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CLINICAL SCIENCE

Dactylitis is an indicator of a more severe phenotype independently associated with greater SJC, CRP, ultrasound synovitis and erosive damage in DMARD-naive early psoriatic arthritis

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ABSTRACT

Objective To characterise the impact of dactylitis in disease-modifying antirheumatic drug (DMARD)-naive early psoriatic arthritis (PsA).

Methods Patients with early PsA meeting the classification criteria for PsA (CASPAR) were recruited. Clinical outcomes were recorded, and ultrasonography was conducted to assess grey scale (GS) and power Doppler (PD) synovitis, periarticular cortical bone erosions and enthesitis. The cohort was dichotomised by the presence or absence of dactylitis.

Results Of 177 patients with PsA, those with dactylitis (dactylitic PsA (81/177, 46%)) had higher tender joint count ($p<0.01$), swollen joint count (SJC) ($p<0.001$) and C reactive protein (CRP) ($p<0.01$) than non-dactylitic PsA. Dactylitis was more prevalent in toes (146/214 (68.2%)) than fingers (68/214 (31.8%)); 'hot' dactylitis was more prevalent than 'cold' (83.6% vs 16.4%). Ultrasound (US) synovitis and erosions were significantly more prevalent in dactylitic PsA ($p<0.001$ and $p<0.001$, respectively). Exclusion of dactylitis in dactylitic PsA confirmed significantly greater SJC (3 vs 1, $p=0.002$), US synovitis (GS ≥ 2 : 20.6% vs 16.1%, $p<0.001$, or PD ≥ 1 : 5.1% vs 3.3%, $p<0.001$) and erosions (1.1% vs 0.5% joints, $p=0.008$; 26.1% vs 12.8% patients, $p=0.035$) than non-dactylitic PsA. Synovitis (GS ≥ 2 and/or PD ≥ 1) occurred in 53.7% of dactylitis. No substantial differences were observed for US enthesitis.

Conclusion Dactylitis signifies a more severe disease phenotype independently associated with an increased disease burden with greater SJC, CRP, US-detected synovitis and bone erosions in DMARD-naive early PsA and may be a useful discriminator for early risk stratification.

INTRODUCTION

Dactylitis is defined as diffuse swelling of a finger or toe and represents a specific lesion typically associated with psoriatic arthritis (PsA). The prevalence of dactylitis in PsA has been estimated at 33%–55%, with approximately 70% occurring at presentation.¹ Dactylitis is the epitome of PsA pathophysiology, encompassing multiple underlying pathologies including inflammation to joints (synovitis) and tendons/ligaments (enthesitis).

Key messages**What is already known about this subject?**

- Dactylitis is a typical lesion in psoriatic arthritis (PsA) and is associated with radiographic progression in chronic disease.
- In early PsA, dactylitis is a common finding, but the associated impact of this lesion on the disease burden is unknown.

What does this study add?

- This study demonstrates that disease-modifying antirheumatic drug (DMARD)-naive patients with early PsA with dactylitis (dactylitic PsA) have a greater burden of disease than patients with PsA without dactylitis (non-dactylitic PsA), which was confirmed independently (ie, when dactylitis was excluded) demonstrating greater swollen joint count, C reactive protein, ultrasound (US) synovitis and US erosions.
- Our data confirm that dactylitis is a clinical marker of a more severe phenotype in DMARD-naive early PsA.

How might this impact on clinical practice or future developments?

- In patients with early PsA, the presence of dactylitis identifies a more severe disease phenotype and may be an important discriminator for risk stratification in early arthritis clinics and clinical research trials.

Flexor tenosynovitis, surrounding diffuse peritendinous inflammation and soft tissue oedema, are typically responsible for the 'sausage digit' appearance.² Importantly, synovitis and bone erosion can develop, adding to further structural and functional impairments.³ Bone marrow oedema and ligamentous enthesitis have also been demonstrated using high-resolution MRI.⁴ At the bedside, the accuracy of ultrasound (US) for detecting inflammatory arthritis in PsA is regarded as comparable to MRI, with studies suggesting US may be superior for the assessment of synovitis.⁵

The presence or history of dactylitis adds high sensitivity and specificity towards classifying PsA (CASPAR criteria).⁶ Further, dactylitis is associated with greater radiographic damage in chronic established PsA.⁷ However, to our knowledge, direct evaluation of the impact of dactylitis on overall disease phenotype and severity in early, untreated PsA has not been characterised. The objective of this study was to determine the impact of dactylitis on clinical phenotype, US synovitis and erosion in disease-modifying antirheumatic drug (DMARD)-naive early PsA.

METHODS

Patients, clinical details and examination

In total, 177 DMARD-naive patients with early PsA meeting CASPAR criteria were recruited into the Leeds Spondyloarthritis Register for Research and Observation for baseline cross-sectional analysis.⁶ Clinical examination included tender joint count (TJC) (78) and swollen joint count (SJC) (76). The early PsA cohort was dichotomised by the presence or absence of dactylitis at baseline (PsA with dactylitis (dactylitic PsA) or PsA without dactylitis (non-dactylitic PsA)). Dactylitis was recorded per digit via the dichotomous (Clegg *et al*) method including tender ('hot') or non-tender ('cold') status.^{8,9} Clinical enthesitis was measured by the Maastricht Ankylosing Spondylitis Enthesitis Score (MASES) to include peripheral and axial entheses.

US examination

Experienced ultrasonographers blinded to clinical details (four operators with over 5 years' experience) scanned 50 joints per patient using the GE Logiq E9 machine with matrix linear (ML) 15–6 MHz or small-footprint linear array 18–8 MHz transducer and had regular training and calibration on the US examination protocol and quality of sonographic assessment throughout the study period, conducted every 6 months to maintain high consistency for US assessment, image interpretation and scoring.

Synovitis

Synovitis was graded by semiquantitative scores (0–3) and defined as grey scale (GS) ≥ 2 or abnormal power Doppler (PD) signal (PD ≥ 1), and GS of ≤ 1 was determined as non-significant as it occurs frequently in healthy individuals.¹⁰

Wrists (radiocarpal, intercarpal and ulnar carpal recesses), metacarpophalangeal (MCP) joints 1–5, proximal interphalangeal (PIP) joints 1–5, distal interphalangeal joints 2–5, elbows, knees (suprapatellar, medial parapatellar and lateral parapatellar recesses), ankles (tibiotalar joint), subtalar joints, talonavicular joints and metatarsophalangeal (MTP) joints 1–5 were scanned in longitudinal and transverse planes (online supplemental table S1A).

Erosions

Erosions were determined by periarticular cortical bone discontinuity present in two perpendicular planes (longitudinal and transverse), with MTP1 excluded as it is a frequent site of osteoarthritis.

Enthesitis

Enthesitis was determined by the Outcome MEasures in Rheumatology (OMERACT)-defined elementary lesions and modified Glasgow Ultrasound Enthesitis Severity Score (GUESS), calculated per patient based on all the enthesitis sites and domains (except bursitis at the quadriceps tendon insertion—not

recorded in the study protocol).^{11,12} The US data recorded for entheses are shown in online supplemental table S1 (B).

Statistical analysis

Statistical tests were two-tailed, statistical significance prespecified at 5% ($p < 0.05$) with 95% CIs. Differences between mean, medians and proportions were calculated using Student's t-test, quantile regression (continuous variables), χ^2 test (binary variables) and Kruskal-Wallis (categorical variables) via Stata V.16.1.

RESULTS

Clinical characteristics

Dactylitic PsA versus non-dactylitic PsA

Dactylitic PsA occurred in 81/177 (46%) patients vs non-dactylitic PsA in 96/177 (54%) patients. Mean ages were similar; 43.7 and 44.4 years, respectively. More patients in the dactylitic group had a symptom duration of < 24 months (68/81 (84%) vs 64/96 (66.7%), $p = 0.008$). The median TJCs and SJC were significantly greater in patients with dactylitic PsA compared with patients without dactylitic PsA (TJC: 9 vs 4, $p < 0.01$; SJC 7 vs 1, $p < 0.001$), with polyarthritis being the predominant phenotype in dactylitic PsA (65.4%, $p < 0.01$), while oligoarthritis was dominant in non-dactylitic PsA (86.5%, $p < 0.001$). Excluding dactylitis affected digits, dactylitic PsA remained predominantly polyarticular (51/81 patients, 62.9%), and the SJC (but not the TJC) still significantly greater (total SJC: 326 joints (81 patients) vs 209 joints (96 patients), median 3 vs 1, $p = 0.002$).

Clinical enthesitis was more prevalent in patients with dactylitic PsA (42/81 (51.9%) vs 34/96 (35.4%); $p = 0.027$), with greater median MASES (1.0 (0.0–2.0) vs 0.0 (0.0–2.0); $p < 0.01$). The prevalence of nail dystrophy did not differ between groups, however the median modified nail psoriasis severity index (mNAPSI) was greater in non-dactylitic PsA (2.0 (0.0–7.5) vs 0.0 (0.0–8.0); $p < 0.05$).

Elevated C reactive protein (CRP > 10 mg/L) occurred more frequently in dactylitic versus non-dactylitic patients (44% vs 25% ($p = 0.006$)) including with a greater median CRP and erythrocyte sedimentation rate (ESR; mm/hr) (CRP: 8.1 vs 5.0 ($p < 0.01$), ESR: 16.5 vs 11 ($p < 0.05$)). Disease Activity in Psoriatic Arthritis (DAPSA) scores were greater in dactylitic PsA but not significant (median 24.4 vs 20.8, $p = 0.07$). No significant differences were observed in PsAQoL, HAQ, and DLQI. Comparison of patient characteristics between groups are shown in table 1.

Characteristics of dactylitis

Of 81/177 (45.8%) patients with dactylitic PsA, dactylitis affected 214 digits, predominantly with multiple digit involvement (> 1) in 51/81 (63%) patients (median digits: 2 (IQR 1–3)) and was distributed asymmetrically (52/81 (64%) patients). Hands were affected in 23/81 (28.4%) patients, feet in 40/81 (49.4%), and both in 18/81 (22.2%). Dactylitis was more prevalent in toes (146/214, 68.2%) than fingers (68/214, 31.8%) with the majority of digits classified as hot dactylitis (179/214 digits, 83.6%) (cold dactylitis (35/214, 16.4%)). The second finger (23/179, 12.8%) and fourth toe (40/179; 22.3%) were most frequently affected by hot dactylitis, and the third finger (2/35; 5.7%) and fourth toe (10/35; 28.6%) by cold dactylitis (online supplemental figure S1A).

US synovitis

In total, 155/177 (87.5%) patients with PsA underwent ultrasonography (6143 joints): 69/155 (44.5%) patients with dactylitic PsA and 86/155 (55.5%) without dactylitic PsA

Table 1 Characteristics of the early PsA cohort dichotomised by the presence or absence of dactylitis

Characteristics and outcomes	Non-dactylitic PsA (96/177 (54.2%))	Dactylitic PsA (81/177 (45.8%))	Difference/p value
Clinical			
Age (years), mean (SD)	44.4 (12.8)	43.7 (13.3)	0.7 (−3.2 to 4.5)
Male	38 (39.6%)	42 (51.9%)	p=0.10
Symptom duration (months), median (IQR)	18.0 (10.5–36.0)	12.0 (6.0–24.0)	−6.0 (−13.1 to 1.1)
Duration from diagnosis (months), median (IQR)	1.1 (0–2.7)	1.2 (0.3–4.6)	0.03 (−0.9 to 1.0)
Symptoms <24 months, patients (%)	64/96 (66.7)	68/81 (84.0)	p=0.008
Early morning stiffness (min), median (IQR)	50.0 (15.0–90.0)	60.0 (15.0–180.0)	0 (−24.1 to 24.1)
TJC (78), median (IQR)	4.0 (1.0–10)	9.0 (5.0–19.0)	5.0 (2.0 to 8.0)**
SJC (76), median (IQR)	1.0 (0.0–3.0)	7.0 (4.0–13.0)	6.0 (4.3 to 7.6)***
TJC (78) median (IQR) (excluding dactylitis)	4.0 (1.0–10.0)	5.0 (2.0–11.0)	1.0 (−1.4 to 3.4)
SJC (76) median (IQR) (excluding dactylitis)	1.0 (0.0–3.0)	3.0 (1.0–6.0)	2.0 (0.8 to 3.3)**
Current psoriasis	96/96 (100.0%)	74/81 (91.4%)	p=0.003**
Family history of psoriasis	52/94 (55.3%)	49/78 (62.8%)	p=0.32
PASI, median (IQR)	2.9 (0.8–4.9)	1.9 (0.4–4.2)	−1.2 (−2.4 to 0.0)
Psoriatic nail dystrophy	49/96 (51.0%)	44/81 (54.3%)	p=0.66
mNAPSI, median (IQR)	2.0 (0.0–7.5)	0.0 (0.0–8.0)	−2.0 (−3.7 to −27.9)*
Clinical Enthesitis	34/96 (35.4%)	42/81 (51.9%)	p=0.027*
MASES score, median (IQR)	0.0 (0.0–2.0)	1.0 (0.0–2.0)	1.0 (0.4 to 1.6)**
BMI, median (IQR)	28.2 (24.0–32.1)	28.6 (25.0–31.5)	0.3 (−1.7 to 2.4)
Smoking (current)	19 (19.8%)	9 (11.1%)	p=0.11
Disease phenotype			
Oligoarthritis (defined by SJC <5)	83/96 (86.5%)	28/81 (34.6%)	p<0.001***
Oligoarthritis (defined by TJC and/or SJC <5)	48/96 (50%)	29/81 (35.8%)	p=0.058
DIP joint disease	7/93 (7.5%)	13/77 (16.9%)	p=0.058
Axial disease	17/94 (18.1%)	9/78 (11.5%)	p=0.23
Arthritis mutilans	0	0	0
Laboratory markers			
CRP (mg/L), median (IQR)	5.0 (5.0–9.3)	8.1 (5.0–18.4)	3.1 (0.9–5.3)**
Elevated CRP (>10 mg/L)	24/96 (25.0%)	36/81 (44.4%)	p=0.006**
ESR, median (IQR)	11.0 (5.0–25.0)	16.5 (7.0–27.0)	7.0 (0.4–13.6)*
Composite outcomes			
DAPSA score, median (IQR)	20.8 (12.6, 30.5)	24.4 (14.9, 36.5)	p=0.07
Patient-reported outcomes (PROs)			
PsAQoL, median (IQR)	6.0 (0.0–13.0)	6.0 (2.0–12.0)	0.0 (−4.1 to 4.1)
DLQI, median (IQR)	3.0 (1.0–9.0)	2.0 (1.0–6.0)	−1.0 (−3.3 to 1.3)
HAQ, median (IQR)	0.75 (0.25–1.50)	0.75 (0.38–1.38)	0.125 (−0.23 to 0.48)

*p<0.05, **p<0.01, ***p<0.001.

BMI, body mass index; CRP, C reactive protein; DAPSA, Disease Activity in Psoriatic Arthritis; DIP, distal interphalangeal; DLQI, Dermatology Quality of Life Index; ESR, erythrocyte sedimentation rate; HAQ, Health Assessment Questionnaire Disability Index; MASES, Maastricht Ankylosing Spondylitis Enthesitis Score; mNAPSI, Modified Nail Psoriasis Severity Index; PASI, Psoriasis Area Severity Index; ; PsA, psoriatic arthritis; PsAQoL, PsA quality of life; SJC, swollen joint count; TJC, tender joint count.

(online supplemental figure S1B). US synovitis was significantly more prevalent in dactylitic PsA (GS ≥ 2 : 23.6% vs 16.1% joints (p<0.001); PD ≥ 1 : 7.3% vs 3.3% joints (p<0.001); GS ≥ 2 +PD ≥ 1 : 6.3% vs 2.6% joints (p<0.001)) as outlined in table 2A. GS ≥ 2 synovitis was most frequently observed at MCP 2–5, PIP 1–3, MTP 2–5, and PD ≥ 1 synovitis at MCP 2 and MTP 4–5. On exclusion of digits affected by dactylitis, US synovitis remained significantly more prevalent in patients with dactylitic PsA (GS ≥ 2 : 21.3% vs 16.1% joints (p<0.001); PD ≥ 1 : 5% vs 3.3% joints (p<0.001); GS ≥ 2 +PD ≥ 1 : 4.1% vs 2.6% joints (p<0.003); table 2B). Further subgroup analyses stratified for phenotype (defined by SJC ≥ 5 as polyarticular) confirmed greater GS ≥ 2 and PD ≥ 1 synovitis, respectively, for polyarticular subsets in dactylitic PsA (p<0.001), including greater GS ≥ 2 synovitis when dactylitis was excluded (p=0.01) (online supplemental table S2). Application of the second definition inclusive of tender joints (tender and/or swollen joints<5 as oligoarticular

indicated significantly greater GS of ≥ 2 and PD of ≥ 1 synovitis, respectively, independent of phenotype in dactylitic PsA. Exclusion of dactylitis from dactylitic PsA also confirmed greater GS of ≥ 2 synovitis in oligoarticular and polyarticular subsets independent of dactylitis affected joints (online supplemental table S3).

US erosions

Periarticular cortical bone erosions were identified in a significantly greater proportion of patients with dactylitic PsA, compared with those without dactylitis (20/69 (29.0%) vs 11/86 (12.8%), p=0.012). There was also a significant difference in the total number of erosions detected in dactylitic versus patients without dactylitic PsA (33/2557 joints vs 15/3206 joints, p<0.001; table 2A). The anatomical sites for joints most prone to erosive damage were MCP 2 (9/33 (27.3%)) and MTP 5 (11/33 (33.3%)).

Table 2 Ultrasound synovitis and bone erosions in non-dactylitic versus dactylitic PsA: (A) including dactylitis affected digits and (B) excluding dactylitis affected digits

(A) US synovitis and erosions	Non-dactylitic PsA (86/155 (55.5%) patients)	Dactylitic PsA (69/155 (44.5%) patients)	Difference
Total GS ≥ 2 (joints)	551/3422 (16.1%)	642/2721 (23.6%)	p<0.001
Total PD ≥ 1 (joints)	114/3422 (3.3%)	198/2721 (7.3%)	p<0.001
Total GS ≥ 2 +PD >1 (joints)	89/3422 (2.6%)	171/2721 (6.3%)	p<0.001
Total US erosions (joints)	15/3206 (0.5%)	33/2557 (1.3%)	p<0.001
Total erosion score (patient level)	Mean 0.28 (SD 0.87), median 0 (0–0)	Mean 0.72 (SD 1.63), median 0 (0–1)	p=0.016
Total US erosive patients	11/86 (12.8%)	20/69 (29.0%)	p=0.012
(B) US synovitis and erosions	Non-dactylitic PsA (86/155 (55.5%)) (same as A)	Dactylitic PsA (69/155 (44.5%)) (dactylitis excluded)	Difference
Total GS ≥ 2 (joints)	551/3422 (16.1%)	507/2466 (20.6%)	p<0.001
Total PD ≥ 1 (joints)	114/3422 (3.3%)	126/2466 (5.1%)	p<0.001
Total GS ≥ 2 +PD >1 (joints)	89/3422 (2.6%)	101/2466 (4.1%)	p=0.003
Total US erosions (joints)	15/3206 (0.5%)	24/2315 (1.1%)	p=0.008
Total erosion score (patient level)	Mean 0.28 (SD 0.87), median 0 (0–0)	Mean 0.58 (SD 1.52), median 0 (0–1)	p=0.048
Total US erosive patients	11/86 (12.8%)	18/69 (26.1%)	p=0.035

GS, grey scale; PD, power Doppler; PsA, psoriatic arthritis.

On exclusion of dactylitic digits, US erosions were more frequent in dactylitic PsA than non-dactylitic PsA (24/2315 (1.1%) vs 15/3206 (0.5%) joints, p=0.008). The proportion of patients with US erosions (US erosion-positive patients) was greater for dactylitic PsA (18/69 (26.1%) vs 11/86 (12.8%) patients, p=0.035). Total erosion scores at the patient level were also higher in dactylitic PsA (p=0.016), including when dactylitis was excluded (p=0.048), as shown in [table 2B](#). Subgroup analyses confirmed greater total US-detected erosions in polyarticular stratified subsets regardless of the phenotype definition applied and on excluding dactylitis affected joints (online supplemental table S2 and S3). The US appearances of erosions detected in the dactylitic PsA group are illustrated in [figure 1B,D](#).

US in dactylitis

In digits affected by dactylitis, US synovitis (GS ≥ 2) was prevalent in 137/255 (53.7%) joints. A higher prevalence of US synovitis was observed in joints affected by hot dactylitis versus those with the cold type (129/227 (56.8%) vs 8/28 (28.6%) joints, p=0.0047). US PD synovitis (PD ≥ 1 regardless of GS grade) was present in 72/255 (28.2%) of the total joints clinically affected by dactylitis and was more prevalent in hot type (hot: 69/227 (30.4%) and cold: 3/28 (10.7%) joints, p=0.0289). In hot dactylitis, erosions occurred in 9/227 (2.6%) of affected joints (4/69 (6%) patients) and none in cold dactylitis (0/28) (p=0.388). [Figure 1](#) illustrates synovitis at MTP5 ([figure 1A](#)) and shows soft tissue oedema and flexor tenosynovitis ([figure 1E](#)).

US enthesitis

Of 1534 entheses examined by US, modified GUESS scores indicated no significant differences between patients with dactylitic PsA and patients without dactylitic PsA (median 3 (IQR 2–6) vs median 4 (IQR 1–6), p=0.91). There were no relevant differences between groups on analysis of OMERACT elementary lesions.

DISCUSSION

This is the first study, to our knowledge, to evaluate the overall clinical and US disease burden in a DMARD-naive early PsA cohort based on the presence/absence of dactylitis. These study results confirmed a greater burden of disease in PsA with

dactylitis. Moreover, patients with dactylitic PsA had greater SJC, CRP, prevalence of US synovitis and erosive damage independently (ie, on exclusion of digits affected by dactylitis) compared with non-dactylitic PsA. These results therefore provide an insight into the significance of dactylitis in early PsA, demonstrating that it is an indicator of a more severe phenotype. Indeed, more aggressive disease accounted for an earlier diagnosis of patients with dactylitic PsA who presented with shorter disease duration. Further analyses to include history of dactylitis and exclude patients with a symptom duration of >24 months, respectively, did not change results confirming the increased burden of disease in the dactylitic group (online supplemental table S4 and S5).

Previous studies in established PsA have shown that digits affected by dactylitis are associated with significant pathological findings. Brockbank *et al* first reported that radiographic damage occurred frequently in hot dactylitis with an average PsA cohort disease duration of 8 years.⁷ Healy *et al* reported a high prevalence of synovitis in hot dactylitis present on MRI in 69%, closely matching the prevalence of US detected synovitis in our study (56.8%), confirming that synovitis is present in the majority of dactylitis in early PsA.¹³ Moreover, in our early PsA study, the greater prevalence of US synovitis and erosions in patients with dactylitic PsA (vs non-dactylitic PsA), even when excluding the dactylitis digits, has to our knowledge not previously been shown and reflects an increased burden of disease. Further, this was reflected by CRP, also a marker of disease activity which was elevated (>10 mg/L) more often in patients with dactylitic PsA (44.4% vs 25%, p=0.006) and with higher median values. This is a relevant observation, since elevated baseline CRP is associated with poor radiographic outcomes.¹⁴ Additionally, radiographic joint destruction is reportedly predicted by the development of dactylitis in men from longitudinal PsA cohort data.¹⁵ Despite the differences found for clinical enthesitis, a possible limitation of our study was the inability to show meaningful differences in US enthesopathy possibly related to the outcomes used or the known clinical and US mismatch shown in other studies.¹⁶ However, our results do provide new data, including for US synovitis and erosion, showing that there is a difference in the burden of disease between patients with early PsA with and without dactylitis.

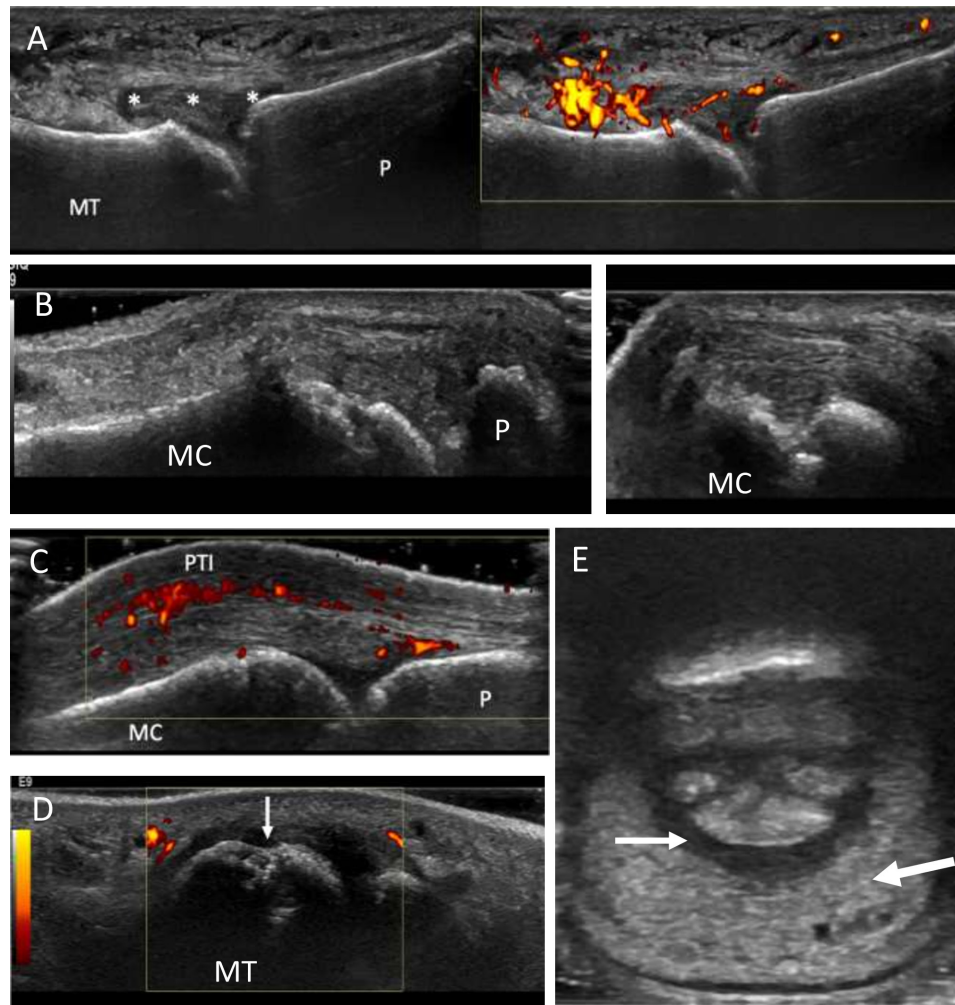


Figure 1 Characteristic ultrasound pathologies in early dactylitic patients with PsA. (A) Longitudinal view through the fifth metatarsophalangeal joint illustrating synovitis within a dactylitic toe. There is grey scale synovitis (grade 3) with effusion (*) and abnormal power Doppler signal (grade 2, right image) consistent with 'active' synovitis. (B) Periarticular cortical bone irregularity at the second MCP joint confirmed in the longitudinal (left) and transverse planes, respectively (right), confirming erosion. A common site of erosion in PsA and in dactylitis. (C) Longitudinal view at the MCP joint displaying power Doppler signal above the extensor tendon (PTI). (D) Image in the transverse plane showing the fifth metatarsal head, the most frequent site of erosion in feet, demonstrating periarticular bone irregularity (arrow). Bone irregularity was confirmed further in the longitudinal plane to signify erosion. There is also surrounding grey scale synovial hypertrophy (grade 2). (E) Transverse view of volar aspect of dactylitic third toe showing diffuse soft tissue oedema (large arrow) and flexor tenosynovitis (small arrow). MCP, metacarpophalangeal; MC, metacarpal head; MT, metatarsal head; P, phalanx; PsA, psoriatic arthritis; PTI, peritendon inflammation.

Tailoring therapy specific to PsA phenotypes is increasingly pertinent to avoid biologic disease-modifying antirheumatic drug (bDMARD) failure, especially given the diverse mode of action therapies available. Moreover, superior treatment responses have been shown for dactylitis with bDMARDs over conventional synthetic DMARDs, including first-line combination therapy.^{17 18} Our study findings can facilitate early risk stratification to optimise treatment outcomes, coherent with the European Alliance of Associations for Rheumatology (EULAR) recommendations that regard dactylitis as a poor prognostic factor in early PsA and advocate rapid initiation of DMARDs.¹⁹ Overall, these data may further inform management strategies, including clinical trials for targeted therapy to understand differential responses within PsA phenotypes.

CONCLUSIONS

The presence of dactylitis is independently associated with an increased burden of disease with greater SJC, CRP, US-detected synovitis and erosive bone damage in DMARD-naïve

early PsA. Dactylitis should therefore be considered a clinical marker for a more severe phenotype in early PsA and may be an important discriminator for risk stratification in early intervention strategies.

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Contributors SD conducted the study, analysis and the writing of the manuscript. OA and XM conducted statistical methods and tests. XM and LG-M contributed to the clinical assessment of patients. RJW contributed to ultrasound scan procedure and protocol. PE and ALT conducted clinical supervision of patients and writing of the manuscript. HM-O, DGM and PH contributed to writing of the manuscript. HM-O designed the study protocol and oversaw its conduct as principal investigator and guarantor.

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Supplementary table S1. The ultrasound assessment of joints (A) and entheses (B). The source data collected on imaging is shown in the tables below:

Table A: Ultrasound imaging data collection for synovitis:

Right				Left			
	GS (0-3)	PD (0-3)	Erosion (0-3)		GS (0-3)	PD (0-3)	Erosion (0-3)
Wrist				Wrist			
MCP1				MCP1			
MCP2				MCP2			
MCP3				MCP3			
MCP4				MCP4			
MCP5				MCP5			
PIP1				PIP1			
PIP2				PIP2			
PIP3				PIP3			
PIP4				PIP4			
PIP5				PIP5			
DIP2				DIP2			
DIP3				DIP3			
DIP4				DIP4			
DIP5				DIP5			
Elbow				Elbow			
Knee				Knee			
Ankle				Ankle			
TNJ				TNJ			
STJ				STJ			
MTP1				MTP1			
MTP 2				MTP 2			
MTP 3				MTP 3			
MTP 4				MTP 4			
MTP 5				MTP 5			

GS: grey scale; PD: power Doppler; DIP: distal interphalangeal joint; PIP: proximal interphalangeal joint; MCP: metacarpophalangeal joint; MTP: metatarsophalangeal joint; TNJ: talonavicular joint; STJ: subtalar joint. Semiquantitative scores (0-3) were recorded for the grading of GS, PD, erosion.

Table B: Ultrasound imaging data collection for enthesitis

	AT	PF	DPT	PPT	QT
Right					
Enthesis thickness (mm)					
Thickening (0-1)					
Hypoechogenicity (0-1)					
PD (0-1)					
Calcifications (0-1)					
Enthesophytes (0-1)					
Erosions (0-1)					
Bursitis (0-1)					
Left					
Enthesis thickness (mm)					
Thickening (0-1)					
Hypoechogenicity (0-1)					
PD (0-1)					
Calcifications (0-1)					
Enthesophytes (0-1)					
Erosions (0-1)					
Bursitis (0-1)					

AT: Achilles tendon enthesitis; PF: plantar fascia; DPT: distal patellar tendon insertion; PPT: proximal patellar tendon insertion, QT: quadriceps tendon insertion. Reference values for enthesitis thickening: AT \leq 5.29, PF: \leq 4.4 mm; DPT: \leq 4 mm; PPT: \leq 4 mm; QT: \leq 6.1 mm. Binary grading (0=absent; 1=present) was recorded for thickening, hypoechogenicity, power Doppler (PD), calcifications, enthesophytes, erosions, bursitis.

Supplementary tables S2 a) Oligoarticular, b) Polyarticular:

Subgroup analyses stratified by phenotype (polyarticular defined by SJC \geq 5) for clinical characteristics (A), ultrasound synovitis and erosion outcomes with dactylitis digits included and excluded (B and C respectively) for dactylitic *versus* non-dactylitic PsA.

S2 a) Oligoarticular subset

A. Characteristics and outcomes	Oligoarticular PsA without dactylitis [83/111 (74.8%)]	Oligoarticular PsA with dactylitis [28/111(25.2%)]	Difference/ p value
Clinical			
Age, mean (SD), years	43.7 (12.5)	42.9 (10.8)	0.8 (-4.5 to 6.0)
Male	32 (39%)	12 (43%)	p=0.69
Symptom duration, median (IQR), months	18.0 (8.0, 36.0)	14.5 (7.5, 24.0)	-1.0 (-10.4 to 8.4)
Duration from diagnosis, median (IQR), months	1.0 (0.0, 2.6)	1.1 (0.0, 3.2)	0.16 (-1.1 to 1.4)
Early morning stiffness median (IQR), minutes	30.0 (10.0, 60.0)	60.0 (10.0, 120.0)	30 (-2.9 to 62.9)
TJC (78), median (IQR)	4.0 (1.0, 9.0)	3.5 (2.0, 9.0)	0.0 (-2.7 to 2.7)
SJC (76), median (IQR)	1.0 (0.0, 2.0)	2.0 (1.0, 3.0)	1.0 (0.2 to 1.8)*
TJC (78) median (IQR) (excluding dactylitis)	4.0 (1.0, 9.0)	2.0 (1.0-6.0)	-2.0 (-4.7 to 0.7)
SJC (76) median (IQR) (excluding dactylitis)	1.0 (0.0, 2.0)	0.5 (0.0-1.0)	0.0 (-0.9 to 0.9)
Current Psoriasis	83 (100%)	25 (89.3%)	p=0.003*
Family history of Psoriasis	42 (52%)	18 (69%)	p=0.12
PASI, median (IQR)	3.0 (0.7, 4.9)	1.0 (0.0, 3.0)	-1.8 (-4.4 to -0.24)*
Psoriatic Nail dystrophy	46 (55%)	13 (46%)	p=0.41
mNAPSI, median (IQR)	2.0 (0.0, 9.0)	0.0 (0.0, 4.0)	-2.0 (-4.5 to 0.54)
Clinical Enthesitis	33 (40%)	15 (54%)	p=0.20
MASES, median (IQR)	0.0 (0.0, 2.0)	1.0 (0.0, 2.0)	1.0 (-0.07 to 2.07)
BMI, median (IQR)	28.0 (24.0, 33.1)	27.1 (22.6, 28.8)	-0.9 (-4.2 to 2.4)
Smoking (current)	17 (20%)	5 (18%)	p=0.59
Disease phenotype			
Predominant DIP joint disease	5/80 (6.3%)	3/28(10.7%)	p=0.44

A. Characteristics and outcomes	Oligoarticular PsA without dactylitis [83/111 (74.8%)]	Oligoarticular PsA with dactylitis [28/111(25.2%)]	Difference/ p value
Axial disease	16/81 (19.8%)	2/28 (7.1%)	p=0.12
Arthritis Mutilans	0	0	0
Laboratory markers			
CRP (mg/L), median (IQR)	5.0 (5.0, 8.8)	5.0 (5.0, 10.8)	0 (-1 to 1)
Elevated (>10)	19 (22.9%)	8 (28.6 %)	p=0.54
ESR, median (IQR)	13.0 (6.0, 30.0)	13.0 (5.0, 25.0)	0 (-9.2 to 9.2)
Patient Reported Outcomes (PROs)			
PsAQoL, median (IQR)	6.0 (0.0, 14.0)	3.0 (1.0, 7.0)	-3.0 (-8.2 to 2.2)
DLQI, median (IQR)	3.0 (1.0, 9.0)	2.0 (1.0, 6.0)	-1.0 (-4.3 to 2.3)
HAQ, median (IQR)	0.6 (0.1, 1.5)	0.4 (0.0, 1.0)	-0.3 (-0.7 to 0.2)
B. Ultrasound Synovitis/ Erosions	Oligoarticular PsA without dactylitis [75/99 (75.8%)]	Oligoarticular PsA with dactylitis [24/99 (24.2%)]	Difference/ p value
Total GS≥2	464/2934 (15.8%)	130/824 (15.8%)	p=0.98
Total PD≥1	81/2934 (2.8%)	22/824 (2.7%)	p=0.61
Total GS≥2+PD>1	67/2934 (2.3%)	19/824 (2.3%)	p=0.86
Total US erosions	13/2748 (0.5%)	3/771 (0.4%)	p=0.76
Total erosion score (patient level)	Mean 0.29 (SD 0.91) Median 0 (0,0)	Mean 0.20 (SD 0.40) Median 0 (0,0)	p=0.67
Total patients US erosive	9/75 (12.0%)	3/24(12.5%)	p=0.59
C. Ultrasound Synovitis/ Erosions	Oligoarticular PsA without dactylitis[75/99 (75.8%)] (same as above (B))	Oligoarticular PsA with dactylitis [24/99 (24.2%)] (dactylitis excluded)	Difference/ p value
Total GS≥2	464/2934 (15.8%)	117/784 (14.9%)	p=0.54
Total PD≥1	81/2934 (2.8%)	17/784 (2.2%)	p=0.36
Total GS≥2+PD>1	67/2934 (2.3%)	14/784 (1.8%)	p=0.66
Total US erosions	13/2748 (0.5%)	2/735 (0.3%)	p=0.46
Total erosion score (patient level)	Mean 0.29 (SD 0.91) Median 0 (0,0)	Mean 0.13 (SD 0.45), Median 0 (0,0)	p=0.387
Total patients US erosive	9/75 (12.0%)	2/24 (8.33%)	p=0.472
*p<0.05, **p<0.01, ***p<0.001.			

BMI: Body mass index; DLQI: Dermatology quality of life index; HAQ: Health assessment questionnaire disability index; MASES: Maastricht ankylosing spondylitis enthesitis scores; mNAPSI: Modified nail psoriasis severity index; PASI: Psoriasis area severity index; PsAQoL: PsA quality of life.

S2 b) Polyarticular subset

A. Characteristics and outcomes	Polyarticular PsA without dactylitis [13/66 (19.7%)]	Polyarticular PsA with dactylitis [53/66 (80.3%)]	Difference/ p value
Clinical			
Age, mean (SD), years	48.8 (14.4)	44.2 (14.5)	4.6 (-4.3 to 13.5)
Male	6 (46%)	30 (57%)	p=0.5
Symptom duration, median (IQR), months	18.0 (12.0, 36.0)	12.0 (6.0, 24.0)	-6.0 (-18.3 to 6.3)
Duration from diagnosis, median (IQR), months	2.3 (0.0, 2.8)	1.3 (0.5, 5.2)	-1.1 (-3.4 to 1.8)
Early morning stiffness median (IQR), minutes	120.0 (60.0, 180.0)	90.0 (40.0, 240.0)	-30 (-148.5 to 88.5)
TJC (78), median (IQR)	10.0 (7.0, 16.0)	12.0 (7.0, 21.0)	2.0 (-6.4 to 10.4)
SJC (76), median (IQR)	7.0 (5.0, 10.0)	10.0 (7.0, 14.0)	3.0 (-1.2 to 7.2)
TJC (78) median (IQR) (excluding dactylitis)	10.0 (7.0-16.0)	6.0 (4.0-13.0)	-4.0 (-9.8 to 1.8)
SJC (76) median (IQR) (excluding dactylitis)	7.0 (5.0-10.0)	5.0 (3.0-8.0)	-2.0 (-5.2 to 1.2)
Current Psoriasis	13/13 (100.0%)	49/53 (92.5%)	p=0.307
Family history of Psoriasis	10 (77%)	31 (60%)	p=0.25
PASI, median (IQR)	2.8 (1.4, 5.2)	2.8 (0.4, 4.2)	0 (-2.4 to 2.4)
Psoriatic Nail dystrophy	6 (46%)	27 (51%)	p=0.76
mNAPSI, median (IQR)	0.0 (0.0, 3.0)	1.0 (0.0, 10.0)	1 (-4.5 to 6.5)
Clinical Enthesitis	3 (23%)	27 (51%)	p=0.071
MASES, median (IQR)	0.0 (0.0, 0.0)	1.0 (0.0, 2.0)	1.0 (-0.03 to 2.1)
BMI, median (IQR)	28.6 (24.6, 31.4)	29.4 (26.2, 31.7)	0.3 (-1.7 to 2.4)
Smoking (current)	2 (15%)	4 (8%)	p=0.39
Disease phenotype			
Predominant DIP joint disease	2 (15%)	10 (20%)	p=0.68
Axial disease	1 (8%)	7 (14%)	p=0.54
Arthritis Mutilans	0	0	0
Laboratory markers			
CRP (mg/L), median (IQR)	5.0 (5.0, 16.5)	12.5 (5.0, 23.0)	7.5 (-3.3 to 18.3)
Elevated (>10)	5 (38%)	28 (53%)	p=0.35
ESR, median (IQR)	12.0 (6.0, 27.0)	24.0 (10.0, 36.0)	12 (-4.1 to 28.1)

A. Characteristics and outcomes	Polyarticular PsA without dactylitis [13/66 (19.7%)]	Polyarticular PsA with dactylitis [53/66 (80.3%)]	Difference/ p value
Patient Reported Outcomes (PROs)			
PsAQoL, median (IQR)	7.0 (1.0, 12.0)	8.0 (3.5, 13.5)	1.0 (-6.3 to 8.3)
DLQI, median (IQR)	4.0 (1.0, 17.0)	2.0 (1.0, 6.0)	-2.0 (-6.8 to 2.8)
HAQ, median (IQR)	0.9 (0.2, 1.2)	0.9 (0.5, 1.4)	0.125 (-0.5 to 0.8)
B. Ultrasound Synovitis/ Erosions	Polyarticular PsA without dactylitis [11/56 (19.6%)]	Polyarticular PsA with dactylitis [45/56 (80.4%)]	Difference/ p value
Total GS \geq 2	87/488 (17.8%)	512/1897 (27.0%)	p<0.001**
Total PD \geq 1	33/488 (6.8%)	176/1897 (9.3%)	p<0.001**
Total GS \geq 2+PD>1	22/488 (4.51%)	152/1897 (8.0%)	p<0.001**
Total US erosions	2/458 (0.44%)	30/1786 (1.7%)	p=0.04*
Total erosion score (patient level)	Mean 0.18 (SD 0.40) Median 0 (0,0)	Mean 1 (SD 1.93), Median 0 (0,1)	p=0.17
Total patients US erosive	2/11 (18.2%)	17/45 (37.7%)	p=0.19
C. Ultrasound Synovitis/ Erosions	Polyarticular PsA without dactylitis [11/56 (19.6%)] (<u>same as above (B)</u>)	Polyarticular PsA with dactylitis [45/56 (80.4%)] (<u>dactylitis excluded</u>)	Difference/ p value
Total GS \geq 2	87/488 (17.8%)	390/1682 (23.2%)	p=0.01*
Total PD \geq 1	33/488 (6.8%)	109/1682 (6.5%)	p=0.825
Total GS \geq 2+PD>1	22/488 (4.5%)	87/1682 (5.2%)	p=0.036*
Total US erosions	2/458 (0.44%)	23/1580 (1.46%)	p=0.08
Total erosion score (patient level)	Mean 0.18 (SD 0.40) Median 0 (0,0)	Mean 0.76 (SD 1.79) Median 0 (0,1)	p=0.3
Total patients US erosive	2/11 (18.2%)	15/45 (33.3%)	p=0.277
*p<0.05, **p<0.01, ***p<0.001.			

BMI: Body mass index; DLQI: Dermatology quality of life index; HAQ: Health assessment questionnaire disability index; MASES: Maastricht ankylosing spondylitis enthesitis scores; mNAPSI: Modified nail psoriasis severity index; PASI: Psoriasis area severity index; PsAQoL: PsA quality of life.

Supplementary tables S3 a) Oligoarticular, b) Polyarticular: Subgroup analyses stratified by phenotype (polyarticular defined as tender and/or swollen joints ≥ 5) for clinical characteristics (A), ultrasound synovitis and erosion outcomes with dactylitis digits included and excluded (B and C respectively) for dactylitic *versus* non-dactylitic PsA.

S3 a) Oligoarticular subset

A. Characteristics and outcomes	Oligoarticular PsA without dactylitis [48/77 (62.3%)]	Oligoarticular PsA with dactylitis [29/77(37.7%)]	Difference/ p value
Clinical			
Age, mean (SD), years	43.6 (12.5)	41.0 (11.8)	2.7 (-3.1 to 8.4)
Male	16 (33%)	12 (41%)	p=0.48
Symptom duration, median (IQR), months	15.5 (9.5, 30.0)	12.0 (6.0, 24.0)	-6 (-14.9 to 2.9)
Duration from diagnosis, median (IQR), months	1.5 (0.0, 2.8)	1.2 (0.0, 4.6)	-0.3 (-1.9 to 1.3)
Early morning stiffness median (IQR), minutes	30.0 (6.5, 60.0)	60.0 (10.0, 120.0)	30 (-7.2 to 67.2)
TJC (78), median (IQR)	3.0 (1.0, 5.5)	6.0 (3.0, 9.0)	3.0 (0.6 to 5.4)*
SJC (76), median (IQR)	1.0 (0.0, 2.0)	4.0 (2.0, 6.0)	3.0 (1.6 to 4.4)***
TJC (78) median (IQR) (excluding dactylitis)	3.0 (1.0, 5.5)	3.0 (1.0, 6.0)	0.0 (-2.7 to 2.7)
SJC (76) median (IQR) (excluding dactylitis)	1.0 (0.0, 2.0)	1.0 (0.0, 2.0)	0.0 (-1.0 to 1.0)
Current Psoriasis	48 (100%)	29 (100%)	-
Family history of Psoriasis	25 (54%)	18 (64%)	p=0.40
PASI, median (IQR)	2.5 (0.6, 4.8)	1.8 (0.4, 4.0)	-0.9 (-2.8 to 1.0)
Psoriatic Nail dystrophy	27 (56%)	11 (38%)	p=0.12
mNAPSI, median (IQR)	2.0 (0.0, 5.0)	0.0 (0.0, 4.0)	-2.0 (-4.4 to 0.4)
Clinical Enthesitis	17 (35%)	13 (45%)	p=0.41
MASES, median (IQR)	0.0 (0.0, 2.5)	0.0 (0.0, 2.0)	0 (-0.7 to 0.7)
BMI, median (IQR)	26.8 (23.5, 30.8)	27.7 (23.8, 31.6)	0.9 (-2.0 to 3.8)
Smoking (current)	9 (19%)	5 (17%)	p=0.63
Disease phenotype			
Predominant DIP joint disease	3 (7%)	2 (7%)	p=0.90

A. Characteristics and outcomes	Oligoarticular PsA without dactylitis [48/77 (62.3%)]	Oligoarticular PsA with dactylitis [29/77(37.7%)]	Difference/ p value
Axial disease	1 (2%)	3 (11%)	p=0.12
Arthritis Mutilans	0	0	0
Laboratory markers			
CRP (mg/L), median (IQR)	5.0 (5.0, 8.2)	5.0 (5.0, 14.9)	0 (-2.5 to 2.5)
Elevated (>10)	9 (19%)	11 (38%)	p=0.063
ESR, median (IQR)	10.5 (5.0, 23.0)	21.0 (5.0, 27.0)	10.0 (0.3 to 19.7)*
Patient Reported Outcomes (PROs)			
PsAQoL, median (IQR)	4.0 (0.0, 12.0)	3.5 (1.0, 10.0)	0 (-5.7 to 5.7)
DLQI, median (IQR)	3.0 (1.0, 6.0)	3.5 (1.0, 7.0)	1.0 (-1.8 to 3.8)
HAQ, median (IQR)	0.3 (0.0, 1.4)	0.4 (0.0, 1.0)	0.97
B. Ultrasound Synovitis/ Erosions			
	Oligoarticular PsA without dactylitis [44/69 (63.7%)]	Oligoarticular PsA with dactylitis [25/69 (36.2%)]	Difference/ p value
Total GS≥2	308/1951 (15.8%)	211/1026 (20.6%)	p=0.001**
Total PD≥1	53/1951 (2.7%)	47/1026 (4.6%)	p=0.007**
Total GS≥2+PD>1	46/1951 (2.4%)	41/1026 (4.0%)	p=0.012*
Total US erosions	9/1833 (0.5%)	9/968 (0.9%)	p=0.167
Total erosion score (patient level)	Mean 0.32 (SD 1.0) Median 0 (0,0)	Mean 0.64 (SD 1.3) Median 0 (0,0)	p=0.048*
Total patients US erosive	5/44 (11.4%)	6/25 (24.0%)	p=0.17
C. Ultrasound Synovitis/ Erosions			
	Oligoarticular PsA without dactylitis [44/69 (63.7%)] (<u>same as above (B)</u>)	Oligoarticular PsA with dactylitis [25/69 (36.2%)] (<u>dactylitis excluded</u>)	Difference/ p value
Total GS≥2	308/1951 (15.8%)	184/1966 (19.1%)	p=0.027*
Total PD≥1	53/1951 (2.7%)	33/966 (3.4%)	p=0.291
Total GS≥2+PD>1	46/1951 (2.4%)	28/966 (2.9%)	p=0.084
Total US erosions	9/1833 (0.5%)	5/912 (0.6%)	p=0.84
Total erosion score (patient level)	Mean 0.31 (SD 1.0) Median 0 (0,0)	Mean 0.32 (SD 1.0) Median 0 (0,0)	p=0.99
Total patients US erosive	5/44 (11.4%)	4/25 (16.0%)	p=0.71
*p<0.05, **p<0.01, ***p<0.001.			

BMI: Body mass index; DLQI: Dermatology quality of life index; HAQ: Health assessment questionnaire disability index; MASES: Maastricht ankylosing spondylitis enthesitis scores; mNAPSI: Modified nail psoriasis severity index; PASI: Psoriasis area severity index; PsAQoL: PsA quality of life.

S3 b) Polyarticular subset

A. Characteristics and outcomes	Polyarticular PsA without dactylitis [48/100 (48.0%)]	Polyarticular PsA with dactylitis [52/100(52.0%)]	Difference/ p value
Clinical			
Age, mean (SD), years	45.2 (13.1)	45.3 (13.9)	-0.1 (-5.5 to 5.3)
Male	22 (46%)	30 (58%)	p=0.24
Symptom duration, median (IQR), months	18.0 (11.0, 48.0)	12.0 (6.0, 24.0)	-6 (-15.7 to 3.7)
Duration from diagnosis, median (IQR), months	0.5 (0.0, 2.7)	1.2 (0.5, 4.6)	0.7 (-0.4 to 1.8)
Early morning stiffness median (IQR), minutes	60.0 (30.0, 120.0)	75.0 (35.0, 240.0)	30 (-20.0 to 80.1)
TJC (78), median (IQR)	8.5 (4.0, 14.5)	12.5 (6.0, 23.5)	4.0 (-1.7 to 9.7)
SJC (76), median (IQR)	2.0 (0.0, 4.5)	7.5 (6.0, 14.0)	6.0 (3.6 to 8.4)***
TJC (78) median (IQR) (excluding dactylitis)	8.5 (4.0, 14.5)	6.0 (4.0-14.0)	-3.0 (-7.5 to 1.5)
SJC (76) median (IQR) (excluding dactylitis)	2.0 (0.0, 4.5)	4.0 (1.0-7.0)	2.0 (-0.1 to 4.1)
Current Psoriasis	48 (100.0%)	45 (86.5%)	p=0.008**
Family history of Psoriasis	27 (56%)	31 (62%)	p=0.56
PASI, median (IQR)	3.0 (1.2, 5.2)	1.9 (0.0, 4.0)	-1.1 (-2.7 to 0.5)
Psoriatic Nail dystrophy	25 (52%)	29 (56%)	p=0.71
mNAPSI, median (IQR)	1.5 (0.0, 9.0)	2.5 (0.0, 10.0)	1 (-2.8 to 4.8)
Clinical Enthesitis	19 (40%)	29 (56%)	p=0.11
MASES, median (IQR)	0.0 (0.0, 2.0)	1.0 (0.0, 2.0)	1.0 (0.1 to 1.9)*
BMI, median (IQR)	29.6 (25.9, 33.2)	29.4 (25.1, 31.3)	-0.4 (-2.7 to 2.0)
Smoking (current)	10 (21%)	4 (8%)	p=0.16
Disease phenotype			
Predominant DIP joint disease	4 (8%)	11 (22%)	p=0.060
Axial disease	16 (33%)	6 (12%)	p=0.011*
Arthritis Mutilans	0	0	0
Laboratory markers			
CRP (mg/L), median (IQR)	5.0 (5.0, 12.0)	9.6 (5.0, 20.5)	4.6 (-0.4 to 9.6)
Elevated (>10)	15 (31%)	25 (48%)	p=0.086

A. Characteristics and outcomes	Polyarticular PsA without dactylitis [48/100 (48.0%)]	Polyarticular PsA with dactylitis [52/100(52.0%)]	Difference/ p value
ESR, median (IQR)	15.5 (7.0, 41.0)	20.0 (9.0, 36.0)	3.0 (-8.8 to 14.8)
Patient Reported Outcomes (PROs)			
PsAQoL, median (IQR)	7.0 (1.0, 13.0)	8.0 (3.0, 13.0)	1.0 (-3.4 to 5.4)
DLQI, median (IQR)	5.0 (1.0, 12.0)	2.0 (1.0, 5.0)	-3.0 (-6.4 to 0.4)
HAQ, median (IQR)	0.8 (0.4, 1.4)	0.9 (0.5, 1.5)	0.1 (-0.3 to 0.
B. Ultrasound Synovitis/ Erosions	Polyarticular PsA without dactylitis [42/86 (48.8%)]	Polyarticular PsA with dactylitis [44/86 51.1%]	Difference/ p value
Total GS \geq 2	243/1471 (16.5%)	431/1695 (25.4%)	p<0.001***
Total PD \geq 1	61/1471 (4.2%)	151/1695 (8.9%)	p<0.001***
Total GS \geq 2+PD>1	43/1471 (2.9%)	130/1695 (7.7%)	p<0.001**
Total US erosions	6/1373 (0.4%)	24/1589 (1.5%)	p=0.004**
Total erosion score (patient level)	Mean 0.23 (SD 0.69) Median 0 (0,0)	Mean 0.77 (SD 1.77) Median 0 (0,1)	p=0.07*
Total patients US erosive	6/42 (14.3%)	14/44 (31.8%)	p=0.04*
C. Ultrasound Synovitis/ Erosions	Polyarticular PsA without dactylitis[42/86 (48.8%)] (same as above (B))	Polyarticular PsA with dactylitis [44/86 51.1%] (dactylitis excluded)	Difference/ p value
Total GS \geq 2	243/1471 (16.5%)	323/1500 (21.5%)	p=0.001**
Total PD \geq 1	61/1471 (4.2%)	93/1500 (6.2%)	p=0.011*
Total GS \geq 2+PD>1	43/1471 (2.9%)	73/1500 (4.9%)	p=0.001**
Total US erosions	6/1373 (0.4%)	20/1403 (1.4%)	p=0.007**
Total erosion score (patient level)	Mean 0.23 (SD 0.69) Median 0 (0,0)	Mean 0.65 (SD 1.7) Median 0 (0,1)	p=0.14
Total patients US erosive	6/42 (14.3%)	13/44 (29.6%)	p=0.088
*p<0.05, **p<0.01, ***p<0.001.			

BMI: Body mass index; DLQI: Dermatology quality of life index; HAQ: Health assessment questionnaire disability index; MASES: Maastricht ankylosing spondylitis enthesitis scores; mNAPSI: Modified nail psoriasis severity index; PASI: Psoriasis area severity index; PsAQoL: PsA quality of life.

Supplementary table S4

Characteristics of the newly diagnosed, early PsA cohort dichotomised by non-dactylitic PsA *versus* current or past history of dactylitis.

Characteristics and outcomes	Non-dactylitic PsA [81/177 (45.8%)]	Dactylitic PsA (Past history or current dactylitis) [96/177 (54.2%)]	p-value
Clinical			
Age, mean (SD), years	44.0 (13.1)	44.2 (12.9)	0.91
Male	35 (43%)	45 (47%)	0.63
Symptom duration, median (IQR), months	13.0 (11.0, 36.0)	12.0 (6.0, 24.0)	0.100
Duration from diagnosis, median (IQR), months	0.1 (0.0, 0.2)	0.1 (0.0, 0.3)	0.18
Early morning stiffness median (IQR), minutes	30.0 (15.0, 60.0)	60.0 (17.5, 180.0)	0.001
TJC (78), median (IQR)	4.0 (1.0, 10.0)	8.0 (3.5, 18.5)	0.001
SJC (76), median (IQR)	1.0 (0.0, 3.0)	6.0 (2.0, 11.0)	<0.001
Current Psoriasis	81/81 (100%)	89/96 (92.6%)	0.013
Family history of Psoriasis	43 (54%)	58 (62%)	0.29
PASI, median (IQR)	2.9 (0.9, 4.8)	1.9 (0.4, 4.2)	0.10
Psoriatic Nail dystrophy	45 (56%)	47 (49%)	0.38
mNAPSI, median (IQR)	2.0 (0.0, 7.0)	0.0 (0.0, 8.5)	0.84
Clinical Enthesitis	29 (36%)	49 (51%)	0.042
MASES, median (IQR)	0.0 (0.0, 2.0)	1.0 (0.0, 2.0)	0.20
BMI, median (IQR)	27.6 (24.0, 31.9)	28.8 (25.1, 31.6)	0.60
Smoking (current)	16 (20%)	12 (12%)	0.36
Disease phenotype			
Oligoarthritis (defined by SJC<5)	70 (86%)	41 (43%)	<0.001
DIP joint disease	6 (8%)	14 (16%)	0.10
Axial disease	15 (19%)	11 (12%)	0.24
Arthritis Mutilans	0	0	0
Laboratory markers			
CRP (mg/L), median (IQR)	5.0 (5.0, 8.2)	6.7 (5.0, 18.0)	0.001
Elevated CRP (>10mg/L)	18 (22%)	42 (44%)	0.003
ESR, median (IQR)	11.0 (6.0, 26.0)	21.0 (7.0, 36.0)	0.060
Patient Reported Outcomes (PROs)			
PsAQoL, median (IQR)	6.0 (0.0, 12.0)	6.0 (1.0, 13.0)	0.47
DLQI, median (IQR)	3.0 (1.0, 9.0)	2.0 (1.0, 6.0)	0.085
HAQ, median (IQR)	0.6 (0.1, 1.2)	0.8 (0.4, 1.4)	0.21
US synovitis and erosions	Non-dactylitic PsA [71/155 (45.8%)]	Dactylitic PsA [84/155 (54.2%)]	p-value
Total GS≥2	414/2786 (14.9%)	779/3357 (23.6%)	p<0.001
Total PD≥1	80/2786 (2.9%)	232/3357 (6.9%)	p<0.001
Total GS≥2+PD>1	61/2786 (2.2%)	199/3357 (6.3%)	p<0.001
Total US erosions	10/2606 (0.4%)	38/3157 (1.2%)	p<0.001
Total US erosive patients	9/71 (12.7%)	22/84 (26.2%)	p=0.036

BMI: Body mass index; DLQI: Dermatology quality of life index; HAQ: Health assessment questionnaire disability index; MASES: Maastricht ankylosing spondylitis enthesitis scores; mNAPSI: Modified nail psoriasis severity index; PASI: Psoriasis area severity index; PsAQoL: PsA quality of life.

Supplementary table S5

Characteristics of the newly diagnosed, early PsA cohort dichotomised by dactylitis excluding those with a symptom duration of >24 months.

Characteristics and outcomes	Non-dactylitic PsA [64/132 (48.5%)]	Dactylitic PsA (Past history or current dactylitis) [68/132(51.5%)]	p-value
Clinical			
Age, mean (SD), years	43.4 (12.7)	43.4 (13.6)	1.00
Male	23 (36%)	34 (50%)	0.10
Symptom duration, median (IQR), months	12.0 (7.0, 18.0)	9.0 (6.0, 18.0)	0.38
Duration from diagnosis, median (IQR), months	0.1 (0.0, 0.2)	0.1 (0.0, 0.4)	0.29
Early morning stiffness median (IQR), minutes	30.0 (15.0, 105.0)	60.0 (15.0, 180.0)	0.033
TJC (78), median (IQR)	4.0 (1.5, 9.0)	8.5 (4.5, 20.0)	<0.001
SJC (76), median (IQR)	1.0 (0.0, 3.0)	6.5 (2.5, 11.0)	<0.001
Current Psoriasis	64/64 (100%)	62/68 (91.2%)	0.02
Family history of Psoriasis	34 (55%)	43 (66%)	0.19
PASI, median (IQR)	2.9 (1.1, 5.2)	1.9 (0.4, 3.9)	0.10
Psoriatic Nail dystrophy	35 (55%)	33 (49%)	0.48
mNAPSI, median (IQR)	1.5 (0.0, 6.0)	0.0 (0.0, 8.5)	1.00
Clinical Enthesitis	24 (38%)	35 (51%)	0.11
MASES, median (IQR)	0.0 (0.0, 2.0)	1.0 (0.0, 2.0)	0.33
BMI, median (IQR)	27.8 (23.5, 31.4)	28.6 (25.0, 31.2)	0.61
Smoking (current)	13 (20%)	8 (12%)	0.40
Disease phenotype			
Oligoarthritis (defined by SJC<5)	56 (88%)	24 (35%)	<0.001
DIP joint disease	4 (7%)	11 (17%)	0.073
Axial disease	11 (18%)	7 (11%)	0.25
Arthritis Mutilans	0	0	0
Laboratory markers			
CRP (mg/L), median (IQR)	5.0 (5.0, 9.1)	8.8 (5.0, 19.7)	0.009
Elevated CRP (>10mg/L)	15 (23%)	32 (47%)	0.005
ESR, median (IQR)	10.0 (5.0, 25.0)	21.5 (7.0, 36.0)	0.065
Patient Reported Outcomes (PROs)			
PsAQoL, median (IQR)	7.0 (0.0, 12.0)	6.0 (1.0, 13.0)	0.87
DLQI, median (IQR)	3.0 (1.0, 9.0)	2.0 (1.0, 6.0)	0.079
HAQ, median (IQR)	0.6 (0.1, 1.3)	0.8 (0.2, 1.4)	0.34
US synovitis and erosions	Non-dactylitic PsA [55/114 (48.3%)]	Dactylitic PsA [59/114 (51.7%)]	p-value
Total GS≥2	383/2218 (17.3%)	561/2373 (23.6%)	p<0.001
Total PD≥1	83/2218 (3.7%)	181/2373 (7.6%)	p<0.001
Total GS≥2+PD>1	66/2218 (3.0%)	157/2373 (6.6%)	p<0.001
Total US erosions	7/2075 (0.3%)	31/2233 (1.4%)	p<0.001
Total US erosive patients	7/55 (12.7%)	19/59 (32.2%)	p=0.013

BMI: Body mass index; DLQI: Dermatology quality of life index; HAQ: Health assessment questionnaire disability index; MASES: Maastricht ankylosing spondylitis enthesitis scores; mNAPSI: Modified nail psoriasis severity index; PASI: Psoriasis area severity index; PsAQoL: PsA quality of life.

