

Silva M, Lee KH, Heisel C, Dela Rosa MA, Schmalzried TP. The biomechanical results of total hip resurfacing arthroplasty. *J Bone Joint Surg Am* 86A(1):40-46, 2004

Abstract:

BACKGROUND: With the advent of more wear-resistant bearings, there is renewed interest in resurfacing total hip arthroplasty. However, there is a paucity of information on the biomechanical results of this type of arthroplasty compared with those of contemporary total hip arthroplasty. **METHODS:** Using standardized radiographs, we measured and compared the biomechanical parameters that affect the hip joint reactive forces in fifty hips that had a metal-metal surface replacement with those parameters in forty hips that had a contemporary cementless total hip replacement performed during the same time-period by the same surgeon. **RESULTS:** On the average, the arthritic hips that were treated with metal-metal surface replacement had had a more valgus preoperative neck-shaft angle and less horizontal femoral offset than the normal, contralateral hips ($p = 0.0003$). After both the metal-metal surface replacements and the cementless total hip replacements, the hip center of rotation was medialized by approximately 6 mm. Both procedures were associated with an average increase in limb length of approximately 3 or 4 mm. After the metal-metal surface replacements, the horizontal femoral offset was essentially equal to the preoperative value, but both values averaged about 8 mm less than those on the normal, contralateral side ($p < 0.00001$). In the hips with a conventional total hip replacement, the horizontal femoral offset increased an average of 9.5 mm compared with the preoperative value and was an average of 5 mm more than that for the normal, contralateral hip ($p = 0.001$). **CONCLUSIONS:** The biomechanical results of total hip resurfacing depend on the preoperative anatomy of the proximal part of the femur. Limb lengthening of 1 cm can be achieved, but horizontal femoral offset is essentially unchanged by hip resurfacing. Horizontal femoral offset can be increased reliably with a contemporary total hip replacement. Arthritic hips of limbs that are more than 1 cm shorter than the contralateral limb or that have a comparatively low horizontal femoral offset may be better served by a contemporary total hip replacement. These biomechanical limitations should be considered in the selection of hips for resurfacing. Level of Evidence: Therapeutic study, Level III-1 (case-control study). See Instructions to Authors for a complete description of levels of evidence.