Methods: Patients were recruited by specialists in rheumatology at hospital clinics and in private practice, and healthy controls were recruited from a website for research subjects. Patients with arthralgia, ACPA and no rheumatic disease, and controls without arthralgia, ACPA, or rheumatic disease were included. Medical history, ACPA, clinical examination and ultrasound of symptomatic joints were performed in all patients and controls. A 2.7-mm-long volume of interest in the 2nd and 3rd MCP joint of the right hand was HR-pQCT scanned at a spatial resolution of 92 μm at baseline and after one year. Cortical and trabecular bone structure were evaluated in a 12.3-mm-long volume of interest proximal to the MCP head using the provided scanner software. Erosions were defined as cortical breaks in two consecutive slices, in two planes, non-linear in shape, and with loss of underlying trabecular structure. Number, depth, width, and volume of erosions were measured using the Osiris® DICOM viewer. Intraobserver agreement for erosions was evaluated with Cohen’s Kappa and coefficient of variance (CV). Values are median (interquartile range).

Results: Twenty-two patients (aged 53(36-65) years) and 23 controls (aged 48 (42-57) years) were evaluated. Ten patients were diagnosed with RA after 86(24-200) days. There was a significant increase in the number of patients with erosions during follow-up in the patient group (4 vs. 10, p<0.031), but not in the control group (1 vs. 4, p=0.083). In addition, at follow-up more erosions per individual were demonstrated in patients compared to controls (p=0.031).

The increase in average and total volume of erosions from baseline to follow-up were larger in patients compared with controls (Fig. 1) (p<0.031 and p=0.027). At follow-up average and total width, depth, and volume of erosions were larger in patients compared with controls (between 0.031 and 0.045).

Percent change in bone density, cortical, as well as trabecular parameters did not differ between patients and controls. Agreement was 95% equivalent to a kappa of 0.89 for erosions. CV for width, depth, and volume of erosions were 8%, 23%, and 39%.

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