Clin Orthop Relat Res (2016) 474:2006–2007 / DOI 10.1007/s11999-016-4876-2

Clinical Orthopaedics and Related Research®
A Publication of The Association of Bone and Joint Surgeons®

Published online: 18 May 2016

CORR Insights

CORR Insights®: Modular to Monoblock: Difficulties of Detaching the M²a-Magnum™ Head Are Common in Metal-on-metal Revisions

Rodrigo M. Mardones MD

Where Are We Now?

Corrosion following THA was once considered a small problem, consisting of only 1% to 2% of all THA complications [5]. However, corrosion is commonly found on metal-on-metal (MoM) large femoral heads, modular prostheses, and revision MoM implants [1, 4]. During revision, the prosthesis head must be detached from the stem. Some MoM implants, however, have a titanium interface as a head adapter. Both types of heads are susceptible to jamming due to corrosion, cold welding, and fretting. Jamming can potentially increase the already existing high-level of adverse reaction to MoM debris, leading up to 49% failure at 6 years on some MoM implants [4].

Replacing the bearing surface by exchanging the modular femoral head, extracting the liner, or performing and acetabular revision may be difficult compared to other bearing surface revisions because the interface between the trunnion and the femoral head (titanium taper adapter) tend to jam and become tight [2, 3]. Intraoperative problems such as separating the head (and or head adaptor) from the prosthetic neck trunnion represent a new challenge during revision THA, and the current article by Mäntymäki and colleagues gives us a sense for the scope of this problem, which was surprisingly common with M²a-Magnum™ (Biomet, Warsaw, IL, USA).

Where Do We Need To Go?

In my view, there are two major issues associated with stuck taper junctions: (1) Removing the head from the stem in a presence of a titanium interface, and (2) our inability to replace damaged trunnions.

It has been widely reported [1, 3, 5, 6] that the trunnion becomes damaged after the head or titanium interface is removed. Instead of removing the stem, an alternative sleeve could cover the damaged trunnion. This would allow us to place a new head over the sleeve.

If we cannot remove the head and/or the titanium taper adapter, or if the trunnion is damaged in the course of removing the head, it is imperative that we remove the stem, even if it is well fixed. When revising MoM THAs, it is

This CORR Insights® *is a commentary on the article* "Modular to Monoblock: Difficulties of Detaching the M²a-Magnum™ Head Are Common in Metal-on-metal Revisions" *by Mäntymäki and colleagues available at:* DOI: 10.1007/s11999-016-4774-7.

The author certifies that he, or a member of his immediate family, has no funding or commercial associations (eg, consultancies, stock ownership, equity interest, patent/licensing arrangements, etc) that might pose a conflict of interest in connection with the submitted article.

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 writers, and do not reflect the opinion or policy of CORR® or The Association of Bone and Joint Surgeons®.

This *CORR* Insights® comment refers to the article available at DOI: 10.1007/s11999-016-4774-7.

R. M. Mardones MD (✉)
Clinica las condes/Universidad de Chile, Lo Fontecilla 441, Las Condes, Santiago, Chile
e-mail: rmardones@clc.cl

CORR Insights

important to have the necessary surgical tools available, as well as any tools that facilitate the removal of prosthetic femoral heads that are stuck on the trunnions.

How Do We Get There?

We must develop standard techniques and instruments that can detach the head while also avoiding trunnion damage. An alternative solution is creating a replacement trunnion with a new head. A device like this would need to perform similarly to a monoblock prosthesis in order to avoid any MoM corrosion.

We should not underestimate the power of preparation—corrosion is a problem we must anticipate. Orthopaedists should have the necessary skills and instruments to extract a well-attached cementless stem in a way that minimizes bone and soft-tissue damage. A corkscrew femoral head extraction tool, diamond saw, cables, and revision stems should always be available during these difficult procedures.

In my view, modular MoM THAs have largely fallen out of favor. However, it seems possible that the potential benefits of MoM THA could be realized if modularity is minimized. Perhaps a large-head monoblock MoM femoral component could be developed that might avoid fretting, corrosion, and the cold welding that was observed in this series. If a less-modular MoM THA cannot be developed, it seems likely (and appropriate) that MoM THA will be abandoned.

References

1. Cook RB, Bolland BJ, Wharton JA, Tilley S, Latham JM, Wood RJ. Pseudotumour formation due to tribocorrosion at the taper interface of large diameter metal on polymer modular total hip replacements. *J Arthroplasty*. 2013;28:1430–1436.
2. Cooper HJ, Della Valle CJ. Large diameter femoral heads: is bigger always better? *Bone Joint J*. 2014;96-B:23–26.
3. Esposito CI, Wright TM, Goodman SB, Berry DJ, Clinical B, Bioengineering Study Groups from Carl TBW. What is the trouble with trunnions? *Clin Orthop Relat Res*. 2014;472:3652–3658.
4. Langton DJ, Jameson SS, Joyce TJ, Gandhi JN, Sidaginamale R, Mereddy P, Lord J, Nargol AV. Accelerating failure rate of the ASR total hip replacement. *J Bone Joint Surg Br*. 2011;93:1011–1016.
5. Lavernia CJ, Iacobelli DA, Villa JM, Jones K, Gonzalez JL, Jones WK. Trunnion-Head Stresses in THA: Are Big Heads Trouble? *J Arthroplasty*. 2015;30:1085–1088.
6. Mistry JB, Chughtai M, Elmallah RK, Diedrich A, Le S, Thomas M, Mont MA. Trunnionosis in total hip arthroplasty: A review. *J Orthop Traumatol*. 2016;17:1–6.