

# **Total Shoulder Arthroplasty**

## **Clinical and radiological studies on the implant positioning and fixation**

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### **Akademisk avhandling**

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### **Abstract**

Shoulder arthroplasty surgery has shown remarkable progress during the last few decades. A number of factors affect postoperative range of motion, pain and prosthetic durability. Among these factors, the length of the lever arm and joint stability is the ones that can be altered by the selected prosthetic component. It is uncertain how much of the normal anatomy needs to be re-established. Stemless prostheses with total reliance on metaphyseal fixation were introduced in France in 2004 (TESS, Zimmer Biomet). The goals were to avoid stem-related complications. Stemless implants have other potential benefits, including the ability to restore shoulder anatomy.

**Study I:** This is a prospective cohort study of 49 patients with one of two versions of the TESS prosthesis (anatomical or reverse) with clinical and radiological follow-up ranging from 9–24 months. The TESS prosthesis showed short-term results that were comparable with other shoulder prosthetic systems.

**Study II:** This is a prospective comparative non-randomised study of 37 patients (40 shoulders) who underwent TESS reverse shoulder arthroplasty (RSA) with a follow-up ranging from 15–66 months. We found a significant improvement in functional outcome and reduction of pain in both stemmed and stemless groups. Glenoid overhang influenced the occurrence of scapular notching (SN).

**Study III:** This is a radiological study showing that CT had a good reliability and reproducibility in estimating LHO.

**Study IV:** This is a prospective radiological study of 69 patients (70 shoulders) with primary osteoarthritis (OA) who had undergone stemless total anatomical shoulder arthroplasty (TSA). This study showed that stemless anatomical TSA could be useful in restoring shoulder anatomy.

**Study V:** This is a prospective study of 44 patients with OA who had undergone stemless anatomical TSA with a clinical and radiological follow up ranging from 12 – 50 months. Our study showed that LHO reconstruction close to the anatomy of a healthy contralateral shoulder improved shoulder function. Stemless anatomical TSA help to restore LHO. Increasing LHO may have a negative effect on shoulder function at three months but had no effect at 12 months. The main conclusions of this thesis are:

1. TSA (anatomic and reverse) using stemless humeral components is reliable if bone quality is adequate. The complication rate is comparable with other shoulder prosthetic systems.
2. Glenoid overhang decreased complications in RSA.
3. LHO measurement on AP radiographs is less reliable and underestimates the distance when compared with CT.
4. Stemless TSA could be of help in reconstructing shoulder anatomy.
5. Shoulder reconstruction close to the anatomy of a healthy contralateral shoulder improves shoulder function.

### **Keywords**

Total shoulder arthroplasty, reverse shoulder arthroplasty, stemless shoulder arthroplasty, TESS shoulder prosthesis, comprehensive shoulder prosthesis, scapular notching, arm lengthening, Quick DASH, lateral humeral offset, glenohumeral offset, shoulder anatomy, CT shoulder, shoulder anatomy reconstruction.

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