

## **A link between changes in knee joint function and biomarkers of bone degradation in individuals with knee osteoarthritis**

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### Introduction

This study investigates biomarkers of bone- and cartilage degradation and their association with knee function and pain in individuals with knee osteoarthritis (KOA).

### Methods

Sixteen individuals with KOA performed baseline evaluations and a one-year follow-up including a maximal jump for distance (JFD, cm), the 30s Single Leg Mini-Squat test (SLMS) with simultaneous recording of knee kinematics, and completed the Knee Injury and Osteoarthritis Outcome Score (KOOS). Knee flexion-extension range of motion (ROM) during the SLMS were extracted, and a mean Jerk Index (MJI) was calculated. Levels of TRAP and C2C (bone and cartilage degradation) in plasma were analyzed using ELISA.

### Results

At the one-year follow-up, mean flexion-extension ROM during the SLMS was significantly reduced, and levels of TRAP and C2C increased (Figure 1A-C). Exploration of associations between change scores showed moderate negative correlations between TRAP and MJI ( $r=-0.50$ ,  $p=0.05$ ), and between TRAP and KOOS subscales Pain ( $r=-0.67$ ), Symptoms ( $r=-0.64$ ), and ADL ( $r=-0.64$ ) ( $p<0.01$ ).

### Discussion

TRAP and C2C were increased at the one-year follow-up, accompanied by a reduction in flexion-extension ROM during SLMS. The explorative analysis of change scores demonstrated that increased TRAP was associated with worse patient-reported pain and symptoms, and reduced MJI-variability. The data indicate a link between changes in joint function and degradation biomarkers. However, the relationship is complex and further investigations are warranted to determine directions and implications.

Figure 1. Change in A) knee flexion-extension ROM during SLMS test, and plasma levels of B) bone degradation and C) cartilage degradation.