was pain-free. She had grip strength of 22kg on the left non-dominant, operated side versus 26kg on the dominant right side. Radiologically, there were signs of incorporation of the bone graft. No complication has been reported.

Discussion: Our experience of using patient specific ß-TCP bone substitute as part of the fixation has been encouraging in the short term and is a technique that we would use again. The bone substitute has given good mechanical support to the fixation and having a bespoke implant of the defect saved time intra-operatively to fashion it to its shape.

Recent Publications

1. Sajid, Soha & Shave, Ruth & Butt, Sohail. (2012). Development of calcific myonecrosis as a late complication of an open fracture. Grand Rounds. 12. 10-13. 10.1102/1470-5206.2012.000

Biography

Soha Sajid currently works at Dudley Group of Hospitals. This work has been done in conjunction with Robert Jones and Agnes Hunt Orthopaedics Hospital in Oswestry. She has published several of research articles in different international journals.

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