The arc of pelvic motion has been shown to be as great as 70° through sit to stand activities\textsuperscript{1} – DiGioia CORR 2006
Overview

Every patient moves differently\(^1\) and their total hip replacement should be optimised to account for this.

The orientation of the acetabular cup is one of the most important factors under the surgeon’s control\(^2\), and acetabular cup orientation has a significant effect on device performance, including patient outcomes, impingement, edge loading, bearing wear, osteolysis and loosening\(^3,4\).

There remains two key issues with THR today:

1. **What is the target for a well orientated cup?**
2. **Are we able to achieve that orientation?**

1 Implant orientation

**Clinical issue**

**Safe zones**

There have been various attempts to define a ‘safe zone’ for the orientation of an acetabular cup, and increasing evidence to suggest that one generic zone is not applicable\(^5,6,7,8,9\).

**Pelvic tilt**

Pelvic tilt is an important consideration for a patient’s physiological profile, and the arc of pelvic motion in some patients can be as mobile as 70° and in others as stiff as 5° during functional activities\(^1,10\). This can have significant impact on the functional orientation of the acetabular cup.

**Clinical solution**

**What is the optimal cup orientation for an individual patient?**

OPS\(^\text{TM}\) is a state-of-the-art technology platform that identifies a target orientation unique to each individual. These target orientations are calculated from a dynamic pre-operative functional simulation, which accounts for the patient’s physiological profile throughout a range of daily activities.
Intra-operative tools

It is inherently difficult to position the cup during surgery and achieving a target orientation is a considerable challenge in THR.

It has been shown that up to 50% of surgeries miss the intended orientation\textsuperscript{11} and the chance of hitting a target to within 5° can be as low as 21.5\%\textsuperscript{12}.

Clinical issue

How is the optimised position delivered during surgery?

Once the target orientation for a specific patient has been decided, a unique guide is produced for the individual. The planned orientation is built into the axis of the guide which is used intra-operatively with a simple laser system to allow the surgeon to deliver on the planned cup orientation.
The final position and orientation of the femoral component in total hip arthroplasty can be directly affected by the femoral neck osteotomy. Recent literature suggests that both the level and angle of the femoral neck resection can impact the varus / valgus position as well as the anteversion of the definitive component. This is an important consideration in reconstructing hip biomechanics, which if done poorly, has been associated with higher rates of dislocation, muscle weakness, limping, leg length discrepancy, impingement and early loosening of the implant. Controlling the osteotomy should be considered in optimising the position of the femoral component.

The femoral neck resection can be accurately controlled by utilising the OPS™ femoral osteotomy guide. Once the target osteotomy plane has been identified using pre-operative three-dimensional templating software, a unique, patient specific 3D printed guide is created. The OPS™ femoral osteotomy guide incorporates an open capture system that controls the resection, allowing the surgeon to precisely recreate the pre-operative femoral plan.
Reference:


Get the full picture.
Scan to view the OPS™ introductory video.