Comparison between intra-articular contact patterns in the trapeziometacarpal joint of healthy and arthritic subjects

Benjamin Dourthe¹, Priscilla D’Agostino¹, Faes Kerkhof³, G. Harry van Lenthe², Filip Stockmans¹,³, and Evie Vereecke¹
1. Muscle & Movement Group, Development and Regeneration, University of Leuven, Kortrijk, Belgium; 2. Biomechanics Section, University of Leuven, Leuven, Belgium; 3. AZ Groeninge, Campus Looistraat, Kortrijk, Belgium
benjamin.dourthe@kuleuven.be

Objectives
1) Design a clinical tool to estimate the in vivo distribution of intra-articular pressure from CT images
2) Provide further insight on the development of osteoarthritis (OA) in the trapeziometacarpal (TMC) joint

Motivations
The trapeziometacarpal (TMC) joint has a major physiological role.
It provides the ability to perform a variety of prehensile tasks (e.g., writing, typing, holding and grasping objects/tools)¹.

Methodology
CT Scanning
Proximity mapping
Population: 16 healthy + 6 OA
Hand postures:
1 neutral
max. flexion/extension
max. adduction/abduction
3 loaded

Results
Healthy
Distinct proximity patterns observed across tasks with a recurrent pattern reported on the volar aspect of the MC1.

OA
Larger articular surfaces, joint space narrowing, increased joint congruence, important articular deformations.

Conclusions
• The method enables the in vivo assessment of joint space with proximity as a surrogate for pressure.
• The recurrent volar proximity pattern (MC1) explains the volar deformation observed in OA patients.
• The lengthening of the trapezial horns explains the impaired abduction reported in OA patients.
• The method can be used in a clinical setting to better understand and prevent OA development.

References:
¹ Marzke et al., J Anat. 197(Pt 1): 121–140, 2000