

CORR Insights®: What Is the Dislocation and Revision Rate of Dual-mobility Cups Used in Complex Revision THAs?

Matthew P. Abdel MD

Where Are We Now?

Contemporary data indicate that dislocation has become the most common reason for re-revision after revision THA [7]. Careful soft tissue handling (inclusive of closure); correct positioning of the acetabular and femoral components; minimization of soft tissue, bony, and implant impingement through attentive intraoperative trialing and ROM assessment; large femoral heads; dual-mobility constructs; and constrained liners can be used to improve stability. However, in revision THA, the

improved head-neck ratio of large femoral heads often does not suffice. Moreover, although constrained liners have been shown to minimize the risk of dislocation after revision THA [2, 3], reduced ROM and subsequent impingement, excessive wear, risk of disassembly, and increased bone-prosthesis stresses and subsequent loosening make them a less attractive option [1-3].

On the other hand, studies have shown that dual-mobility constructs decrease the risk of dislocation after revision THA without the limitations of constrained liners [7, 10]. For instance, Hartzler et al. [7] showed that dislocation in those receiving a dual-mobility construct was three-fold lower than in those receiving a 40-mm femoral head during revision THA. Moreover, re-revision for dislocation was substantially lower in the dual-mobility group than in the 40-mm femoral head group. This has been reinforced in a large systematic review by Reina et al. [10] that showed dislocation and re-revision for dislocation were also substantially lower after revision THA in the dual-mobility group than in controls.

In this excellent paper by Unter Ecker et al. [11], the authors studied

216 complex revision THAs treated with a cemented dual-mobility construct. They found that dislocation-free survival rates were 96% at 5 years and 82% at 9 years. Moreover, survival free of revision for dislocation was 99% at 5 years and 85% at 9 years. These findings are important because the authors focused on complex revision THAs in which there was substantial bony and soft tissue compromise. These are precisely the type of procedures in which a surgeon may contemplate a dual-mobility construct versus a constrained liner.

Where Do We Need To Go?

Although dual-mobility constructs substantially reduce the risk of dislocation and re-revision for dislocation after revision THA in most series at the mid-term [7, 10], advancements are still needed for patients receiving megaprotheses (such as proximal femoral replacements and total femoral replacements) who have no functioning abductor musculature, as well as for those who have experienced dislocation after reconstruction with dual-mobility constructs or constrained liners. Evidence suggests that both of these are unsolved problems; for example, one study [12] showed that the overall dislocation rate after revision with a proximal femoral implant was nearly 14% at a mean of 2 years post-operatively, although 52% of patients

This CORR Insights® is a commentary on the article "What Is the Dislocation and Revision Rate of Dual-mobility Cups Used in Complex Revision THAs?" by Unter Ecker et al. available at: DOI: [10.1097/CORR.0000000000001467](https://doi.org/10.1097/CORR.0000000000001467).

The author certifies that he (MPA), or a member of his immediate family, has received or may receive payments or benefits, during the study period, in an amount of USD 100,001 to USD 1,000,000 from Stryker, Mahwah, NJ.

All ICMJE Conflict of Interest Forms for authors and *Clinical Orthopaedics and Related Research*® editors and board members are on file with the publication and can be viewed on request.

The opinions expressed are those of the writer, and do not reflect the opinion or policy of *CORR*® or the Association of Bone and Joint Surgeons®.

M. P. Abdel ✉, Mayo Clinic, 200 First Street SW, Rochester, MN 55905 USA, Email: abdel.matthew@mayo.edu

M. P. Abdel, Department of Orthopedic Surgery, Mayo Clinic, Rochester, MN, USA

in that series received a constrained liner. On the other hand, another study [5] showed that conversion to a dual-mobility construct can be a salvage option in high-risk patients who have undergone multiple operations with dislocated constrained liners.

In addition, longer-term follow-up is required for the types of dual-mobility constructs used in revision procedures in North America. As opposed to Europe, where dual-mobility constructs were introduced in 1974 and results were first published in 1986, dual-mobility constructs were not available in the United States until 2009 [1].

Finally, because dual-mobility THA bearings with 28-mm femoral heads can experience intraprostatic dislocations [13], future investigations should focus on solving this problem. In addition, although no series has shown an adverse local tissue response from a dual-mobility construct, some surgeons are concerned with taper corrosion and risk of corrosion with a modular liner [1, 4, 8]. As such, innovations to minimize cobalt and chromium in the construct with ceramic femoral heads and alternative liners are appealing.

How Do We Get There?

In the revision setting, I believe that dual-mobility constructs have been a game changer when it comes to mitigating the risk of dislocation. However, future studies are needed in three main areas: patients receiving megaprotheses who have no abductors, patients in whom the dual-mobility construct is dislocated, and those undergoing two-stage exchange arthroplasty for periprosthetic joint

infections. For instance, a recent study has indicated that the risk of dislocation after two-stage exchange arthroplasty for periprosthetic joint infection is prohibitively high, with a cumulative incidence of dislocation of 9% at 1 year [9], an estimate that is substantially worse in those with a megaprosthesis and those with an absent or non-united greater trochanter or abductor deficiency. Studies on dual-mobility constructs based on national registries, such as the American Joint Replacement Registry, provide a ripe area for investigation in these unique cohorts. Ultimately, multicenter randomized clinical trials on constrained liners versus dual-mobility constructs in patients with megaprotheses and large femoral heads versus dual-mobility constructs in reimplantations will provide data to the practicing clinician.

References

1. Abdel MP. Dual-mobility constructs in revision total hip arthroplasties. *J Arthroplasty*. 2018;33:1328-1330.
2. Bedard NA, Brown TS, Lewallen DG, Trousdale RT, Berry DJ, Abdel MP. Constrained liners implanted simultaneously at the time of acetabular shell revision with a highly porous implant: surprisingly good fixation at 10 years. *J Bone Joint Surg Am*. 2020;102:1521-1529.
3. Brown TS, Tibbo ME, Arsoy D, et al. Long-term outcomes of constrained liners cemented into retained, well-fixed acetabular components. *J Bone Joint Surg Am*. 2019;101:620-627.
4. Chalmers BP, Mangold DG, Hanssen AD, Pagnano MW, Trousdale RT, Abdel MP. Uniformly low serum cobalt levels after modular dual-mobility total hip arthroplasties with ceramic heads: a prospective study in high-risk patients. *Bone Joint J*. 2019;101:57-61.
5. Chalmers BP, Pallante GD, Taunton MJ, Sierra RJ, Trousdale RT. Can dislocation of a constrained liner be salvaged with dual-mobility constructs in revision THA? *Clin Orthop Relat Res*. 2018;476:305-312.
6. Goldman AH, Sierra RJ, Trousdale RT, Lewallen DG, Berry DJ, Abdel MP. The Lawrence D. Dorr Surgical Techniques & Technologies Award: Why are contemporary revision total hip arthroplasties failing? An analysis of 2500 cases. *J Arthroplasty*. 2019;34:S11-s16.
7. Hartzler MA, Abdel MP, Sculco PK, Taunton MJ, Pagnano MW, Hanssen AD. Otto Aufranc Award: Dual-mobility constructs in revision THA reduced dislocation, rerevision, and reoperation compared with large femoral heads. *Clin Orthop Relat Res*. 2018;476:293-301.
8. Kolz JM, Wyles CC, Van Citters DW, Chapman RM, Trousdale RT, Berry DJ. In vivo corrosion of modular dual-mobility implants: a retrieval study. *J Arthroplasty*. 2020. Published online June 4, 2020. DOI: [10.1016/j.arth.2020.05.075](https://doi.org/10.1016/j.arth.2020.05.075).
9. McAlister IP, Perry KI, Mara KC, Hanssen AD, Berry DJ, Abdel MP. Two-stage revision of total hip arthroplasty for infection is associated with a high rate of dislocation. *J Bone Joint Surg Am*. 2019;101:322-329.
10. Reina N, Pareek A, Krych AJ, Pagnano MW, Berry DJ, Abdel MP. Dual-mobility constructs in primary and revision total hip arthroplasty: a systematic review of comparative studies. *J Arthroplasty*. 2019;34:594-603.
11. Unter Ecker N, Kocaoğlu H, Zahar A, Haasper C, Gehrke T, Citak M. What is the dislocation and revision rate of dual-mobility cups used in complex revision THAs? *Clin Orthop Relat Res*. 2021;479:280-285.
12. Viste A, Perry KI, Taunton MJ, Hanssen AD, Abdel MP. Proximal femoral replacement in contemporary revision total hip arthroplasty for severe femoral bone loss: a review of outcomes. *Bone Joint J*. 2017;99:325-329.
13. Wegrzyn J, Malatray M, Pibarot V, Anania G, Bėjui-Hugues J. Is isolated mobile component exchange an option in the management of intraprostatic dislocation of a dual mobility cup? *Clin Orthop Relat Res*. 2020;478:279-287.