We report our experience with a 1-2 intramedullary wire fixation. K wires were left out of skin for boxers.

Incidence of metacarpal neck or shaft fractures is high:10% of all fractures. Mostly young man. More often 5th mc. Majority can be treated conservatively.

For 5th mc neck fx there is controversial treatment: 30-70 degrees of angulation are indicated for surgical treatment, depends on author.

In meta analysis of different treatments for boxer fx, zong et al (1) found that conservative treatment has less complications then surgery.

Long term prognosis is very good but Mal-union may cause:
- prominence of mc head in palm (may be problematic in hand workers)
- pseudo-clawing and Loss of dorsal mc head contour (aesthetic problem)

Metacarpal shaft fx may be transverse. Oblique, spiral. or comminuted.

In most, closed rx is indicated but surgery is indicated for angulation, Malrotation or Shortening of >5-10 mm and for Multiple or open fx.

Few Methods of fixation exist and are surgeon preference based:
- screws are indicated only for spiral fx.
- Plates are commonly used but with up to 30% complication rate (mal-union, up to 10% Non-Union, Stiffness).
- Intramedullary fixation was found to have better 6 months results then plate fixation for metacarpal fractures (2) and was better then plate with less complications for single mc shaft fx (3). commercial kits for IMN were also developed.

We report our experience with a 1-2 intramedullary k wire fixation (imkw) method in finger metacarpal neck and shaft fractures.

Materials and methods: retrospective chart review

23 patients Operated in this method in 2012-2018 (3 lost to follow-up)

14 shaft fractures (most where 2nd 5th) and 9 mc 5th neck fx (boxer).

20/23 man. average age 27 (18-64). 80% rt hand.

Average time to surgery was 11 days (range 1-45 days) Closed reduction was attempted for 5th mc box fx and for shaft fx up to 2.5 w. for box fx Indications were >55 degrees only in young or manual workers, for shaft fx: indications were Multi fx (3) mal-rotated (2) angulated (8) open (1)

Single 1.6-1.8 k wire was used in 15 patients and 2 in 5 patients.

K wires were left out of skin for box fx and either that or under skin for shaft fx.

Technique of surgery
- Tools needed: 1.4-1.5 mm k wires. 2.5 drill. Pliers, cutter. T handle C Arm.
- Pre band 1.4-1.8 m’m k wires with pliers and cut tip obliquely.
- Make a stab >1 cm skin incision near base of mc.
- Drill a 2.5 hole in the base with a drill guide as soft tissue protector.
- Perform a closed reduction and pass 1-2 k wires with a T handle by feel and under scan. Check for rotation.

- Split wrist (and MPJ only if rotationally unstable) for 3 weeks. move the fingers early on
- F-up in 7-10 days for rotation check, suture removal, cast refitting and x-ray.
- at 3 weeks remove cast and k wires in clinic for boxer fx. At 5-6 weeks post op for shaft Fix.

Examples: 2nd mc shaft mal-rotated

Results
- 16/20 (80%) of fractures united with anatomic or near anatomic alignment.
- 3/20 (1 neck 2 shaft) healed with residual but acceptable angulation (15-20 degrees)
- 5th neck fx healed with 35 deg angulation (operated at 2 weeks, incompletely corrected 55 to 20 deg in surgery).
- Boxer fx healed radiologically at around 4-6 weeks and shaft at 8-10 weeks.

Complications

- 23/23 pts closed imkw couldn’t be achieved: needed limited open reduction or temporary maneuver by k wire through mc head to control distal fragment
- 4/23 patients needed additional k wire from neck of mc (2 were thumb mc spiral fx)

Post operative:
- 4/20 (20%) mild pin tract infections (serous dc or redness) all resolved with oral Abx.
- 1 loss of 20 deg of mpj extension (this had additional k wire inserted from mc neck)
- 1 mild residual stiffness at 3 months (multi mc fx)
- 4 united with mild to moderate residual angulation
- 1 re-fracture of 5th shaft after 1 year (united at 3 months. came back 1 year later with a re-fracture with the k wire still inside and bent to 45 deg)

Discussion and conclusions

This technique of imkw is Readily available, versatile and un-costly.

- Short or time. not difficult to perform (especially in border mc). With good clinical and radiological results.
- We had High complication rate like others, but minor: pin tract infection in 20%. Mild residual but acceptable angulation in up to 20% (but most in late surgery)
- Single k wire is enough for mc neck fractures and for transverse shaft fractures, and 2 k wires are needed for spiral shaft fx. Fixing 4th mc and thumb proved more difficult
- Late mal-union can be done (openly) with imkw as well as Multiple mc fx.
- Surgery is Best done in <10 days for neck fx and <14 for shaft fx.
- K Wires should be removed after 3 weeks for mc neck fractures and 5-6 weeks for shaft fracture (leaving k wire buried under the skin, should be considered for shaft fx as this may lessen pin tract infection rate)

Bibliography