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Comment on Volar Locking Plate Implant Prominence and Flexor Tendon Rupture

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To the Editor:

I read with interest the article in your February edition by Soong et al. entitled, “Volar Locking Plate Implant Prominence and Flexor Tendon Rupture” (2011;93:328-35). Whilst I completely agree that flexor tendon ruptures are due to mechanical irritation on prominent metalwork, I am concerned that the authors’ conclusions are an over-simplification and may put too much blame on the plate and too little on the surgeon by not considering other variables such as plate position and fracture reduction.

The authors quote our published study on the prevalence on Flexor Pollicis Longus ruptures (FPL) (1) in stating that FPL ruptures occurred in 2.5% of cases of volar plating and correctly state that we did not have an FPL rupture in 40 cases with the DVR plate. To suggest that this fact supports their argument is misleading, however, as with a 2.5% prevalence in 40 cases it is as likely as not that we would have seen an FPL rupture with a DVR plate.

Further, in our article we suggest that it is probably inaccurate plate position and fracture reduction that is more important in the etiology of ruptures than the design of plate itself. In subsequent, yet unpublished, research performed in this department and presented at IFSSH (2010) and BSSH (2009, 2010 & 2011), we have shown that inaccurate plate position and fracture reduction, as seen on intra- and post-operative radiographs, are strong predictors of FPL rupture and have demonstrated on cadaveric and dry bone models the significant effects of accuracy of plate position and fracture reduction on plate prominence (how much the free edge of the plate stands off the bone).

Further, as mentioned in their paper, the Acu-loc plate is designed to sit more distally than the DVR plate, to provide more support for the radial styloid and provide more distal placement of screws, and this is demonstrated well in Figure 3 (p. 2) of their article. Due to this plate design all Acu-loc plates should be Grade 2 (using their system) and all DVR plates should be Grade 0. Acu-loc plates of Grade 0 or 1 have been put on too proximally and DVR plates of Grade 1 or 2 have been put on too distally (both

of which, we have shown, causes statistically increased prominence compared with the position of best fit).

It is my, belief, based upon our own research that the position of the plate and the quality of the reduction, both of which are under the surgeon's control, are more important than the design of the plate and I think blaming the design of the plate is misleading and dangerous. It is interesting that our paper presented the FPL ruptures associated with the first 201 procedures performed in our department; we have not, to my knowledge, had a further rupture in the subsequent 400 cases since we have been investigating the cause.

References

1. Casaletto JA, Machin D, Leung R, Brown DJ. Flexor pollicis longus tendon ruptures after palmar plate fixation of fractures of the distal radius. J Hand Surg Eur Vol. 2009;34:471-4.

Conflict of Interest: None Declared

Article Author Response

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Article Author(s) to Letter Writer(s)

We appreciate the interest in our article. We completely agree with Dr. Brown that the surgeon plays an important role in plate positioning, as we state prominently in the final sentence of the abstract: "Regardless of plate selection, surgeons should avoid implant prominence in this area." Our article does not state, nor should be interpreted as indicating, that plate design is the sole predisposing factor in flexor tendon rupture. However, the surgeon's role does not negate our findings with regard to plate design. Indeed, Dr. Brown notes that "Due to this plate design all Acu-loc plates should be Grade 2 ... and all DVR plates should be Grade 0". He further states the opinion that "prominent metalwork" is the cause of tendon ruptures. Perhaps, based in part on design, each different plate has a different margin of error for placement.

Thus, we all agree that both surgeon and implant factors are involved. Determining the relative importance of these factors will require further investigations. In our study, the presence of two parallel series with many similarities (number of surgeons, training of surgeons, number and types of fractures treated, length of follow-up) may have helped to control for surgeon related factors, although a Level 1 design would

clearly be superior. With regard to fracture reduction and plate position, while we did not formally assess initial reduction, we did assess for loss of reduction during follow-up, and we did assess plate position, including proximal/distal (Grade 1 vs. 2) and medial/lateral, as shown in Table III. We encourage Dr. Brown and colleagues to publish their work in these areas, to assist other surgeons in avoiding tendon complications, regardless of which plate they use.

Regarding our reference to the series of 40 DVR cases without rupture, we agree that this is a small number, and thus the next sentence mentions a larger series of 87 DVR cases without rupture. Our own article includes another 95. We encourage other investigators to publish even larger series.

Finally, readers should be aware that the latest generation of the Acumed plate, the “Acu-loc 2”, now offers an alternative version which is positioned more proximally. We believe this change may help address the plate design issues that were the focus of our article.