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ALIGN PsA: Advancing a Multidisciplinary Approach in PsA

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This activity has been designed to meet the educational needs of physicians, physician assistants, medical assistants, and nurse practitioners involved in the care of patients with psoriatic disease.

Educational Needs

Psoriasis is a common skin condition that affects approximately 3.2% of adults in the United States. Psoriasis is associated with a number of coexisting conditions, the most prevalent of which is psoriatic arthritis (PsA). Among people with psoriasis, the prevalence of PsA is estimated to be between 6% and 41%. According to expert KOL opinion, interdisciplinary cooperation between dermatologists and rheumatologists remains a significant practice gap in the management of psoriasis/psoriatic arthritis (PsA). Combined clinics offer a promising care model because they increase collaborative care for patients with complex diseases, enhance professional development, provide unique training opportunities for medical students, residents, and fellows in a setting where they can learn the importance of communication between patients and provider and allow the opportunity to study long-term outcomes and outcome measurements in patients with complex diseases.

Educational Objectives

- Analyze the roles of the dermatologist and rheumatologist in the treatment of psoriatic disease (PD), including both psoriasis (PsO) and psoriatic arthritis (PsA)
- Discuss how to integrate interdisciplinary collaboration into daily clinical practice
- Define PsA under the spondyloarthritis umbrella and discuss CASPAR criteria
- Describe the detrimental effects and comorbidities of untreated PD
- Discuss comorbidities associated with PD
- Define the patient-centric effects of PD, including aspects that affect quality of life, and recommend techniques to treat the "whole" patient
- Review data on new and emerging therapies for PD
- Demonstrate strategies to incorporate diagnostic and treatment updates into clinical practice and how to tailor treatment to individual cases

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Seminars in Cutaneous Medicine and Surgery

EDITORS

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Seminars in Cutaneous Medicine and Surgery presents well-rounded and authoritative discussions of important clinical areas, especially those undergoing rapid change in the specialty. Each issue, under the direction of the Editors and Guest Editors selected because of their expertise in the subject area, includes the most current information on the diagnosis and management of specific disorders of the skin, as well as the application of the latest scientific findings to patient care.

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INTRODUCTION

Psoriasis is a common skin condition that affects approximately 3.2% of adults in the United States.[1] Psoriasis is associated with a number of coexisting conditions, the most prevalent of which is psoriatic arthritis (PsA). Among people with psoriasis, the prevalence of PsA is estimated to be between 6% and 41%.[2] PsA and other comorbidities are associated with a decreased life span.[3]

PsA has a heterogeneous presentation, with symptoms that span multiple clinical specialties.[4] In addition to the nail and skin symptoms that are also present in psoriasis, PsA affects peripheral joints, axial joints, entheses, and other organs.[5] As such, the diagnosis and management of PsA can be complex and time-consuming, benefitting from a multidisciplinary approach. Traditional single-specialty management paradigms can result in fragmented care, delaying the diagnosis and treatment of PsA and leading to worse clinical outcomes for patients.[6] An estimated 15% of PsA cases are undiagnosed, and more than half of patients with PsA are undertreated.[7,8]

Because of the diverse and multi-organ presentation of PsA, rheumatologists and dermatologists often share management responsibilities.[9] As such, established guidelines for the management of PsA include recommendations for communication and referral between rheumatologists and dermatologists.[10,11] To prevent disjointed care and improve outcomes of patients, combined dermatology-rheumatology clinics have emerged to provide patients with concurrent care that holistically addresses their multiple disease manifestations.[12] In this review, we will discuss the diagnosis and management of PsA. We will also review the importance and implementation of interdisciplinary care and describe the roles of the dermatologist and rheumatologist within the co-management paradigm.

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ALIGN PsA: Advancing a Multidisciplinary Approach in PsA

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Abstract

Psoriasis is a chronic skin condition that is associated with several comorbidities and co-manifestations that reduce patient quality of life. Psoriatic arthritis (PsA) is a form of spondyloarthritis that is associated with psoriasis and typically involves peripheral disease, axial disease, enthesitis, dactylitis, and skin and nail lesions. Psoriatic arthritis is associated with a substantial psychosocial and functional burden and can lead to irreversible joint damage if left untreated. Early and accurate diagnosis of PsA is critical. The symptoms of PsA span the fields of dermatology and rheumatology, and professional societies recommend co-management between rheumatologists and dermatologists to optimally treat the condition. Dermatologists must be familiar with the hallmarks of PsA, while rheumatologists should understand the impact that cutaneous manifestations of PsA can have on quality of life. Current models of co-management include combined clinics and virtual clinics, which have had success in case reports. Co-management of PsA has been associated with more use of biologics, better preventive care, and higher patient satisfaction.

Keywords

Psoriatic arthritis, psoriasis, biologics, interdisciplinary care, comorbidities, immune arthritis

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Psoriatic Disease: Signs, Symptoms, and Diagnosis

Psoriasis is a chronic, inflammatory disease with a probable genetic and environmental etiology. Although psoriasis is often considered a disease of the skin, the condition can have severe musculoskeletal and systemic comorbidities and co-manifestations.[4,13] These conditions include Crohn's disease, uveitis, celiac disease, and metabolic syndrome. Psoriasis has also been associated with psychiatric disorders, such as anxiety and depression.[13]

PsA is an inflammatory condition that falls under the spondylarthritis umbrella of diseases.[11] Most patients with PsA have cutaneous manifestations for 8-12 years before they develop PsA, although, a small subset of patients develop joint symptoms prior to cutaneous symptoms, and a number of patients develop psoriasis and arthritis at the same time.[14] The severities of cutaneous manifestations and joint manifestations do not always correlate with one another.[15] PsA is a progressive condition and, left untreated, is associated with reduced function and worse quality of life.[11]

Musculoskeletal Aspects of Psoriatic Arthritis

Traditionally, 5 domains of PsA have been identified, 4 of which are related to the musculoskeletal system: peripheral disease, axial disease, enthesitis, and dactylitis. The fifth domain encompasses the skin and nail symptoms of psoriasis.[5] More recently, additional domains were identified at the Outcome Measures in Rheumatology meeting and include fatigue, systemic inflammation, and social aspects such as emotional well-being and economic cost.[16]

Peripheral disease involves destructive lesions in the peripheral joints of the arms and legs, while axial disease affects the spine.[17] Radiographic characteristics of PsA include joint erosion, joint space narrowing, periarticular periostitis, osteolysis, acro-osteolysis, ankylosis, spur formation, and spondylitis.[11] In early PsA, imaging typically reveals marginal and well-defined erosions, but they may become progressively more irregular and ill-defined as the disease progresses.[17] At diagnosis, approximately one-quarter of patients with PsA have erosions and joint space narrowing, and one-fifth have periostitis.[18]

Enthesitis is inflammation where tendons, ligaments, and fascia insert into the bone, and can lead to painful periostitis and spur formation.[19] Enthesitis can be identified through clinical assessment with a validated tool or evaluation with ultrasound or magnetic resonance imaging (MRI).[20,21] Enthesitis is common in PsA, affecting approximately 35% of patients.[19]

Dactylitis, commonly known as "sausage digit," is a combination of enthesitis and synovitis, affecting an entire digit (a finger or toe).[11] Acute dactylitis is a common early sign of PsA, affecting approximately one-third of PsA patients at diagnosis.[22] Moreover, between 40% and 50% of patients will have acute dactylitis at some point during their disease course.[22,23] Digits with dactylitis typically have more radiologic progression than unaffected digits.[22]

Cutaneous Aspects of Psoriatic Arthritis

The cutaneous manifestations of PsA typically precede the musculoskeletal symptoms.[14] Among patients with psoriasis, nail and scalp involvement are predictors for the future development of PsA.[24] Ultrasonographic nail findings of onycholysis, pitting, and nail crumbling have been associated with entheseal thickening (suggestive of inflammatory processes),[25] although only onycholysis was associated with PsA in multivariate analysis.[26] Nail lesions have been associated with distal interphalangeal joint arthritis in particular.[27]

No specific clinical subtype of psoriasis has been associated with PsA, meaning that both plaque psoriasis and pustular psoriasis can co-occur with musculoskeletal symptoms. In general, however, PsA is associated with plaque psoriasis, and lesions frequently localize to the scalp and to the intergluteal and perianal regions.[27]

Diagnosis of Psoriatic Arthritis

PsA is diagnosed on the basis of clinical judgement. Along with the presence of psoriatic skin or nail lesions, specific peripheral or axial patterns of joint inflammation are characteristic of PsA. The absence of rheumatoid factor is another important feature of PsA that distinguishes the condition from rheumatoid arthritis, although as many as 5% of patients with PsA can have a positive rheumatoid factor. Other inflammatory conditions should be considered on differential diagnosis, including gout, systemic lupus erythematosus, rheumatoid arthritis, sarcoidosis, osteoarthritis, and ankylosing spondylitis.[5,11] Diagnostic criteria for PsA have not been validated, but PsA is frequently classified on the basis of the Classification Criteria for Psoriatic Arthritis (CASPAR criteria; **Table 1**).[5,28] A score of 3 or more points is indicative of PsA, with a specificity of 98.7% and a sensitivity of 91.4%.[28]

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TABLE 1 Classification Criteria for Psoriatic Arthritis (CASPAR criteria)

Criterion	Additional Information	Score
Current psoriasis	Defined as psoriatic skin or scalp disease present today as judged by a rheumatologist or dermatologist	2
Personal history of psoriasis	Defined as a history of psoriasis according to a patient, family physician, dermatologist, rheumatologist, or other qualified healthcare provider	1
Family history of psoriasis	Defined as a history of psoriasis in a first- or second-degree relative according to patient report	1
Psoriatic nail dystrophy	Including onycholysis, pitting, and hyperketosis observed on current physical examination	1
Negative test result for rheumatoid factor	By any method except latex, but enzyme-linked immunosorbent assay or nephelometry are preferable	2
Current dactylitis	Defined as swelling of an entire digit	1
History of dactylitis	Recorded by a rheumatologist	1
Radiographic evidence of juxtaarticular new bone formation	Appearing as ill-defined ossification near joint margins—but excluding osteophyte formation—on plain radiographs of the hand or foot	1

In general, radiography alone is insufficient for detecting the signs of enthesitis and articular disease in early PsA. Evaluation with ultrasound, contrast-enhanced ultrasound, or MRI is more sensitive for the detection of early PsA. Given its reproducibility and low cost, ultrasound is often the first-choice tool for evaluating joint damage.[29] In a single-center study of patients diagnosed with early PsA, 100% had evidence of articular inflammation based on ultrasound results.[30]

Screening tools have been developed to facilitate early PsA diagnosis and rheumatology referral by dermatologists. The Psoriatic Arthritis Screening Questionnaire (PASQ) is a relatively simple way to identify PsA in patients with the use of a 10-item questionnaire. The sensitivity and specificity of the PASQ are 86.3% and 88.9%, respectively, in patients with established disease. The sensitivity and specificity of the PASQ are 92.9% and 75%, respectively, in patients with early disease.[31] The Psoriasis Epidemiology Screening Tool (PEST) is a 5-item questionnaire that includes a joint diagram so that patients can easily identify where they have pain. In the validation cohort, the 5-question PEST was associated with a 92% sensitivity and 78% specificity.[32] The Toronto PsA Arthritis Screen (ToPAS) is a 12-item questionnaire that includes photographs of psoriasis and nail lesions to ensure agreement between doctors and patients on the definitions of clinical symptoms. Depending on where the ToPAS is administered (eg, rheumatology, dermatology, or family medicine clinics) the sensitivity ranged from 89.1% to 92.6%, and the specificity ranged from 85.7% to 100%.[33] The Psoriatic Arthritis Screening Evaluation (PASE) contains 15 items divided into subscales for function and symptoms. Questions are answered on a 5-point Likert scale. The PASE has a sensitivity of 82% and specificity of 73%.[34]

Although the established PsA screening tools may be useful for dermatologists and providers who are not as familiar with musculoskeletal manifestations of PsA, researchers have reported that the real-world sensitivities and specificities of the PASE, PEST, and ToPAS were lower than those reported in validation studies.[35] Recently, Cohen and colleagues published a screening mnemonic, "PSA," for the identification of musculoskeletal symptoms in patients with PsA: pain (in the joints), stiffness (>30 minutes after a period of inactivity)/sausage digit (dactylitis), and axial (axial spine involvement/back pain associated with stiffness and pain that improves with activity). The PSA acronym is not a validated screening tool, but it may be an excellent way for dermatologists to quickly monitor patients for PsA. Patients with 2 or more of the items can be more thoroughly screened with a validated tool or referred for evaluation.[36]

Burden of Psoriatic Arthritis

Psoriasis and its co-manifestations are associated with a considerable physical and emotional burden on patients. Health-related quality of life (HRQoL) is substantially decreased among patients. When evaluated with the Short Form Health Survey Questionnaire (SF-36), patients with psoriasis had a worse physical SF-36 component than most other chronic disease states, including type 2 diabetes, myocardial infarction, and cancer. Only congestive heart failure was associated with a lower physical SF-36 component score. Furthermore, psoriasis was associated with a worse mental SF-36 component score than cancer and type 2 diabetes, behind only chronic lung disease and depression. Joint pain in particular has been associated with lower overall HRQoL scores and worse physical HRQoL scores.[37]

Relative to psoriasis alone, PsA is associated with greater costs and worse clinical outcomes. Patients with PsA are at greater risk for inpatient admissions, emergency department visits, and outpatient visits, resulting in higher total medical costs.[38] In total, the direct annual healthcare costs of PsA have been estimated at up to $1.9 billion in the United States (2008 dollars).[39] Furthermore, many patients with PsA are unable to work full time or they miss work, resulting in indirect costs due to unemployment and disability. Indirect costs have been estimated to account for up to 72% of total healthcare costs, which are not accounted for in the $1.9 billion figure.[39,40]

Long-term treatment for PsA is usually required, as spontaneous remission is uncommon.[5] In the absence of appropriate treatment, PsA can progress, leading to an increase in joint damage, a greater risk of treatment failure, and a lower likelihood of remission. Patients who do not receive prompt treatment are also more likely to have worse functional disability.[6] Furthermore, since PsA is associated with several serious comorbidities, undiagnosed PsA could lead to morbidity and mortality attributed to its co-manifestations, such as cardiovascular events. Early and accurate diagnosis of PsA, therefore, is imperative.

Clinical Guidelines

A comprehensive US guideline on psoriasis and PsA diagnosis and management was published by the American Academy of Dermatology (AAD) in 2008. In the guidelines, the AAD reviews the pathogenesis, prognosis, classification, assessment, and treatment of psoriasis and PsA.[11,41] In 2015, the international Group for Research and Assessment of Psoriasis and Psoriatic Arthritis (GRAPPA) published PsA treatment recommendations on the basis of disease domain (eg, axial PsA, dactylitis, enthesitis) and comorbidities.[10] Even since these guidelines were published, however, a number of new therapies have been developed and reached the marketplace (**Table 2**).

The American College of Rheumatology (ACR), in conjunction with the National Psoriasis Foundation (NPF), will be releasing new PsA guidelines in 2018.[42] In a presentation at the 2017 ACR annual meeting, the ACR reviewed the highlights of the drafted guidance, including pharmacologic and non-pharmacologic treatment recommendations and a new treat-to-target strategy for active PsA.[43] Once the ACR guidelines are published, clinicians will have a multitude of recommendations for the management of psoriasis and PsA, both from the dermatology and rheumatology perspective (ie, 2008 AAD guidelines, 2016 GRAPPA guidelines, ACR/NPF 2018 guidelines).

In 2008 when the first AAD PsA guidelines were published, the only options for the treatment of PsA were traditional agents such as methotrexate (despite limited efficacy data) or tumor necrosis factor (TNF) inhibitors, a class which only consisted of adalimumab, etanercept, or infliximab at the time.[11] The publication of the 2015 GRAPPA guidelines and the expected publication of the ACR guidelines have drastically changed the evidence-based management guidance for PsA, approaching PsA from a rheumatologic perspective in addition to the dermatologic perspective. The overarching principles of the recent guidelines will likely be similar, with some overlap in treatment recommendations, but the ACR focus on rheumatologic manifestations will likely be helpful for dermatologists and rheumatologists alike, who will benefit from evidence-based recommendations in this area.[44] Further, there will now be an update of new therapeutic classes.

Psoriatic Disease Management

According to the GRAPPA treatment recommendations for PsA, the ultimate goal of therapy for patients with PsA is three-fold. First, therapy should achieve the lowest possible level of disease activity in all disease domains. Second, therapy should optimize functional status and quality of life while also preventing structural damage as much as possible. Finally, clinicians should prioritize avoiding or minimizing complications from untreated active disease and therapy.[10]

Although treating to target is commonly accepted as standard of care for rheumatoid arthritis, the PsA field has not yet adopted this standard, despite evidence of better outcomes. In the TICOPA study, tight control of inflammation in early PsA was achieved through frequent monitoring and treatment escalation when minimal disease activity criteria (remission or low disease activity) were not met. Compared with standard care (less frequent monitoring), tight control was associated with more improvement in joint disease after 48 weeks. Furthermore, tight control led to better patient-reported outcomes, including measurements of HRQoL.[45]

No clinical target analogous to inactive disease is universally accepted and validated for PsA,[46] although very low disease activity has been proposed as an option.[47] In the 2016 treatment guidelines, GRAPPA noted that target disease activity levels would be added as goals when definitions of remission and low or minimal disease activity are accepted and validated for PsA.[10] During the presentation of the draft guidance for PsA, the ACR announced that they would be recommending a treat-to-target strategy, but the target has not yet been announced.[43]

Treatment Options: Immune-Modifying Agents

The most important and substantial change for PsA treatment based on the ACR draft guidelines is the recommendation of first-line biologic disease-modifying antirheumatic drugs (DMARD) with a TNF inhibitor for moderate or severe PsA. A variety of treatment options are available for PsA, including oral small molecules (OSMs; a term synonymous with but preferable to DMARDs, according to the ACR), TNF inhibitors, IL-12/IL-23 inhibitors, IL-17 inhibitors, abatacept, and tofacitinib (**Table 2**).[43] Mild PsA is typically treated with symptomatic therapies, such as nonsteroidal antiinflammatory drugs (NSAIDs), but many patients with PsA have an inadequate response to these therapies. For active PsA in the past, OSMs like methotrexate have been recommended as first-line options along with TNF inhibitors.[10,11]

TNF Inhibitors

TNF inhibitors revolutionized the treatment of inflammatory arthritides and are often the standard of care for the treatment of these conditions. In general, TNF inhibitors are well tolerated, with a long history of safety and efficacy data. Responses to therapy can be rapid, occurring as quickly as within a week. Because TNF inhibitors can also address the skin and nail manifestations of psoriasis, they are excellent options for patients who have both joint and skin disease.

Etanercept, a soluble TNF receptor biologic, was the first TNF inhibitor shown to improve PsA symptoms.[48] In a randomized controlled trial, 60 patients with PsA were randomly assigned to receive etanercept or placebo. Compared with placebo treatment, 12-week treatment with etanercept was associated with a significantly higher rate of patients who met the Psoriatic Arthritis Response Criteria (PsARC; 87% vs 23%; $P < .001$) and who met the ACR criteria for improvement (ACR20; 73% vs 13%; $P < .001$).[49] In a longer-term study of 205 patients with PsA, etanercept was shown to reduce structural damage and improve physical functioning relative to placebo.[50]

Infliximab is a TNF inhibitor that directly binds TNF, reducing the symptoms associated with PsA. In the phase 3 IMPACT trial, infliximab was compared with placebo in 200 patients with active PsA. After 24 weeks of treatment, the infliximab group had a high rate of improvement in PsARC and ACR20 scores. Furthermore, infliximab was associated with a significantly higher rate of improvement than placebo for dactylitis (34% vs 12% ; $P < .001$) and enthesitis (37% vs 20%; $P = .002$).[51]

Like infliximab, adalimumab is a TNF inhibitor that binds directly to TNF and has well-established efficacy in PsA. In the phase 3 ADEPT trial, 315 patients with moderate to severe PsA were randomly assigned to receive adalimumab or placebo. After 24 weeks of treatment, significantly more patients in the adalimumab group than in the placebo group had an ACR20 response (57% vs 15%; $P < .001$).[52] Adalimumab treatment also resulted in better physical functioning and inhibited structural damage throughout 2 years of treatment.[52,53]

Certolizumab pegol binds free and membrane-bound TNF and showed efficacy in PsA in the RAPID-PsA trials. A total of 409 patients with PsA who had exposure to no more than one TNF inhibitor were randomly assigned to receive placebo or one of two doses of certolizumab pegol (200 mg every 2 weeks or 400 mg every 4 weeks, both after three 400-mg loading doses). After 24 weeks of treatment, certolizumab pegol 200 and 400 mg were associated with a significantly higher rate of ACR20 response than placebo (58.0% vs 51.9% vs 24.3%, respectively; $P < .001$). Importantly, the response to certolizumab pegol was independent of prior exposure to TNF inhibitors, which suggests that switching among TNF inhibitors upon treatment failure is a viable alternative to switching among drug classes. Durable improvements in rates of radiographic non-progression, cutaneous manifestations, enthesitis, and dactylitis were also noted.[54]

TABLE 2 Immune-modifying treatment options for PsA

Drug	Administration Route	Dosing for PsA	Approval Psoriasis	Approval PsA	Biosimilars
TNF inhibitors					
Adalimumab	SC	40 mg every other week	2008	2005	Adalimumab-adbm, adalimumab-atto
Certolizumab pegol	SC	400 mg initially at week 2 and 4, followed by 200 mg every other week; maintenance of 400 mg every 4 weeks allowed	No indication	2013	none
Etanercept	SC	For PsA: 50 mg once weekly For psoriasis: 50 mg twice weekly for 3 months, then once weekly	2004	2002	Etanercept-szzs
Golimumab	IV, SC	IV: 2 mg/kg infusion over 30 minutes at weeks 0 and 4, then every 8 weeks SC: 50 mg once monthly	No indication	SC: 2009 IV: 2017	none
Infliximab	IV	5 mg/kg at 0, 2, and 6 weeks, then every 8 weeks	2006	2005	Infliximab-abda, infliximab-dyyb, infliximab-qbtx
IL-17 inhibitors					
Ixekizumab	SC	For PsA: 160 mg at week 0, then 80 mg every 4 weeks For psoriasis: 160 mg at week 0, then 80 mg at weeks 2, 4, 6, 8, 10, and 12, then 80 mg every 4 weeks	2016	2017	none
Secukinumab	SC	300 mg at weeks 0, 1, 2, 3, and 4, then every 4 weeks; 150 mg allowable for some patients	2015	2016	none
IL-12 and IL-23 inhibitors					
Ustekinumab	SC	For PsA: 45 mg at weeks 0 and 4, then every 12 weeks For psoriasis: 45 mg (<100 kg) or 90 mg (>100 kg) at weeks 0 and 4, then every 12 weeks	2009	2013	none
PDE4 inhibitor					
Apremilast	Oral	Titrate to 30 mg twice daily	2014	2014	n/a
JAK inhibitor					
Tofacitinib	Oral	5 mg once daily (extended-release tablets) or twice daily	No indication	2017	n/a
T-cell modulator					
Abatacept	IV, SC	IV: 500 mg (< 60 kg), 750 mg (60-100 kg), or 1000 mg (>100 kg) as 30-minute infusion at weeks 2 and 4, then every 4 weeks SC: Administer 500 mg (< 60 kg), 750 mg (60-100 kg), or 1000 mg (>100 kg) once weekly	No indication	2017	none
Common OSMs/DMARDs*					
Leflunomide	Oral	In RA: 100 mg daily for 3 days, then 20 mg daily	No indication	No indication	n/a
Methotrexate	IM, IV, oral	In RA: oral 7.5 mg once weekly; oral 2.5 mg given at 12-hour intervals for 3 doses once weekly In psoriasis: Oral, IM, or IV 10-25 mg once weekly; oral 2.5 mg given at 12-hour intervals for 3 doses once weekly	1972	No indication	n/a
Sulfasalazine	Oral	In RA: 500 mg delayed-release twice daily	No indication	No indication	n/a

DMARDs, disease-modifying antirheumatic drugs; IL, interleukin; IM, intramuscular; IV, intravenous; JAK, Janus kinase; OSMs, oral small molecules; PDE4, phosphodiesterase 4; PsA, psoriatic arthritis; RA, rheumatoid arthritis; SC, subcutaneous; TNF, tumor necrosis factor.
*Approved for use in other inflammatory conditions but used off-label for the treatment of PsA. Other DMARDs, including antimalarials, cyclosporine, and gold, are not recommended for use by the American Academy of Dermatology because of the unconvincing evidence for efficacy.

The most recent addition to the TNF inhibitor class is golimumab, an antibody that binds free and membrane-bound TNF. In the phase 3 GO-VIBRANT study, 480 patients with active PsA received golimumab or placebo. At week 24, significantly better response rates were reported in the golimumab group than the placebo group for ACR20 (76.8% vs 24.3%; $P < .001$). Furthermore, golimumab prevented radiographic evidence of progression and improved quality of life, cutaneous manifestations, enthesitis, and dactylitis.[55]

TNF inhibitors as a class have generally good safety profiles. The rates of adverse events and serious adverse events are typically similar between groups, and treatment discontinuation has been similar between groups or even lower for TNF inhibitors.[56] TNF inhibitors are associated with an increased risk of infections.[57] Although there have been some concerns about an increase in malignancies among patients with inflammatory arthritis who are treated with TNF inhibitors, a systematic review and meta-analysis showed no increase in malignancies with TNF inhibitor use.[57,58]

No head-to-head comparisons of TNF inhibitors for PsA have been performed. In the absence of direct comparison studies, decisions about which TNF inhibitor to initiate first should be made on the basis of available safety data, the presence of various PsA domains, and patient preferences (eg, dosing, administration, price).[59] When a TNF inhibitor is ineffective for PsA, GRAPPA recommends switching to either another TNF inhibitor or a new biologic class.[10] According to the draft guidance presented in 2017, the ACR will recommend switching to an IL-17 inhibitor when a TNF inhibitor is ineffective.[43]

OSMs

For patients who cannot receive TNF inhibitors first-line, the ACR recommends OSMs over other biologics.[43] The AAD recommends first-line treatment with methotrexate, TNF inhibitors, or a combination of the two as first-line options. Although no OSMs are approved for use in PsA, they have been used off-label for many decades and have established safety profiles. Nonetheless, randomized controlled trials are scarce, and data for efficacy in PsA are inconsistent.[11]

Methotrexate has been approved since the 1970s for use in psoriasis and has been used off-label to treat PsA for nearly as long. In a randomized controlled trial from 2012, pulse dosing of methotrexate was compared with placebo in 221 patients with active PsA. Compared with placebo, methotrexate did not significantly impact the rate of ACR20 responses after 6 months of treatment. Other measures of inflammatory joint disease, such as erythrocyte sedimentation rate and C-reactive protein levels, were not significantly different between groups. Methotrexate did, however, improve skin manifestations of psoriasis relative to placebo ($P = .02$). Common adverse events associated with methotrexate include nausea and vomiting, respiratory tract infections, abdominal pain, and abnormal liver function tests.[60] Other randomized controlled trials of methotrexate in PsA that support the efficacy of the drug were not adequately powered to assess the clinical benefit.[11]

Sulfasalazine is another OSM that has been used in PsA despite limited evidence of efficacy. In a randomized controlled trial from 1996, 120 patients were randomly assigned to receive sulfasalazine 2 g per day or placebo. After 6 months of treatment, only pain was better in the sulfasalazine group compared with the placebo group. No significant change in joint symptoms, skin symptoms, morning stiffness, or inflammatory biologic variables were identified.[61] In another prospective trial of 221 patients, sulfasalazine was associated with a trend toward treatment response (defined as lower joint pain and tenderness scores; 57.8% vs 45.6%; $P = .05$).[62] Common adverse events associated with sulfasalazine treatment include gastrointestinal complaints (eg, dyspepsia, nausea) and rashes.[61,62]

Leflunomide is an OSM that targets activated T cells and has been used to treat PsA. In a randomized controlled trial, leflunomide 100 mg daily was compared with placebo in 190 patients with active PsA and at least 3% skin involvement from psoriasis. After 24 weeks of treatment, significantly more patients in the leflunomide group than in the placebo group achieved an ACR20 response (36.3% vs 20.0%; $P = .014$). Leflunomide was also shown to improve joint symptoms, skin symptoms, and HRQoL. Leflunomide is associated with an increased incidence of diarrhea, elevated alanine aminotransferase levels, and tiredness or lethargy.[63]

IL-17 Inhibitors

In the field of PsA, IL-17 inhibitors are relatively new developments. The first approval in this class was for secukinumab on the basis of the results of the FUTURE 2 study. In this phase 3 trial, 397 patients with PsA who were refractory to up to 3 TNF inhibitors were randomly assigned to one of three doses of secukinumab or placebo. Although all doses of secukinumab were more efficacious than placebo, 300 mg secukinumab was associated with the highest proportion of patients achieving ACR20 responses at week 24 (54% vs 15%; $P < .001$). Secukinumab was also associated with improved HRQoL and physical functioning relative to placebo at week 24. Common adverse events in FUTURE 2 included infections and infestations.[64]

Ixekizumab is an IL-17 inhibitor that showed efficacy in PsA in the phase 3 SPIRIT-P1 and SPIRIT-P2 trials. In the SPIRIT-P1 trial, 417 patients with PsA who were naïve to biologic therapy were randomly assigned to receive placebo, adalimumab, or one of two ixekizumab doses (80 mg every 2 weeks or every 4 weeks). After 24 weeks of treatment, both ixekizumab every 2 weeks and every 4 weeks were associated with better rates of ACR20 responses than placebo (62.1% vs 57.9% vs 30.2%, respectively; $P < .001$). Furthermore, both ixekizumab groups were associated with less functional disability and less progression of structural damage than placebo. As with TNF inhibitors, ixekizumab improved psoriasis symptoms, dactylitis, and enthesitis.[65] In SPIRIT-P2, 363 patients with PsA who were refractory to TNF inhibitors were randomly assigned to receive ixekizumab every 2 weeks, ixekizumab every 4 weeks, or placebo. At week 24, both ixekizumab every 2 weeks and ixekizumab every 4 weeks were associated with improved rates of ACR20 responses relative to placebo (48% vs 53% vs 33.8%, respectively; $P < .001$).[66] In both trials, ixekizumab was associated with a higher rate of treatment-emergent adverse events than placebo.[65,66] In SPIRIT-P2, ixekizumab resulted in more treatment-emergent infections, which were mostly mild or moderate in severity.[66]

Brodalumab, an IL-17 inhibitor, is being investigated in PsA. In a phase 2 randomized controlled trial, brodalumab was compared with placebo among patients with active PsA. After 12 weeks of treatment, the rates of ACR20 were higher for patients who received 140-mg brodalumab (37%) and 280-mg brodalumab (39%) regimens compared with placebo (18%; $P = .03$ and .02, respectively). The rates of improvement were noted regardless of whether patients had received prior biologic therapy.[67]

Although adalimumab was included as an active control in the SPIRIT-P1 trial, ixekizumab superiority was only compared with placebo in this study.[65] IL-17 inhibitors are preferred in patients who are refractory to TNF inhibitors, but when they fail, the next step recommended by the ACR in their 2017 draft PsA guidance is an IL-12 and IL-23 inhibitor.

IL-12/23 Inhibitor

Ustekinumab is the only IL-12/IL-23 inhibitor currently approved for the management of PsA. Ustekinumab was evaluated in 615 patients with PsA who were biologic-naïve (PSUMMIT 1 trial) and in 312 patients, 180 of whom had received at least one previous TNF inhibitor (PSUMMIT 2 trial).[68,69] In PSUMMIT 1, the groups that received ustekinumab 45 mg or 90 mg had significantly more patients reach

ACR20 responses at 24 weeks compared with the placebo group (42.4% vs 49.5% vs 22.8%, respectively; $P < .001$). Other aspects of PsA that were improved by ustekinumab included dactylitis, enthesitis, spondylitis, and peripheral joint disease.[68] Similar results were reported for TNF inhibitor–refractory patients in PSUMMIT2, with an ACR20 response rate of 43.8% for ustekinumab-treated patients and 20.2% for placebo-treated patients at week 24 ($P < .001$). Similarly, among the 180 patients who had received prior TNF inhibitor therapy, more patients who received ustekinumab achieved ACR20 responses (35.6% vs 14.5%).[70] In a preplanned analysis of the PSUMMIT trials, ustekinumab was shown to slow radiographic progression.[69] Ustekinumab is well tolerated in general, with similar rates of adverse events reported for the ustekinumab and placebo groups in the PSUMMIT trials.[68,69]

Guselkumab is a monoclonal antibody that inhibits IL-23 and is currently approved for the treatment of plaque psoriasis and is being investigated for the treatment of PsA. In a phase 2 study, 149 patients with active PsA and plaque psoriasis affecting 3% or more of their body surface area were randomly assigned to receive 100-mg guselkumab or placebo. Compared with patients who received placebo, those who received guselkumab had a significantly higher rate of ACR20 after 24 weeks (58% vs 18%; $P < .001$). Guselkumab was a well-tolerated treatment option.[71]

T-Cell Modulator

Abatacept, the only T-cell modulator currently approved for the management of PsA, exerts its therapeutic effects by modulating the CD28 costimulatory signal that activates T cells. In a phase 3 study, abatacept was compared with placebo in 424 patients, approximately 60% of whom had previously used a TNF inhibitor. Abatacept was associated with a significant improvement in the rate of ACR20 response relative to placebo (39.4% vs 22.3%; $P < .001$). Among patients who had previously received at least one TNF inhibitor, the rates of ACR20 response were similar to those in the general population for abatacept (36.4%) and placebo (22.3%; $P = .012$). However, abatacept did not significantly improve HRQoL, and the improvements in psoriasis lesions were modest. Abatacept is well tolerated, with similar rates of all adverse events and infections reported for abatacept and placebo groups.[65]

Phosphodiesterase 4 (PDE4) Inhibitor

Apremilast is an oral phosphodiesterase 4 (PDE4) inhibitor that was approved for use on the basis of the results of the PALACE trials. In PALACE 1, 504 patients with PsA were randomly assigned to 20-mg or 30-mg apremilast twice daily or to placebo. After 16 weeks of treatment, ACR20 responses were achieved by significantly more patients in the 20 or 30 mg apremilast groups than in the placebo group (31% vs 40% vs 19%, respectively; $P < .001$). Furthermore, apremilast was associated with significant improvements in physical functioning and psoriasis relative to placebo.[72] In PALACE 2, similar rates of ACR20 responses were reported for the 20-mg apremilast group (37.4%) and the 30-mg apremilast group (32.1%) compared with placebo (18.9%).[73] In PALACE 3, 505 patients with PsA were enrolled, and apremilast was shown to significantly improve the rates of ACR20 responses and psoriasis skin involvement.[74] Gastrointestinal adverse events, including diarrhea and nausea, are commonly reported in patients receiving apremilast. Other adverse events include headache and upper respiratory tract infections.[72,74]

Janus Kinase (JAK) Inhibitor

Tofacitinib is a Janus kinase (JAK) targeted synthetic inhibitor that has been shown to have efficacy in PsA in the OPAL Beyond and OPAL Broaden clinical trials. In OPAL Beyond, 395 patients with PsA and an inadequate response to one or more TNF inhibitors were randomly assigned to receive 5 or 10 mg tofacitinib twice daily or placebo for 3 months followed by a switch to tofacitinib 5 or 10 mg twice daily. After 3 months, ACR20 response occurred in 50% of patients in the 5-mg group and 47% in the 10-mg group compared with 24% in the placebo group ($P < .001$). Tofacitinib was also shown to improve HRQoL, enthesitis, dactylitis, skin manifestations, and physical functioning more than placebo.[75] In the OPAL Broaden clinical trial, 422 patients with PsA were randomly assigned to one of the four dose groups from the OPAL Beyond trial or to adalimumab 40 mg every 2 weeks, for a total of five groups. At month 3, the ACR20 response rates were better in the 5- and 10-mg tofacitinib groups than in the pooled placebo groups (50% vs 61% vs 33%; $P = .01$ for 5-mg dose and $P < .001$ for the 10-mg dose). The rate of ACR20 responses in the adalimumab group was 55%. As in the OPAL Beyond trial, tofacitinib was associated with an improvement in HRQoL, enthesitis (at the 10-mg dose), dactylitis, cutaneous symptoms, and physical functioning.[76] Adverse events occurred at a higher rate in the tofacitinib groups than in the placebo groups, with the most common adverse events including upper respiratory tract infection, nasopharyngitis, and headache.[75,76]

Biosimilars

The US FDA considers a biosimilar to be a follow-on product that is "biosimilar to or interchangeable with" an approved biologic agent with no clinically meaningful differences in safety or efficacy.[77] Several biosimilars have been developed for reference TNF inhibitors (**Table 2**), and many new biosimilars with utility in rheumatic diseases are under development. According to the ACR, biosimilars are not analogous to generics because they are not identical to their reference products, since they are produced in living cells.[78] For this reason, the ACR recommends that the decision to substitute a biosimilar for a reference product should be made only by the prescriber, and prescribers should retain the right to order that biologics are dispensed as written.[79]

Biosimilars are approved for all of the clinical indications of the reference product without the need for clinical trials in each indication, a concept known as extrapolation. In clinical development, biosimilars are still tested in a phase 3 confirmatory clinical study for an indication for which any clinically relevant difference in safety and efficacy can be identified. Of note, all extrapolated indications are required to be justified scientifically and are reviewed by regulatory agencies.[80]

Co-Management of Psoriatic Arthritis

The fields of dermatology and rheumatology have considerable overlap in terms of conditions managed, including inflammatory arthritides such as PsA. The AAD and GRAPPA guidelines both recommend co-management of PsA between rheumatologists and dermatologists to address this overlap.[10,11] In response to the need for multidisciplinary management of PsA and other psoriatic diseases, combined dermatology-rheumatology clinics have emerged across the United States and internationally. There are more than 20 combined dermatology-rheumatology clinics in the United States alone.[81]

Although there has been interest in the co-management of psoriatic diseases for decades,[82] the co-management approach has only recently been formalized through the introduction of professional societies and networks intended to facilitate the care of psoriatic disease through a multidisciplinary approach. For example, the Rheumatologic Dermatology Society was created to advance patient care and promote collaboration among members in disease states like lupus and dermatomyositis.[83] Similarly, the Psoriasis & Psoriatic Arthritis Clinics Multicenter Advancement Network (PPACMAN) is a network of combined dermatology-rheumatology clinics with the mission of "[nucleating] psoriatic disease combined clinics and centers to advance a multi-level approach to psoriatic patients, increase disease awareness and accelerate management."[84]

What Dermatologists Should Know About Inflammatory Arthritis

A major difference between the cutaneous and joint manifestations of PsA is that cutaneous manifestations are typically reversible, while joint manifestations are associated with destructive processes that can lead to irreversible joint damage.[85] Because PsA is often undiagnosed, and since most patients have skin disease before they have joint disease, screening for joint involvement should be a top priority for dermatologists managing patients with psoriatic disease.[7] In particular, dermatologists should ask questions that center on joint pain, joint stiffness, and swelling. When documenting joint pain and stiffness, the following elements should be included in records: onset, duration, and relationship to exercise.[86] In a systematic review of clinical signs and symptoms of PsA, rheumatologists determined that dermatologists should screen for peripheral inflammatory pain, axial inflammatory pain, dactylitis, and buttock and sciatic pain at every visit.[87] Furthermore, if patients complain of joint symptoms, a physical examination should be conducted of at least the hands, feet, and affected joints. In general, referrals to a rheumatologist should be considered for any patient with joint symptoms, and any patients with disabling symptoms or uncontrolled joint pain on NSAIDs should be referred.[86] Useful screening questionnaires include the PASQ, PEST, ToPAS, and the PASE, among others.

There are a number of reasonable approaches that dermatologists can take to managing mild joint pain prior to referral. Although most patients with joint pain will have already tried NSAIDs for joint pain relief at the time of presentation, it is reasonable to offer NSAIDs and recommend consistent dosing to patients with joint pain. Between 2 and 4 weeks of a maximum-strength NSAID should be an adequate trial. Of note, the following patients should not be offered an NSAID trial: those with osteoarthritis, which should be managed with acetaminophen; those with renal or peptic ulcer disease; and older patients. Patients with moderate to severe cutaneous manifestations of psoriasis who are receiving OSMs or biologics may find that they have symptom relief from joint disease as well. The ideal goal should always be complete remission of joint symptoms, so any residual disease after DMARD or biologic therapy would be cause for referral to a rheumatologist. Furthermore, if skin involvement does not warrant OSMs or biologics and can be managed with topical therapy, a rheumatologist should manage treatment for the joint involvement.[86]

What Rheumatologists Should Know About Psoriasis

Although it may be tempting for rheumatologists to treat PsA as a form of rheumatoid arthritis with skin involvement, there are distinct differences caused by the psoriasis component of PsA. This is particularly important because of the differences in comorbidities and co-manifestations of PsA and rheumatoid arthritis (**Table 3**). In an evaluation of HRQoL in patients with PsA and RA, PsA was associated with significantly worse role limitations due to emotional problems.[88] Therefore, even if treatment provided by a rheumatologist adequately addresses the musculoskeletal symptoms of PsA, rheumatologists should still collaborate with a dermatologist to ensure that cutaneous symptoms are addressed. In some cases, topical therapies or phototherapy may be indicated in addition to OSMs or biologics, highlighting the importance of dermatology referral.[85]

Treatment of PsA with TNF inhibitors and systemic glucocorticoids can lead to cutaneous complications, which requires careful monitoring for symptoms. Although rare, severe exacerbation of psoriasis (psoriasiform dermatitis) is a potential adverse effect of TNF inhibitor treatment.[89] In most cases, TNF inhibitor therapy should not be discontinued if psoriasiform dermatitis is tolerable and mild, as PsA could worsen. Instead, aggressive topical treatments should be pursued with subsequent phototherapy or OSMs if the skin lesions do not resolve.[90] Another potential complication of arthritis treatment can result from psoriasis rebound flares after systemic glucocorticoids are discontinued. The risk of psoriasis flare is approximately 8% and is higher when patients receive high-dose intramuscular glucocorticoids. Therefore, when administering systemic glucocorticoids for their rapid anti-inflammatory effects in PsA, rheumatologists should counsel patients on the risk for cutaneous flares and consult with a dermatologist to minimize flares and provide optimal management if they do occur.[91]

TABLE 3 Comorbidities that occurred at a significantly different rate in patients with rheumatoid arthritis and psoriatic arthritis in the Australian Rheumatology Association Database

Comorbidity	Rheumatoid Arthritis (n=3609) %	Psoriatic Arthritis (n=490) %	Adjusted Odds Ratio (95% CI)	*P* Value
Hypertension	35.2	38.2	1.7 (1.4-2.1)	<.001
Depression	23.2	35.9	2.1 (1.7-2.6)	<.001
Gastrointestinal disease	26.5	31.6	1.7 (1.4-2.1)	<.001
Hyperlipidemia	18.4	25.3	2.0 (1.6-2.5)	<.001
Blood disease	17.1	19.2	1.4 (1.1-1.8)	.008
Neurological disease	11.8	14.5	1.5 (1.2-2.0)	.003
Diabetes mellitus	8.4	12.9	2.2 (1.6-3.0)	<.001
Thyroid disease	8.6	11.0	1.8 (1.3-2.5)	.001
Ischemic heart disease	6.8	7.6	2.0 (1.3-2.9)	.001
Liver disease	4.1	6.1	1.7 (1.1-2.6)	.01
Any infection in the last 6 months	37.5	53.7	2.1 (1.7-2.6)	<.001

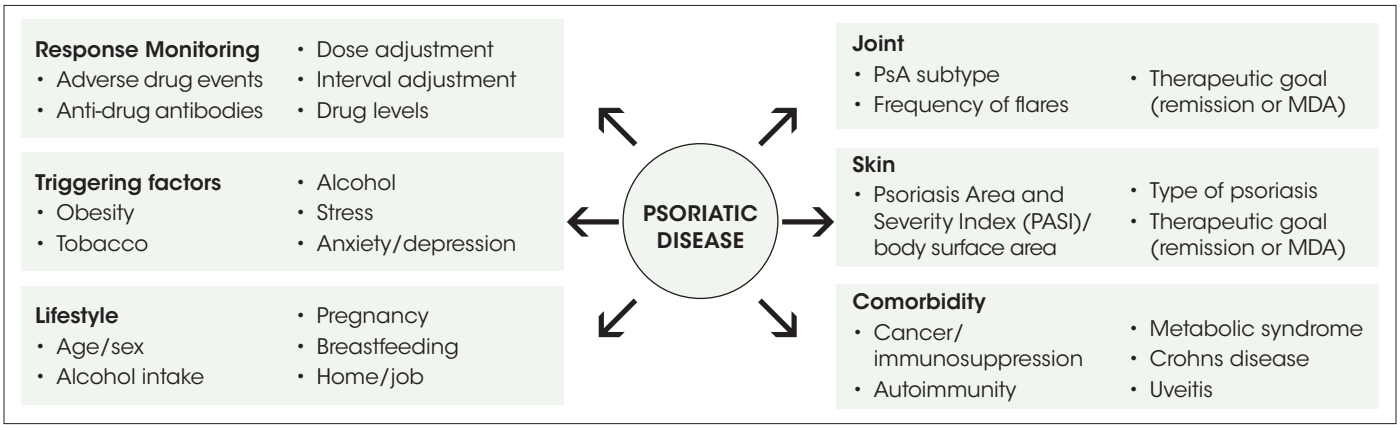

FIGURE 1 Co-management of PsA in combined clinics facilitates the holistic treatment of the various domains of PsA.[97] MDA, minimal disease activity; PsA, psoriatic arthritis.

Goals

The overall goal of co-management is to provide comprehensive, multidisciplinary care to improve the outcomes of patients with PsA.[92] Several factors in management contribute to optimal outcomes: early diagnosis, optimal treatment, and appropriate preventive care. PsA typically takes a median of 1 year to be diagnosed, and a delayed diagnosis of even 6 months may result in irreversible joint damage.[6,93] Optimal treatment is currently lacking in PsA and should be another goal of combined clinics. Almost half of all patients with PsA are unsatisfied with their treatment, and psoriasis is often undertreated.[94] Finally, evidence-based preventive care is often overlooked in patients with PsA and other inflammatory arthritides. Less than one-third of patients with inflammatory arthritis receive immunizations for pneumococcus and influenza, and many patients do not receive appropriate screening for cardiovascular disease risk factors.[95] Comprehensive management of patients with PsA will also inevitably improve quality of care and treatment selection.[12]

Benefits, Challenges, and Barriers to Co-Management

According to surveyed clinicians at member clinics of PPACMAN, the benefits of dermatology-rheumatology clinics include improved communication among healthcare teams, excellent training opportunities, and prompt and accurate diagnosis of PsA. Other benefits include more frequent monitoring of skin and joint manifestations and treatment-related effects, better recruitment for clinical trials and studies, and satisfying or rewarding interactions with colleagues.[96]

In a systematic review of combined dermatology-rheumatology clinics for the care of psoriasis and PsA, researchers reported that multidisciplinary consultations were associated with better skin and joint symptoms after treatment modification. Furthermore, 94% of patients were "very satisfied" with their care at the multidisciplinary clinic. Wait times at these clinics were higher than for standard clinics. Although the researchers noted that the evidence is limited for these clinics, the extant data suggest improved overall management with the combined clinic approach (**Figure 1**).[4]

Clinicians at combined clinics have also reported challenges associated with the dermatology-rheumatology co-management model. Scheduling the right mix of patients, filling both specialists' schedules appropriately, and demonstrating value to the institution were all difficulties reported by physicians.[96]

Successful Models

A variety of models for the combined care clinic exist. The most common model for the co-management of PsA is a combined clinic in which dermatologists and rheumatologists provide concurrent, synchronous care.[98] Most physicians who work in combined clinics are at academic practices that host weekly or monthly combined clinic hours. Virtual clinics are another option for the co-management of PsA. In these practice settings, rheumatologists and dermatologists do not interact with patients in the same time or place, but they do have an established referral and communication process to optimize care.[96] Retrospective and observational reports of the outcomes of cases managed synchronously have so far been positive. We will now describe case reports of successful combined clinic experiences.

Center for Skin and Related Musculoskeletal Diseases (SARM)

At the Center for Skin and Related Musculoskeletal Diseases (SARM) at Brigham and Women's Hospital in Boston, Massachusetts, dermatologists and rheumatologists provide concomitant care at the point of service. Psoriasis and PsA were the most common diagnoses made over a 6-year period, accounting for more than half of all cases seen at SARM. On presentation to the clinic, 50% of cases were being managed with topical therapy alone, but only 38% of patients continued with topical therapy alone after evaluation. Furthermore, after presentation to the clinic, more patients received prescriptions for OSMs (15% vs 25% for before vs after) and biologics (37% vs 16%), suggesting more aggressive management (**Figure 2**).[92]

The SARM clinic reported low rates of adverse events in their patients during the 6-year period: 3% for patients with psoriasis and 6% for patients with PsA. This was attributed to evidence-based preventive care (eg, purified protein derivative placement, hepatitis panel testing, and baseline laboratory testing prior to initiation of OSMs or biologics), review and documentation of immunization status and laboratory monitoring, and review and counseling for relevant comorbidities.[92]

Psoriasis Rheumatology and Dermatology (PSORD) Unit

At the Psoriasis Rheumatology and Dermatology (PSORD) unit at the Hospital Universitario Parc Taulí in Barcelona, Spain, the implementation of concomitant joint care hours for rheumatologists and dermatologists was preceded by multiple training sessions that focused on the signs and symptoms of psoriasis and PsA presented from the perspectives of each group. In contrast to the Brigham and Woman's SARM model and the DART Clinic (see below), the PSORD unit consisted of a single, 3-hour session per month, and all patients referred to the PSORD unit returned to their specialist for management after diagnosis and treatment were established. According to the

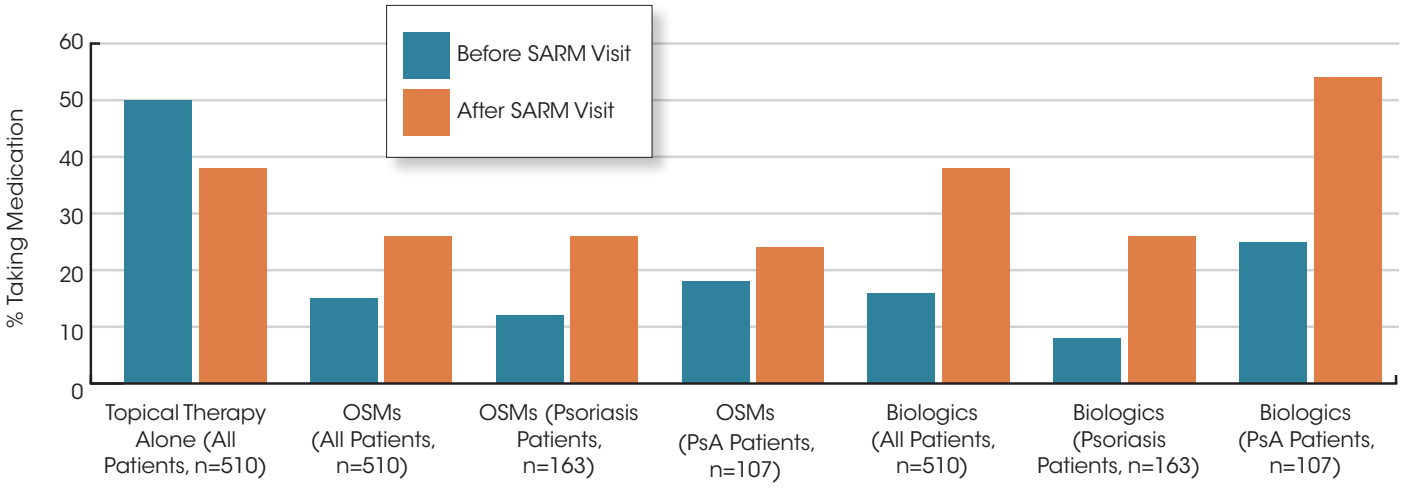

FIGURE 2 Escalation of treatment modalities following evaluation at the Center for Skin and Related Musculoskeletal Diseases (SARM) at Brigham and Women's Hospital in Boston, Massachusetts, a combined rheumatology and dermatology clinic center, between 2003 and 2009.[92] OSMs, oral small molecules; PsA, psoriatic arthritis.

study authors, this model improved the support and management of problematic cases but did not replace routine follow-up or specialist care. Between 2009 and 2012, 184 patients were referred to the PSORD unit. After visiting the PSORD unit, diagnosis or therapy remained unchanged in only 21% of cases (**Figures 3 and 4**).[99]

Hospital Can Misses, Ibiza, Spain

A multidisciplinary care unit was established at the Hospital Can Misses in Ibiza, Spain, in which patients with psoriatic disease are referred for diagnostic problems, therapy-related issues, comorbidity management, or safety concerns. As with the PSORD unit, patients returned to their usual care provider after their problems were solved. After patients were evaluated in the multidisciplinary care unit, more patients received topical therapy (44.6% vs 88.4% for before vs after), OSMs (44% vs 54%), and biologics (17% vs 29%). Satisfaction with the combined clinic was excellent, with patients rating their therapy quality as 9 out of 10 (**Table 4**).[100]

Dermatology and Rheumatology Treatment (DART) Clinic

Another example of the concomitant care model was reported in a case study of the Dermatology and Rheumatology Treatment (DART) Clinic in Canada, where all patients are concomitantly assessed by both a rheumatologist and a dermatologist. Since 2012, the DART Clinic has seen 20 to 25 patients per day and accepts referrals from community- and hospital-based rheumatologists, dermatologists, internists, and other subspecialties. Most patients with psoriasis who attended the DART Clinic have PsA, which could represent referral bias due to the co-management focus of the clinic. The researchers noted that rheumatologists and dermatologists at the clinic gain experience in cross-specialty care, including rheumatology residents learning about skin biopsies and dermatology residents becoming more comfortable with the use of OSMs.[101]

Future Therapies and Directions

Many of the emerging therapies for PsA target pathways that are similar to the currently established treatment. Agents that are currently under investigation in PsA include brodalumab (IL-17 inhibitor), bimekizumab (IL-17 inhibitor),[102] risankizumab (IL-23 inhibitor),[103] guselkumab (IL-23 inhibitor), upadacitinib (JAK inhibitor),[104] and BCD-085 (IL-17 inhibitor).[105] As the treatment options for PsA expand

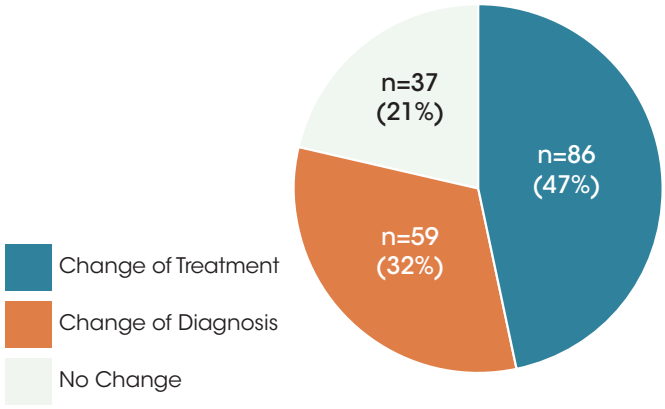

FIGURE 3 Diagnostic and therapeutic outcome of referral to the Psoriasis Rheumatology and Dermatology (PSORD) unit at the Hospital Universitario Parc Taulí in Barcelona, Spain.[99]

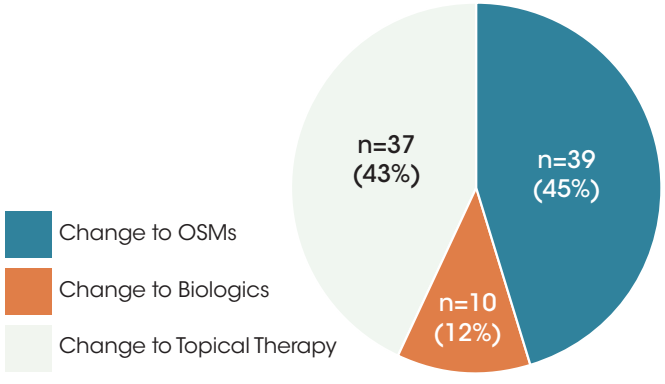

FIGURE 4 Diagnostic and therapeutic outcome of referral to the Psoriasis Rheumatology and Dermatology (PSORD) unit at the Hospital Universitario Parc Taulí in Barcelona, Spain.[99] OSMs, oral systemic medications.

over the coming years, the dermatology-rheumatology overlap has more therapeutic implications than ever.[9] There is currently no proposal for quality indicators for the multidisciplinary care of PsA, highlighting a current gap in knowledge. Metrics for quality and standards of care are an important component of developing and disseminating the organizational framework for combined clinics.[97]

In conclusion, more treatment options for PsA are available now than ever before, and more are expected to be released. Coupled with the anticipated ACR guidelines, dermatologists and rheumatologists now have the opportunity to diagnose and treat PsA early. Through novel combined clinics and interdisciplinary care with established referral systems, dermatologists and rheumatologists can prevent irreversible joint damage and other comorbidities and co-manifestations of PsA that are associated with higher levels of mortality.

TABLE 4 Satisfaction with care in the multidisciplinary care unit at Hospital Can Misses, Ibiza, Spain[100]

Response	n (%)
Describe the care of the multidisciplinary unit compared with your usual care.	
Much better	52 (46.8%)
Better	51 (45.9%)
The same	8 (7.2%)
Worse	0
Much worse	0
Describe the quality of the information given in the multidisciplinary care unit.	
Very good	58 (52.2%)
Good	48 (43.2%)
Normal	4 (3.6%)
Bad	1 (0.9%)
Very bad	0
Was your disease better controlled in this multidisciplinary care unit?	
Yes	112 (100%)

References

1. Rachakonda TD, Schupp CW, Armstrong AW. Psoriasis Prevalence Among Adults in the United States. *J Am Acad Dermatol.* 2014;70(3):512-516.
2. Ogdie A, Weiss P. The epidemiology of psoriatic arthritis. *Rheum Dis Clin North Am.* 2015;41(4):545-568.
3. Gelfand JM, Troxel AB, Lewis JD, et al. The risk of mortality in patients with psoriasis: results from a population-based study. *Arch Dermatol.* 2007;143(12):1493-1499.
4. Cobo-Ibanez T, Villaverde V, Seoane-Mato D, et al. Multidisciplinary dermatology-rheumatology management for patients with moderate-to-severe psoriasis and psoriatic arthritis: a systematic review. *Rheumatol Int.* 2016;36(2):221-229.
5. Ritchlin CT, Colbert RA, Gladman DD. Psoriatic arthritis. *N Engl J Med.* 2017;376(10):957-970.
6. Haroon M, Gallagher P, FitzGerald O. Diagnostic delay of more than 6 months contributes to poor radiographic and functional outcome in psoriatic arthritis. *Ann Rheum Dis.* 2015;74(6):1045-1050.
7. Villani AP, Rouzaud M, Sevrain M, et al. Prevalence of undiagnosed psoriatic arthritis among psoriasis patients: systematic review and meta-analysis. *J Am Acad Dermatol.* 2015;73(2):242-248.
8. Lebwohl MG, Kavanaugh A, Armstrong AW, Van Voorhees AS. US perspectives in the management of psoriasis and psoriatic arthritis: patient and physician results from the population-based multinational assessment of psoriasis and psoriatic arthritis (MAPP) survey. *Am J Clin Dermatol.* 2016;17(1):87-97..
9. Jagadeesan S, Shenoy P. Arthropathy in dermatology: a comprehensive review. *Indian Dermatol Online J.* 2017;8(2):79-93.
10. Coates LC, Kavanaugh A, Mease PJ, et al. Group for Research and Assessment of Psoriasis and Psoriatic Arthritis 2015 Treatment Recommendations for Psoriatic Arthritis. *Arthritis & Rheumatol.* 2016;68(5):1060-1071.
11. Gottlieb A, Korman NJ, Gordon KB, et al. Guidelines of care for the management of psoriasis and psoriatic arthritis: section 2. Psoriatic arthritis: overview and guidelines of care for treatment with an emphasis on the biologics. *J Am Acad Dermatol.* 2008; 58(5):851-864.
12. Gratacos-Masmitja J, Luelmo-Aguilar J, Zarco-Montejo P, et al. Points to consider in the foundation of multidisciplinary units for psoriatic arthritis: a Delphi study and a systematic review of the literature. *Adv Ther.* 2017;33(12):2150-2159.
13. Oliveira Mde F, Rocha Bde O, Duarte GV. Psoriasis: classical and emerging comorbidities. *An Bras Dermatol.* 2015;90(1):9-20.
14. Gottlieb AB, Kircik L, Eisen D, et al. Use of etanercept for psoriatic arthritis in the dermatology clinic: the Experience Diagnosing, Understanding Care, and Treatment with Etanercept (EDUCATE) study. *J Dermatolog Treat.* 2006; 17(6):343-352.
15. Cauli A, Gladman DD, Mathieu A, et al. Patient global assessment in psoriatic arthritis: a multicenter GRAPPA and OMERACT study. *J Rheumatol.* 2011;38(5):898-903.
16. Orbai AM, de Wit M, Mease PJ, et al. Updating the psoriatic arthritis (PsA) core domain set: a report from the PsA Workshop at OMERACT 2016. *J Rheumatol.* 2017;44(10):1522-1528.
17. Sudol-Szopinska I, Matuszewska G, Kwiatkowska B, Pracon G. Diagnostic imaging of psoriatic arthritis. Part I: etiopathogenesis, classifications and radiographic features. *J of Ultrason.* 2016;16(64):65-77.
18. Kane D, Stafford L, Bresnihan B, FitzGerald O. A prospective, clinical and radiological study of early psoriatic arthritis: an early synovitis clinic experience. *Rheumatology.* 2003;42(12):1460-1468.
19. Polachek A, Li S, Chandran V, Gladman DD. Clinical enthesitis in a prospective longitudinal psoriatic arthritis cohort: incidence, prevalence, characteristics, and outcome. *Arthritis Care Res (Hoboken).* 2017;69(11):1685-1691.
20. Kristensen S, Christensen JH, Schmidt EB, et al. Assessment of enthesitis in patients with psoriatic arthritis using clinical examination and ultrasound. *Muscles Ligaments Tendons J.* 2016; 6(2):241-247.
21. Bagel J, Schwartzman S. Enthesitis and dactylitis in psoriatic disease: a guide for dermatologists. *Am J Clin Dermatol.* 2018. doi: 10.1007/s40257-018-0377-2.
22. Brockbank J, Stein M, Schentag C, Gladman D. Dactylitis in psoriatic arthritis: a marker for disease severity? *Ann Rheum Dis.* 2005;64(2):188-190.
23. Gladman DD, Ziouzina O, Thavaneswaran A, Chandran V. Dactylitis in psoriatic arthritis: prevalence and response to therapy in the biologic era. *J Rheumatol.* 2013;40(8):1357-1359.
24. Wilson FC, Icen M, Crowson CS, McEvoy MT, Gabriel SE, Kremers HM. Incidence and clinical predictors of psoriatic arthritis in patients with psoriasis: a population-based study. *Arthritis Rheum.* 2009;61(2):233-239.
25. Aydin SZ, Castillo-Gallego C, Ash ZR, et al. Ultrasonographic assessment of nail in psoriatic disease shows a link between onychopathy and distal interphalangeal joint extensor tendon enthesopathy. *Dermatology.* 2012;225(3):231-235.
26. Love TJ, Gudjonsson JE, Valdimarsson H, Gudbjornsson B. Psoriatic arthritis and onycholysis—results from the cross-sectional Reykjavik psoriatic arthritis study. *J Rheumatol.* 2012; 39(7):1441-1444.
27. Rouzaud M, Sevrain M, Villani AP, et al. Is there a psoriasis skin phenotype associated with psoriatic arthritis? Systematic literature review. *J Eur Acad Dermatol Venereol.* 2014;28 (suppl 5):17-26.
28. Taylor W, Gladman D, Helliwell P, Marchesoni A, Mease P, Mielants H. Classification criteria for psoriatic arthritis: development of new criteria from a large international study. *Arthritis Rheum.* 2006;54(8):2665-2673.
29. Baran R, Sigurgeirsson B. Psoriatic nail disease, a predictor of psoriatic arthritis. *Br J Dermatol.* 2014;171(5):935-936.
30. Bonifati C, Elia F, Francesconi F, et al. The diagnosis of early psoriatic arthritis in an outpatient dermatological centre for psoriasis. *J Eur Acad Dermatol Venereol.* 2012;26(5):627-633.
31. Khraishi M, Landells I, Mugford G. The Self-Administered Psoriasis and Arthritis Screening Questionnaire (PASQ): a sensitive and specific tool for the diagnosis of early and established psoriatic arthritis. *Psoriasis Forum.* 2010;16(2):9-16.
32. Ibrahim GH, Buch MH, Lawson C, Waxman R, Helliwell PS. Evaluation of an existing screening tool for psoriatic arthritis in people with psoriasis and the development of a new instrument: the Psoriasis Epidemiology Screening Tool (PEST) questionnaire. *Clin Exp Rheumatol.* 2009;27(3):469-474.
33. Gladman DD, Schentag CT, Tom BD, et al. Development and initial validation of a screening questionnaire for psoriatic arthritis: the Toronto Psoriatic Arthritis Screen (ToPAS). *Ann Rheum Dis.* 2009;68(4):497-501.
34. Husni ME, Meyer KH, Cohen DS, Mody E, Qureshi AA. The PASE questionnaire: pilot-testing a psoriatic arthritis screening and evaluation tool. *J Am Acad Dermatol.* 2007;57(4):581-587.
35. Coates LC, Aslam T, Al Balushi F, et al. Comparison of three screening tools to detect psoriatic arthritis in patients with psoriasis (CONTEST study). *Br J Dermatol.* 2013;168(4):802-807.
36. Cohen JM, Husni ME, Qureshi AA, Merola JF. Psoriatic arthritis: it's as easy as PSA. *J Am Acad Dermatol.* 2015;72(5):905-906.
37. Rapp SR, Feldman SR, Exum ML, Fleischer AB, Jr., Reboussin DM. Psoriasis causes as much disability as other major medical diseases. *J Am Acad Dermatol.* 1999;41(3 Pt 1):401-407.
38. Feldman SR, Zhao Y, Shi L, Tran MH, Lu J. Economic and comorbidity burden among moderate-to-severe psoriasis patients with comorbid psoriatic arthritis. *Arthritis Care Res (Hoboken).* 2015;67(5):708-717.
39. Lee S, Mendelsohn A, Sarnes E. The burden of psoriatic arthritis: a literature review from a global health systems perspective. *PT.* 2010;35(12):680-689.
40. Kavanaugh A, Helliwell P, Ritchlin CT. Psoriatic arthritis and burden of disease: patient perspectives from the population-based multinational assessment of psoriasis and psoriatic arthritis (MAPP) survey. *Rheumatol Ther.* 2016;3(1):91-102.
41. Menter A, Gottlieb A, Feldman SR, et al. Guidelines of care for the management of psoriasis and psoriatic arthritis: section 1. Overview of psoriasis and guidelines of care for the treatment of psoriasis with biologics. *J Am Acad Dermatol.* 2008;58(5):826-850.
42. American College of Rheumatology. Psoriatic Arthritis. https://www.rheumatology.org/Practice-Quality/Clinical-Support/Clinical-Practice-Guidelines/Psoriatic-Arthritis. Accessed October 8, 2018.

43. Davio K. ACR and NPF Unveil new clinical guideline for treating psoriatic arthritis.; https://www.ajmc.com/conferences/acr-2017/acr-and-npf-unveil-new-clinical-guideline-for-treating-psoriatic-arthritis. Published November 8, 2017. Accessed October 9, 2018.
44. Gossec L, Coates LC, de Wit M, et al. Management of psoriatic arthritis in 2016: a comparison of EULAR and GRAPPA recommendations. *Nat Rev Rheumatol.* 2016;12(12):743-750.
45. Coates LC, Moverley AR, McParland L, et al. Effect of tight control of inflammation in early psoriatic arthritis (TICOPA): a UK multicentre, open-label, randomised, controlled trial. *Lancet*. 2015;386(10012):2489-2498.
46. Gossec L, McGonagle D, Korotaeva T, et al. Minimal disease activity as a treatment target in psoriatic arthritis: a review of the literature. *J. Rheumatol.* 2018;45(1):6-13.
47. Coates LC, Lubrano E, Perrotta FM, Emery P, Conaghan PG, Helliwell PS. What should be the primary target of "treat to target" in psoriatic arthritis? *J Rheumatol.* 2018. doi: 10.3899/jrheum.180267.
48. Mease P. A short history of biological therapy for psoriatic arthritis. *Clin Exp Rheumatol.* 2015;33(5 suppl 93):S104-108.
49. Mease PJ, Goffe BS, Metz J, VanderStoep A, Finck B, Burge DJ. Etanercept in the treatment of psoriatic arthritis and psoriasis: a randomised trial. *Lancet.* 2000;356(9227):385-390.
50. Mease PJ, Kivitz AJ, Burch FX, et al. Etanercept treatment of psoriatic arthritis: Safety, efficacy, and effect on disease progression. *Arthritis Rheum.* 2004;50(7):2264-2272.
51. Antoni C, Krueger GG, de Vlam K, et al. Infliximab improves signs and symptoms of psoriatic arthritis: results of the IMPACT 2 trial. *Ann Rheum Dis.* 2005;64(8):1150.
52. Mease PJ, Gladman DD, Ritchlin CT, et al. Adalimumab for the treatment of patients with moderately to severely active psoriatic arthritis: results of a double-blind, randomized, placebo-controlled trial. *Arthritis Rheum.* 2005;52(10):3279-3289.
53. Mease PJ, Ory P, Sharp JT, et al. Adalimumab for long-term treatment of psoriatic arthritis: 2-year data from the Adalimumab Effectiveness in Psoriatic Arthritis Trial (ADEPT). *Ann Rheum Dis.* 2009;68(5):702-709.
54. Mease PJ, Fleischmann R, Deodhar AA, et al. Effect of certolizumab pegol on signs and symptoms in patients with psoriatic arthritis: 24-week results of a Phase 3 double-blind randomised placebo-controlled study (RAPID-PsA). *Ann Rheum Dis.* 2014;73(1): 48-55.
55. Kavanaugh A, Husni ME, Harrison DD, et al. Safety and efficacy of intravenous golimumab in patients with active psoriatic arthritis: results through week twenty-four of the GO-VIBRANT study. *Arthritis Rheumatol.* 2017;69(11):2151-2161.
56. Lemos LL, de Oliveira Costa J, Almeida AM, et al. Treatment of psoriatic arthritis with anti-TNF agents: a systematic review and meta-analysis of efficacy, effectiveness and safety. *Rheumatol Int.* 2014;34(10):1345-1360.
57. Dommasch ED, Abuabara K, Shin DB, Nguyen J, Troxel AB, Gelfand JM. The risk of infection and malignancy with tumor necrosis factor antagonists in adults with psoriatic disease: A systematic review and meta-analysis of randomized controlled trials. *J Am Acad Dermatol.* 2011;64(6):1035-1050.
58. Bonovas S, Minozzi S, Lytras T, et al. Risk of malignancies using anti-TNF agents in rheumatoid arthritis, psoriatic arthritis, and ankylosing spondylitis: a systematic review and meta-analysis. *Expert Opin Drug Saf.* 2016;15(suppl 1):35-54.
59. D'Angelo S, Tramontano G, Gilio M, Leccese P, Olivieri I. Review of the treatment of psoriatic arthritis with biological agents: choice of drug for initial therapy and switch therapy for non-responders. *Open Access Rheumatol.*: Research and Reviews. 2017; 9:21-28.
60. Kingsley GH, Kowalczyk A, Taylor H, et al. A randomized placebo-controlled trial of methotrexate in psoriatic arthritis. *Rheumatology.* 2012;51(8):1368-1377.
61. Combe B, Goupille P, Kuntz JL, Tebib J, LiotÈ F, Bregeon C. Sulphasalazine inpsoriatic arthritis: a randomized, multicentre, placebo-controlled study. *Rheumatology.* 1996;35(7):664-668.
62. Clegg DO, Reda DJ, Mejias E, et al. Comparison of sulfasalazine and placebo in the treatment of psoriatic arthritis. A Department of Veterans Affairs Cooperative Study. *Arthritis Rheum.* 1996;39(12):2013-2020.
63. Kaltwasser JP, Nash P, Gladman D, et al. Efficacy and safety of leflunomide in the treatment of psoriatic arthritis and psoriasis: a multinational, double-blind, randomized, placebo-controlled clinical trial. *Arthritis Rheum.* 2004;50(6):1939-1950.
64. McInnes IB, Mease PJ, Kirkham B, et al. Secukinumab, a human anti-interleukin-17A monoclonal antibody, in patients with psoriatic arthritis (FUTURE 2): a randomised, double-blind, placebo-controlled, phase 3 trial. *Lancet.* 2015;386(9999):1137-1146.
65. Mease PJ, van der Heijde D, Ritchlin CT, et al. Ixekizumab, an interleukin-17A specific monoclonal antibody, for the treatment of biologic-naive patients with active psoriatic arthritis: results from the 24-week randomised, double-blind, placebo-controlled and active (adalimumab)-controlled period of the phase III trial SPIRIT-P1. *Ann Rheum Dis.* 2017;76(1):79.
66. Nash P, Kirkham B, Okada M, et al. Ixekizumab for the treatment of patients with active psoriatic arthritis and an inadequate response to tumour necrosis factor inhibitors: results from the 24-week randomised, double-blind, placebo-controlled period of the SPIRIT-P2 phase 3 trial. *Lancet.* 2017;389(10086):2317-2327.
67. Mease PJ, Genovese MC, Greenwald MW, et al. Brodalumab, an anti-IL17RA monoclonal antibody, in psoriatic arthritis. *N Engl J Med.* 2014;370(24):2295-2306.
68. McInnes IB, Kavanaugh A, Gottlieb AB, et al. Efficacy and safety of ustekinumab in patients with active psoriatic arthritis: 1 year results of the phase 3, multicentre, double-blind, placebo-controlled PSUMMIT 1 trial. *Lancet.* 2013;382(9894):780-789.
69. Kavanaugh A, Ritchlin C, Rahman P, et al. Ustekinumab, an anti-IL-12/23 p40 monoclonal antibody, inhibits radiographic progression in patients with active psoriatic arthritis: results of an integrated analysis of radiographic data from the phase 3, multicentre, randomised, double-blind, placebo-controlled PSUMMIT-1 and PSUMMIT-2 trials. *Ann Rheum Dis.* 2014;73(6):1000-1006.
70. Ritchlin C, Rahman P, Kavanaugh A, et al. Efficacy and safety of the anti-IL-12/23 p40 monoclonal antibody, ustekinumab, in patients with active psoriatic arthritis despite conventional non-biological and biological anti-tumour necrosis factor therapy: 6-month and 1-year results of the phase 3, multicentre, double-blind, placebo-controlled, randomised PSUMMIT 2 trial. *Ann Rheum Dis.* 2014;73(6):990-999.
71. Deodhar A, Gottlieb AB, Boehncke W-H, et al. Efficacy and safety of guselkumab in patients with active psoriatic arthritis: a randomised, double-blind, placebo-controlled, phase 2 study. *Lancet.* 2018;391(10136):2213-2224.
72. Kavanaugh A, Mease PJ, Gomez-Reino JJ, et al. Treatment of psoriatic arthritis in a phase 3 randomised, placebo-controlled trial with apremilast, an oral phosphodiesterase 4 inhibitor. *Ann Rheum Dis.* 2014;73(6):1020.
73. Cutolo M, Myerson GE, Fleischmann RM, et al. A phase III, randomized, controlled trial of apremilast in patients with psoriatic arthritis: results of the PALACE 2 trial. *J Rheumatol.* 2016;43(9):1724-1734.
74. Edwards CJ, Blanco FJ, Crowley J, et al. Apremilast, an oral phosphodiesterase 4 inhibitor, in patients with psoriatic arthritis and current skin involvement: a phase III, randomised, controlled trial (PALACE 3). *Ann Rheum Dis.* 2016;75(6):1065-1073.
75. Gladman D, Rigby W, Azevedo VF, et al. Tofacitinib for psoriatic arthritis in patients with an inadequate response to TNF inhibitors. *N Engl J Med.* 2017;377(16):1525-1536.
76. Mease P, Hall S, FitzGerald O, et al. Tofacitinib or adalimumab versus placebo for psoriatic arthritis. *N Engl J Med.* 2017;377(16):1537-1550.
77. US Food & Drug Administration. Biosimilars. September 6, 2018; https://www.fda.gov/Drugs/DevelopmentApprovalProcess/HowDrugsareDevelopedandApproved/ApprovalApplications/TherapeuticBiologicApplications/Biosimilars/. Published September 6, 2018. Accessed October 14, 2018.
78. Bridges SL, Jr., White DW, Worthing AB, et al. The science behind biosimilars: entering a new era of biologic therapy. *Arthritis Rheum.* 2018;70(3):334-344.
79. Committee on Rheumatologic Care. American College of Rheumatology position statement, biosimilars. Atlanta, GA: American College of Rheumatology; March, 2018. https://www.rheumatology.org/Portals/0/Files/Biosimilars-Position-Statement.pdf. Accessed November 15, 2018.
80. Krendyukov A, Schiestl M. Extrapolation concept at work with biosimilar: a decade of experience in oncology. *ESMO open.* 2018;3(2):e000319.
81. Psoriasis & Psoriatic Arthritis Clinics Multicenter Advancement Network. Clinics. http://www.ppacman.org/clinics.html. Accessed October 12, 2018.
82. Beary JF, III. Combined care of the rheumatic patient. *JAMA.* 1985;254(23):3374-3375.
83. Rhematologic Dermatology Society. Our mission. http://www.rheumaderm-society.org/about-rds/our-mission/. Accessed October 12, 2018.
84. Psoriasis & Psoriatic Arthritis Clinics Multicenter Advancement Network. About Us. http://www.ppacman.org/about.html. Accessed October 12, 2018.
85. Sasaki JL, Koo JY. Skin therapies: dermatologic perspective on the rheumatology-dermatology interface. *Clin Exp Rheumatol.* 2015;33(5 Suppl 93):S78-S81.
86. Taylor SL, Petrie M, O'Rourke KS, Feldman SR. Rheumatologists' recommendations on what to do in the dermatology office to evaluate and manage psoriasis patients' joint symptoms. *J Dermatolog Treat.* 2009;20(6):350-353.
87. Villani AP, Rouzaud M, Sevrain M, et al. Symptoms dermatologists should look for in daily practice to improve detection of psoriatic arthritis in psoriasis patients: an expert group consensus. *J Eur Acad Dermatol Venereol.* 2014; 28(suppl 5):27-32.
88. Husted JA, Gladman DD, Farewell VT, Cook RJ. Health-related quality of life of patients with psoriatic arthritis: A comparison with patients with rheumatoid arthritis. *Arthritis Care Res (Hoboken).* 2001;45(2):151-158.
89. de Gannes GC, Ghoreishi M, Pope J, et al. Psoriasis and pustular dermatitis triggered by TNF-α inhibitors in patients with rheumatologic conditions. *Arch Dermatol.* 2007;143(2):223-231.
90. Collamer AN, Guerrero KT, Henning JS, Battafarano DF. Psoriatic skin lesions induced by tumor necrosis factor antagonist therapy: a literature review and potential mechanisms of action. *Arthritis Rheum.* 2008;59(7):996-1001.
91. Coates LC, Helliwell PS. Psoriasis flare with corticosteroid use in psoriatic arthritis. *Br J Dermatol.* 2015;174(1):219-221.
92. Velez NF, Wei-Passanese EX, Husni ME, Mody EA, Qureshi AA. Management of psoriasis and psoriatic arthritis in a combined dermatology and rheumatology clinic. *Arch Dermatol Res.* 2012;304(1):7-13.
93. Gladman DD, Thavaneswaran A, Chandran V, Cook RJ. Do patients with psoriatic arthritis who present early fare better than those presenting later in the disease? *Ann Rheum Dis.* 2011;70(12):2152-2154.
94. Armstrong AW, Robertson AD, Wu J, Schupp C, Lebwohl MG. Undertreatment, treatment trends, and treatment dissatisfaction among patients with psoriasis and psoriatic arthritis in the United States: findings from the National Psoriasis Foundation surveys, 2003-2011. *JAMA Dermatol.* 2013;149(10):1180-1185.
95. Curtis JR, Arora T, Narongroeknawin P, et al. The delivery of evidence-based preventive care for older Americans with arthritis. *Arthritis Res Ther.* 2010;12(4):R144-R144.
96. Okhovat JP, Ogdie A, Reddy SM, Rosen CF, Scher JU, Merola JF. Psoriasis and Psoriatic Arthritis Clinics Multicenter Advancement Network Consortium (PPACMAN) survey: benefits and challenges of combined rheumatology-dermatology clinics. *J Rheumatol.* 2017;44(5):693-694.
97. Queiro R, Coto P. Multidisciplinary care for psoriatic disease: Where we are and where we need to go. *Rheumatology (Oxford).* 2017;56(11):1829-1831.
98. Soleymani T, Reddy SM, Cohen JM, Neimann AL. Early Recognition and Treatment Heralds Optimal Outcomes: the Benefits of Combined Rheumatology-Dermatology Clinics and Integrative Care of Psoriasis and Psoriatic Arthritis Patients. *Curr Rheumatol Rep.* 2017;20(1):1.
99. Luelmo J, Gratacos J, Moreno Martinez-Losa M, et al. Multidisciplinary psoriasis and psoriatic arthritis unit: report of 4 years' experience. *Actas Dermosifiliogr.* 2014;105(4):371-377.
100. Urruticoechea-Arana A, Serra Torres M, Hergueta Diaz M, et al. Experience and Satisfaction With a Multidisciplinary Care Unit for Patients With Psoriasis and Psoriatic Arthritis. *Reumatol Clin.* 2017. doi: 10.1016/j.reuma.2017.07.007.
101. Samycia M, McCourt C, Shojania K, Au S. Experiences from a combined dermatology and rheumatology clinic: a retrospective review. *J Cutan Med Surg.* 2016;20(5):486-489.
102. UCB. Bimekizumab demonstrates impressive joint and skin responses for psoriatic arthritis patients. https://www.ucb.com/stories-media/Press-Releases/article/Bimekizumab-demonstrates-impressive-joint-and-skin-responses-for-psoriatic-arthritis-patients-nbsp. Published December 20, 2017. Accessed October 12, 2018.
103. Mease PJ, Kellner H, Morita A, et al. OP0307 Efficacy and safety of risankizumab, a selective il-23p19 inhibitor, in patients with active psoriatic arthritis over 24 weeks: results from a phase 2 trial. *Ann Rheum Dis.* 2018;77(suppl 2):200.
104. A Study Comparing Upadacitinib (ABT-494) to Placebo and to Adalimumab in Participants With Psoriatic Arthritis Who Have an Inadequate Response to at Least One Non-Biologic Disease Modifying Anti-Rheumatic Drug (SELECT - PsA 1). https://clinicaltrials.gov/ct2/show/NCT03104400. Accessed October 12, 2018.
105. Clinical Study of Efficacy and Safety of BCD-085 (Monoclonal Anti-IL-17 Antibody) in Psoriatic Arthritis (PATERA). https://clinicaltrials.gov/ct2/show/NCT03598751. Accessed October 12, 2018.

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