

Dear Ladies and Gentlemen,

I herewith submit the revision of the review on recent developments, available literature and perspectives on calcar-guided short-stem THA for re-review and kind consideration for publication in World Journal of Orthopedics.

Thank you very much for your valuable comments, which improve the manuscript markedly. I have adjusted the manuscript according to your proposals.

I am looking forward to the reviewer's thoughts and comments about our manuscript.

The responses to each of your comments are appended below.

I hope you will appreciate the improvements and kindly ask again for consideration for publication in your journal.

Sincerely,

The author

Reviewer 1:

Thank you for submitting your article to World Journal of Orthopedics. The authors have summarized the recent findings on calcar-guided short stems. I believe this paper is very significant, because the knowledge and concepts about the calcar-guided short stem are not yet well known to orthopedic surgeons all around the world.

Author:

Thank you very much. I also do believe the content of the manuscript is highly important. As those types of short stems are used in almost 10% of all THAs already in Europe, worldwide there will also be a marked increase in popularity in the future.

There are some comments as described below, # It is pointed out in your paper that avoiding undersizing of calcar-guided short stems prevents postoperative complications, but how do you specifically perform the actual positioning? There is no detailed description of that your article, so could you please specify it?

Author:

Thank you for this comment.

The positioning of the stem in the proximal femur is dependent on the resection level of the femoral neck. The characteristic of calcar-guided short stems is that they will position themselves alongside the calcar curve.

Given a varus anatomy, a high resection also results in a varus position of the implant, maintaining a large femoral offset. On the other hand, given a valgus

anatomy, a low resection results in a valgus position, causing a small femoral offset.

In the manuscript I have described it like this (from line 149; I adjusted the text accordingly in the revision (bold)):

*The positioning is performed according to the individual anatomy along the calcar curve[20]. **It is dependent on the resection level of the femoral neck.** This feature differentiates this design from other conventional stems and many other short-stem designs. Calcar-guided short stems can follow a valgus anatomy into a valgus position or a varus anatomy into a varus position. The positioning must be accomplished by the surgeon, **through the intraoperative selection of an individualized, adjusted level of resection, according to the preoperative plan (Fig. 4a and b).** A high resection of the femoral neck leads to a varus position, with a corresponding high offset, whereas a low resection results in a valgus alignment and a corresponding low offset[20]. It has been demonstrated that the individual anatomy of the proximal femur can, therefore, be reconstructed across a broad bandwidth and offset, allowing leg length to be restored[25-27].*

Reference [20] actually leads to a video article, describing the individualized implantation technique in detail in the operation room.

Avoiding undersizing has been shown to be important in order to prevent early subsidence and subsequent loosening. This means, it is important to secure the cortical contact with the distal lateral cortex. This must be identified using intraoperative radiography. If it is not secured, the stem should be upsized.

The text has now been adjusted to specify on how to detect undersizing and how to deal with it. In the manuscript it says (from line 264, the adjustments to the revision are bold):

*A securely achieved cortical contact with the distal lateral cortex appears to be crucial to provide sufficient primary stability[49] (Fig. 8). **A missing cortical contact has previously been defined as “undersizing” [50].** The use of intraoperative imaging to identify the potential “undersizing” of calcar-guided short stems is highly recommended, especially with regard to individualized positioning[20,50].*

If the cortical contact is not securely achieved with the trial components, the stem should be upsized.

Reference [49] in detail deals with how to intraoperatively decide on “undersizing” and potential clinical consequences.

It would be very beneficial to be able to adapt to patients with osteoporosis, the elderly, and patients with osteonecrosis of the femoral head (ONFH), but are there any patients who are not recommended for the calcar-guided short stem other than Dorr type C?

Thank you for this comment.

As always, surgeons will have to make individualized decisions. However, as stated in detail in the manuscript, a broad range of indications are possible. In our experience of the last 15 years dealing with short stems, for calcar-guided short stems, only severe osteoporosis (in the future there might be a cemented short-stem design for those cases) and Dorr type C femora are contraindications. This is why we believe in calcar-guided short-stem THA becoming the future standard someday.