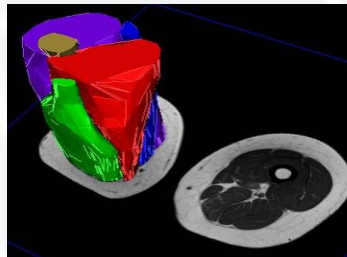


Comparison of Muscle Area and Strength between Knees with and without Structural Progression – Pilot Data from the OAI



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for the OAI investigators

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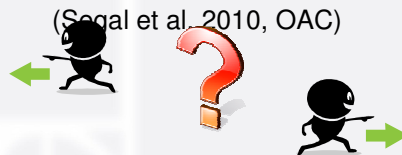
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Motivation

“In women but not in men, quadriceps weakness was associated with increased risk for tibiofemoral and whole knee JSN”

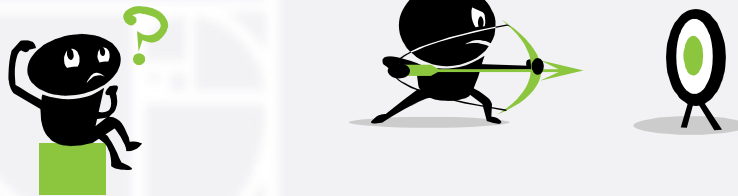


„Greater quadriceps strength at baseline was associated with increased likelihood of tibiofemoral osteoarthritis progression in malaligned and lax knees.“

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Study objectives

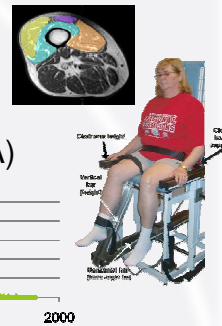
Do baseline values or two-year changes in muscle status predict structural progression of osteoarthritis?



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Study design

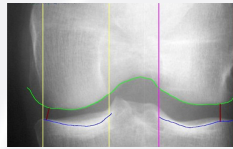
- Case-control study
 - Progressor – Non-progressor
- Analyzed muscle characteristics:
 - Anatomical cross sectional area (ACSA)
 - (Specific) strength
 - MR image signal intensity
- Analyzed muscles:
 - Quadriceps \leftrightarrow
 - Thigh muscle groups: Hamstrings, Adductors
 - Quadriceps heads



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Progressor definition

Criterion one: X-ray



$\Delta \text{mmJSW} > \text{SDC}^*$

Structural progressor
in medial compartment

$\Delta \text{MFTC_ThCtAB} > \text{SDC}^*$



$\Delta \text{mmJSW} < \text{SDC}^*$

$\Delta \text{MFTC_ThCtAB} < \text{SDC}^*$

Structural non-progressor
Neither in medial nor in lateral compartment

Criterion two: MRI

*SDC derived from OAI pilot study

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Progressor selection

OAI sample with available quantitative MRI data: n=725
(Eckstein et al. 2011, ACR)

100 knees excluded: Missing JSW measurements

JSW measurements available (BL & FU): n=625

Progression by X-ray: n=141

Progression by MRI: n=134

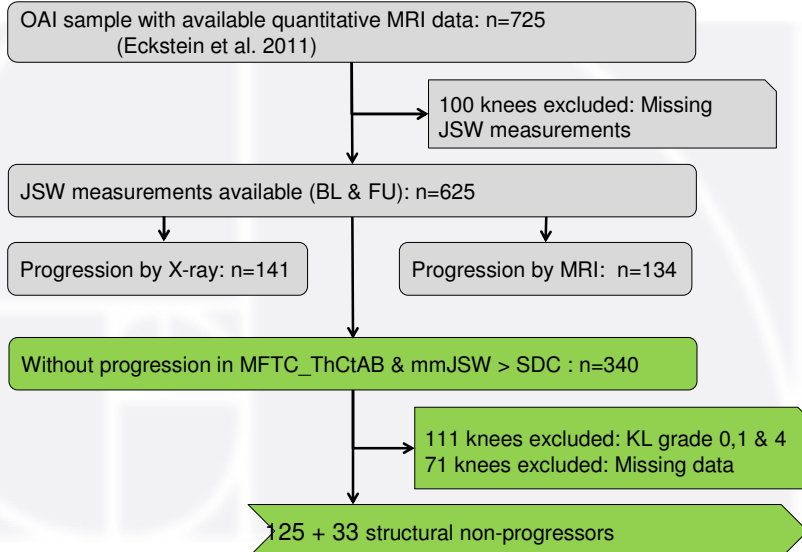
Medial progression in MFTC_ThCtAB & mmJSW > SDC : n=54

8 knees excluded: KL grade 0,1 & 4
14 + 6 knees excluded: Missing data

26 + 6 structural progressors

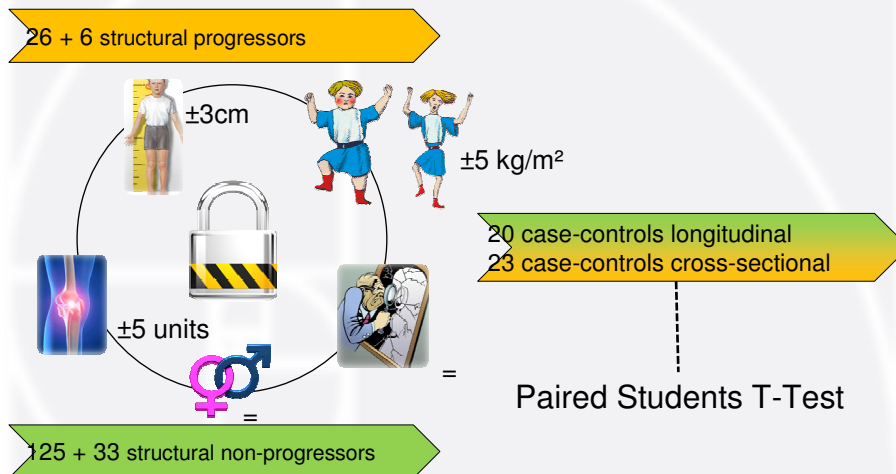
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Non-progressor selection



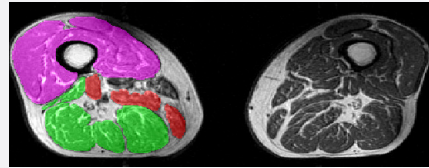
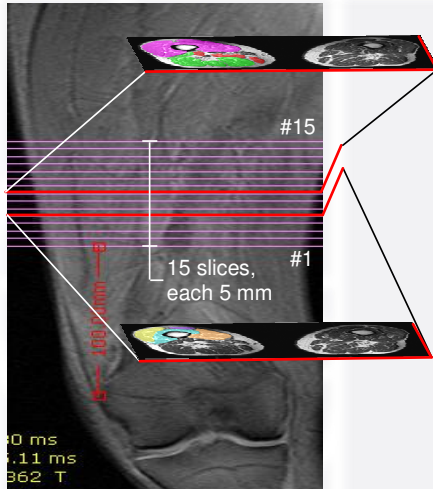
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Participant matching

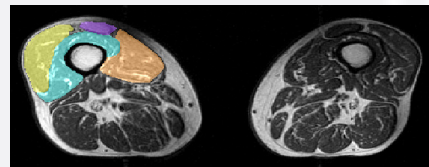


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Data acquisition



Thigh muscle groups at 33% femoral length *

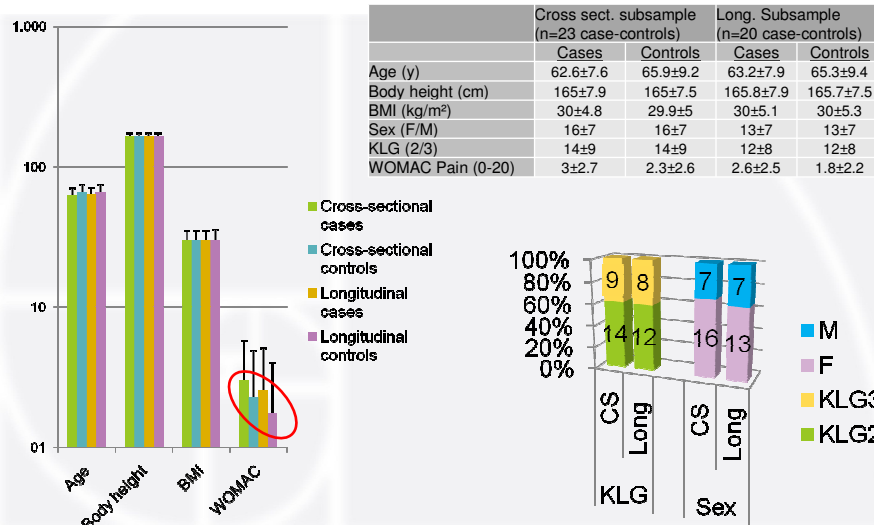


Quadriceps heads at 30% femoral length *

*location estimated by body height (Dannhauer et al. 2010)

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Demographics

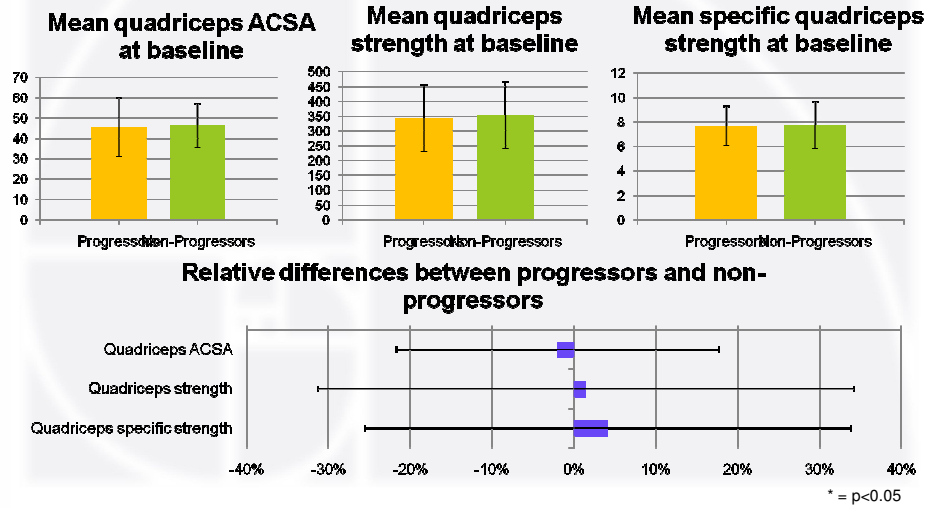


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Primary Endpoints

Cross-sectional

Quadriceps ACSA, strength and specific strength

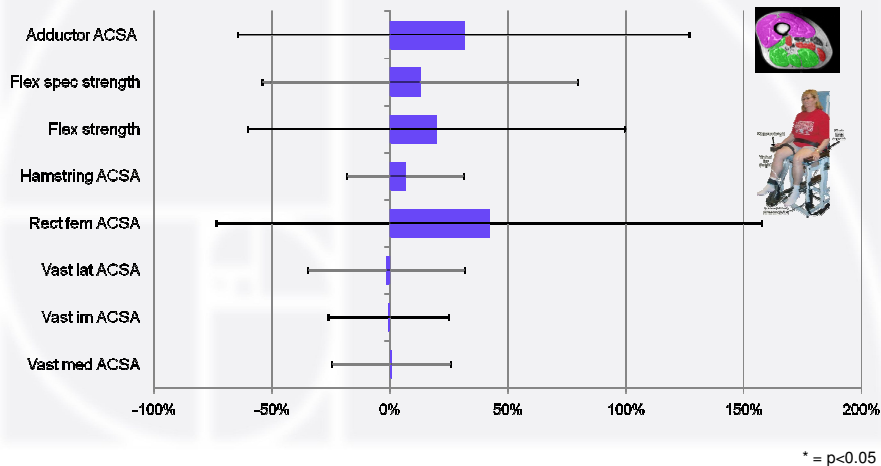


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Exploratory analyses

Cross-sectional

Quadriceps head, thigh muscle group ACSAs, hamstrings strength and specific strength

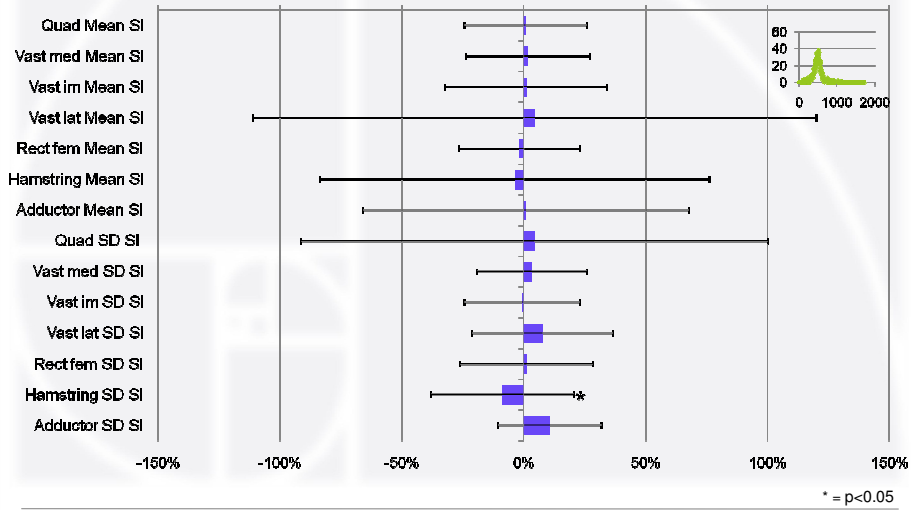


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Exploratory analyses

Cross-sectional

MR image signal intensity analyses



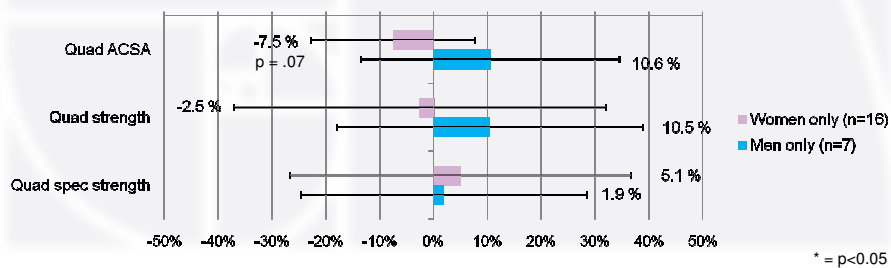
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Exploratory sex specific analyses

Cross-sectional

„In women but not in men, quadriceps weakness was associated with increased risk for tibiofemoral and whole knee JSN“ Segal et al. 2010, OAC

Sensitivity analyses: Relative difference of quadriceps muscle status at baseline



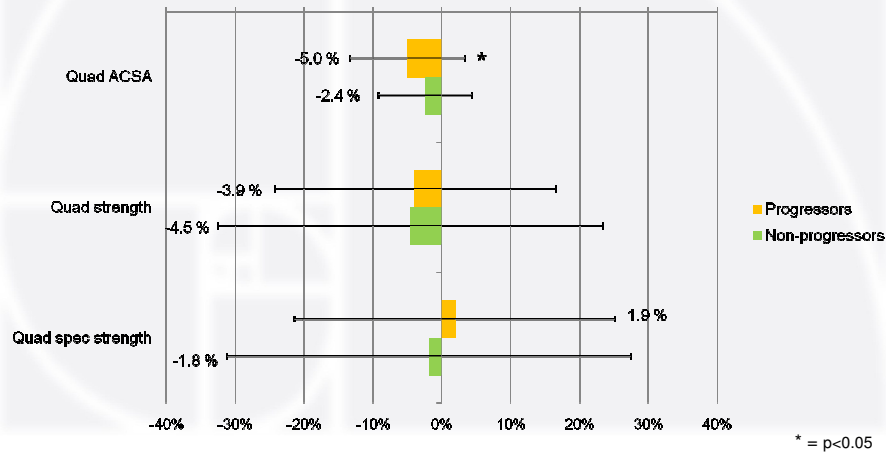
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Secondary Endpoints

Longitudinal

Quadriceps ACSA, strength and specific strength

Mean longitudinal changes of quadriceps muscle status

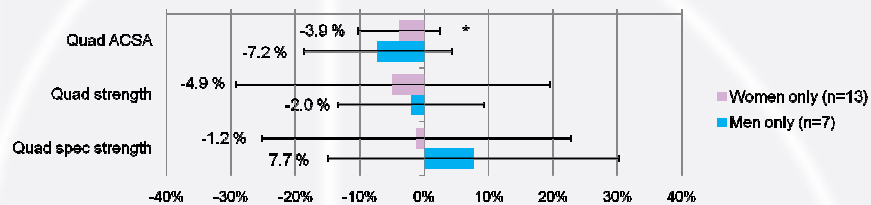


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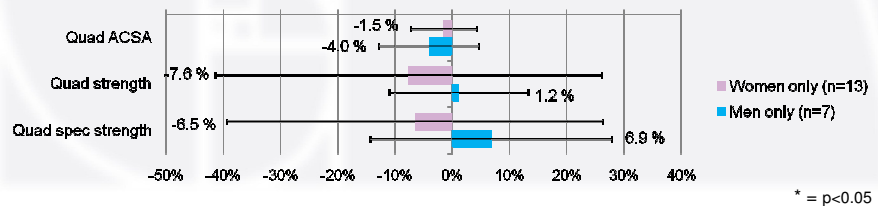
Exploratory sex specific analyses

Longitudinal

Sensitivity analyses: Longitudinal changes of quadriceps muscle status in progressors

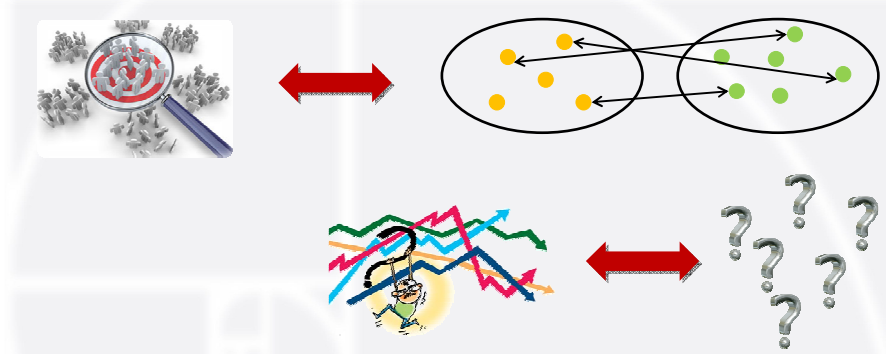


Sensitivity analyses: Longitudinal changes of quadriceps muscle status in non-progressors



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Conclusion



Despite the robust definition of structural progression and a close matching between progressors and non-progressor knees, findings of this pilot study do not support that thigh muscle status is associated with structural progression in knees with radiographic OA.