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Assessment of hand osteoarthritis: correlation between thermographic and radiographic methods.

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OBJECTIVE: Anatomical stages of digital osteoarthritis (OA) have been characterized radiographically as progressing through sequential phases from normal to osteophyte formation, progressive loss of joint space, joint erosion and joint remodelling. **Our study was designed to evaluate a physiological parameter, joint surface temperature, measured with computerized digital infrared thermal imaging,** and its association with sequential stages of radiographic OA (rOA). METHODS: Thermograms, radiographs and digital photographs were taken of both hands of 91 subjects with nodal hand OA. Temperature measurements were made on digits 2-5 at distal interphalangeal (DIP) joints, proximal interphalangeal (PIP) joints and metacarpophalangeal (MCP) joints (2184 joints in total). We fitted a repeated measures ANCOVA model to analyse the effects of rOA on temperature, with handedness, joint group, digit and NSAID use as covariates. RESULTS: **The reliability of the thermoscanning procedure was high (generalizability coefficient 0.899 for two scans performed 3 h apart).** The mean joint temperature decreased with increasing rOA severity, defined by the Kellgren-Lawrence (KL) scale. The mean temperature of KL0 joints was significantly different from that of each of the other KL grades (P </= 0.002). After adjustment for the other covariates, there was a strong association of rOA with joint surface temperature (P<0.001). The earliest discernible radiographic disease (KL1) was associated with a higher surface temperature than KL0 joints (P = 0.01) and a higher surface temperature than any other KL grade. Joint erosions were not associated with a change in joint temperature. CONCLUSION: **Joint surface temperature varied with the severity of rOA.** Joints were warmer than normal at the onset of OA. As the severity of rOA worsened, joint surface temperature declined. These data support the supposition that digital OA progresses in phases initiated by an inflammatory process. The cooler surface temperatures in later stages of the disease may in part explain the paucity of symptoms reported by patients with hand OA.