

Reduced Dislocation Risk Using the Lateralized Offset SL-Plus Total Hip Femoral Component

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Introduction:

Restoration of femoral offset in total hip arthroplasty restores biomechanics of the hip, properly tensions the soft tissues, and may reduce dislocation risk. Due to variations in anatomy, femoral stems having a single offset for each stem size do not consistently restore the patient's pre-morbid femoral offset. This study was performed to determine if more accurate restoration of femoral offset and a lower dislocation rate could be achieved using a lateralized offset stem in appropriate subgroups of patients.

Methods:

Over a 14-month period, the author implanted 238 consecutive cementless THA's using the SL-Plus femoral component (Plus Endoprothetik AG, Rotkreuz, Switzerland) in all patients (**Group A**). A lateralized offset version was used in 2 subgroups of patients:

1. Those whose anatomic offset of the hip based on pre-operative templating could not be re-established using a standard offset prosthesis, including those with:
 - a. Long, lateralized femoral neck
 - b. Coxa Vara
 - c. Protrusio acetabuli
 - d. Narrow, funnel-shaped canal in patients with large bone structure
2. Those whose soft tissue laxity assessed intra-operatively placed them at risk for dislocation

Group B consisted of 472 consecutive cementless THA's over the previous 48 months using the SL-Plus stem but prior to the availability of the lateralized offset version.

All surgeries were performed through a posterior, single-incision MIS approach utilizing a posterior capsular repair. Patients were followed at regular intervals with questionnaires, physical examinations, and radiographs. Twenty-two patients in Group A and 31 patients in group B died or were lost to follow-up before their 12-month follow-up visit, leaving 216 patients in Group A and 441 patients in Group B for study.

Demographics

	Group A	Group B
Number	216	441
Lateralized Offset Stems	80 (37%)	0
Age	67.0 (46-85)	63.3 (23-93)
Weight (kg)	80.8 (43-133)	73.7 (41-163)
Male:Female	104:112	180:261
% Osteoarthritis	82%	93%

Results

One hip dislocated in Group A (0.46%) while 24 hips dislocated in Group B (5.44%, $p < 0.01$). The Group A dislocation was anterior and did not recur. Ten of the Group B dislocations were anterior, and 14 were posterior. Ten of the 24 dislocators in Group B required further surgery to either change component position, use a larger diameter head, convert to a constrained acetabular component, or to increase soft tissue tension by using a lateralized acetabular liner, longer neck length, stem revision to a lateralized offset stem, or some combination of the above.

Of all patients with normal contralateral hips for comparison, 4 of 18 dislocators vs. 40 of 463 nondislocators had post-operative offset at least 8mm less than the contralateral side ($p < 0.05$). One hundred ninety-eight hips (91.7%) in Group A and 401 hips (90.9%) in Group B had leg length discrepancies < 7 mm ($p = \text{NS}$).

Conclusions

Recently, emphasis has been placed on restoring hip biomechanics and abductor lever arm by using lateralized offset total hip femoral components. This study suggests that the use of a lateralized offset stem in certain subgroups of patients allows more accurate soft tissue tensioning and restoration of pre-morbid femoral offset. Restoring anatomical offset may reduce the dislocation rate in certain patients while avoiding the need for excessive lengthening of the leg to properly tension soft tissues. Whether restoring anatomical offset may have other advantages such as increasing walking stamina and reducing pain by reducing abductor muscle strain and joint reaction force remains to be proven.