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CORR Insights®: Hard-on-hard Bearings Are Associated With Increased Noise Generation in Young Patients Undergoing Hip Arthroplasty

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Where Are We Now?

The study by Nam and colleagues sheds some light on a controversial subject: Noise generation in THA. Even considering the methodological limitations of a survey inquiry using this design, the findings of the study appear remarkable to me; 9% (61 of 682) of young patients with THA reported noise generation. The most attention-grabbing—and somewhat alarming—finding was that “noises” were associated with

increased pain and joint stiffness. Similarly, Cogan et al. [2], in a retrospective study of 365 ceramic-on-ceramic (CoC) THAs, reported a disturbingly high frequency of “noisy” joints (42%) in the cohorts of patients with poor subjective results, while hip noise was less frequent (11%) in patients with satisfactory results. This observation is not surprising, considering the contemporary high functional expectations of young patients requiring THA.

Until the late 1990s, the issue of joint noise generation in THA had been all-but ignored. Researchers struggled to describe and categorize the various noises noted by THA patients in their joint, and surgeons had difficulty estimating the clinical relevance of the problem. Fast forward to today, and the problem of the squeaking hip appears well represented in orthopaedic research, and is frequently discussed at specialty meetings. Fortunately, we now have a clearer idea of the problem. This is particularly important for CoC bearings, as they are currently used for many young patients undergoing THA. Interest regarding research of joint noises of metal-on-metal (MoM) bearings, however, will probably decline following the progressive de-emphasis of this bearing couple.

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Where Do We Need To Go?

The current study’s findings lead to the following questions: (1) Are modern matrix-composite ceramics more or less “noisy” than conventional pure

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aluminum oxide bearings? (2) Is there a discrepancy between objective findings and patient-reported subjective outcomes? (3) Is the problem of noise generation only related to hard-on-hard bearings?

THA can occasionally generate some noise, which is more frequent with hard-on-hard bearings like CoC, or MoM. Patients described the noises in several different ways including “popping”, “snapping”, “clicking”, “clunking”, “knocking”, “crunching/grinding”, and “squeaking” [6, 7]. Joint-space distraction and relocation impact of the bearing surfaces during a gait cycle could be interpreted as a “click”, “pop”, “knock”, or “snap”. Some noises (“snap” or “pop”) may be related to soft-tissue impingement or movement. “Crunching”, “grinding”, or “squeaking” can indicate a mismatched wear couple, third-body particles within the bearing, bearing fracture, or edge loading [1]. The large majority of noises produced in the hip joint with CoC bearings appear not to cause clinical problems and generally do not disturb the patient. In some circumstances however, like implant malposition, instability, fracture, surgery comes into the picture [4]. A useful protocol for diagnosis and treatment of articular noises in CoC THAs is available online [6]. Note-

worthy, the joint was reported to be “noisy” in nine out of 132 revisions (7%) carried out during a 16-year followup period in a cohort of 5884 CoC THAs in patients with degenerative joint disease [5]. Large diameter CoC bearings [3] and noncemented stems with greater flexibility in the sagittal plane, presenting peculiar resonance properties [4], seem to be particularly predisposed to generate articular noises.

How Do We Get There?

Undoubtedly, projects designed to explore a causal relationship between noises generated in the hip joint and subjective/objective THA outcomes have a great potential to provide important information for the clinical practice. Prospective randomized clinical studies with a validated survey methodology will require assessment of ceramic versus nonceramic bearings. In particular, researchers will need to focus on frequency and clinical impact of joint noises generated using composite versus conventional ceramics, and the role played by large diameter bearings. Objective and subjective outcomes of study participants will need to be matched to identify causes of symptoms. Such studies will

require a large sample size and at least a 2-year followup. Realistically, this would mean a major effort to achieve a relatively minimal return in terms of impact for the clinical practice of THA. In fact, only a fraction of hips are managed with ceramic bearings around the world. Arthroplasty registries and database of large volume Institutions could be used instead to assess the issue of noisy joints and objective/subjective outcome. For now, I will continue using CoC for young patients undergoing THA. But before surgery, I make sure that they are aware that the joint may generate some noises, though the likelihood that these noises would result in revision is low.

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