

ROUNDUP³⁶⁰

Wrist & Hand

Size no limit

■ The most unusual and interesting paper crossing our desks here at 360 this issue has to be a superbly innovative paper from **Belgrade (Serbia)**. As the saying goes, if you have a hammer everything looks like a nail. It appears the same may apply if you have an Ilizarov. Flying in the face of orthodox treatment, these surgeons treated 18 patients with scaphoid nonunions using an ingenious Ilizarov method, of whom 15 were available for follow-up at a minimum of five years after their surgery. These 15 patients were operated on at around a year and half following their injury. The patients were given a comprehensive outcome assessment including functional and satisfaction measures, grip strength and late arthritic changes. They underwent a staged treatment with distraction, compression and subsequent immobilisation which achieved bony union in all 15 patients by a mean of just under three months of treatment. The Mayo wrist scores were markedly improved throughout the treatment period, rising from 21 pre-operatively to 86 post-operatively, and reaching 96 by final follow-up. Grip strength was impressive, with patients obtaining 96% use of the uninjured hand and in seven cases reaching full power.¹ This is one of those papers that is so unorthodox that on first look the temptation, as the reader, is to reject it, but it's brilliant enough to deserve a second look. Distraction osteogenesis is apparently possible in the

scaphoid and, for those patients and surgeons daring enough to try it, is associated with excellent results.

Cancellous bone grafting in scaphoid nonunion

■ We turn our attention to more tried and tested orthodox fixation methods, but with a twist. Traditional fixation relies on a combination of inherent graft stability and supplementation with a scaphoid screw. With the development of more powerful modern scaphoid screws, researchers in **Boston (USA)** examined the potential for cancellous grafting in these tricky little nonunions. The research team evaluated the efficacy of a loose packed distal radius cancellous graft in combination with a modern scaphoid screw in a prospective case series of 12 patients (Level III evidence). All the patients had suffered scaphoid waist fractures that went on to develop a nonunion. Surgery was undertaken at a mean of 11 months. The surgical team corrected the displacement and held the fracture reduced with a retrograde scaphoid screw prior to loose-packing distal radius cancellous autograft around the screw site via an anterior approach. Follow-up was to a minimum of two years including repeat CT scans. Using this technique the authors were able to report significantly improved grip strength and wrist dorsiflexion angles. The post-operative functional clinical scores were also much improved (mean DASH, 4, Mayo Wrist, 88) and the intrascaphoid angles improved (49° to 32°).² While

not strictly orthodox, the authors conclude there is “marked simplification of surgical carpentry”. This is perhaps the first time we have seen orthopaedic surgeons referred to as carpenters in academic prose, but we would agree simpler is better, and we wonder, here at 360, if in fact with modern screws in the absence of significant hump back deformity, is grafting necessary?

The Kienböck's dichotomy

■ Kienböck's continues to polarise opinion, with two camps from the relatively conservative “wait and see” surgeons who will, for the most part, observe the disease and occasionally carry out radial shortening osteotomies in symptomatic patients, through to the ultra-aggressive group who employ vascularised grafting at an early stage. Researchers in **Urmia (Iran)** have come to our rescue and undertaken a retrospective comparative cohort study (Level III evidence), designed to establish the relative benefits of the two vastly different approaches in a long-term follow-up study. The researchers were able to identify 16 patients (nine treated with radial shortening and seven with vascularised pedicle flaps). Follow-up was similar in each group to 6.5 years and there were no significant differences in demographics (gender, age, Lichtman stage) or follow-up between the two groups. Final follow-up included assessment of pain, wrist movement, grip strength, functional status and radiological assessment, all yielding no significant differences

between the two groups.³ Given the thoroughness of the assessments performed it would be tempting to agree wholeheartedly with the authors that there is in fact no difference in outcomes between the two groups. However, it is difficult to be completely confident in such a small retrospective study. The data here could be best used as a pilot to inform a prospective randomised trial. We wait with baited breath.

Late displacement of the distal radius

■ The widespread shift in treatment of distal radial fractures from Kirschner wiring to volar locking plates over the past few years has spawned a plethora of papers examining the efficacy, suitability and complications of locking volar plate technology. Nearly a decade after the industry-driven introduction of this treatment modality, the evidence is starting to catch up with the treatments. A research team in **Seoul (South Korea)** set out to identify another piece in the evidence puzzle. The team designed a retrospective study of 120 unstable distal radial fractures treated with locking plate technology, to establish the long-term outcomes and risks of fracture re-displacement. All the patients included in their study underwent treatment with a volar locking plate over a two-year period between 2007 and 2009, and were followed up for a period of six months. The patients received post-operative and six-month radiographs as part of their routine clinical care and it is these radiographs that form

the basis of this study. Researchers assessed the quality of reduction using widely accepted radiological criteria (ulnar variance, radial inclination, dorsal angulation) in addition to other factors they felt might influence late displacement. The research team identified significant overcorrection of ulnar variance and undercorrection of dorsal angulation and inclination. They identified a significant progression of radial shortening and dorsal angulation (although they felt this change to be clinically irrelevant). They also identified that poor position of the screws in the subchondral bone and low bone mineral density (measured on DXA at the hip) were predictive of progressive radial shortening.⁴ The results of this series do clearly support the use of the volar locking plates, but a note of caution must be injected; careful placement of the distal screws/pegs and caution in the severely osteopaenic is likely to reduce the risk of subsequent late displacement.

Flexor slide for finger contracture

■ One of the most disabling sequelae of central nervous system disorders is the upper motor neurone lesions that can lead to spastic contracture of the flexor muscles, particularly in the long flexors of the fingers. Modern management includes the use of splintage and targeted Botox injections (to avoid contracture) and a variety of tendon release procedures once contractures are established. The Page and Scaglietti procedures were initially described for Volkmann's contracture. The impact on global limb function in particular is not well described and surgeons in **Garches (France)** undertook a retrospective case series (Level IV evidence) to assess the expected improvements in hand function following surgical intervention. A series of 54 patients presenting with CNS lesions causing cosmetic and functionally impairing contractures of the extrinsic hand, wrist and pronator muscles formed the basis of this series. The patients were all

treated with motor nerve blockade prior to treatment to distinguish spasticity from contracture; release was only performed on contractures. Outcomes were assessed using the Zancolli and House classification. Patients were followed up for a mean of two years. The Zancolli and House classifications improved significantly post-operatively with 25 hands classified as Zancolli group 1 (compared with none pre-operatively) and



ten non-functional hands became supporting hands following surgery (House group 0 or 1). Wrist and finger extension improved by a whopping 67° between pre- and post-operative measures. However, in 12 patients a partial recurrence occurred (with seven due to unmasking of intrinsic hand deformities) requiring further intervention.⁵ We were cheered, here at 360, to read this report of successful treatment of a condition that can be extremely disabling and difficult to treat. We raise our collective glasses to the authors.

Aesthetic syndactyly

■ For an operation that is undertaken for both functional and aesthetic reasons it is slightly puzzling that there are few reports currently in the literature concerning the aesthetic outcomes of different fingertip reconstructions. Although the outcomes of individual procedures are well documented there are few comparative series. Surgeons in **Zagreb (Croatia)** assessed the out-

comes from a cosmetic perspective of 84 separated digits in 26 patients. The patients all had complete syndactyly or complex complete syndactyly and a range of different surgical options were employed. Outcomes were assessed in this comparative case series (Level II evidence) using a four-domain scale (lateral nail fold, nail plate, symmetry and pulp thickness).⁶ The research team identified that complete simple syndactylies achieved the best functional results when managed with release and full thickness skin grafts, while the complex syndactylies achieved better aesthetic results when managed with Buck-Gramco pulp flaps. The authors of this useful paper conclude that traditional 'zig-zag' full thickness flaps should in future be reserved for cases of complete simple syndactyly and we tend to agree with them.

Heal with steel: flexor tendon repair

■ Improving the strength of flexor tendon repair with new sutures and techniques has been a long-term goal of surgeons involved in hand trauma. Given that the tensile strength of the tendon decreases after repair and the best functional results are achieved with an early motion protocol, any system with improved tensile strength is welcomed with open arms. A second problem, but one that is often overlooked, is that of knots in the repair. These can be irritating, causing scarring and affecting tendon gliding. A new innovative approach being championed by surgeons in **San Francisco (USA)** is the use of a knotless multifilament steel suture which can be secured with a cable crimp system. This study sought to compare the biomechanical and technical properties of flexor tendon repairs using a four-strand cruciate FiberWire (FW) repair and a two-strand multifilament stainless steel (MFSS) single cross-lock cable-crimp system. The investigators conducted a basic science investigation using cadaveric hands to establish the potential efficacy of the proposed

new approach. They used a novel testing rig to measure force friction, 2 mm gap force and ultimate tensile strength in addition to recording required surgical exposure and repair time for an FDP tendon. The investigators conducted eight tests for each repair method and averaged the results. The novel multifilament stainless steel (MFSS) system was compared to a four-strand cruciate FiberWire (FW) repair. The MFSS was superior in respect to repair time (seven minutes *versus* 12 minutes) and exposure (the MFSS did not require removal of the C1 and A3 pulleys), while achieving a lower friction repair (53% increase *versus* 89%) with a similar ultimate tensile strength.⁷ While these results are biomechanical only, this paper certainly deserves a pause for thought – the opportunity to achieve a similar strength repair with less surgical exposure and time is attractive. Clinical studies are required, however, to corroborate these results in the clinical setting.

Fixation of trapeziometacarpal cups

■ Treatment of carpo-metacarpal joint (CMCJ) osteoarthritis remains a controversial topic, with surgeons arguing from almost every perspective; excision, fusion, infill and suspension, total and hemiarthroplasty. Despite the lack of consensus of opinion as to which treatment modality is best, there is agreement that as far as CMCJ arthroplasty is concerned the limiting factor is cup fixation. Using radiostereometric analysis (RSA) technology more often applied to total joint arthroplasty (and described in our 'Technique in Focus' this month), researchers in **Holstebro (Denmark)**, reasoning that given cup fixation is a recognised problem, aimed to determine differences in fixation between cemented and uncemented screw-in cups, thereby resolving a key fixation issue. The researchers designed a prospective parallel-group randomised controlled trial (Level I evidence), including 32 hands (28 patients) with Eaton stage 2 or 3 OA of the CMCJ. During surgery

patients were randomised to either a DLC all-polyethylene cup or the uncemented HA-coated Elektra cup. Patients were followed up with RSA, DASH and pain scores to two years.⁸ The authors did not identify any significant differences in migration of the prosthesis throughout the study but did identify three cups (one polyethylene and two uncemented) that were loose by RSA criteria at two years. The clinical scores were no different between the groups and, certainly

based on the results presented here, the authors' conclusions that both methods seem comparable and that RSA may be a useful technique in evaluating prosthesis of this design certainly seem reasonable.

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