



Letter to the Editor

Letter to the Editor: Is There a Benefit to Modularity in ‘Simpler’ Femoral Revisions?

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To the Editor,

In their recent study, Huddleston and colleagues [3] presented the results of a multicenter study in which modular and nonmodular stems were used for femoral revisions in patients with Paprosky Type I to Type IIIA bone defects. The authors of the

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study observed an increased risk of intraoperative fracture with the modular revision stems (11% versus 7%) and concluded that modular revision stems are associated with a higher risk of intraoperative fracture. This raises the question whether the modularity of a revision stem is the reason for the increased risk of intraoperative fracture? In addition, it is important to define the overall risk of intraoperative fracture itself.

Intraoperative fractures most commonly occur when the shape of the femur differs considerably from that of the revision stem. The femur differing from the revision stem is often the result of the progressive development of femoral varus that sometimes arises over time as a stem loosens. When this occurs, it should be corrected by an extended trochanteric osteotomy in order to prevent intraoperative fracture. McInnis and colleagues [4] attributed their observed percentage of intraoperative fractures of 24% to the endofemoral implantation (as opposed to implantation following an extended trochanteric osteotomy) of a straight modular revision stem. Moreover, Pattyn and colleagues [5] observed intraoperative fissures and fractures in 32% of 59 patients when implanting the modular revision stem Profemur-R

by the endofemoral approach compared to 11% via the transfemoral approach. The study by Huddleston and colleagues involved experienced surgeons in specialized clinics. I assume that this particular piece of evidence would have been considered during the preoperative planning stage and the surgery itself.

Secondly, the length of the revision stem plays a crucial role in determining the level of risk for intraoperative fracture. If the revision stem bridges the isthmus, the risk of fracture or perforation is increased, especially when a straight revision stem is implanted in the curved femur. For that reason, I advocate the use of shorter revision stems with a fixation zone in the isthmus, at the tip of the stem [1, 2]. This can be easily achieved with modular revision stems because a proximal part of the stem cannot compromise the distal fixation of the tip of the stem in the isthmus. For modular stems, the first step involves distal fixation of the distal component in the isthmus of the femur. In the second step, the proximal component will be implanted, after removing some of the proximal bone with a cylindrical reamer when implanted endofemorally. This removed bone would compromise the distal fixation

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of the stem in the isthmus of the shaft when implanted as a monoblock stem by early contact of the proximal part of the stem at that bone. Therefore, using short revision stems with the fixation of the tip of the stem in the intact isthmus is much more difficult with monoblock prostheses. In my opinion, the percentage of intraoperative fractures associated with the Wagner monoblock revision prosthesis as reported by Warren and colleagues [7] (17%) and Wilkes and colleagues [8] (12%) are the result of using long, straight revision stems. In our own study of 116 modular, curved revision stems with a 2° taper used in femoral revisions with Paprosky Type I to Type IV bone defects [2], we avoided intraoperative fractures completely by using shorter revision stems when the isthmus was intact.

Moreover, the taper of the stem plays an important role in determining the appropriate length of the revision stem. Although a 2° taper enables the fixation to be accomplished at the tip of the stem [1, 2], the ZMR-stem (Zimmer, Swindon, UK) with a 3.5° taper (used frequently by Huddleston and colleagues) does not enable fixation at the tip of the stem. Here, the fixation zone in the femur usually lies

higher up the stem resulting in the use of longer revision stems with a bypass of the isthmus. As a result, there is a higher risk of intraoperative fracture, which helps explain why van Houwelingen and colleagues [6] observed an intraoperative fracture percentage of 16% with this type of stem.

Therefore, I suggest that there is no direct correlation between the modularity of a revision stem and the risk of intraoperative fracture. In my opinion, the risk of intraoperative fracture can be reduced by using shorter revision stems with the fixation zone at the tip of the stem and the assessment of a clear indication for a corrective osteotomy in the form of an extended trochanteric osteotomy.

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