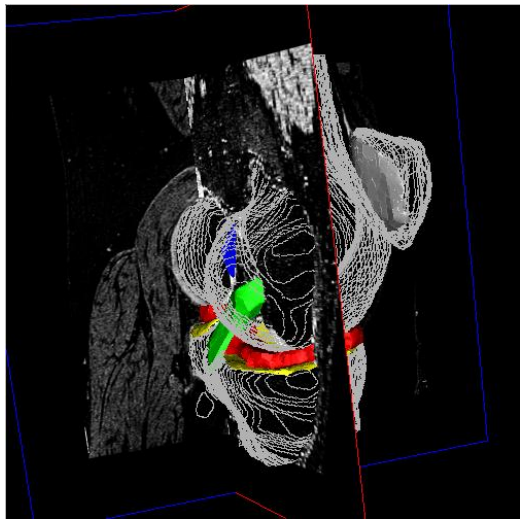
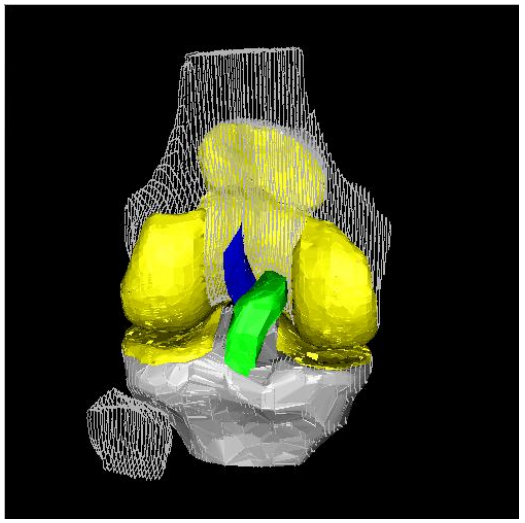


PARACELSUS
MEDIZINISCHE PRIVATUNIVERSITÄT

NanoDiaRA



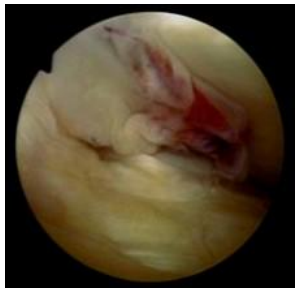
PROLONGED SUBREGIONAL FEMORO-TIBIAL CARTILAGE INCREASE AFTER ACL TEAR – 5-YEAR FOLLOW-UP

F. Eckstein[1], W. Wirth[1], M. Hudelmaier[1], L.S. Lohmander[2], R.Frobell[2]

[1]Paracelsus Medical University, Salzburg, Austria & Chondrometrics GmbH, Ainring, Germany; [2] Orthopedics, Clinical Sciences Lund, Lund University, Lund, Sweden

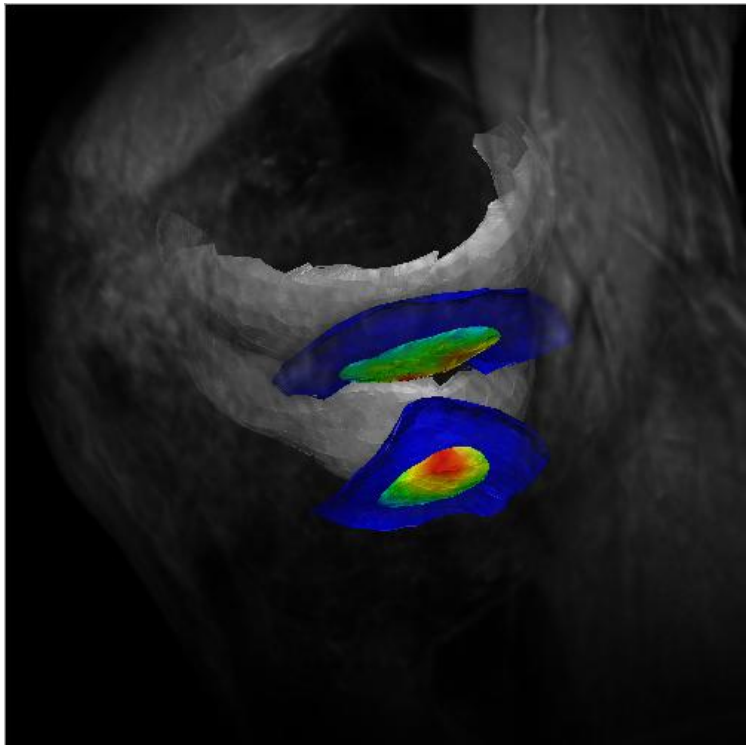
3550 / Cartilage Increase after ACL Tear - Background

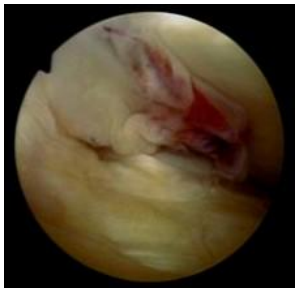
- An ACL tear is a serious and common knee injury.
- It mainly affects young active adults.
- In the long term, the risk of OA development is increased:
  - » *due to the acute trauma*
  - » *due to chronic unfavorable biomechanical conditions*
- Little is known about the structural changes in cartilage following ACL injury

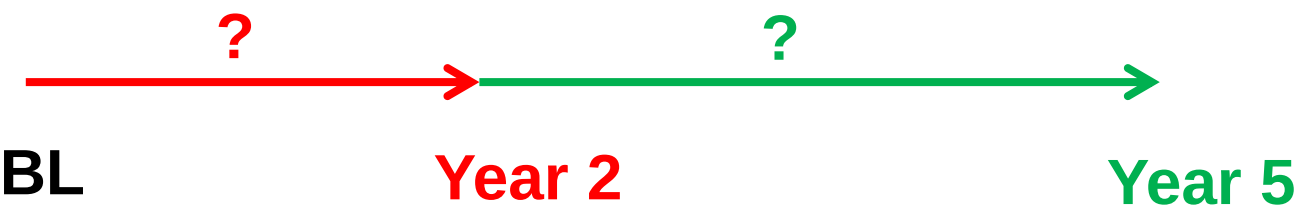


3550 / Cartilage Increase after ACL Tear - Objective

- To determine the rate of change in (subregional) cartilage thickness after ACL injury:
  - » in the early phase (BL → 2 y follow up)
  - » in an intermediate phase (2 → 5 y follow up)



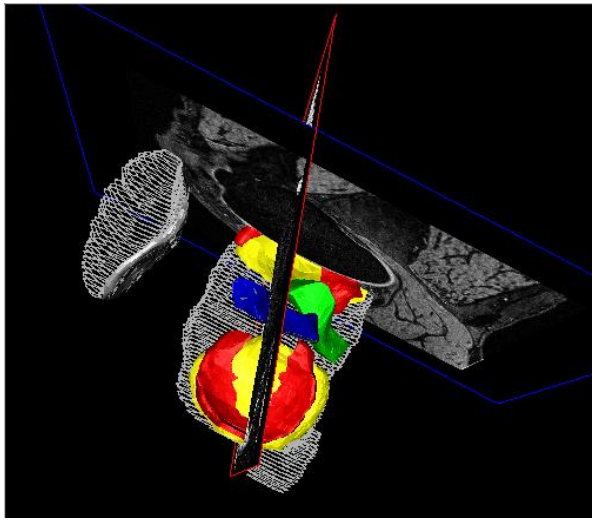


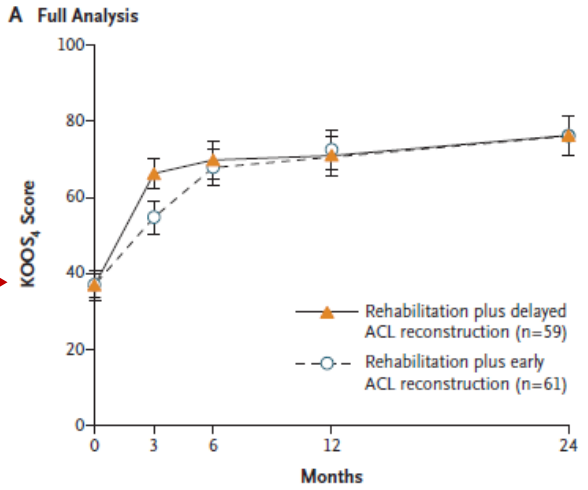


3550 / Cartilage Increase after ACL Tear – KANON Study

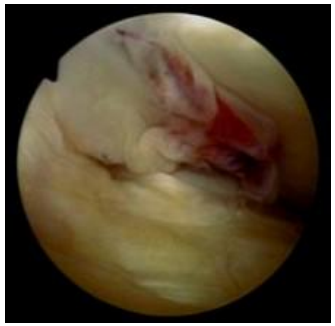
- 121 young, active adults:
  ACL tear after trauma to uninjured knee
- Primary analysis: comparison of clinical outcomes (KOOS) between patients randomized to:
  - » Early ACL reconstruction and structured rehabilitation or
  - » Structured rehabilitation with optional delayed ACL reconstruction
- No significant differences after 2 years
  (Frobell et al. N Engl. J. Med. 2010)

  or after 5 years
  (Frobell et al. Br Med J 2013).



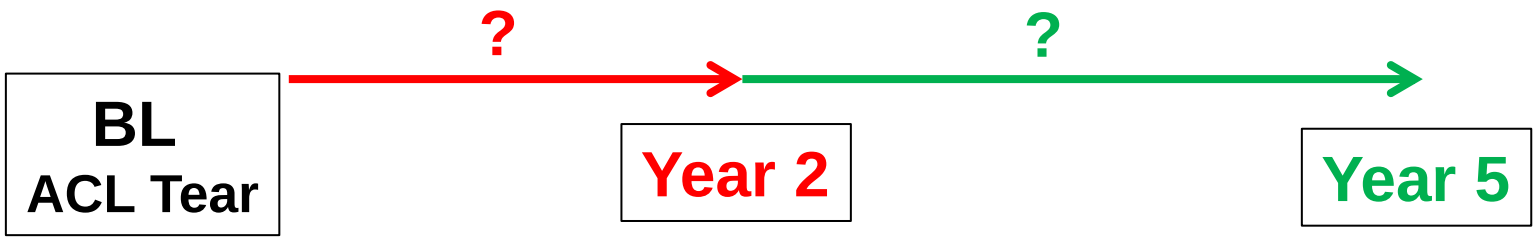


3550 / Cartilage Increase after ACL Tear - Design



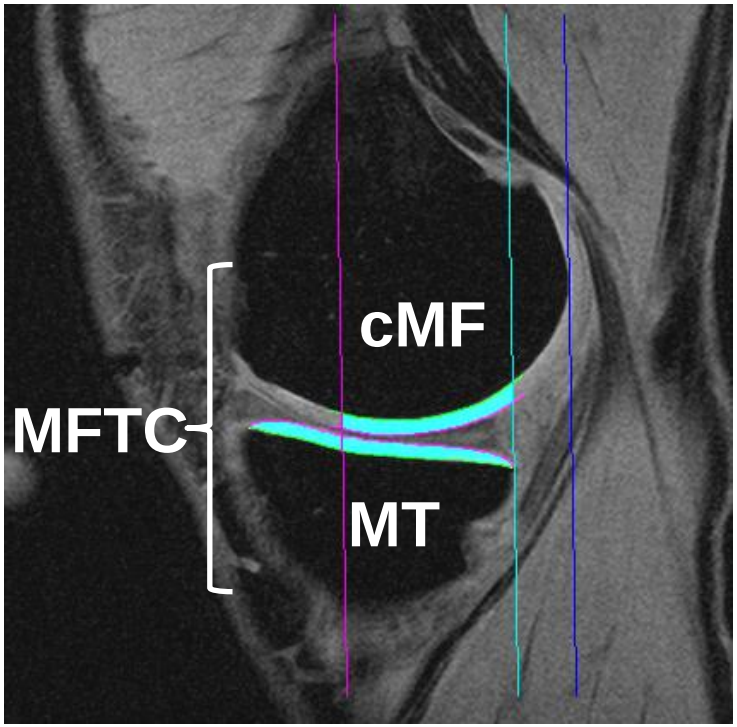
- ✓ Demographics
  - » 24% female participants
  - » Age: 26 ± 5 years
  - » BMI: 24.2 ± 3.0 kg/m^2
- ✓ Sagittal FLASH (1.5T)
  1.5mm x 0.29mm x 0.29mm

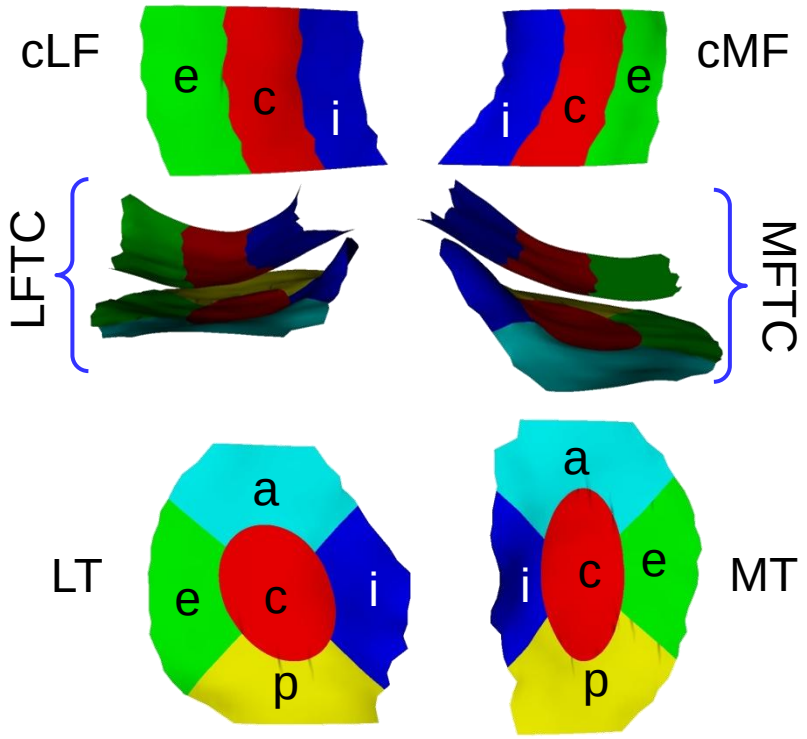
N= 106 (of 121) subjects with complete data



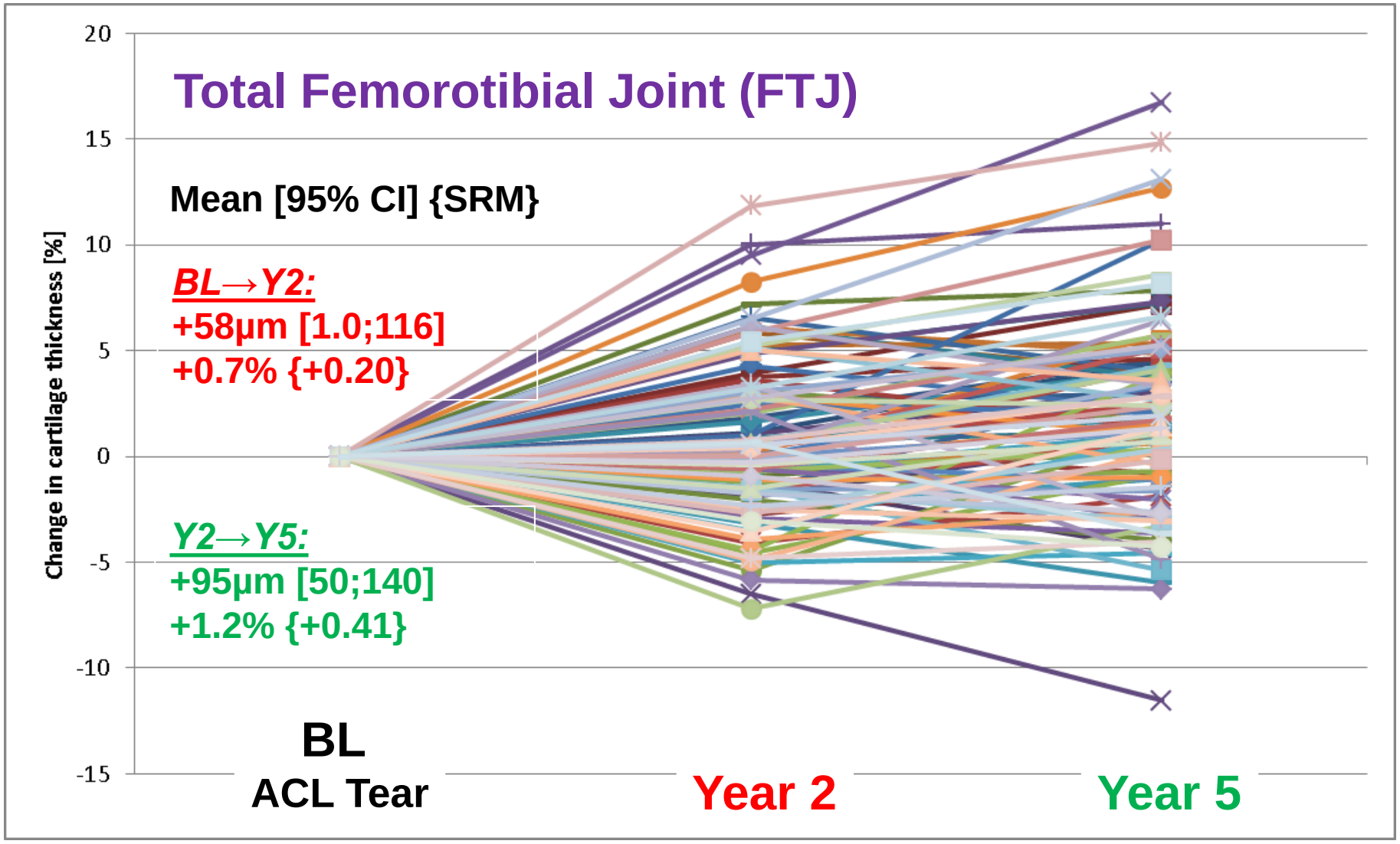
3550 / Cartilage Increase after ACL Tear - Analysis

- Pair-wise segmentation of articular cartilages (blinding to tpt):
  - » **Tibia:** Medial & lateral (MT/LT) each 5 subregions
  - » **Femur**: central 75% of medial & lateral condyle (cMF/cLF) each 3 subregions
  - » → Medial and lateral compartment (MFTC/LFTC) each 8 subregions
- Computation of cartilage thickness (ThCtAB)

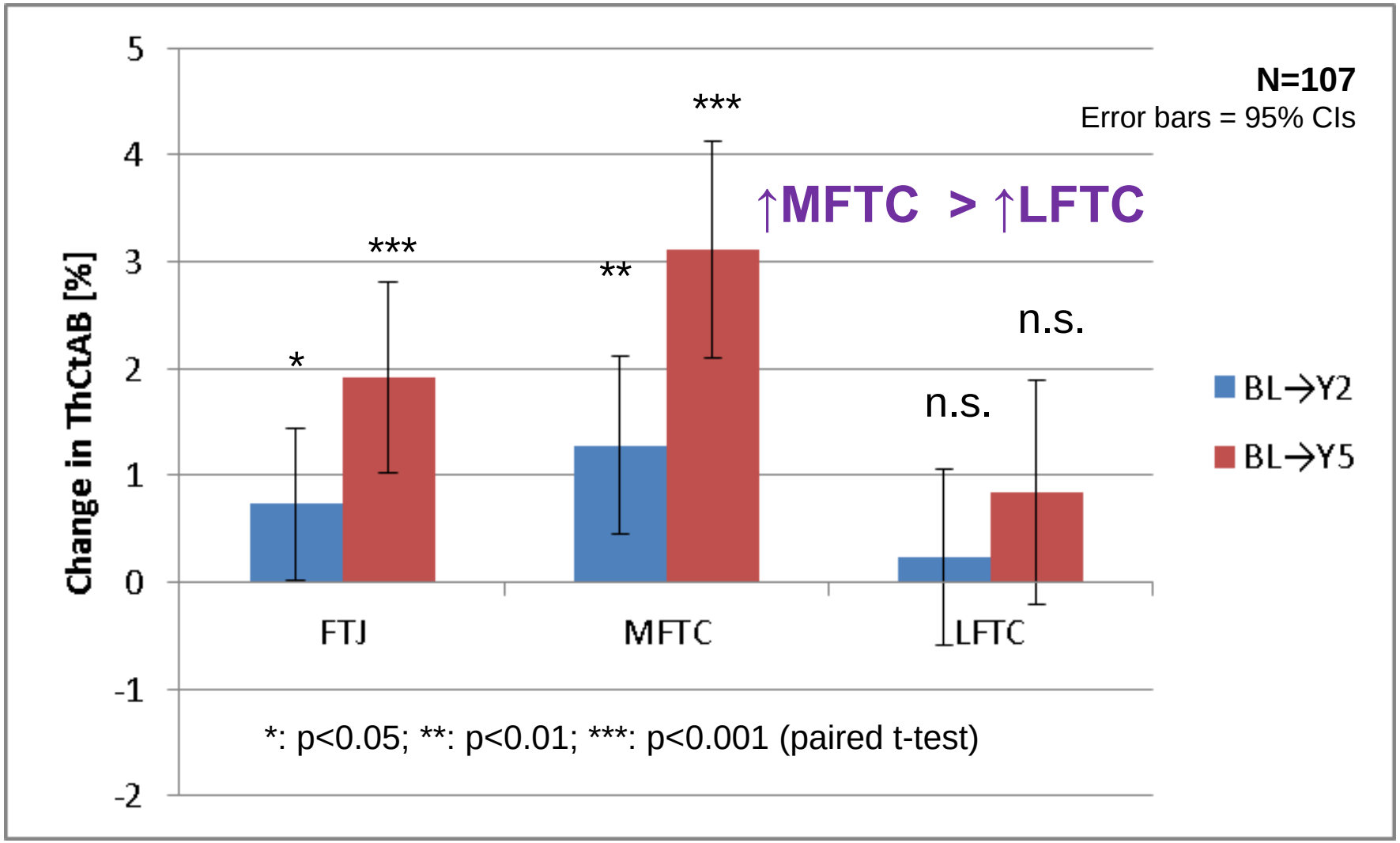




3550 / Cartilage Increase after ACL Tear – Results I



3550 / Cartilage Increase after ACL Tear – Results II



3550 / Cartilage Increase after ACL Tear – Results III

BL→Y2 (% change):

6 subregions ↑ (p<0.05)

8 subregions =

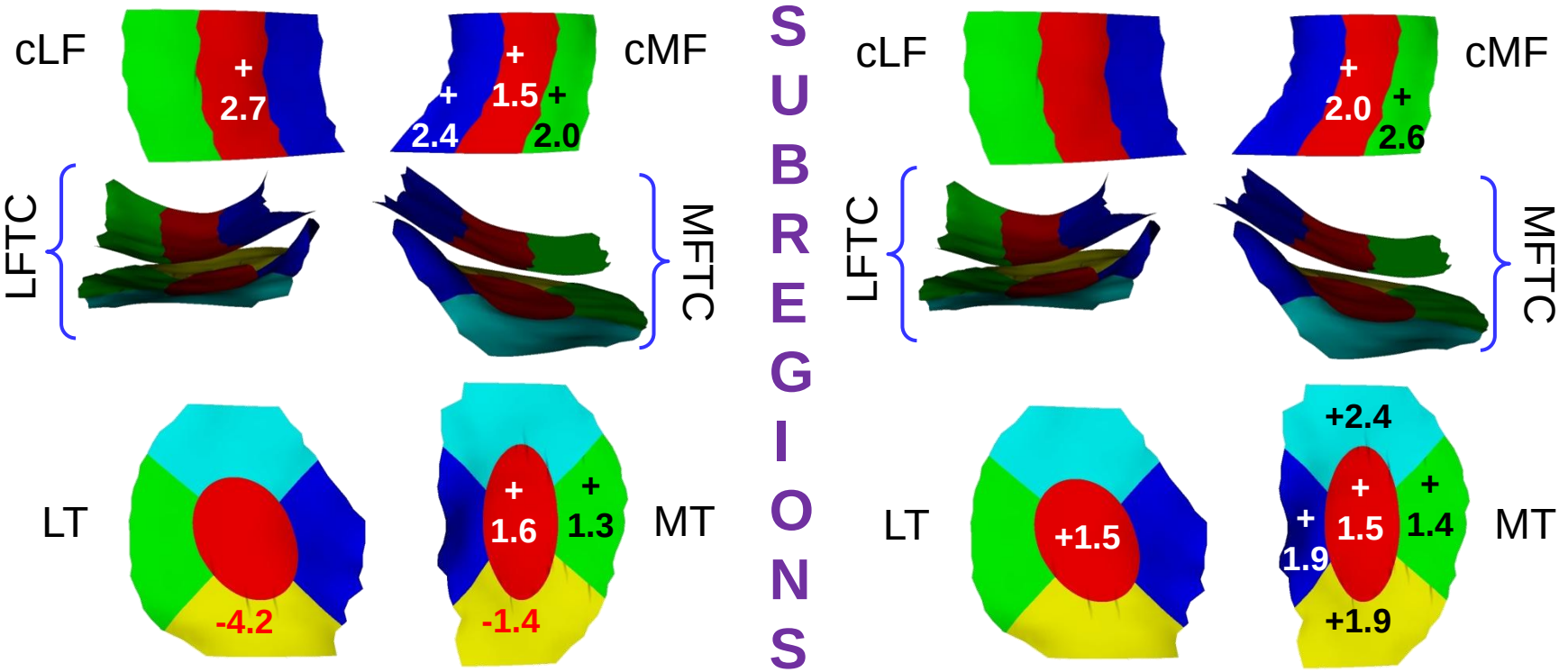
2 subregions ↓ (p<0.05)

Y2→Y5 (% change):

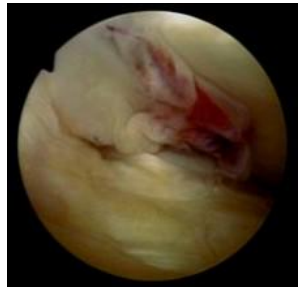
8 subregions ↑ (p<0.05)

8 subregions =

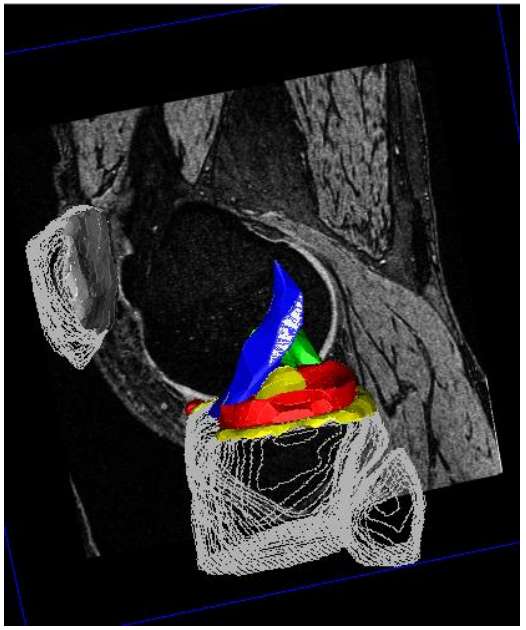
0 subregions. ↓



3550 / Cartilage Increase after ACL Tear - Conclusion

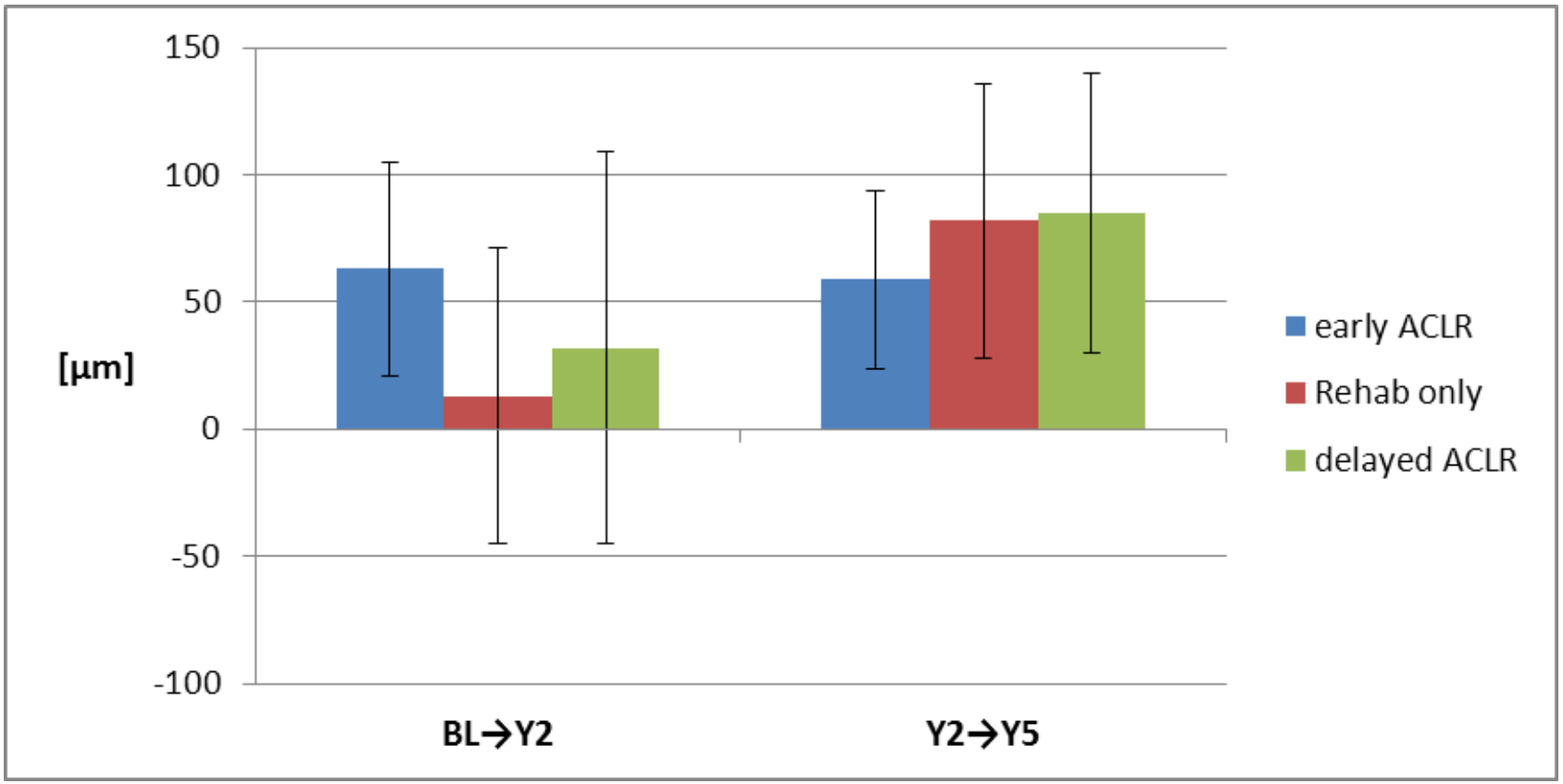


- Increase in cartilage thickness after ACL tear not only in the early, but also in an intermediate period (Y2 → Y5)
- Medial increase > lateral increase
- ecMF↑ and pLT↓ may be first signs of pathological change
- Impact of age and treatment?



3550 / Cartilage Increase after ACL Tear - Treatment

- MFTC cartilage increase
- No significant difference between treatment groups
  (ACLR = Surgical ACL Repair)



3550 / Cartilage Increase after ACL Tear - Funding

- ✓ The KANON was funded by the:
  - ✓ Swedish Research Council,
  - ✓ Medical Faculty of Lund University,
  - ✓ Region Skåne, Thelma Zoegas Fund,
  - ✓ Stig & Ragna Gorthon Research Foundation,
  - ✓ Swedish National Centre for Research in Sports,
  - ✓ Crafoord foundation,
  - ✓ Tore Nilsson research fund,
  - ✓ Pfizer Global Research.

LUND UNIVERSITY

PARACELSUS
MEDIZINISCHE PRIVATUNIVERSITÄT

- The quantitative cartilage analysis was performed at the Institute of Anatomy and Musculoskeletal Research @ Paracelsus Med. Univ. It was funded as part of NanoDiaRa project (7th EU framework), NMP4-LA-2009-228929, http://nanodiara.eu)

NanoDiaRA