IDENTIFYING THA PATIENTS AT RISK

Recommendations based on recent research

Total Hip Arthroplasty (THA) is a common, but challenging surgery. As the number of patients rises and cost control becomes increasingly essential, anticipating issues during surgery and avoiding complications after surgery are becoming more important than ever. With ~2% of patients experiencing a dislocation after THA, ~7% reporting dissatisfaction, and ~8% THA litigation due to leg length discrepancy, identifying risk factors before surgery is indispensable. This review outlines recent research from leading surgeons regarding critical patient factors to consider before THA.

Consider your patient’s spine rigidity

Based on findings published in 2017 by surgeons from NYU Langone Orthopedics, dislocation rate in THA is 1.55% with an increased risk for patients with previous spine fusion: x1.87 for 1 to 2-level fusion and x3.13 for 3 to 7-level fusion. More generally, a patient with Adult Spinal Deformity (ASD) has a higher rate of THA instability. Given that 60% of people over the age of 65 years suffer from ASD, this might be a concern for many of your patients. Indeed, patients with a fused or degenerated spine are less able to rotate their pelvis during sitting, resulting in less functional cup anteverision, eventually leading to anterior impingement and possible posterior dislocation. You can judge your patient’s spine rigidity by comparing pelvic tilt between standing and sitting positions. Knowing your patient’s spine rigidity before the surgery will allow you to adjust your pre-operative plan.

Assess your patient’s pelvic tilt

An increasing number of publications are now demonstrating that achievement of an acetabular component within the Lewinnek safe zone does not preclude the risk of dislocation and impingement. As shown by numerous researchers, weight-bearing pelvic tilt differs from supine pelvic tilt. Even while the cup remains fixed within the acetabulum, this change in pelvic tilt affects the functional anteverision and inclination (i.e. versus the vertical plane), as well as functional range of motion, and consequently the likelihood of impingement or dislocation. Surgeons and researchers at the Hospital for Special Surgery (HSS) demonstrated that each 1° of pelvic ante/retroversion changes functional cup anteverision by 0.7°. Tilt of the APP in standing or sitting can therefore move an apparently well-positioned cup out of the safe zone. To avoid dislocation, cup positioning should take your patient’s functional weight-bearing pelvic tilt into consideration.

Consider your patient’s 3D femoral anatomy preoperatively

For a good clinical outcome, the femur must be considered together with the cup. Knowing preoperatively whether your patient has high or low femoral anteverision, neck-shaft angle (CCD), offset, or neck length might lead you to choose a modular implant, or altered positioning, and achieve appropriate combined anteverision. Using 2D projections (i.e. standard X-ray) can miss flagging unusual anatomy, thus increasing surgical time. A review of 402 THA patients showed that 30% had a 2D-3D difference in CCD of >5°. True 3D femoral anteverision, CCD, offset and neck length can be determined automatically from 3D models reconstructed from low-dose biplanar imaging, leading to a patient-specific plan and fewer intraoperative surprises. 3D planning with hipEOS was recently shown to increase component sizing accuracy, which may help reduce inventory and further decrease surgery time.

Investigate preoperative leg length discrepancy

Postoperative leg length discrepancy is one of the most common causes of THA litigation. It is therefore critical to know your patient’s true preoperative leg length. Dr. Lazennec recently reported that 2D projections incorrectly measure leg length, with an average 2D/3D difference in anatomical length of 6 mm. Moreover, he showed that patient perception of limb length correlates less with anatomical femoral length than with pelvic obliquity and functional leg length. These parameters require full-leg weight-bearing images to be assessed.
EOS: A unique platform to help you identify and minimize risks

EOS provides functional, 3D, weight-bearing information about your patients at a low dose of radiation. hipEOS 3D simulation and planning software allows you to anticipate problems that may occur during surgery and create a patient-specific plan. Improved planning tools may have the potential to lead to faster surgeries, better clinical outcomes and lower overall costs.

Caution: US Federal law restricts these devices to sale by or on the order of a physician. Please carefully read the operator’s manual of the device before use.

EOS System: Manufacturer EOS imaging / hipEOS: Manufacturer oneFIT medical

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7. Perfetti (2023) Total hip prostheses in standing, sitting and squatting positions: an overview of our 8 years practice using the EOS imaging technology. Open Orthop J.

Weight-bearing, full body, low-dose, 3D measurements in standing and sitting positions

hipEOS pre-operative planning in functional positions, including range of motion (ROM) analysis

hipEOS allows you to select and position the cup and stem based on your patient’s 3D anatomy and pelvic assessment in functional positions. Implant ranges of motion can be tested in standing, sitting and theoretical sitting positions. You can adjust the plan, with immediate feedback on how changes affect relevant clinical parameters, particularly leg length discrepancies, femoral offset and femoral torsion, three key criteria for a successful THA.