Characterization of joint instability and cartilage changes in early knee OA

NanoDiaRA

Field: Musculoskeletal Biomechanics

Heide Boeth

Engineering Track
Project start January 2010

Mentoring Committee

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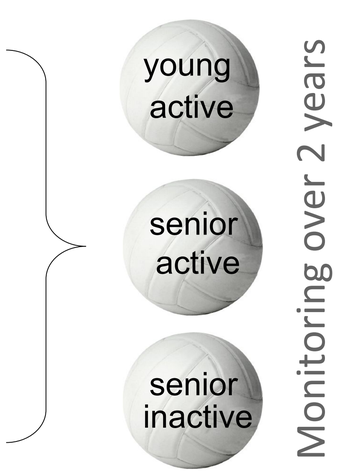
Aims and Objectives

Early detection of knee OA

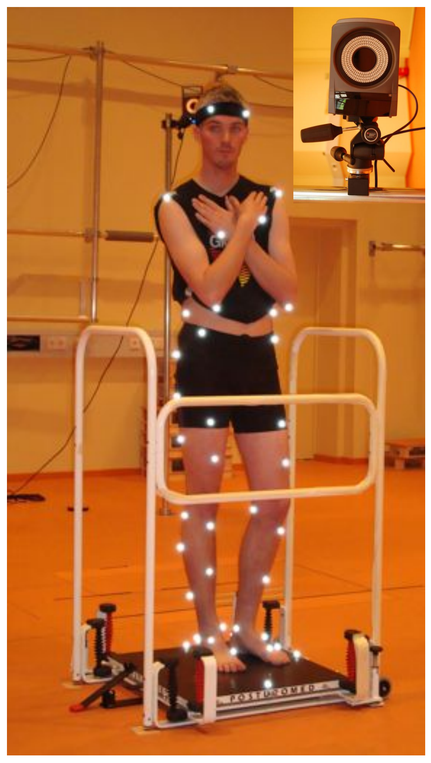
- **Quantification knee joint stability**
  → Optical measurement system
- **Quantification cartilage volume**
  → 3D reconstruction from MRI data
- **Detection of collagen wear products**
  → Serum / urine samples



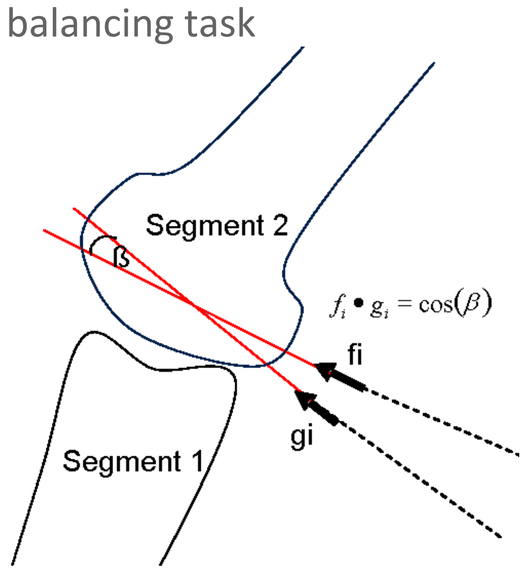
Hypothesis:

Knee joint stability		Cartilage volume	
↑	young active	↓	young active
	senior active		senior inactive
↓	senior inactive		senior active

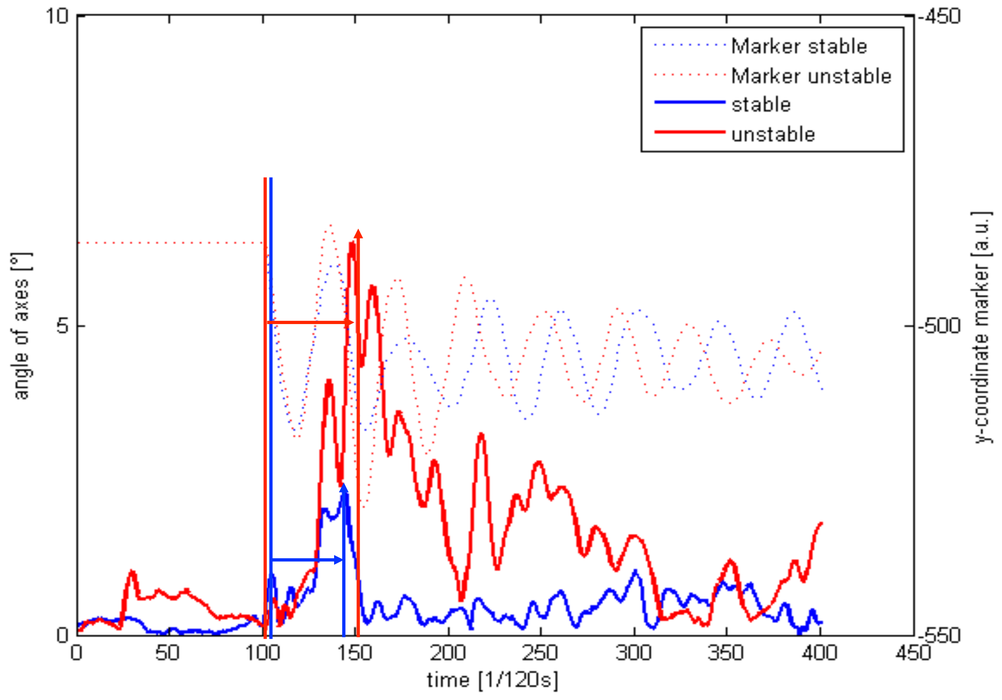
Materials & Methods

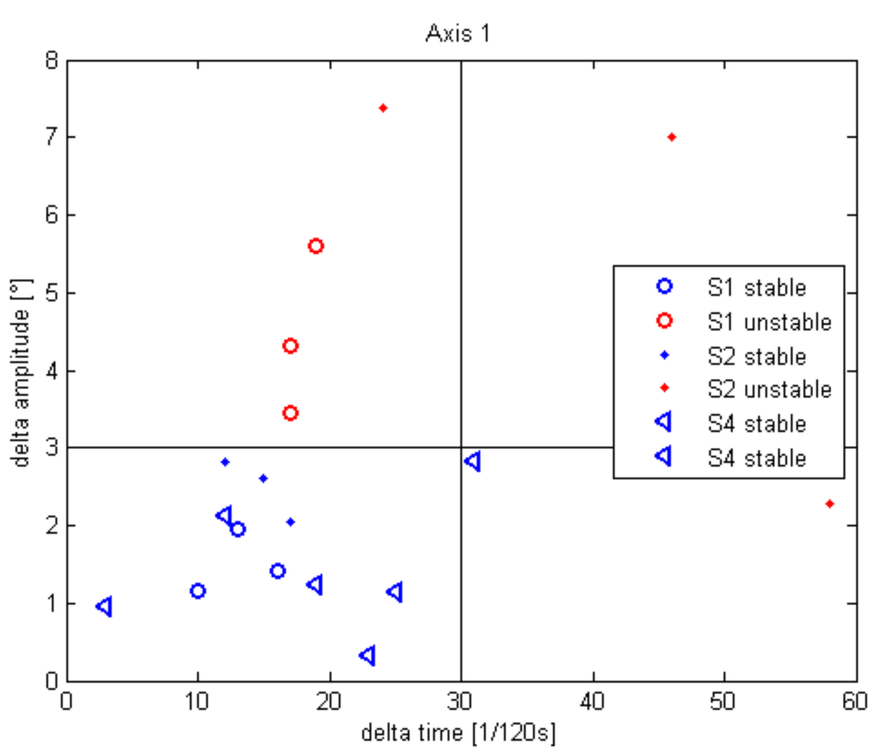


- Vicon measurement system
- Calculation of knee joint axis (Ehrig et al. 2007) during a balancing task



Preliminary Results



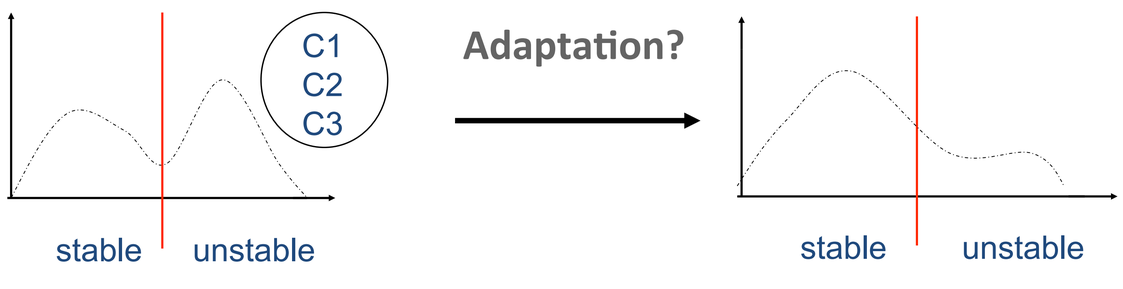


Schedule

2010	Jan	Literature search, Ethical approval, Investigating methods for measuring knee joint stability
	April	Test measurements + data analysis Subject recruitment
	Sept	Proposal submission Functional measurement protocol completed 1st & 2nd subject cohort : MRT + serum / urine 1st subject cohort: stability measurement
2011	Jan	2nd & 3rd subject cohort: stability measurement 3rd subject cohort: MRT + serum / urine
	Apr	Data analysis, Algorithm development
2012	Sept	Repeat all measurements
2013	Jan	Data analysis of repeated measurements Write up results. Get Ph.D.

Perspectives

1. Development from baseline?



2. Adaptation after 2 years?

- Is there a relevant increase in knee joint stability in young active athletes over the 2 years?
- Are active seniors able to maintain joint stability?
- Do young and elderly athletes loose cartilage at the same rate?

Acknowledgements

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