

Computer-assisted diagnosis and monitoring of degenerative bone diseases

visual computing techniques for automated detection of Osteoporosis (OP) and Osteoarthritis (OA)

background

- early predictors and ways to observe the progression of OA are highly demanded
- clinical detection relies heavily on subjective experience
- assessments based on semi-quant KL grading and manual JSW/A measurements
- highly physician-dependent with subjective interpretation results

objectives

- developing a novel method for the assessment and follow up of osteoarthritis (OA)
- automated joint space width/area (JSW/A) assessment, semi-automatic Kellgren & Lawrence grading
- using high-resolution radiographs
- assessing subchondral bone by bone micro architecture (BMA)

methods

- 274 standardized knee radiographs
- JSW/A and KL assessment by 3 independent physicians
- sw-based analysis of JSW/A
- evaluation of the inter-/intra observer variability, JSW/A cut offs, with or without additional clinical parameters

results

- case/control match: 54 %
- JSW - interpersonal variability: 46.52 % (CV)
- KL score intrapersonal variability: 29.29 % (CV)
- identical KL scores for 274 images: 41 (15%)

conclusion

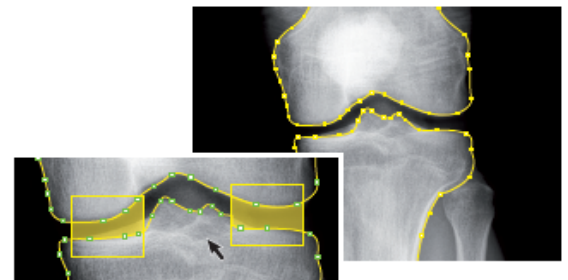
- manual assessment and diagnosis have shown to be highly subjective and physician-dependent
- significant inter- and intra-observer variability observed in regard to JSW and KL scores
- computer-assisted methods have shown to deliver consistent results
- automatic annotation and analysis of JSW/A provide a new method for OA assessment and follow up

workflow

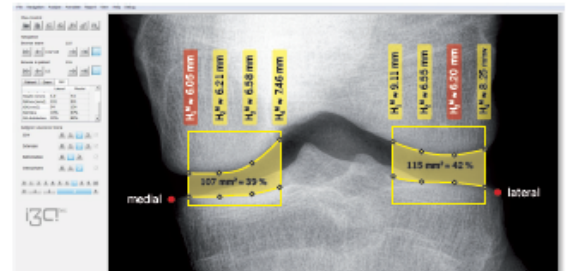
Fully automatic JSW/A assessment based on image annotation and segmentation. Semi-automatic Kellgren & Lawrence grading tool



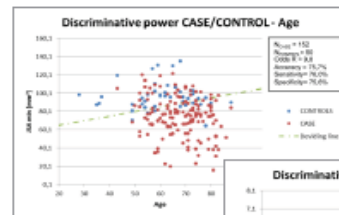
bone contour detection



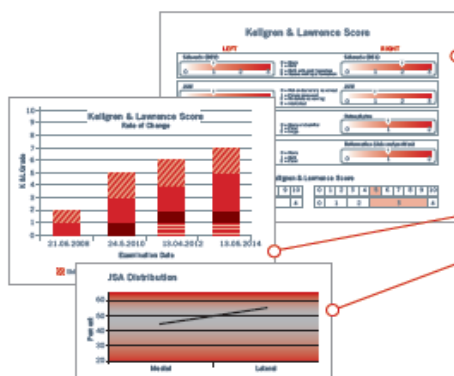
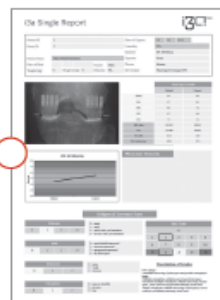
automatic JSW assessment



JSW results



Print Single Report



Patient data is stored in PACS/patient DB

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