

ORIGINAL RESEARCH COMMUNICATION

# Reduced physical activity increases intermuscular adipose tissue in healthy young adults<sup>1,2,3</sup>

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**Background:** Recent findings suggest that higher levels of intermuscular adipose tissue (IMAT) are associated with glucose dysregulation, lower levels of muscle strength, and a heightened risk of disability. Although several studies have described adaptations in muscle after reduced physical activity, the change in IMAT in healthy young adults is unknown.

**Objective:** The objective was to determine whether reduced lower limb activity alters IMAT in healthy young adults and to assess whether this change affects muscle strength loss.

**Design:** The subjects (6 men and 12 women aged 19–28 y) underwent a 4-wk control period, which was followed by 4 wk of unilateral lower limb suspension. Volumes of whole muscle, subcutaneous adipose tissue, and IMAT were assessed by using magnetic resonance imaging in the thigh and calf. Muscle strength was assessed during maximal voluntary isometric contractions.

**Results:** No changes were observed in the control period. Reduced physical activity decreased thigh and calf muscle volumes by 7.4% and 7.9% ( $P < 0.001$ ), respectively; no significant change in subcutaneous adipose tissue was observed. Additionally, IMAT increased in both regions; the increase was larger in the calf (20%) than in the thigh (14.5%) ( $P \leq 0.005$ ) and was partially explained by the loss in muscle ( $R^2 = 26\%$ ). The loss in strength was greater in the thigh (20.4%) than in the calf (15%). Strength loss was associated with increases in IMAT ( $P = 0.039$ ) after adjustment for the loss in muscle, initial strength, initial IMAT, and initial muscle volume.

**Conclusions:** IMAT accumulates markedly after reduced activity in healthy young adults. Increases in IMAT may contribute to losses in muscle strength associated with reduced physical activity, but the mechanism responsible is yet to be determined.

**Key Words:** Unilateral limb suspension • bed rest • physical inactivity • intermuscular adipose tissue

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