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Reviewer A

Comment 1. The authors present a case study on a very interesting and rare case with bilateral multiple carpal bone fractures. There are few studies of carpal bone fractures and this makes the subject of the study important and interesting. The fact that it is a case study comes with some obvious limitations such as no cases for comparison, but to compensate for that, and to make this study more interesting, I would expect a more thorough review of the literature.

Reply 1: Thank you. We have added a reference in the introduction and elaborated in the discussion. To our knowledge there are no reports on pilon type fractures in the carpus except the 4-5 cmc fracture dislocations mentioned. We are not sure which parts of the literature we should review more thorough?

Comment 2: I would also like an explanation of the aim of the study. Is the purpose to present a unique type of fracture pattern? Or is the purpose to describe the method of surgical fixation? A discussion about the choice of treatment is also lacking. Was surgical fixation used to be able to perform early mobilization?

Reply 2: The aim of this paper was to present a unique fracture pattern with our choice of treatment and the following result. For us it was obvious to choose stable fixation due to the bilateral injury, making the patient able to care for themselves as soon as possible. The patient being autistic and therefore having huge difficulties in complying to any instructional follow also underlined the importance of achieving a stable situation.

We have added a sentence on our decision making.

Changes in the text: P: 3 Line 63-65: For bilateral injuries to the wrist, carpus or hand we strive to achieve a stable situation allowing the patient to care for them self as soon as possible, a patient with uncertain compliance strengthened this decision.

Comment 3: The results section is a bit thin. The ROM is, according to my taste, inadequately presented and there are no measurements of patient reported functional level. Is 6 months an adequate follow up time to evaluate post traumatic osteoarthritis?

Reply 3. We have added the different ranges of motion (see also below). The functional level reported by PROMS is not possible due to the patients habitual situation. He is tended by his mother who reported on the sons functional level and

pain (he needs continuous guarding, needs and problems is read by his nearest of kin). We have elaborated on his functional level. As for the evaluation after 6 months is early if we were excluding posttraumatic arthrosis. It can of course come at a later stage. In cases of serious cartilage injury or ligament injuries, malpositions, articular steps it is our experience that secondary arthrosis comes early (for example after perilunar fracture-dislocations). In other cases where carpal fractures are anatomically reduced and fixed (for example scaphoid fractures) arthrosis is rarely seen. We believe we have achieved the same for this patient, due to the unchanged radiographs/CT at follow-up, 3 months and 6 months. It is not too early to report posttraumatic arthrosis, there is none, but it is of course too early to exclude it in the future.

Changes in the text:

P5: Line:95-100: The patient has a serious autism disorder and is attended by his family. According to his parents the patient's function quickly returned, attention, appetite and activities including bicycling had returned to his preinjury activity level after 3 months and no behavior foreign to med smerte was seen. They had not observed any complaints nor seen limitations in his wrist or hand function.

P4: 83-94: After 8 weeks the fractures were clinically considered healed (no tenderness on compression or palpation) confirmed by radiographs (no visible fracture lines). CT scans at 3 and 6 months demonstrated bridging trabeculae on sagittal and coronal scaphoid CT reconstructions (as defined by Diaz et al)(8). Total wrist active range of motion (total AROM= flexion (75°) + extension (75°) + radial deviation (25°) + ulnar deviation (55°)) was 230° bilaterally, and grip strength measured with a JAMAR hand dynamometer (J.A. Preston Corp, Clifton, NJ) was 22 and 21 kgs on the left and right side. He was allowed unrestricted activities. At 6 months the patient demonstrated symmetrical, excellent AROM = 250° (flexion= 80°, extension= 85°, radial deviation= 35° and ulnar deviation= 55°) and forearm (200°, pronation =100° and supination = 100°) rotation as well as grip-strength (32 kgs bilateral).

Comment 4: If a clearer aim was presented, a clearer conclusion could also be drawn. I inquire for a more distinct scientific structure of the manuscript. The conclusion that a well reduced fracture is prone to perform better than a badly reduced fracture, however obvious, can not be drawn from this study.

Reply 4: We agree. The aim was to present this special bilateral case, and demonstrating an excellent due to anatomical restoration and early mobilization although he had a complex fracture pattern. As for badly reduced fractures we have never seen any studies where the wrist have fared well, all papers focus on the importance of restoring anatomy (bone and ligament). We believe we can advise colleagues follow the treatment we choose in similar cases.

Comment 5: A limitation of the study is that the patient is autistic which makes the results less generalizable. This might be the reason for not presenting patient reported outcomes, and this limitation should be addressed.

Reply: Thank you, we have discussed that above, it is a limitation.

Comment 6: Row 44 Sagittal instead of Saggital
Changed

Comment 7: Row 44 and 45 disruption and disruption
Thank you, we changed to ruptures for the last disruption.

Comment 8: 49 carpal fractures are not so rare -the reference Kara et al states that perilunate fractures are rare but does not study the incidence of carpal fractures. For incidence numbers of carpal fractures there are more suitable references to cite.

We have added the reference by Herzberg et al for perilunate injuries. We have added a comment on the fracture incidence and a reference.

Changes in the text: P 3, line 50-52: Except for scaphoid fractures and dorsal triquetral flake injuries, carpal fractures are rare(6), but important to acknowledge and...

Comment 8: 50 Vast majority- The second most common carpal bone fracture is probably the dorsal flake triquetrum fracture. You may mean perilunate fracture again?

Reply: thank you, see answer and changes above.

Comment 9: 60 and throughout the manuscript. Do you mean displaced rather than dislocated?

Reply: yes, thank you. We have changed to displaced throughout.

Comment 10: 66 3rd and 4th

Reply: Thank you, changed.

Change in text: 3rd and 4th

Comment 11: 70 flouroscopy

Reply: thank you, changed.

Comment 12: 72 percutaneous, retrogradely?

Reply: yes, given in the text, percutan, retrograde.

Comment 13: 79 how did you define a healed fracture?

Reply: Thank you, it was necessary to define it. We have specified and added in the text as well as a reference.

Changes in the text: P: 4, line 82-85: considered healed (no tenderness on compression or palpation) confirmed by radiographs (no visible fracture lines). CT scans at 3 and 6 months demonstrated bridging trabeculae on sagittal and coronal scaphoid CT reconstructions (as defined by Diaz et al)

Comment 14: 80 I prefer the ROM to be presented separately for each direction of motion.

Reply: we have added in the text, see answer above.

Comment 15: 84 By forearm motion do you mean pro- and supination? How can this be 200 deg?

Reply: he had 100 degrees of pronation and supination = 200 degrees, very good range of motion.

Changes in the text: P: 5 Line: 92-93: forearm (200°, pronation =100° and supination = 100°) rotation as....

Comment 16: 87 What was the preinjury activity level?

Reply: We are not sure how to answer this or whether it is of any importance being a physically healthy boy with a serious mental condition. We prefer that the readers can imagine his activity level (having physics for bicycling) without any further outlining.

Comment 17: 88 Is there any patient reported measurement of function, i.e. PRWE, DASH or EQ5D.

Reply: see above, it is not possible or relevant due to the seriousness of his autism.

Comment 18: 103-105 This is not really shown in this study. I would prefer a slightly more moderate conclusion of this case study.

Reply: We disagree. We describe a rare injury, bilateral (in two wrists), where the patient has regained excellent results and where his caretakers are unable to see any handicaps/limitations in his wrist function. We have not found any cases for comparison. Whether a conservative treatment could have worked is dubious, Scaphoid fractures are for example well tolerated if they heal, similar to other solitary carpal fractures. Conservative treatment of fracture-dislocations fare bad, even surgically treated fracture-dislocations will often fare bad. We have added a sentence and a reference to an early follow-up study.

Changes in the text: P5 Line112-114: Even after shorter follow up, patients demonstrate complex recovery, residual problems and degenerative changes on radiographs(11).

Figures:

Several of the fractures are described as displaced, however to my eyes, all of the fractures seem nondisplaced or minimally displaced. How is displacement defined?

Reply: We defined it as > 1 mm in any direction measured on CT. We have added in the CT description

Change in text: P: 3 Line 62: (> 1 mm)

The images are insufficiently numbered.

Reply: We have corrected this insufficiency.

Reviewer B

I congratulate the authors on documenting a rare trauma case.

The paper is well-written and pertinent.

Some minor things need to be addressed tough:

- Despite the patient being a teenager and even with the post-op evaluation at 6 months not showing any degenerative signs, this patient still has a very high risk of developing wrist arthritis in the future. The follow-up needed for this kind of conclusion has to be a minimum of 5-10 years.

Reply: We agree, but we have not claimed that he will avoid post-traumatic arthrosis, but there are no signs of incongruencies or arthrosis at the 6 months follow-up. We will see in 5-10 years whether he has avoided it or not. See answer above

- Why did you choose to treat the scaphoid fractures in an open way and not endoscopically? it has been documented that the recovery is faster with reduced pain.

Reply: We treated one of the fractures percutaneously. We do not agree that this patient would be a good case for endoscopic treatment, and do not see where the advantage should be. We have experience with for example scaphoid non-union surgery percutaneously and open, and have had the opposite experience (much longer surgery time, more swollen wrists etc) of you/open surgery. We have never seen published series of endoscopically treated perilunar fx dislocations or 4-5 CMC fracture dislocations reporting better/faster recovery or less pain (hardly any endoscopic procedures for this at all). As for the postoperative for our patient he was

two nights in the hospital with a plexus brachialis catheter (due to his autism), dismissed with oral painkillers and the cast and fared well.