

The Tapered Press Fit Total Hip Arthroplasty: *A European Alternative*  
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**INTRODUCTION:** Nearly 25 years ago, Karl Zweymüller implanted the first cementless, tapered, rectangular cross-sectioned total hip femoral component of his design. Although the stem has undergone some minor modifications over the years, the basic design philosophy has withstood the test of time. The concepts of axial stability through a double taper and rotational stability through edge-cortical contact provide excellent primary stability. Secondary stability is reliably achieved by osseointegration to the grit-blasted titanium-niobium alloy surface.

**METHODS:** The author has implanted over 1,300 consecutive SL-Plus stems to date using a single, posterior mini-incision approach. One thousand of these stems have been followed prospectively for a minimum 24 months (85 dead or lost to follow-up). Stems were implanted in all Dorr bone types. Incision length approximated the Body Mass Index (BMI) / 3 in centimeters. Femora were prepared by broaching only, compacting (rather than removing) the cancellous bone to create a rectangular cross-sectioned envelope to accept the stem. All patients were allowed immediate full weight bearing with advancement to unsupported weight bearing as tolerated.

**RESULTS:** Mean follow-up was 37 months (24-70). Mean operative time was 57 minutes (33-155). Mean incision length was 9.6cm (7.0-14.0). Stems were implanted in 442 Dorr A femurs, 474 Dorr B femurs, and 84 Dorr C femurs. Five stems (0.5%) were placed in >5 degrees of varus or valgus. Leg length discrepancy was <7mm in 912 patients (91.2%). Six cups failed to osseointegrate (0.6%) while all 1,000 stems were radiographically osseointegrated. Stem subsidence was ≤2mm in all patients. Minor osteolysis was apparent in 68 hips (6.8%) and was confined to Gruen zones 1 and 7. Mild stress shielding was apparent radiographically in 86 hips (8.6%) and was also largely confined to zones 1 and 7. Thigh pain was nearly absent in this consecutive group of patients with only 12 patients (1.2%) having moderate/severe thigh pain.

**DISCUSSION:** The tapered, rectangular cross-sectioned SL-Plus femoral component provides excellent short-term clinical and radiographic results. The reproducible primary stability provided by this unique design provides evidence that fit, but not fill, is essential to achieve osseointegration to a non-porous coated, roughened titanium surface.