

# Acromioplasty Planification: A Randomized Prospective Study

Shoulder / Shoulder - Rotator Cuff

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## Aim

We developed a computer-assisted planning solution “ArthroPlanner” for acromioplasty. The solution allows to perform standard morphological bony measurements, as well as 3D simulations of the patient’s joint during everyday shoulder activities. The software computes the precise bone resection (location and amount) based on detected subacromial impingements during motion.

## Background

Subacromial impingement of the rotator cuff between the anterior or lateral acromion and the superior humeral head is a common disorder.

## Methods

We reconstruct the bones of the patient’s shoulder joint (scapula and humerus from the humeral head to the mid-shaft) from a CT image. The bones are then imported into ArthroPlanner software and the following steps are performed: 1) generic bone models are produced, 2) biomechanical parameters are computed to permit motion description of the glenohumeral joint, 3) morphological measurements are performed to analyze individual shoulder anatomy (CSA,  $\beta$  angle,...), and 4) the joint is simulated using ROM of everyday activities, impingements detected for each motion and the resulting resection plan is calculated. Post-operative visits for all patients were performed at 6 months, including a clinical examination (evaluation of the ROM, pain scores) and an echography to control the rotator cuff. A post-operative CT 3D reconstruction was performed to determine the actual bone resection executed at surgery compared to the planning recommendations. The data collected were compared between the groups.

## Results

Preoperatively, groups were similar regarding scores,ROM, CSA, except for B angle. Postoperatively, ROM (AFF, abd, IR, ER), VAS, ASES, CS, SSV, SST, and tendon healing were similar. Nevertheless, bone resection was less in the planification group.

## Conclusions

Acromioplasty planification change the authors practice, allowing to do less acromioplasty and to remove less bone at different places.