

# Sustained Shoulder Muscle Atrophy After Proximal Humerus Fracture - A CT Study

Robin BK Hansson, Gabriel Baghdo, Åsa Fröberg, Antti P Launonen, Hans E Berg

Karolinska Institutet, CLINTEC, Stockholm, Sweden. Tampere University Hospital, Tampere, Finland

## Background

Clinical trials typically use patient reported outcomes (PROMS) to evaluate the long-term benefit of surgical or non-surgical treatment of proximal humerus fracture (PHF). While measurements of muscle mass and strength are cornerstones in many clinical studies of the lower limbs, such objective measures are largely lacking in RCTs of upper limb fractures.

## Objectives

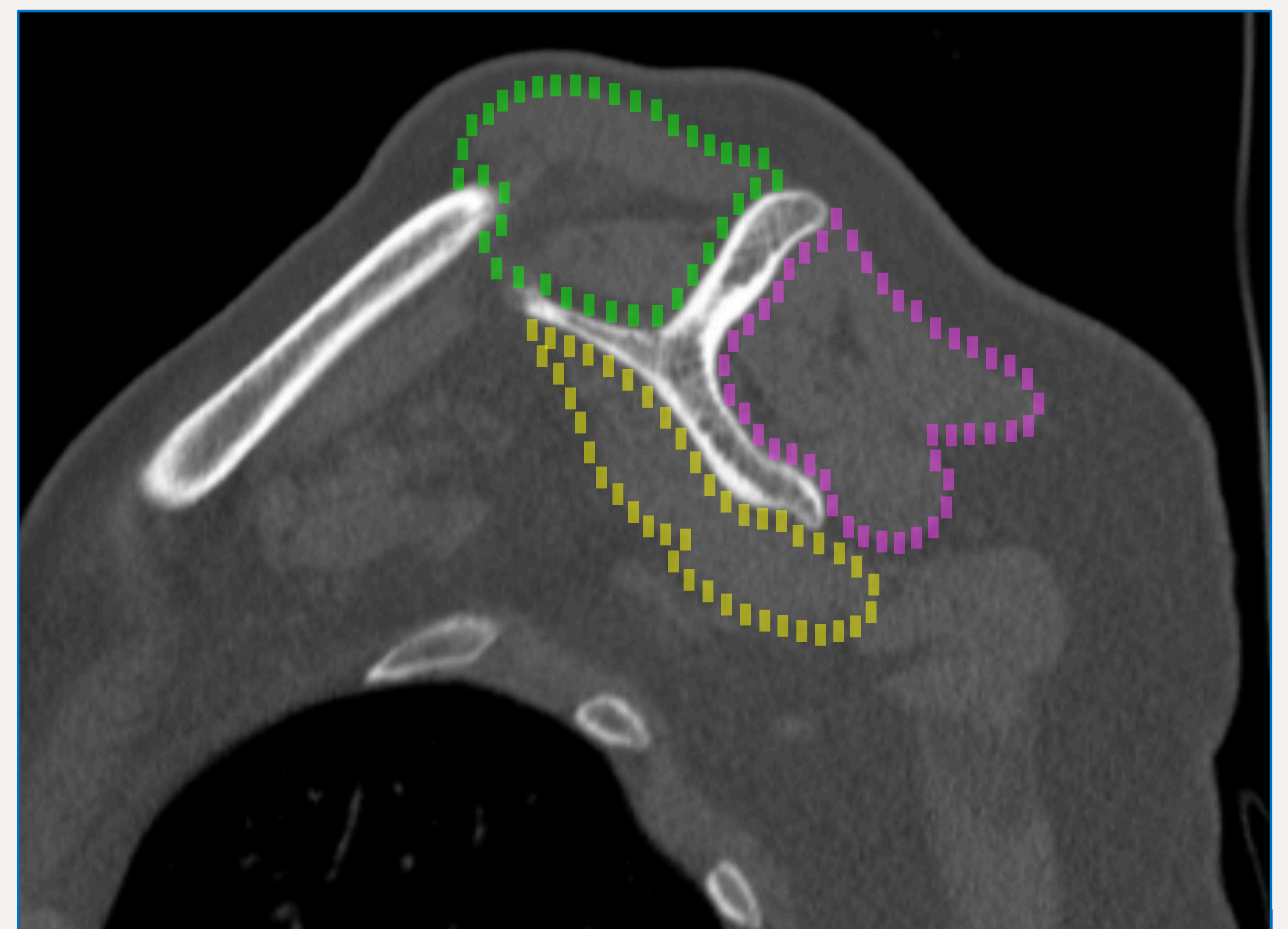
We aimed to develop objective methods to evaluate changes in muscle cross-sectional area (CSA) and radiological attenuation (RA; fatty infiltration) of multiple shoulder muscles after PHF.

## Study Design & Methods

Eleven prospectively included patients, treated non-operatively for dislocated PHF were studied in this pilot study. Anonymized CT-scans were manually measured for shoulder muscle CSA and RA in standardized projections by use of the image program ImageJ2. The deltoid, supraspinatus, infraspinatus/teres minor and subscapularis muscles were examined at the trauma and one year later.

## Results

Profound atrophy was assessed in all four measured shoulder muscles 1 year after trauma. The deltoid muscle was preserved in RA (fat content) whereas CSA (size) declined by 41%. In contrast, the supraspinatus and shoulder external rotators showed substantial fat infiltration (-15 HU), with a less pronounced decrease in CSA (28%).



Oblique-sagittal plane perpendicular to the glenoid surface/scapular body through the medial border of the coracoid process (known as the Y-view). Green: Supraspinatus, Purple: External rotators (Infraspinatus, Teres minor), Yellow: Subscapularis.

## Conclusions

The profound long-term muscle atrophy seen after this common injury would most likely decrease strength and challenge shoulder function. The marked differences in fatty infiltration and size suggest a possible difference in rehabilitation rate between shoulder muscles.

