Pain localization matters - Do pain locations and pain intensity correlate?
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Introduction.
Orthopedic questionnaires are a common tool to assess pain intensity. A critical argument with pain intensity is its subjective character and that it cannot be objectivated. Pain locations on the body surface might be a new approach but have been poorly investigated. Dave et al. could demonstrate better outcome for TKA in patients with only knee pain compared to patients with pain at multiple sites (Dave et al., 2016). The aim of this study was to investigate pain locations on the body surface and correlate it with pain intensity.

Methods.
Included were orthopedic patients in outpatient clinic with pathologies of large joints (shoulder, hip, and knee) and/or spine. At each consultation, the pain score and the pain locations on the body surface were assessed with a standardized patient questionnaire (paper and pencil). The locations were marked on a special 2.5dimensional figure with a front and back view.
The pain locations were classified with a grid of 105-elements representing clinically defined places on the body (e.g. thigh: trochanter, front, lateral, dorsal, medial).
All questionnaires were digitally analyzed (TO and MP; ETHZ). The mean symptom score was calculated, the number of locations with the 105-element grid and their frequency.
To visualize the "symptom-streams" all figures were digitally superposed.

Results.
712 assessments could be included completed by 348 patients (56% female, mean age 67.3 years). The mean symptom score was 28/100 and two thirds of patients had a score between 10 and 40.
In the mean 3 locations were marked (maximum of 23). 33% of all assessments had one, 23% two and 16% three locations. Female patients had more locations (3.3 vs 2.6; $p<0.001$). The five most frequent locations were: knee right (19%), knee left (19%), ventral right thigh (17%), sacrum (16%), lateral thigh left (15%). The digital views superposed demonstrated two combinations of "symptom streams": 1. sacrum, groin, thigh, knee and 2. neck, shoulder, arm.
Up to 6 pain locations correlated positively with pain intensity (pearson´s correlation r=0.997).

Conclusion.
Pain locations can be analyzed with a grid of 105 clinically defined elements on the body surface. In orthopedic patients, two thirds had up to 3 pain locations.
Pain location and pain intensity correlate up to 6 localizations with a very high correlation coefficient. Symptom locations seem to have the potential to objectivize the "subjective" pain intensity.