

Consensus Statement

Treatment of Nail Psoriasis

Best Practice Recommendations From the Medical Board of the National Psoriasis Foundation

Jeffrey J. Crowley, MD; Jeffrey M. Weinberg, MD; Jashin J. Wu, MD;
Andrew D. Robertson, PhD; Abby S. Van Voorhees, MD

IMPORTANCE Nail psoriasis can be difficult to treat and has a significant effect on quality of life. Relatively few controlled trials evaluating treatments for nail psoriasis have been published. There is an unmet need for treatment recommendations to guide therapeutic decisions.

OBJECTIVE To develop treatment recommendations for nail psoriasis from the Medical Board of the National Psoriasis Foundation.

EVIDENCE REVIEW A PubMed search for publications on nail psoriasis treatments was performed from January 1, 1947, through May 11, 2014, without language restrictions.

FINDINGS Treatment recommendations for 4 clinical nail psoriasis scenarios were developed based on the evidence reviewed in this study and expert opinion of the Medical Board of the National Psoriasis Foundation. Treatment of nail psoriasis should balance consideration of the extent of skin disease, psoriatic arthritis, and severity of nail disease with concomitant impairment of quality of life. All patients should be evaluated for onychomycosis because this may complicate psoriatic nail disease. For disease limited to the nails, high-potency topical corticosteroids with or without calcipotriol are initial options. For patients with significant nail disease for whom topical therapy has failed, treatment with adalimumab, etanercept, intralesional corticosteroids, ustekinumab, methotrexate sodium, and acitretin are recommended. For patients with significant skin and nail disease, adalimumab, etanercept, and ustekinumab are strongly recommended, and methotrexate, acitretin, infliximab, and apremilast are recommended. Finally, for a patient with significant nail, skin, and joint disease, adalimumab, etanercept, ustekinumab, infliximab, methotrexate, apremilast, and golimumab are recommended.

CONCLUSIONS AND RELEVANCE Treatment of nail psoriasis poses a clinical challenge. Clinical trial data are limited, and results are reported inconsistently, making comparisons among treatment options difficult. The treatment recommendations from the Medical Board of the National Psoriasis Foundation will help guide treatment decisions for clinicians who are treating patients with nail psoriasis.

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Author Affiliations: Bakersfield Dermatology, Bakersfield, California (Crowley); Department of Dermatology, Mt Sinai Health System, New York, New York (Weinberg); Department of Dermatology, Kaiser Permanente Los Angeles Medical Center, Los Angeles, California (Wu); National Psoriasis Foundation, Portland, Oregon (Robertson); Department of Dermatology, Perelman School of Medicine at the University of Pennsylvania, Philadelphia (Van Voorhees).

Corresponding Author: Jeffrey J. Crowley, MD, Bakersfield Dermatology, 5101 Commerce Dr, Ste 101, Bakersfield, CA 93309 (crowley415@aol.com).

Psoriasis is a chronic systemic inflammatory disease involving the skin, nails, and joints. Approximately 50% of patients with psoriasis have some nail involvement, and the lifetime incidence of nail disease is estimated at 80% to 90%.¹ Nail disease may rarely be the only manifestation of psoriasis.² More important, nail psoriasis can cause significant pain and discomfort, leading to impairment in quality of life and work function.³

There is a strong correlation of nail psoriasis with psoriatic arthritis. Patients with psoriatic arthritis have rates of nail disease as high as 70%. There is evidence that nail psoriasis may be a predictor of joint disease developing later in life.⁴ Fingernail psoriasis is more problematic for many patients than toenail disease. In addition, psoriatic toenails are often secondarily infected with dermatophytes, which may complicate treatment assessment.⁵ Treatment with immunosuppressive medications may even contribute to the development of onychomycosis in patients with toenail psoriasis.⁶ For these reasons, most studies evaluate fingernail psoriasis alone.

Clinically, nail disease has many presentations depending on the location of the inflammatory process. Nail pitting (the most common finding in nail psoriasis), nail dystrophy, and leukonychia are due to nail matrix involvement. Nail bed psoriasis is characterized by onycholysis, oil drop patches, subungual hyperkeratosis, and splinter hemorrhages.² The Nail Psoriasis Severity Index (NAPSI) was developed to measure changes in nail disease over time.⁷ When using this measure, each nail is divided into 4 quadrants; each quadrant is given a score of 1 for signs of matrix disease and 1 for signs of nail bed disease. A nail without symptoms is scored zero, and the maximum value for each nail is 8—4 for matrix involvement and 4 for nail bed disease. Thus, the maximum NAPSI value for a study measuring fingernail disease is 80 and the maximum for a target nail is 8. This scale measures the extent of nail disease but not the severity of nail involvement, so a modified NAPSI has been proposed that assigns a severity score of 0 to 3 for both nail bed and matrix involvement.⁸ Some studies use a single target nail or an overall severity score. Other scales have been used to measure nail involvement, but most studies reviewed here use some form of the NAPSI. The wide variety of objective measures used in nail psoriasis studies make comparison of treatment outcomes for various interventions difficult.

An array of treatment options are available for nail psoriasis, including topical products, procedural interventions, and oral systemic and biologic agents. The challenges of treating nail disease are poor penetration of topical therapy into the nail and surrounding tissue, pain associated with intralesional injections, adverse effects, and monitoring of systemic therapies and patient adherence to therapy. Because many of the treatments most commonly used to treat psoriasis do not have published, randomized, double-blind, placebo-controlled trials addressing nail disease, the recent Cochrane review does not help dermatologists make an informed decision regarding the best treatment for a patient with nail psoriasis.⁹ Others have published reviews of nail psoriasis and treatments.^{2,10} Recommendations from a Delphi consensus conference have also been published.¹¹ Our purpose is to critically review the identified publications and propose evidence-based practical treatment recommendations for nail psoriasis that may prove useful to clinicians who are treating patients with this challenging disorder.

Methods

We searched PubMed for articles on nail psoriasis from January 1, 1947, through May 11, 2014, without language restrictions. We used the keywords *psoriasis* and *nail*, both with and without the name of the potential therapy. The articles were evaluated with levels of evidence as reported by Shekelle et al.¹² The entire Medical Board of the National Psoriasis Foundation was polled for their treatment preference for 4 typical clinical presentations of nail psoriasis. All treatments with clinical data reviewed in this article were treatment options offered to the medical board. Board members rated each treatment as "recommend with high enthusiasm," "recommend with low enthusiasm," "do not recommend," and "no preference." Of 22 members, 13 completed the poll. These recommendations were tallied and incorporated into the article and later approved by the entire board.

Results of Article Review

Although data are limited and placebo-controlled trials rare, there are data to support the efficacy of topical cyclosporine, topical tacrolimus, clobetasol propionate nail lacquer, calcipotriol, a combination of calcipotriol and betamethasone dipropionate, tazarotene, and *Indigo naturalis* extract (Table 1). Aprelimast and the traditional systemic agents acitretin, methotrexate sodium, and cyclosporine, which are effective in plaque psoriasis, are also effective in nail disease (Table 2).

Evidence for the efficacy of biologic agents (targeting tumor necrosis factor, interleukin [IL] 12/23, and IL-17) includes data from multiple randomized, placebo-controlled, double-blind trials and other controlled trials in which nail psoriasis was assessed as a secondary endpoint (Table 3).

Treatment Recommendations

Treatment recommendations for 4 clinical nail psoriasis scenarios were developed based on the evidence reviewed in this study and expert opinion from the Medical Board of the National Psoriasis Foundation.

1. Patients with psoriasis limited to the nails. These patients have minimal or no skin disease and no evidence of joint disease, with 3 of 10 fingernails having onycholysis, pitting, and distal hyperkeratosis. These patients are embarrassed by the appearance of the nails and have mild pain with use. No previous therapy has been used.

High-potency topical corticosteroids alone or in combination with calcipotriol were recommended with enthusiasm, and intralesional corticosteroids were recommended. Systemic and biologic treatments were not recommended for this patient scenario.

2. Patients with psoriasis limited to the nails for whom topical therapy has failed. These patients have 5 of 10 nails involved and moderate to severe nail pain.

The medical board recommended the following in ranking order from highest enthusiasm to lowest: adalimumab, etanercept, intralesional corticosteroids, ustekinumab, methotrexate, and acitretin.

3. Patients with psoriasis of the skin and nails. These patients have psoriasis on 8% of their body surface area, 5 of 10 nails with

Table 1. Topical and Procedural Interventions in Nail Psoriasis

Treatment	Evidence ^a	Trial Type	Duration	Patients, No.	Outcomes	Adverse Events	Source
Topical CsA, 70%, in maize oil every day	IB	Vehicle controlled	12 wk	16	CsA group: 3 complete remissions, 5 significantly improved. Vehicle group: 1 slight improvement, 3 minimal improvement, and 4 with no change	Excellent tolerability, no detectable serum CsA	Cannavò et al ¹³
Topical tacrolimus ointment, 0.1%, every day	III	1 Hand tacrolimus, 1 control	12 wk	21	Absolute change (decrease) in NAPSI of 13 for treated hand vs 3 for untreated hand	Acute paronychia in tacrolimus group (n = 1)	De Simone et al ¹⁴
Clobetasol nail lacquer, 0.05%, 1%, or 8%, twice weekly	III	Active left hand, right hand control	16 wk	15	Only 8% of group with significant improvement compared with no treatment	No skin reactions, HPA axis suppression not evaluated	Nakamura et al ¹⁵
Topical tazarotene gel, 0.1%, every day	III	Vehicle controlled	24 wk	31	Improvement in onycholysis and nail pitting compared with vehicle. One nail was occluded and 1 nail was not, but this did not change outcome	Tazarotene group (n = 5): peeling skin, paronychia	Scher et al ¹⁶
Calcipotriol twice a day vs a combination of calcipotriol and betamethasone every day	IIB	Comparator	12 wk	32	NAPSI improved in both groups without significant difference between groups. Twice-a-day application of calcipotriol was low (26%)	NR	Tzung et al ¹⁷
Combination of calcipotriol and betamethasone every day	III	Open label	12 wk	25	NAPSI score reduction from 5.8 to 1.6	Fingertip irritation (n = 2), psoriasis flare (n = 1)	Rigopoulos et al ¹⁸
Calcipotriol ointment vs a combination of betamethasone and salicylic acid, 0.03 g/g	III	Comparator	5 mo	58	49.2% and 51.7% reduction of hyperkeratosis in calcipotriol and combination of betamethasone and salicylic acid groups, respectively. Toenails also with reductions in hyperkeratosis of 20.1% and 22.9% in the calcipotriol and betamethasone groups, respectively	NR	Tosti et al, ¹⁹ (1998)
Indigo naturalis (Lindioil) vs olive oil	IIA	Vehicle controlled	12 wk	31	Mean reduction in NAPSI scores (single hand) was 49.8% vs 22.9% for Lindioil and vehicle control, respectively. In the open-label period (wk 24), there was a 61% mean reduction in NAPSI vs baseline	None observed during trial period	Lin et al ²⁰
Phototherapy with psoralen or acitretin	III	Medical record review	48 wk	84	Medical record review with NAPSI measurements at wk 24 and 48. Treatments: CsA (n = 7), acitretin (n = 9), methotrexate (n = 9), psoralen plus UV-A (n = 5), narrow-band UV-B (n = 6), acitretin plus psoralen-UV-A (n = 5), acitretin plus narrow-band UV-B (n = 6), infliximab (n = 8), etanercept (n = 9), efalizumab (n = 10), and adalimumab (n = 8). NAPSI improved in all groups except narrow-band UV-B monotherapy	NR	Sánchez-Regaña et al ²¹
595-nm PDL	III	Open label with 2 PDL settings	6 mo	20	PDL applied to nail folds monthly with either 9 J/cm ² (6-ms pulse, 10-ms cryogen, 7-mm spot) or 6 J/cm ² (0.45-ms pulse, 10-ms cryogen, 7-mm spot). Both treatments decreased NAPSI from 10 to 6	Pain in all, but greater in 6-ms pulse group; pettechieae and hyperpigmentation in one-third of patients	Treewittayapoom et al ²²
PDL vs PDL with MAL (photodynamic therapy)	III	Comparator	6 mo	14	All nails treated with PDL monthly (595 nm, 9 J/cm ² , 6-ms pulse, 7-mm spot). Nails on 1 hand were treated with MAL for 3 h with occlusion. Global NAPSI scores decreased in both groups from 241 and 231 to 111 and 98 in the PDT and PDL groups, respectively	Some pain with treatments	Fernández-Guarino et al ²³
Grenz ray	IIB	Double-blind left-right trial	10 wk	22	Significant improvement in active group vs sham therapy. Hyperkeratotic nails had poor response	NR	Lindelöf ²⁴
Intralesional corticosteroid injections	IV	Medical record review	NA	109 nails	Three 0.1- to 0.2-mL injections of triamcinolone acetonide suspension (5 mg/mL) delivered into the base of psoriatic nails via pneumatic injector. Repeated injections into 109 nails resulted in 80% treatment success	NR	Bleeker ²⁵

Table 1. Topical and Procedural Interventions in Nail Psoriasis (continued)

Treatment	Evidence ^a	Trial Type	Duration	Patients, No.	Outcomes	Adverse Events	Source
Intralesional triamcinolone acetonide	III	Open label	16 wk	17	4 Monthly injections using a needle-free injection device led to a decrease in NAPSI for the target nail of 46.3%. Mean baseline NAPSI score of 6.5 and final NAPSI score of 2.8	Minimal pain	Nantel-Battista et al ²⁶

Abbreviations: CsA, cyclosporine; HPA, hypothalamic-pituitary-adrenal; MAL, methyl-aminolaevulinic acid; ms, milliseconds; NA, not available; NAPSI, Nail Psoriasis Severity Index; NR, not reported; PDL, pulsed dye laser; PDT, photodynamic therapy.

^a IB includes evidence from randomized clinical trials; IIA, nonrandomized clinical trials; IIB, experimental study; III, comparative studies, correlation studies, and case-control studies; IV, expert committee reports or opinions and case reports.¹²

Table 2. Oral Systemics in the Treatment of Nail Psoriasis

Treatment	Evidence ^a	Trial Type	Duration, wk	Patients, No.	Outcomes	Adverse Events	Source
MTX	IIA	Comparator	52	317	Mean target fingernail NAPSI at baseline, wk 24, and wk 52 were 4.8, 2.1, and 1.2, respectively, with briakinumab (n = 154) compared with 4.8, 3.0, and 3.0 for MTX (n = 163). Overall, a 48% NAPSI improvement was seen in the MTX group at wk 52	More discontinuations in MTX group owing to lack of efficacy	Reich et al ²⁷
MTX vs CsA	III	Comparator	24	37	MTX (15 mg/wk) or CsA (initial dose, 5 mg/kg/d). NAPSI reduction of 43.3% and 37.2% for MTX and CsA, respectively. MTX was more effective on nail matrix scores, whereas CsA was more effective on nail bed scores	MTX group: nausea (n = 2), telogen effluvium (n = 1), and abnormal laboratory test results (n = 1). CSA group: abnormal laboratory test results (n = 2)	Gümüsel et al ²⁸
CsA vs etretinate	III	Comparator	10	137	CsA (2.5 mg/kg/d; n = 90) and etretinate (0.5 mg/kg/d; n = 47) both improved nail disease from baseline but without a significant difference between treatments. Etretinate is no longer manufactured	CsA group: increases in creatinine, bilirubin, and triglyceride levels. Etretinate group: increased triglyceride levels	Mahrle et al ²⁹
CsA vs a combination of CsA and calcipotriol cream twice daily	III	Comparator	12	54	CsA (n = 21; 3-4.5 mg/kg/d) or CsA and calcipotriol (n = 33) showed improvement of 47% and 79%, respectively	NR	Feliciani et al ³⁰
Acitretin	III	Open label	24	36	Acitretin (0.2-0.3 mg/kg) reduced NAPSI by 41% with complete or almost complete clearance in 25%	Fingertip dryness, pyogenic granulomas (n = 1), no dropouts owing to abnormal laboratory values	Tosti et al ³¹
Apremilast	IB	RDBPCT	16	558	A 50% reduction in NAPSI was achieved for 33.3% and 14.9% of patients with apremilast (30 mg) twice a day and placebo, respectively at 16 wk. At wk 32 (open label), NAPSI 50 response was seen in 45.2% of patients with apremilast	Nausea, diarrhea, nasopharyngitis, respiratory tract infection, and headache (>5%)	Papp et al ³²

Abbreviations: CsA, cyclosporine; MTX, methotrexate sodium; NAPSI, Nail Psoriasis Severity Index; NR, not reported; RDBPCT, randomized, double-blind, placebo-controlled trials.

^a IB includes evidence from randomized clinical studies; IIA, nonrandomized controlled studies; IIB, experimental study; III, comparative studies, correlation studies, and case-control studies.¹²

severe nail dystrophy, and moderate to severe nail-associated pain.

Topical therapies have proven inadequate to control disease.

The board recommended adalimumab, etanercept, and ustekinumab with high enthusiasm; methotrexate, acitretin, infliximab, and apremilast were also recommended.

- Patients with skin, joint, and nail disease. These patients have skin disease on 8% of their body surface area, a history of dactylitis and morning stiffness (psoriatic arthritis), and 5 of 10 nails with severe nail involvement and pain.

The recommendations for treatment were, in ranked order from the highest to the lowest: adalimumab, etanercept, ustekinumab, infliximab, methotrexate, apremilast, and golimumab.

Other Issues

Intralesional injection of corticosteroids is an accepted clinical treatment for localized nail psoriasis and is recommended here for patients with psoriasis limited to the nails. Despite many decades of use, published data to support the safety or efficacy of intralesional injections are extremely limited. Techniques vary but generally involve injection of triamcinolone acetonide, 0.1 to 0.2 mL of 5- to 10-mg/mL suspension into the lateral nail folds. Nerve blockers and/or topical anesthetics to ease the pain associated with injection may be given before injection.²⁵ Injections are repeated at various intervals. Adverse effects from intralesional corticosteroids include pain on injection, skin atrophy, depigmen-

Table 3. Biologics in the Treatment of Nail Psoriasis

Treatment	Evidence ^a	Trial Type	Duration, wk	Patients, No.	Outcomes	Adverse Events	Source
ADA	IB	RPCDBT in hand/foot psoriasis	16	72	NAPSI improvement for ADA (80 mg wk 0 and 1, then 40 mg every other wk) vs placebo of 50% and 8%, respectively. Patients treated for 28 wk with ADA had 54% NAPSI improvement	Events leading to discontinuation: ADA (n = 3), placebo (n = 2)	Leonardi et al ³³
ADA	III	Open label in psoriatic arthritis	12	164	54.2% of patients had a ≥50% improvement in NAPSI	21 Serious events, including 4 infections	Van den Bosch et al ³⁴
ADA	III	Open label	24	21	85% and 72% improvement in NAPSI for fingernails and toenails, respectively	Well tolerated, injection site erythema (n = 6)	Rigopoulos et al ³⁵
ETN	IIA	Randomized dose comparison	24	72	2 Groups: 50 mg twice weekly for 12 wk, then 50 mg/wk for 12 wk (biw/qw) and 50 mg/wk for 24 wk (qw/qw). ≥50% Improvement in NAPSI in 58.1% and 82.3% in the biw/qw group and 50.5% and 80.7% in the qw/qw group at wk 12 and 24, respectively. Complete target nail clearance at 24 wk in 14.3% and 31.0% in the biw/qw and qw/qw groups, respectively. Significant improvement in DLQI in both groups from baseline at wk 12 and 24	Events leading to discontinuation: lung cancer, myocardial infarction, injection site pain, toxiderma, and psoriasis flare, no serious infections	Ortonne et al ³⁶
ETN	IIB	Randomized dose comparison	54	711	2 Dosage regimens: 25 mg of ETN biw (continuous) or 50 mg biw for a maximum of 12 wk, with discontinuation on response and retreatment with 25 mg biw with return of psoriasis (interrupted). Pooled analysis of 562 patients with nail involvement in both groups showed NAPSI score improvement of 28.9% and 51% at wk 12 and 54, respectively. 30% With no nail psoriasis at wk 54	NR	Luger et al ³⁷
GOL (FDA approved for psoriatic arthritis)	IB	RPCDBT in psoriatic arthritis	24	405	Patients randomized to placebo, 50 mg of GOL every 4 wk, or 100 mg of GOL every 4 wk. Stable doses of MTX and prednisone allowed. Median percentage change in NAPSI at wk 12 and 24 was 0%, 25%, and 43% and 0%, 33%, and 54% for the placebo group, GOL (50 mg), and GOL (100 mg) groups, respectively	Nasopharyngitis and upper respiratory tract infections most common, events similar for GOL and placebo groups	Kavanaugh et al ³⁸
IFX	IB	RDBPCT	24	373	IFX (5 mg/kg) or placebo (4:1) at wk 0, 2, 6, and every 8 wk through wk 46 with placebo crossover at wk 24. In the 308 patients with nail psoriasis, the median percentage improvement in target nail NAPSI at wk 10 and 24 was 26.8% and 57.2% compared with -7.7% and -4.1% for IFX and placebo, respectively	Infection and infusion reactions noted in IFX and placebo groups, squamous and basal cell carcinoma in IFX group	Rich et al ³⁹
IFX	IIB	Retrospective analysis	50	378	Analysis of subset from Rich et al ³⁹ with 186 patients who completed the 50-wk trial. Mean NAPSI improved 28.3%, 61.4%, and 67.8% at wk 10, 24, and 50, respectively. Complete nail clearance was achieved by 7.5%, 29.9%, and 49.2% of patients at wk 10, 24, and 50, respectively	NR	Reich et al ⁴⁰
Comparison of ADA, ETN, and IFX	III	Open label comparator	24	72	NAPSI scores at baseline, wk 14, and wk 24 were 33, 21, and 11 for ADA; 35, 24, and 10.6 for ETN; and 33, 15, and 3 for IFX. Efficacy for IFX was superior to ADA and ETN at wk 14	NR	Saraceno et al ⁴¹
Comparison of ADA, ETN, and IFX	III	Medical record review	48	39	High efficacy seen in all groups, with 92.8%, 89.5%, and 95.1% improvement in NAPSI at wk 48 for ADA, ETN, and IFX, respectively	NR	Kyriakou et al ⁴²

(continued)

Table 3. Biologics in the Treatment of Nail Psoriasis (continued)

Treatment	Evidence ^a	Trial Type	Duration, wk	Patients, No.	Outcomes	Adverse Events	Source
UST	IB	RDBPCT	12 and 24	545	Mean percentage improvement in NAPS I for placebo, UST (45 mg), and UST (90 mg) was 11.8%, 26.7%, and 24.9%, respectively. After wk 12, patients continued therapy. At wk 24, there was a mean percentage NASPI improvement of 46.5% and 48.7% in the UST (45 mg) and UST (90 mg) groups, respectively	NR	Rich et al ⁴³
UST	IIB	Randomized open label	64	158	Japanese study showing mean percentage improvement in NAPS I of 56.6% and 67.8% for the 45-mg and 90-mg UST dosages, respectively	NR	Igarashi et al ⁴⁴
IXE (IL-17 antibody)	IB	RDBPCT	12	142	Mean percentage change in NAPS I from baseline was 6.8, 14.3, -24.0, -57.1, and -49.3 in the placebo, 10-mg, 25-mg, 75-mg, and 150-mg groups, respectively. This change was significant for the 75-mg and 150-mg groups vs placebo	No serious events reported	Leonardi et al ⁴⁵
SEC (IL-17 antibody)	IB	RDBPCT	12	304	The composite fingernail score was -19.1%, -10.6%, and 14.4% for the early (SEC [150 mg] at wk 0, 1, 2, and 4), monthly (SEC [150 mg] at wk 0, 4, and 8), and placebo groups	NR	Paul et al ⁴⁶

Abbreviations: ADA, adalimumab; biw/qw, twice weekly followed by weekly dosage; DLQI, Dermatology Life Quality Index; ETN, etanercept; FDA, US Food and Drug Administration; GOL, golimumab; IXE, ixekizumab; IFX, infliximab; IL, interleukin; MTX, methotrexate; NAPS I, Nail Psoriasis Severity Index; NR, not reported; qw/qw, weekly dosage followed by weekly dosage; RDBPCT, randomized, double-blind, placebo-controlled trials; SEC, secukinumab; UST, ustekinumab.

^a IA, evidence includes evidence from meta-analysis of randomized controlled trials; IB, randomized controlled studies; IIA, nonrandomized controlled studies; IIB, experimental study; III comparative studies, correlation studies, and case-control studies; IV, expert committee reports or opinions, and case reports.¹²

tation, secondary infection, cyst formation, subungual hemorrhage, and tendon rupture.²⁵

Nail matrix disease and nail bed disease reflect inflammation present in different locations of the distal phalanx. There may be differential effects of treatment on these 2 components of nail psoriasis. In a comparison of methotrexate and cyclosporine, methotrexate treatment was more effective according to nail matrix scores, whereas cyclosporine was more effective according to nail bed scores.²⁸ In almost all treatments, including topical therapy, the intervention leads to improvement in both nail bed and matrix disease. In a study with infliximab, there was some indication that nail bed disease may improve before nail matrix disease.³⁹ This finding is supported by the time it takes for treatment effects to become clinically visible; thus, treatment effects on nail matrix disease take longer to be seen.

Improvements in nail psoriasis often lag behind the improvements in skin and joint disease. Fingernails grow at a rate of 3 to 4 mm/mo; thus, it takes 5 to 7 months for a nail to grow from the matrix to the distal fingertip.⁴⁷ Therefore, the length of a clinical trial must reflect this delay. Few studies show any significant improvement before 12 weeks, and several studies with etanercept, infliximab, and ustekinumab demonstrate continued improvement beyond 6 months.^{36,40,44}

One of the problems in reviewing data on nail psoriasis is the lack of consistent outcome reporting among the studies. Even when NAPS I data are presented, they may be presented in different ways. Target nail NAPS I, mean improvement in NAPS I, percentage of patients with no nail disease, and modified NAPS I are some of the many outcomes reported. The Dermatology Life

Quality Index contains some questions pertinent to nail signs and symptoms but does not specifically account for the influence of nail disease on quality of life. Some researchers have used quality-of-life measures validated in onychomycosis and applied these to psoriasis.⁴⁸ A validated measure specific to nail psoriasis, the nail psoriasis quality of life scale, has been published.⁴⁹ Clearly, there is a need for more uniform reporting of nail outcomes and adoption of a valid quality-of-life metric that is specific to nail disease.

Therapy that uses more than 1 modality may be necessary to control psoriatic disease. There are limited data to evaluate or support the use of combination therapy in nail psoriasis. Thus, treatment options recommended in this review are monotherapy.

Conclusions

Nail psoriasis poses a significant burden to our patients with psoriasis. Even when psoriasis and psoriatic arthritis are controlled, nail disease may persist. Clinical data are limited in nail psoriasis, and clinical outcomes are not standardized. Thus, comparison among treatment options is virtually impossible based on the current literature. For patients with disease limited to the nails, high-potency topical corticosteroids with or without calcipotriol are initial options, and intralesional corticosteroids can also be considered. For patients with significant nail disease for whom topical therapy has failed, treatment with adalimumab, etanercept, intralesional corticosteroids, ustekinumab, methotrexate, and acitretin are recommended. For patients with significant skin and nail disease, adali-

mumab, etanercept, and ustekinumab are recommended with high enthusiasm, and methotrexate, acitretin, infliximab, and apremilast are recommended. Finally, for a patient with significant nail, skin, and joint disease, the following are recommended with decreasing enthusiasm: adalimumab, etanercept, ustekinumab, infliximab, methotrexate, apremilast, and golimumab.

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