third of forearm, 42 fractures in the middle third and 5 fractures of the proximal third. Thirty-eight fractures (58.4%) had subluxation of the DRUJ and 27 had no DRUJ subluxation. All subluxations were dorsal. Post-operatively, 30 of the 38 fractures (78.9%) had persistent DRUJ subluxation. Of the 27 fractures, which had no pre-operative DRUJ subluxation, 10 fractures (37%) revealed dorsal subluxation in the post-operative radiographs. All fractures were immobilised in above elbow plaster casts for 6 weeks. All patients were followed up at 3, 6 and 12 months. Patients were assessed clinically, radiologically with standardised radiographs and functional assessment of grip and pinch strength using Jamar dynamometer. At 12 months, 12 patients had significant symptoms associated with DRUJ. Of these, four had functional restriction, which were related to complex DRUJ dislocations.

DRUJ dislocations are more common in fractures, which are in the direction of the interosseous membrane ($p < 0.002$). They are commonly associated in fractures involving the middle and distal third of the forearm. There is a tendency for under-reporting of DRUJ dislocations in fractures of both bones of forearm and hence, more attention should be paid to this entity.

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Volar locking plate fixation of unstable distal radius fractures: A new ally against an old enemy
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Introduction: While simple straightforward distal radius fractures are easy to treat, no one technique seems to work for the difficult ones. Volar locking plating (VLP) is a bio-mechanically sound fixation technique which holds a lot of promise in this respect.

We present here our series of distal radius fractures treated using volar locking plates.

Materials and methods: The records of all distal radius fractures treated with volar locking plates were reviewed. A minimum follow-up of 6 months was ensured. Patient, fracture and surgery details were noted. Measurements were carried out on pre and post-operative X-rays to assess the quality of the correction and its maintenance. All patients were reviewed and their wrist and hand function assessed using the Stewart scale.

Results: Twenty-six fractures in 26 patients were treated by volar locking plating between February and August 2004. The mean age at the time of surgery was 57 years and the mean follow-up was 9 months. Four fractures were AO type A and the rest were type C. Five different types of VLP were used, the commonest being the Forth plate. Radiological measurements showed that the fixation improved the alignment of the fracture in each case but did not always restore normal anatomy. Once plated all fractures went on to unite without any change in alignment.

The wrist and hand function (assessed using the Stewart scale) was good and excellent in 89% of patients and fair to poor in 11%. The two patients (8%) who had poor results included one patient who developed a post-operative compartment syndrome and another who had a distal forearm cross-union.

Conclusion: Volar distal radius locking plating is a useful technique for treating complex distal radius fractures especially AO type C. Rapid restoration of wrist function is possible as fixation is very stable.

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Ulnar carpo-metacarpal joint fractures and fracture dislocations
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Introduction: Fourth and fifth metacarpal base fractures are debilitating. Conservative and surgical regimes have been suggested with little support in the literature. We report a prospective series of fractures of fourth and fifth metacarpal bases, with up to 1-year review.

Methods: Over 12 months 54 fractures of fourth or fifth metacarpal base presented, with or without associated carpus fractures. AP, lateral, oblique and 60° supinated X-rays were performed. Metacarpal base dislocations or intra-articular steps underwent reduction and instrumented fixation with short arm cast protection. Undisplaced fractures were managed conservatively in a moulded short arm cast for 4 weeks. Review was proposed at 1 and 4 weeks, 3, 6 and 12 months. Wires and casts were removed at 4 weeks.

Results:

39 of 54 had notes and X-rays available; 82% were male; mean age 31; 82% right hand dominance; 15% non-dominant hand injuries; punching injury in 82%; 20 fifth base fractures, 2 with hamate injury;
four fourth base fractures, one with hamate injury;
15 fractures of fourth and fifth bases (\(\pm\) carpus injury);
16 fractures managed conservatively; 1 displaced at 1 week requiring k-wires;
23 required fixation; 21 k-wires (2 open). Two by ORIF;
none required revision surgery;
mean follow up was 7.75 weeks (range 1—26 weeks).

Nineteen had telephone follow up at 18 months: 58% reported persistent pain, 32% persistent swelling and 63% reduced hand function. Average return to work was 11 weeks (range 1—64 weeks); three patients never returned to work.

**Conclusion:** Fourth and fifth metacarpal base fractures may be more common than current literature suggests. Good imaging can aid diagnosis. Young males sustain most injuries, usually by punching. Follow up is difficult so long-term effects are poorly recognised. Many patients report persistent pain and dysfunction.

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The incidence and effects of adjacent metacarpal shortening due to trauma

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**Aim:** Metacarpal shortening as little as 2 mm can cause loss of force production capacity based on the standard muscle length—tension curve (commonly known as the Blix curve).

This study aims to show the clinical corollary of the same predictions and functional outcome.

**Methods:** We reviewed 20 patients who had experienced traumatic fractures of 2 or more adjacent metacarpals and were treated conservatively.

There were 18 males and 2 females. Seventeen patients had a fracture of the shaft of fourth metacarpal. In addition 83.33% of the patients had a fracture of the fifth metacarpal. 11.11% had a fracture of the third metacarpal. Two patients had a fracture of the second metacarpal.

The patients were assessed using the DASH score and comparison of grip strength in both hands as measured by a Dynomometer. Mean follow-up was 18 months. In addition the degree of metacarpal shortening was assessed radiographically by measuring the degree of overlap in mid axial metacarpal length.

**Results:** The mean difference in grip strength between hands that had sustained fractures and the opposite unaffected hands was 11.111 (\(P = 0.0006, S.D. = 12.2462, Standard error 2.8865\)).

DASH scores revealed a difference of 10.86 on average in comparison to scores prior to the injury ‘retrospective questioner’. Two patients reported a change in dominance for tasks such as turning keys due to perceived weakness in affected hands.

**Conclusions:** Fractures of adjacent metacarpals, in particular border metacarpals, leads to decrease in strength and can affect handgrip. This is due to the shortening, more than 5 mm, associated with these fractures. Patients who decline to have open reduction and internal fixation, for multiple metacarpal fractures associated with shortening, irrespective of rotational deformities, should be warned about the functional outcome of the adjacent and multiple metacarpal fractures.

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Forearm fracture in children

Single bone fixation with elastic stable intramedullary nailing in 20 cases

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**Introduction:** The majority of forearm fractures in children can be treated by casting with or without closed reduction. However, in unstable forearm fractures, it is difficult to maintain reduction by closed means. A few authors have been in favour of single bone fixation for both bone forearm fractures with compression plate and recently by intramedullary nailing. We report our experience with use of the elastic stable intramedullary nailing for the treatment of forearm fractures in children.

**Patients and methods:** From May 2002 to July 2004, 20 children (14 boys and 6 girls), median age 10 years (range 6—15 years) were treated with elastic stable intramedullary nailing (ESIN) for 16 closed and 4 grade I open forearm fractures. Radius was fractured in its proximal third in 5 cases and in its middle third in remaining 15 cases. Ulnar fractures were located in the proximal third in 2 cases, middle third in 17 cases and distal third in 1 case. An attempt at closed reduction was made in all the cases.

Indications for nailing of the forearm fractures were:

1. Redisplacement of the fractures in plaster after closed reduction (7 cases).