

IMPLANT SELECTION FOR ACETABULAR DEFECT RECONSTRUCTIONS

Problem description

The number of primary total hip replacements (THR) has risen dramatically worldwide within recent decades. Epidemiological studies illustrate the increasing trend for primary procedures and revision-operations in Germany. The epidemiological study by Pilz, Hanstein und Skripitz¹ examined the development of primary THR in Germany between 2010 and 2040. The authors project an increase in primary THR of 27% by the year 2040. In the 75 to 80 age group, the number of patients is expected to double compared to 2010. Other authors expect an increase in the incidence rate of primary THR by 62% for the period from 2020 to 2060. At the same time, it is predicted that the total number of revision procedures will increase by around 40% by 2060.² The aging of the population and the increasing primary case numbers will inevitably lead to more revision surgeries. With this in mind, a proven revision strategy for the hip joint is required, as well as an extension of the surgical procedure is often necessary.

Defect-associated therapy of acetabular defects

In hip revision, osteolysis, aseptic cup loosening, cup migration or the removal of implants can lead to large bony defects. Even if only an aseptic cup loosening in combination with a small bone defect (e.g. Paprosky type I or type IIa) is detected preoperatively, a significantly larger defect can still occur be present and found during explanation. As a surgeon, it is therefore essential for me to be able to react flexibly to the respective defect situation in order to also adequately treat defects of the type IIIa and b according to Paprosky. In my opinion, this requires a modular system with intraoperative variability. The modular revision cup system variants MRS-TITAN Standard and Maximum allows me a flexible defect-oriented approach (Fig. 1-3).



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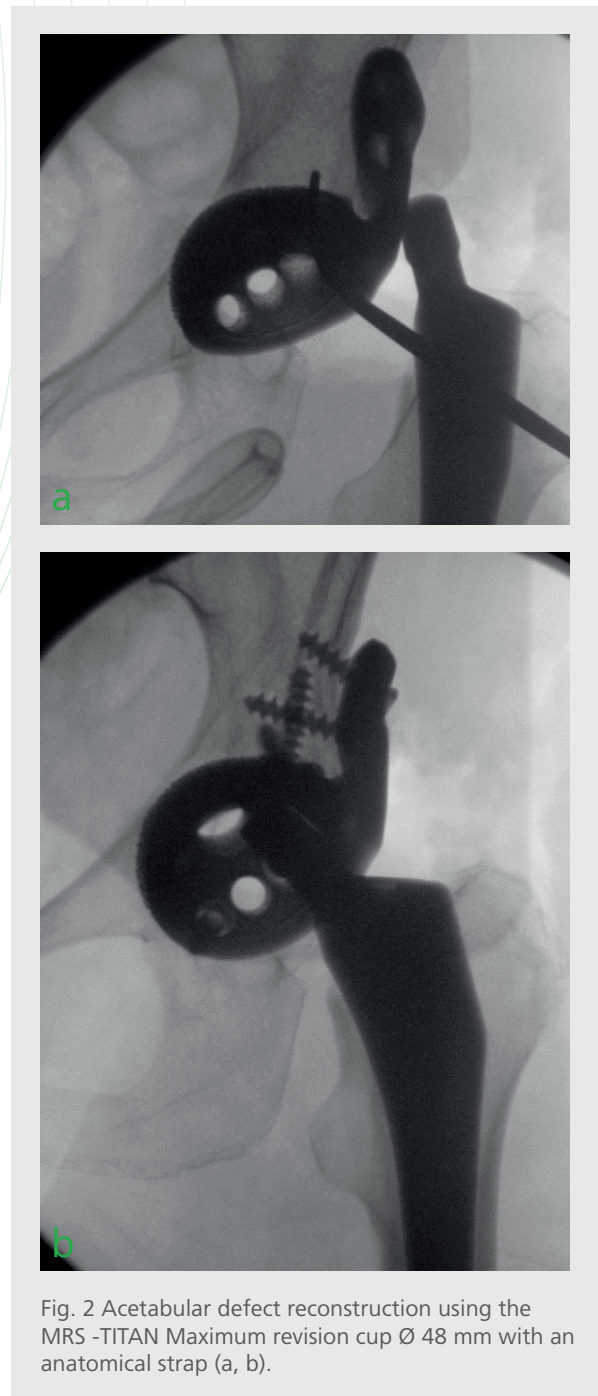
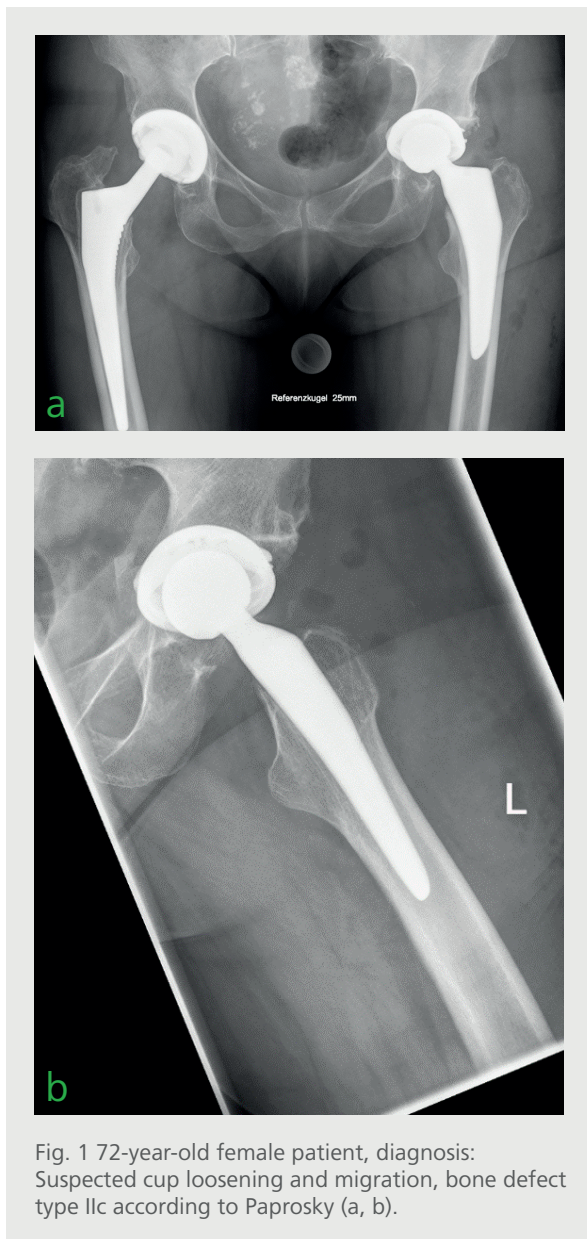
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However, a removal of fixed implants or bone cement can significantly increase the bone defect and require a cementless press-fit cup with angular stable screw fixation, intramedullary peg anchorage (iliac peg) and anatomical strap construction. In such cases, the modularity of the system not only enables me to make rapid progress within surgery in interest of the patient. However, in some cases this modular system is what ensures rapid surgery progress in the first place.

Another substantial aspect of cup revision is the primary stability of the implant. Preoperatively, the reliability of the bone stock and the postoperative recovery time of the bone can hardly be estimated. The oval shape and trabecular surface structure of the revision cup create good conditions for sufficient primary stability. Furthermore, the surface structure ensures a good bony ingrowth behavior and successful osseointegration in the long term.

Good muscular function of the joint is also essential for the hip. An important aspect for an adequate muscle function is the reconstruction of the center of rotation, which is often unsuccessful in revision cases. As a result, postoperative proximalisation of the center of rotation may occur. This can lead to insufficiency of the gluteal muscles, so thus the crucial region for the hip function is at risk. Due to the oval shape of the cup, the reconstruction of the center of rotation is much easier.



Implant and instruments

Another not insignificant point when choosing an implant is the handling of the instruments. It requires a clear number of necessary instruments that should be easy to handle. This is given and guaranteed by MRS-TITAN Standard/Maximum with the revision cup system. The cobalt-chromium-free alloy ensures better bony integration and eliminates concerns about possible implant allergies.

Conclusion

A cementless modular cup implant for acetabular defect reconstruction should ensure sufficient primary stability and preservation or restoration of the center of rotation. Reconstructing the center of rotation leads to better functional results. The MRS-TITAN Standard und Maximum revision cup system fulfills these requirements, while the modularity of the system ensure individual intraoperative defect adaption (Fig. 4). In my personal experience, this system represents a suitable revision strategy for acetabular defect reconstruction.



Fig. 4 Revision cup system MRS TITAN Standard and Maximum, anatomical strap, modular iliac peg in 3 lengths (30, 50, 70 mm).

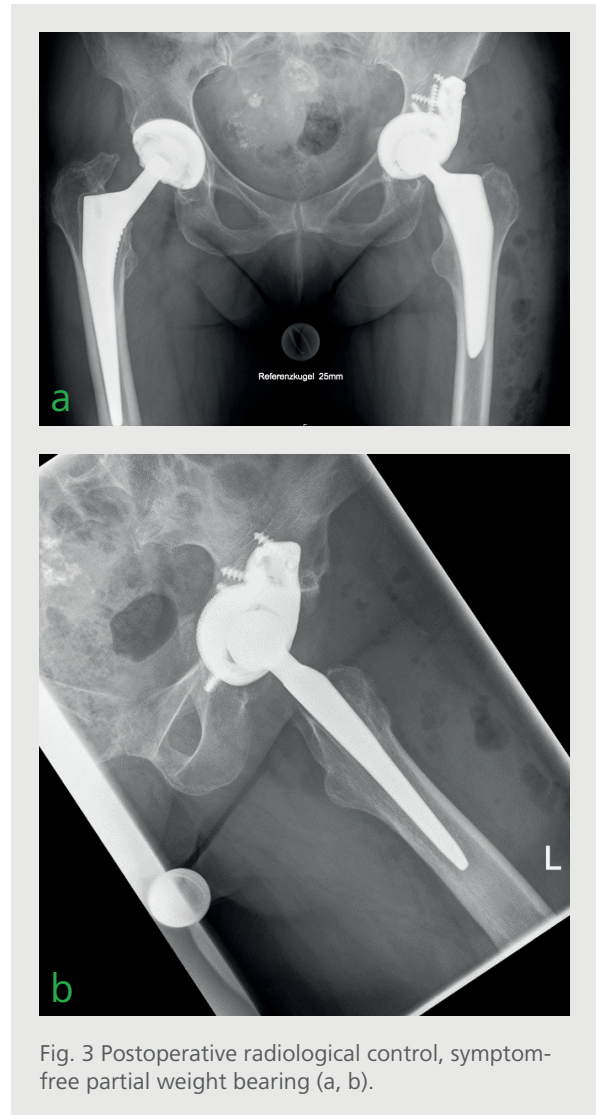


Fig. 3 Postoperative radiological control, symptom-free partial weight bearing (a, b).

Literature

- ¹ Pilz V, Hanstein T, Skripitz R. Projections of primary hip arthroplasty in Germany until 2040. Acta Orthop. 2018;89(3):308-313. doi: 10.1080/17453674.2018.1446463.
- ² Klug A, Pfluger DH, Gramlich Y, Hoffmann R, Drees P, Kutzner KP. Future burden of primary and revision hip arthroplasty in Germany: a socio-economic challenge. Arch Orthop Trauma Surg. 2021;141(11): 2001-2010.

Image sources

Fig. 1 to 3 Roland-Klinik am Werdersee
Fig. 4 PETER BREHM GmbH



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