

Influence of Stem Design on Total Hip Arthroplasty

Clinical and radiological assessment based on randomized controlled trials and register data

Akademisk avhandling

Som för avläggande av doktorsexamen vid Sahlgrenska akademien, Göteborgs universitet kommer att offentligens försvaras i R-aulan, Sahlgrenska universitetets sjukhuset, Mölndals, fredagen 3 maj, 2024 klockan 09.00

Karin Rilby, Legitimerad läkare

Fakultetsopponent:

Professor Javad Parvizi

MD, FRCS

Acibadem University, Turkiet

Avhandlingen baseras på följande delarbeten

- I. Rilby, K., Naclér E., Mohaddes, M., Kärrholm J., Similar outcome with a new anteverted or a straight standard stem: a randomized study of 72 total hip arthroplasties evaluated with clinical variables, radiostereometry, and DXA up to 2 years. *Acta Orthopaedica*. 2022; 93: 59-67.
- II. Rilby, K., Naclér E., Mohaddes, M., Kärrholm J., No difference in outcome or migration but greater loss of bone mineral density with the Collum Femoris Preserving stem compared with the Corail stem: a randomized controlled trial with five-year follow-up. *The Bone & Joint Journal*. 2022; 104-B(5): 581-588.
- III. Rilby, K., Naclér E., Mohaddes, M., Kärrholm J., Similar results after five years with the use of the Fitmore or the CLS femoral components. *The Bone & Joint Journal Open*. 2023; 4(5): 306-314.
- IV. Rilby, K., van Veghel M., Mohaddes M., van Steenberg L., Lewis P., Kärrholm J., Schreurs W., Hannink G. Does choice of primary stem influence choice of revision stem? Evaluation of 591 first time femoral stem revisions in 16,258 primary short-stem Total Hip Arthroplasties (THA) and 32,515 matched standard-stem THAs from the Australian, Dutch and Swedish Arthroplasty Registers. In manuscript.

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Influence of Stem Design on Total Hip Arthroplasty

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Abstract

Background: Since the 1960s, total hip arthroplasty has revolutionized the care of patients with end-stage osteoarthritis. Results after surgery using contemporary implants are usually good. Nevertheless, new implants are constantly being developed and introduced to the market. In recent years, there has been a trend towards shorter femoral implants, to save proximal bone and thereby facilitate any future revision surgery.

Aim: This thesis aimed to evaluate three different stem design, comparing them with a reference stem (Papers I–III). In Paper IV, register data were used to study and compare survival rates and first-time revisions of short stems versus stems of standard length.

Results: Small differences in outcome were found between implants as regards patient-reported outcome measures and migration as seen through radiostereometric analysis. In contrast to the aim of the design, two of the studied implants had more pronounced loss of proximal bone stock. In Paper IV, the short stems showed survival rates equalling those of standard stems. In first-time revisions, short stems were – more frequently than standard stems – exchanged with stems of standard length as opposed to longer revision stems.

Conclusion: In conclusion, there were small differences in outcome between the implant designs studied and reference stems. Two of the studied stems were associated with increased loss of proximal bone density, this stands in contrast to the aim of the design. However, if revision becomes necessary, a short stem seems to allow for replacement with a stem of standard length, which may be advantageous in younger patients with risk of repeated revision surgery.

Keywords: Total hip arthroplasty, Radiostereometric analysis, DXA, patient-reported outcome measures, bone mineral density loss, revision

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