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Capsular resection versus capsular repair in direct anterior approach for total hip arthroplasty: a prospective randomized controlled trial

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CAPSULAR RESECTION VERSUS CAPSULAR REPAIR in DIRECT ANTERIOR APPROACH for THA:
A PROSPECTIVE RANDOMIZED CONTROLLED TRIAL

INTRODUCTION
The intermuscular and intertrenuous direct anterior approach (DAA) for primary total hip arthroplasty (THA) has become increasingly popular because of early recovery of muscle strength and improved walking ability in the early postoperative period. The capsular releasing sequence is crucial to safely conduct the procedure on a regular table. The release of the anterior capsule is the first step of this sequence and allows for optimal exposure of the femur and acetabulum. This can be done by either resecting a part of the anterior capsule or by preserving it. Preserving the anterior capsule can be time-consuming, especially in the surgical learning curve, and it is a potential burden for optimal implant positioning. However, sparing the capsule might be a stabilizing factor as well as it is an extra barrier in hemostasis as well as infection. A restored capsule could figure as a protection sleeve for the psoas tendon and give the surgeon important feedback on the biomechanical aspect of the native hip.

PURPOSE
The aim of this study was to compare capsular resection versus capsular repair through:
1. patient-reported outcome measures (PROMs)
2. the incidence of adverse events
3. the implant position radiographically.

We hypothesized that clinical outcome would not be different between both techniques.

PATIENTS & METHODS
Between November 2017 and November 2018, we included 190 patients with end stage hip osteoarthritis, scheduled for THA. Patients with rheumatoid arthritis, previous surgery of hip or spine, or fractures were excluded. Bilateral cases were not excluded.

RANDOMIZATION: Participants were randomized into two cohorts: capsular resection (CR) (N=115) or capsular sparing (CS) (N=104) cohort. No statistical differences were found regarding demographic parameters (age, sex, BMI).

OPERATIVE TECHNIQUE: All procedures were conducted by the senior author (K.C.) on a regular OR table without hyperextension and with the same brand of cementless implant (Picoacetab - Corin8, Depuy-Synthes). A bikini-incision was used. In the CR cohort, a triangle of the anterior capsule was resected, in the CS cohort a medial based anterior flap was created and sutured back in place at the end of the procedure (Figure 1, Figure 2).

OUTCOMES: Harris Hip Score (HHS), Hip disability and Osteoarthritis Outcome Score (HOOS) and the Short Form 36 Item Health Survey (SF-36) were used to monitor outcomes pre-operatively and 1 year postoperatively. In addition, adverse events as wound problems (infection, hemorrhage, thromboembolic events), implant fractures, and revision surgery were monitored. Furthermore, postoperative radiographs were evaluated by 2 independent orthopedic surgeons by using Lyricare®. In both cohorts, blood standing radiography records were performed at 3 months after surgery. Using Lewiinek criteria, they were analyzed twice at an interval of 6 weeks by one observer.

RESULTS
A bilateral procedure was performed in 18 patients in the CR group, versus 15 patients in the CS group. In the CR and CS group, respectively 8 patients (7.0%) and 6 patients (7.7%) did not respond for PROMs for a variety of logistic reasons. One patient died 8 months after surgery because of a pneumothorax. Of the responders, preoperative response rate was 86.0% in the CR group versus 88.5% in the CS group. Postoperative response rate was 89.7% versus 85.8% respectively.

There was no difference in duration of surgery (p=0.756). After 1 year, both cohorts had no difference in improvement of HHS, HOOS or SF-36.

There were no dislocations, rehospitalization or reoperations in both groups. During follow-up, the incidence of psoas tendonitis was 6 cases in the CR cohort (8.2%) and 7 cases in the CS cohort (11.7%) (p=0.639). Wound problems occurred in 1 case (1.4%) in the CR group and in 3 cases (2.9%) in the CS group (p=0.268). For the CR cohort versus CS cohort respectively, the mean acetabular component abduction- inclination was 33.0° versus 33.2° (p=0.276), mean cup anteverision was 16.5° versus 16.8° (p=0.392) and mean femoral component varus was 1.3° versus 1.4° (p=0.351).

CONCLUSION
No clinical or radiographic differences were found between resection or preservation of the anterior capsule when performing a primary THA through the anterior approach.

In order to optimize the acetabular and femoral exposure, it might be advisable to resect a part of the intertrenuous capsule, especially during the surgical learning curve, without compromising the clinical outcomes.

Nevertheless, we still use a capsular preservation technique in our routine practice. In our opinion, a restored capsule gives the surgeon important feedback on the biomechanical aspect of the native hip, without causing malpositioning of the component and in the same amount of surgery time.

An important limitation of this study is the substantial non-response rate of PROMs, due to a variety of reasons, all unlikely to be related to outcome.

The strength of this study included its prospective, randomized double blinded design. Using HHS, HOOS as well as SF-36, we covered a broad spectrum of commonly used PROMs. We also avoided the potential influence of the learning curve by conducting all procedures by the same experienced surgeon, making the capsular management the only difference in treatment.

LEVEL OF EVIDENCE - LEVEL 1 - PROSPECTIVE RANDOMIZED CONTROLLED TRIAL

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