In which patients should a custom-made acetabular implant (triflange) be used?

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Response/Recommendation: Custom-made acetabular implants (Triflange) is an option for reconstruction of acetabulum in patients with severe uncontained acetabular bone loss, with or without pelvic discontinuity.

Rationale:

The increasing number of patients with severe acetabular bone loss has led to the frequent use of the various options for acetabular reconstruction that includes the use of custom-made acetabular implants (CMAIs) [1,2]. The purpose of this umbrella review was to evaluate the outcome of patients undergoing CMAI, with the intention of identifying the appropriate indications for such device.

Various types of studies describing the results of the use of CMAIs have been published over the past two decades [3,4,5]. Using the search strategy, 187 records were found. After removing 46 duplicates, the titles and abstracts of 141 studies were screened. A full-text review of 15 studies was carried out. The full-text review resulted in the exclusion of 12 studies. Ultimately, 2 systematic reviews and 1 meta-analysis were included in the review [6,7,8]. A brief analysis of relevant studies is presented here.

In the majority of studies the indications for the use of CMAIs was acetabular defects classified as Paprosky type IIIA and IIIB or AAOS type III and IV [6,7,8]. A systematic review by De Martino et al. [6], including 17 studies, reported a complication rate of 29 and a re-operation rate of 17.3% with the use of CMAIs. The most common complication after the use of CMAIs was dislocations (11%), followed by periprosthetic joint infection (PJI) (6%), nerve injury (3.8%), and

wound complications (2.7%). Re-operations were performed most often due to dislocation (6.4%) and PJI (5.5%). Aseptic loosening of CMAIs was noted in 1.7% of cases.

Chiarlone et al. [7], in their systematic review, pooled the results of 18 studies and reported a complication rate of 29%, a re-operation rate of 19.3%, and a re-revision rate of 5.2%. The main reason for re-operations was dislocation also. The aseptic loosening rate of CMAIs was 2.6%. PJI and aseptic loosening constituted the main reason for removal of CMAIs.

In a systematic review and meta-analysis, Broekhuis et al. [8] combined the results of 33 studies. The rate of implant-associated infections was 24%, re-operations for any reason was 15%, and implant failures of 12%. An association of results with the generation of CMAIs was found, implant failure rates were higher for the old generation. The results were also associated with the follow-up length and study start date. Improvements in postoperative functional outcomes were noted in all reviews [6,7,8].

Based on the available data, it appears that CMAIs have resulted in significant improvement of function and satisfaction in patients with severe acetabular bone loss, with or without pelvic discontinuity. Gaining experience with the use of CMAIs, both on the part of surgeons and on the part of engineers involved in implant development, appears to contribute to improved results.

However, the use of CMAIs is associated with some issues. There is a high cost and wait time for the manufacturing of these prosthetic devices. In addition, based on the experience of many surgeons there is usually a need for intraoperative refinements to have the custom-made device fit properly. On occasions bone may have to be removed or the device trimmed down to allow for an optimal fit. In recent years and improvements in engineering these issues seem to have abated to some extent. Nonetheless, there is a need for further research to examine the cost-effectiveness of CMAIs as well as to define clearer indications for their use.

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