What Is Causing Squeaking in Hip After Joint Replacement?

Doesn't it seem odd that after 30 or more years using ceramic implants for hip replacements that suddenly there is an increased number of patients reporting squeaking when they move? And this new problem only started in 2006. What's going on?

Some experts have suggested it's a problem with mismatched ceramic bearing diameters, malpositioning of the implant, or loss of the protective fluid film. Others have investigated the possibility that the use of short necks in the femoral component or wear debris from metal pinching against other metal could cause this problem.

In this study, the authors show that metallosis caused by impingement (pinching) of the femoral neck against the rim of the acetabulum (hip socket) is the most common cause of squeaking. Metallosis refers to wear debris from the metal parts of the implant. It can cause a painful inflammatory reaction in the soft tissues and bone around the implant.

There were two parts to the study. First, they looked at what happened to 1,275 total hip replacements that had to be revised. They zeroed in on the cases of ceramic-on-ceramic hips that reported noises such as squeaking or grinding.

Then, they reviewed 1,139 cases of primary (first-time) hip replacements using ceramic-on-ceramic implants. This group was further divided into two subgroups based on the type of implants they received. Group 1 had a conventional titanium alloy shell for the socket. Inside that was a ceramic liner. The edges of the shell and the liner were even with each other. This is called a flush-mounted design.

Group 2 was divided into two separate groups. Group 2A had implants with a recessed liner and a conventional titanium alloy femoral stem. With the recessed liner, the edge is not even with the shell. Instead, the edge of the liner is slightly below the rim of the shell. Group 2B had a recessed liner and a beta titanium alloy femoral stem. Beta titanium alloy is made up of molybdenum, zirconium, and iron.

Squeaking was heard most often in Group 2B (recessed liner with beta stem). Squeaking was heard more often in group 2 (recessed liner) as a whole compared to group 1 (flush liner).

The fact that the squeaking started at a specific time period points to the time when surgeons started combining the ceramic-on-ceramic bearings with any of the femoral components available (conventional, beta, thinner stem). So for example, hip implants could include a ceramic liner but a titanium stem. And the titanium could be a pure (conventional) or mixed (beta) alloy.

The results of this study suggest that impingement caused by a beta titanium femoral component (compared to conventional titanium alloy) bumping up against a titanium acetabular rim creates problems with the alumina ceramic bearings. Flush-mounted liners with conventional titanium femoral stems did not cause squeaking. The bottom line is that the problem isn't with the ceramic bearings as much as it is the materials around the bearings. A recessed liner with a beta titanium alloy combined together seem to cause the most problems.

What we don't know is the type of debris (e.g., molybdenum, zirconium, iron) put out by beta titanium. Maybe some types of wear debris cause more problems than others. Future studies are needed to improve the materials and the design of hip implants, especially the ceramic ones that can cause squeaking when used with titanium alloy stems.