

Degree of spinal deformity affects hip replacement surgery success

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People with spinal deformity also requiring a total hip replacement are at greater risk for dislocation or follow-up revision surgery, suggesting that these higher-risk patients may benefit from a more personalized approach to their surgeries to reduce the risk of poorer outcomes.

A new study led by [orthopaedic surgeons](#) at NYU Langone Medical Center provides a greater understanding of exactly how spinal deformity interacts with the pelvis, potentially increasing risk despite implanting the artificial hip in what is traditionally considered a "safe zone" by surgeons.

"Surgeons should anticipate potential instability after performing a hip replacement in patients who have existing spinal deformity, and they should adjust their surgical plans accordingly," says lead study author Aaron J. Buckland, MD, assistant professor of Orthopaedic Surgery in the division of Spine Surgery and director of spine research at NYU Langone.

The study was presented March 17, 2017 at the American Academy of Orthopaedic Surgeons (AAOS) 2017 Annual Meeting in San Diego, California. These findings also were published online December 27, 2016 in the *Journal of Arthroplasty*.

More than 310,000 hip replacements are performed in the U.S. each year, with rates dramatically increasing over the past two decades in younger adults 45 to 64 years of age who are active and living longer than ever before. An estimated 2.5 million Americans are currently living with hip replacements.

In a hip replacement, an artificial joint comprised of a ball and socket is implanted to replace the natural socket in the pelvis, enabling movement that is typical of the hip joint. For the past 40 years, surgeons have placed the socket (known as the acetabular cup) adjacent to the pelvic bone in a so-

called "safe zone"—a position that is thought to reduce risk of dislocation. However, the new research suggests that placing the cup in the safe zone may not be enough to prevent dislocation in patients with spinal deformity.

Until now, no studies of the hip-spine relationship have focused on patients with sagittal spinal deformity, says Dr. Buckland. "Our research helps bridge any disconnect between surgeons who regularly treat spinal deformities and those who perform hip joint replacements, fostering more collaboration to improve patient outcomes," he adds.

For the study, researchers retrospectively reviewed 107 patients who met the criteria for sagittal spinal deformity and who had 139 hip replacements collectively. Using software containing detailed measurements of patients who were imaged before and after surgery, researchers analyzed the acetabular cup position, dynamic changes in cup position, and rate of instability in patients who had undergone hip replacements.

They found an eight percent dislocation rate for hip replacement in patients with some degree of spinal stenosis; 5.8 percent of the same patient cohort required revision surgery due to recurrent dislocation. This compares to a 1 to 2 percent dislocation risk in the typical population, according to Dr. Buckland.

The lumbar spine, or lower back, moves during normal posture changes, such as transitioning from sitting to standing. This creates alterations in "spinopelvic tilt," which, in turn, changes the functional position of the acetabulum, or hip socket.

Among all study patients, 78 percent had normal placement of their artificial hip while lying down (supine). But that number significantly decreased to 58 percent when patients stood, due to increases in spinopelvic tilt. Among patients with hip

replacements that dislocated, 80 percent had "safe zone" cup placement, 80 percent had spinopelvic tilt, and 60 percent were deemed 'safe' by both parameters.

The findings have led orthopaedic surgeons who perform hip replacements at NYU Langone to collaborate with their spine surgeon colleagues on preoperative planning in an effort to secure optimal outcomes in patients.

"The fact that high rates of dislocation occurred in patients with 'safe zone' placement of their artificial hips implies that our understanding of what defines acceptable acetabular positioning for these [patients](#) remains questionable," says study co-author Jonathan Vigdorichik, MD, assistant professor of Orthopaedic Surgery at NYU Langone. "It is imperative that the degree of spinal deformity be a primary factor in preoperative planning of hip replacements"

The research team plans future projects to examine postural analysis more closely in order to develop patient-specific or pathology-specific safe zones, enhance impingement-free range of motion, and study in more detail the use of a dual-mobility bearing implant in this complex patient population.

More information: Paper Presentation 708

8:12 AM - 8:18 AM Total Hip Arthroplasty in the Spinal Deformity Population: How Does Deformity Impact Hip Stability? Edward Delsole MD, Ran Schwarzkopf MD, Jonathan Vigdorichik MD, Thomas Errico MD, Aaron Buckland, MD, FRACS.

Provided by New York University School of Medicine

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