Review Article

Calming the Itch: Evidence-Based Non-pharmacologic Interventions for Chronic Pruritus

Duncan MacIntyre, BS[1], Peter Lio, MD[2]

[1] University of Illinois at Chicago, [2] Dermatology, Northwestern University Feinberg School of Medicine

Keywords: Pruritus, itch, Non-pharmacologic, TENS, Phototherapy, Mind-body, acupuncture, cryotherapy

Journal of Integrative Dermatology

Chronic pruritus, defined as itch lasting more than six weeks, affects up to 22% of individuals during their lifetime and carries a substantial burden, including impaired sleep, reduced quality of life, and increased risk of depression. Conventional pharmacologic therapies often provide only partial or temporary relief, particularly when itch arises from neuropathic or psychogenic causes, highlighting the need for complementary strategies. This review examines evidence for non-pharmacologic interventions, which can be grouped into neuromodulation, mind-body approaches, and barrier or environmental strategies. Neuromodulatory options such as phototherapy, transcutaneous electrical nerve stimulation (TENS), cryotherapy, heat therapy, and acupuncture act on neural pathways. Of these, narrowband ultraviolet B (NB-UVB) phototherapy has the strongest evidence, consistently improving itch and reducing corticosteroid use. Mind-body interventions, including cognitive behavioral therapy (CBT), meditation, relaxation training, music therapy, and massage, target the perception of itch and the itch-scratch cycle, with benefits most evident in atopic dermatitis (AD). Barrier-focused therapies such as antimicrobial textiles and wet-wrap treatment enhance hydration, restore skin integrity, and may provide rapid relief, particularly in pediatric AD. Despite encouraging findings, most trials are small, short-term, and heterogeneous. These therapies should be considered supportive adjuncts to standard care, with larger controlled studies needed to establish long-term efficacy.

INTRODUCTION

Chronic pruritus is defined as itching lasting more than six weeks and affects as many as 22% of individuals during their lifetime, accounting for 1% of annual hospital visits in the United States.[1,2] It is experienced across all demographics, regardless of age, gender, or socioeconomic background.[3] Beyond the physical effects, chronic pruritus is linked to sleep disturbances, anxiety, depression, and even suicidal ideation, highlighting its profound impact on mental health.[4]

Recent research has shown that individuals with chronic pruritus experience significant impairments in daily functioning, including challenges at work, disrupted social interactions, and feelings of frustration and emotional distress.[5] However, despite its impact, chronic pruritus is frequently underrecognized and inadequately treated in clinical settings.[1]

The underlying mechanisms of chronic pruritus remain incompletely understood but involve complex interactions between cytokines, sensory neurons, and cutaneous and central nervous system receptors.[6] It is suggested that chronic itch is driven by peripheral and central sensitization, dysregulated neuroimmune signaling, and psychological factors.[7,8] This evolving view has shifted the focus from purely symptomatic relief to targeting underlying mechanisms, including neural circuits, inflammatory mediators, and cognitive-emotional pathways.

Nonpharmacologic treatments for chronic pruritus include diverse approaches aimed at modifying itch pathways or altering the perception of itch.[6] Some methods can be effective independently, but are typically most beneficial when used alongside traditional pharmacologic therapies.[6] These interventions may help reduce medication reliance, minimize side effects, and improve patient adherence, making them valuable additions to conventional treatment strategies. This is especially important because many commonly used treatments, such as antihistamines and corticosteroids, provide only limited or temporary benefit, particularly in cases where the itch arises from neuropathic or psychogenic causes.[8]

Given the multifactorial pathophysiology of pruritus, nonpharmacological interventions can be thought about in three main domains: 1) neural modulation interventions that act on peripheral or central nerve pathways; 2) mind-body interventions that can change the brain's perception of itch and modify scratching behavior; 3) barrier and environmental approaches that alter the immediate external environment around the skin (see Table). This review explores their mechanisms, clinical applications, and potential role in managing chronic pruritus.

Table. Nonpharmacologic interventions with some evidence for anti-itch effects and their potential mechanisms.

Intervention	Potential Mechanism
Phototherapy (NB-UVB, PUVA)	Induces apoptosis of inflammatory cells, alters keratinocyte signaling, and reduces itch mediator release
Transcutaneous Electrical Nerve Stimulation (TENS)	Inhibits C fiber itch transmission and reduces spinal excitability and cytokine activity
Cryotherapy	Slows conduction of itch nerve fibers and transiently suppresses inflammatory mediators
Heat Therapy	Activates and desensitizes TRPV1 channels, blocking histamine and serotonin-induced itch
Acupuncture	Modulates cytokine signaling, reduces mast cell activity, and alters sensory nerve responses
Cognitive-Behavioral Therapy (CBT)	Reduces maladaptive thoughts and scratching behaviors that perpetuate itch
Meditation/Mindfulness	Lowers somatosensory cortex activity and decreases perceived itch intensity
Relaxation Techniques	Decreases sympathetic arousal, indirectly reducing scratching
Music Therapy	Provides distraction and reduces perceived itch intensity
Massage Therapy	Improves skin barrier function, circulation, and reduces stress-related itch
Therapeutic Textiles	Anti-inflammatory or antimicrobial properties; barrier-restoring effects
Wet-Wrap Therapy	Enhances hydration and drug penetration, providing rapid itch relief

NEUROMODULATION

Neuromodulatory interventions disrupt itch signaling by targeting the peripheral or central nervous system.[9] By altering how signals are transmitted and perceived, relief can be provided from the feeling of itch as an adjunctive, or when traditional pharmacologic therapies are limited. Some of the most common nonpharmacological neuromodulation approaches include phototherapy, transcutaneous electrical nerve stimulation (TENS), cryotherapy, heat therapy, and acupuncture.

PHOTOTHERAPY

Light has been used for centuries to treat skin conditions, with ultraviolet (UV) light serving as a cornerstone therapy due to its ability to reduce cutaneous inflammation.[6,10] UV light can further be broken down into UVA and UVB. UVA light targets a broader range of inflammatory cells, including T lymphocytes, mast cells, and dermal dendritic cells.[11] Still, when combined with the photosensitizing agent psoralen, it carries a higher risk of carcinogenesis compared to narrowband UVB therapy.[12] In contrast, UVB radiation reduces inflammation by targeting epidermal keratinocytes and Langerhans cells and decreases histamine release through changes in mast cell membrane phospholipid metabolism.[13] Though UVB radiation is associated with carcinogenic effects, even extended use of narrowband UVB therapy is considered to have a very low likelihood of causing skin cancer.[14]

Phototherapy has proven effective for the relief of pruritus for a range of conditions, including psoriasis, atopic dermatitis (AD), prurigo nodularis (PN), uremic pruritus, unspecified pruritus, and pruritus associated with conditions like lichen planus and cutaneous mastocytosis, among others.[15] Three times weekly narrowband (NB)-UVB therapy achieved Psoriasis Area and Severity Index (PASI) 75, at least a 75% improvement in psoriasis severity and skin clearance, in 70 to 80% of patients after 6 to 12 weeks.[15] Although PASI doesn't directly measure itch, it can serve as an estimate of itch severity. Phototherapy is considered safe and effective, with most side effects stemming from the varying skin penetration of UV radiation.[16] UVB primarily causes more superficial epidermal reactions like erythema, and UVA can lead to photodamage due to deeper dermis penetration.[17]

In AD patients, there have been several randomized controlled trials (RCTs) that support NB-UVB for the treatment of itch. One study found that visual analogue scale (VAS) scores, a measure of itch intensity, significantly decreased from 9.4 to 4.0 following consistent treatment with NB-UVB, with improvements being experienced by patients around 8 weeks.[18] A systematic review reported that NB-UVB increased the likelihood of clinically meaningful itch reduction at approximately 12 weeks compared with placebo.[19]

Phototherapy is one of the few nonpharmacologic treatments with substantial clinical evidence supporting its efficacy for pruritus. In particular, NB-UVB has demonstrated broad applicability across inflammatory and noninflammatory pruritic conditions.[20] Despite its effectiveness, phototherapy has limitations, including limited access in community settings, the need for frequent clinic visits, and variability in insurance coverage.[21] However, NB-UVB can serve as an excellent primary or adjunctive treatment, as demonstrated by a study showing that it dropped the median amount of topical corticosteroids from 37.5 g/month to 19.7 g/month used by AD patients.[22]

NERVE STIMULATION THERAPY

Transcutaneous electrical nerve stimulation (TENS) uses electric currents through cutaneous patches to treat various disorders.[23] It has recently gained attention as an antipruritic therapy after decades of use for pain management.[6] TENS works by inhibiting C fiber-mediated neurotransmission through a process known as "gating," effectively reducing itch and pain signals.[24]

In practice, electrodes are typically placed directly over pruritic areas or along adjacent dermatomes thought to correspond to the involved nerve pathways. Commercially available TENS units vary in size and configuration, with differing electrode sizes and programmable settings, allowing for individualized use in home settings.

A recent study demonstrated that applying TENS three times weekly for up to 12 sessions significantly improved pruritus in patients with AD and lichen simplex chronicus, with itch intensity measured by the VAS, declining by approximately 5 points and remaining significantly lower one month post-treatment ($p < 0.001$).[25] In other cases, TENS has shown effectiveness for itch related to mixed-thickness burns and scrotal neuropathic pruritus.[26,27] TENS is generally safe, but it should be avoided by patients who are pregnant, have seizure disorders, or use pacemakers.[6] These safety considerations should be reviewed with patients prior to home use.

TENS is a practical modality that has demonstrated antipruritic effects in several small studies. Its ease of use, favorable safety profile, and potential for home application make it an attractive adjunctive option for chronic pruritus.[25] Although current evidence is limited by study heterogeneity and small sample sizes, its accessibility and noninvasive nature make it a promising candidate for broader integration into clinical care.[28] However, these studies demonstrate the potential of patient-administered therapies like TENS and how they may become increasingly valuable in personalizing long-term itch management.

CRYOTHERAPY

Whole-body cryotherapy involves brief exposure to cold air in a specially designed chamber, often reaching temperatures as low as −110°C.[29] Patients are typically exposed for a few minutes while wearing protective garments to minimize the risk of cold-related injury.[29] Cryotherapy reduces itch by altering nerve signal transmission at low temperatures, likely by slowing conduction along cutaneous C fibers and Aδ nerves responsible for transmitting itch and pain signals to the brain.[30] While not widely studied for pruritic skin disorders, one study found that whole-body cryotherapy led to a modest decrease in pruritus severity for patients with AD after a month of three weekly sessions in progressively colder chambers.[30] However, the results should be interpreted cautiously, as there was no placebo comparison, and some participants experienced mild frostbite. Liquid nitrogen cryotherapy has shown temporary benefits for pruritic conditions such as psoriasis, PN, and chronic pruritus ani, with reports of itch relief and lesion improvement lasting several months.[31-33] However, its use is limited by potential side effects, including skin atrophy, hypopigmentation, procedural pain, and post-treatment drainage.[31,33]

HEAT THERAPY

Brief application of heat to localized areas has been shown in recent clinical trials to reduce itch intensity in AD. A randomized real-life and experimental study using a 5-second application of noxious heat at 49 °C found an immediate and significant reduction in itch, both for mechanically induced itch and during daily itch episodes, with no loss of effectiveness over repeated applications.[34] It has been suggested that activation and desensitization of heat-sensitive ion channels, particularly TRPV1, in nerve endings in the epidermis, control this antipruritic effect.[35] In contrast, studies involving healthy volunteers with experimentally induced itch found that short-term warming at lower levels of heat, ranging from 38-41 °C, demonstrated no significant effects on histamine or serotonin-induced itch, highlighting that higher temperatures may be required for relief.[36, 37] Because 49 °C is in the noxious range, careful application and avoidance of prolonged contact are necessary to prevent burns.

ACUPUNCTURE

Acupuncture, a key component of traditional Chinese medicine, has been explored as a potential therapy for pruritus. While clinical trials on acupuncture are challenging to design due to difficulties in blinding and controlling for placebo effects, some evidence suggests it may help reduce itch. It is hypothesized that acupuncture may help reduce itch by lowering immune cell activity, affecting nerve fibers that transmit itch signals, and influencing sensory pathways involved in skin irritation.[38-40] A study on uremic pruritus found that patients who received acupuncture three times per week for a month experienced an approximately 45% reduction in itch, with improvements persisting for up to three months.[41] Another small study found that acupressure helped relieve itching associated with AD.[42] However, due to the lack of rigorous controls in many studies, it remains challenging to determine whether acupuncture's benefits are genuinely therapeutic or primarily driven by placebo effects.[43]

MIND-BODY INTERVENTIONS

Mind-body interventions aim to reduce feelings of itch by modifying how they are perceived or changing the way people act when they experience the urge to scratch.[9] These nonpharmacological methods target chronic pruritus' cognitive, emotional, and behavioral dimensions to improve symptoms.[9] Approaches in this category include cognitive behavioral therapy (CBT), meditation and mindfulness, psychotherapy, biofeedback, relaxation therapy, music therapy, and massage therapy.

PSYCHOTHERAPY

Psychotherapy offers a range of approaches that can help modify the perception of itch and associated behaviors while also addressing anxiety, stress, and sleep disturbances linked to chronic pruritus.[6] Cognitive behavioral therapy is a structured, evidence-based form of psychotherapy and represents the most extensively studied psychotherapeutic intervention for itch.[44]

An RCT found that patients with AD who completed a 12-week CBT program alongside dermatologic education experienced a reduction in itch severity and scratching frequency, with some also requiring less topical steroid use compared to those who received education alone.[45]

Beyond CBT, other psychotherapeutic approaches have demonstrated potential benefits in managing itch-related distress and behaviors. Habit reversal training, a behavioral psychotherapy developed initially for tic disorders, has been studied in AD and prurigo nodularis, though evidence remains limited.[46] Support groups for children with AD have been shown to improve quality of life and reduce itch severity, with one study reporting that children who participated, along with their parents, experienced less frequent pruritus compared to those in a control group after six months of biweekly sessions.[47] Hypnosis, which induces a focused trance-like state through guided imagery or relaxation, has shown benefit in small studies when combined with stress management or biofeedback for conditions such as AD and chronic urticaria.[48-51]

COGNITIVE BEHAVIORAL THERAPY (CBT)

CBT targets the psychological and behavioral drivers of the itch-scratch cycle.[52] A randomized controlled trial of internet-delivered, exposure-based CBT over 12 weeks in adults with moderate-to-severe AD demonstrated significant reductions in itch intensity, perceived stress, sleep disturbance, and depression, with effects maintained at 12-month follow-up.[53] Another RCT of a CBT-based itch-coping group program in adults with AD similarly reported reduced itch and scratching, along with decreased corticosteroid and antihistamine use, with benefits sustained at three- and 12-month follow-up.[54]

For other chronic pruritic conditions, evidence for CBT remains limited. In psoriasis, therapist-guided internet-based CBT improved functioning and disease impact, though pruritus was not a primary outcome.[55] In chronic urticaria and chronic pruritus of unknown origin, RCTs demonstrating antipruritic effects of CBT are lacking.[56] These findings indicate that while CBT is effective for AD, its role in other pruritic conditions remains uncertain and warrants further investigation.

MEDITATION AND MINDFULNESS

Meditation has been shown to reduce the brain's response to pain and itch by decreasing activity in the primary somatosensory cortex, a region responsible for processing these sensations.[57] Although research is limited, early findings suggest that mindfulness-based meditation may offer symptom relief for patients with chronic pruritus. In a small study of 10 adults with chronic pruritus, an eight-week meditation course improved itch severity, sleep quality, and overall well-being.[58] The study revealed a significant correlation between meditation session attendance and improvement in itch-specific quality of life measured by the ItchyQoL instrument ($r = 0.87$, $p = 0.02$) for all those who attended at least 75% of the classes.[58] While promising, these findings are limited by the small sample size.

RELAXATION THERAPY

Relaxation techniques are often used in dermatology as supportive interventions to reduce sympathetic arousal that can intensify the itch-scratch cycle. Progressive muscle relaxation (PMR) is a structured relaxation method. In an RCT of 25 adults with AD, those assigned to PMR for one month experienced significant reductions in pruritus, sleep loss, and state anxiety compared with controls, although eczema severity scores did not differ significantly between groups.[59] In psoriasis, a controlled trial of mindfulness-based stress reduction delivered alongside phototherapy or photochemotherapy found that participants achieved faster skin clearing and reported reductions in symptom-related distress, including itch discomfort, and improved quality of life.[60] Taken together, these findings suggest that while relaxation therapy is not standalone, it may enhance coping and provide symptom relief in patients with chronic pruritus, particularly when integrated into multidisciplinary care.

MUSIC THERAPY

Music therapy has been explored as a supportive approach to itch control. In a randomized inpatient study of 50 patients with psoriasis, AD, and other dermatoses, those randomized to a single music intervention session experienced a significantly greater reduction in pruritus intensity one hour after the intervention compared with an emollient cream control (mean numerical rating scale decrease 2.3 vs 1.2 points).[61] Evidence beyond this trial remains limited, but these findings suggest music may offer short-term symptomatic relief as a low-risk adjunctive treatment in those with varying dermatological conditions.

MASSAGE THERAPY

Massage therapy has been considered as a supportive approach for patients with chronic pruritic skin disease. In an RCT of 20 children with moderate AD, daily 20-minute parent-administered massage for one month, in addition to standard topical therapy, led to significantly greater reductions in pruritus severity, sleep disturbance, and overall disease activity as measured by SCORing AD (SCORAD) compared with topical therapy alone.[62] A more recent RCT in 66 infants with eczema found that mother-performed massage

combined with routine care significantly reduced eczema severity (EASI), improved dermatology-related quality of life (IDQOL) score, and lowered relapse rates compared to routine care alone, although pruritus was not directly measured.[63] These findings suggest that massage may offer adjunctive benefit, specifically in pediatric AD. Still, the evidence base is limited as pruritus outcomes are underexplored, and no trials have evaluated adult populations.

BARRIER AND ENVIRONMENTAL STRATEGIES

Barrier-focused interventions aim to restore stratum corneum integrity, reduce transepidermal water loss, and minimize exposure to irritants, thereby decreasing itch triggers and supporting treatment adherence.

THERAPEUTIC TEXTILES

Clothing is an often-overlooked factor that can impact chronic pruritic skin disease, either relieving or aggravating symptoms.[64] A randomized trial in pediatric patients found that untreated silk garments did not significantly relieve pruritus.[64] However, in multiple studies, silk textiles infused with antimicrobial agents have reduced pruritus and the volume of topical corticosteroid use.[65] Other innovative textiles, including seaweed-silver fabrics, have antimicrobial and barrier-restorative properties, but studies on their effectiveness for pruritus have shown mixed and inconclusive results.[66,67] Other therapeutic textiles, such as zinc-oxide-treated clothing, support barrier benefits; however, evidence for direct itch reduction is limited, while tourmaline-infused fabrics, which emit infrared radiation, have demonstrated statistically significant itch reduction.[68,69]

WET-WRAP THERAPY

Wet-wrap therapy involves applying a damp layer of bandages or garments over topical corticosteroids or emollients, usually for several hours or overnight. The occlusion enhances skin hydration, reduces barrier disruption, and increases penetration of the applied agent.[70] In a prospective RCT of children with severe AD, wet-wraps with diluted topical corticosteroids produced faster and greater short-term improvements in objective SCORAD over 4 weeks compared with emollient-only wraps.[71] As prolonged use of wet-wraps can increase the risk of systemic corticosteroid absorption, secondary infection, and skin maceration, it is generally recommended only for limited durations under clinical supervision.[70,72]

CONCLUSION

Nonpharmacologic therapies for chronic pruritus offer a range of promising interventions. However, many of these approaches remain supported by limited evidence, often derived from smaller sample sizes or studies with methodological challenges. While these therapies may relieve itch in some instances, their true efficacy is unknown in many cases. This underscores the need for more extensive, controlled trials. Specific approaches, particularly narrowband UVB phototherapy, are supported by more substantial evidence; however, even this is best utilized as an adjunctive treatment rather than a standalone therapy. It is apparent that these treatments will be most effective across all modalities when integrated into a comprehensive management plan alongside conventional pharmacologic options. Dermatologists and other healthcare providers should continue exploring these therapies in tandem with traditional treatments to address the multifaceted nature of chronic pruritus.

Future research should prioritize larger, well-designed trials with standardized itch outcome measures to clarify the true efficacy of these interventions. Until such evidence is available, clinicians should view nonpharmacologic therapies as complementary strategies that may reduce symptom burden, improve quality of life, and minimize reliance on medications, while recognizing that their role is supportive rather than curative.

Submitted: September 21, 2025 PDT. Accepted: February 22, 2026 PDT.

REFERENCES

1. Matterne U, Apfelbacher CJ, Loerbroks A, et al. Prevalence, correlates and characteristics of chronic pruritus: a population-based cross-sectional study. *Acta dermato-venereologica*. 2011;91(6):674-679. doi:10.2340/00015555-1159

2. Shive M, Linos E, Berger T, Wehner M, Chren MM. Itch as a patient-reported symptom in ambulatory care visits in the United States. *J Am Acad Dermatol*. 2013;69(4):550-556. doi:10.1016/j.jaad.2013.05.029. PMID:23870201

3. Carr CW, Veledar E, Chen SC. Factors mediating the impact of chronic pruritus on quality of life. *JAMA Dermatol*. 2014;150(6):613-620. doi:10.1001/jamadermatol.2013.7696

4. Gupta MA, Pur DR, Vujcic B, Gupta AK. Suicidal behaviors in the dermatology patient. *Clin Dermatol*. 2017;35(3):302-311. doi:10.1016/j.clindermatol.2017.01.006

5. Sommer R, Augustin M, Hilbring C, et al. Significance of chronic pruritus for intrapersonal burden and interpersonal experiences of stigmatization and sexuality in patients with psoriasis. *J Eur Acad Dermatol Venereol*. 2021;35(7):1553-1561. doi:10.1111/jdv.17188

6. Bonchak JG, Lio PA. Nonpharmacologic interventions for chronic pruritus. *Itch (Phila)*. 2020;5(1):e31-e31. doi:10.1097/itx.0000000000000031

7. Patel JM, Dao H Jr. Chronic pruritus: A review of neurophysiology and associated immune neuromodulatory treatments. *Skin Therapy Lett*. 2018;23(5):5-9.

8. Yosipovitch G, Bernhard JD. Clinical practice. Chronic pruritus. *N Engl J Med*. 2013;368(17):1625-1634. doi:10.1056/NEJMcp1208814

9. Yosipovitch G, Rosen JD, Hashimoto T. Itch: From mechanism to (novel) therapeutic approaches. *J Allergy Clin Immunol*. 2018;142(5):1375-1390. doi:10.1016/j.jaci.2018.09.005

10. Sharma JK, Miller R, Murray S. Chronic urticaria: a Canadian perspective on patterns and practical management strategies. *J Cutan Med Surg*. 2000;4(2):89-93. doi:10.1177/120347540000400209

11. Krutmann J, Morita A. Mechanisms of ultraviolet (UV) B and UVA phototherapy. *J Investig Dermatol Symp Proc*. 1999;4(1):70-72. doi:10.1038/sj.jidsp.5640185

12. Valejo Coelho MM, Apetato M. The dark side of the light: Phototherapy adverse effects. *Clin Dermatol*. 2016;34(5):556-562. doi:10.1016/j.clindermatol.2016.05.005

13. Imazu LE, Tachibana T, Danno K, Tanaka M, Imamura S. Histamine-releasing factor(s) in sera of uraemic pruritus patients in a possible mechanism of UVB therapy. *Arch Derm Res*. 1993;285(7):423-427. doi:10.1007/BF00372137

14. Hearn RMR, Kerr AC, Rahim KF, Ferguson J, Dawe RS. Incidence of skin cancers in 3867 patients treated with narrow-band ultraviolet B phototherapy. *Br J Dermatol*. 2008;159(4):931-935. doi:10.1111/j.1365-2133.2008.08776.x

15. Lim HW, Silpa-archa N, Amadi U, Menter A, Van Voorhees AS, Lebwohl M. Phototherapy in dermatology: A call for action. *J Am Acad Dermatol*. 2015;72(6):1078-1080. doi:10.1016/j.jaad.2015.03.017

16. Patrizi A, Raone B, Ravaioli GM. Management of atopic dermatitis: safety and efficacy of phototherapy. *Clin Cosmet Investig Dermatol*. 2015;8:511-520. doi:10.2147/CCID.S87987. PMID:26491366

17. Zandi S, Kalia S, Lui H. UVA1 phototherapy: a concise and practical review. *Skin Therapy Lett*. 2012;17(1):1-4.

18. Jaworek A, Szafraniec K, Jaworek M, Matusiak Ł, Wojas-Pelc A, Szepietowski JC. Itch relief in atopic dermatitis: Comparison of narrowband ultraviolet B radiation and cyclosporine treatment. *Acta Derm Venereol*. 2020;100(17):adv00291. doi:10.2340/00015555-3652. PMID:33021322

19. Musters AH, Mashayekhi S, Harvey J, et al. Phototherapy for atopic eczema. *Cochrane Database Syst Rev*. 2021;10(11):CD013870. doi:10.1002/14651858.CD013870.pub2. PMID:34709669

20. Dogra S, Mahajan R. Phototherapy for atopic dermatitis: Narrowband ultraviolet B and beyond. *Indian J Dermatol Venereol Leprol*. 2015;81(1):10-15. doi:10.4103/0378-6323.148557

21. Garritsen FM, Brouwer MWD, Limpens J, Spuls PI. Photo(chemo)therapy in the management of atopic dermatitis: an updated systematic review with implications for practice and research. *Br J Dermatol*. 2014;170(3):501-513. doi:10.1111/bjd.12645

22. Choi JY, Owusu-Ayim M, Dawe R, Ibbotson S, Fleming C, Foerster J. Narrowband ultraviolet B phototherapy is associated with a reduction in topical corticosteroid and clinical improvement in atopic dermatitis: a historical inception cohort study. *Clin Exp Dermatol*. 2021;46(6):1067-1074. doi:10.1111/ced.14676

23. Gildenberg PL. History of electrical neuromodulation for chronic pain: Table 1. *Pain Med*. 2006;7(suppl 1):S7-S13. doi:10.1111/j.1526-4637.2006.00118.x

24. Almeida TC do C, Figueiredo FWDS, Barbosa Filho VC, de Abreu LC, Fonseca FLA, Adami F. Effects of transcutaneous electrical nerve stimulation (TENS) on proinflammatory cytokines: protocol for systematic review. *Syst Rev*. 2017;6(1):139. doi:10.1186/s13643-017-0532-5. PMID:28697739

25. Mohammad Ali BM, Hegab DS, El Saadany HM. Use of transcutaneous electrical nerve stimulation for chronic pruritus: Transcutaneous electrical nerve stimulation for pruritus. *Dermatol Ther*. 2015;28(4):210-215. doi:10.1111/dth.12242

26. Whitaker C. The use of TENS for pruritus relief in the burns patient: an individual case report. *J Burn Care Rehabil*. 2001;22(4):274-276. doi:10.1097/00004630-200107000-00005

27. Tang WY, Chan LY, Lo KK, Wong TW. Evaluation on the antipruritic role of transcutaneous electrical nerve stimulation in the treatment of pruritic dermatoses. *Dermatology*. 1999;199(3):237-241. doi:10.1159/000018254

28. Badwy M, Baart SJ, Thio HB, Huygen FJPM, de Vos CC. Electrical neurostimulation for the treatment of chronic pruritus: A systematic review. *Exp Dermatol*. 2022;31(3):280-289. doi:10.1111/exd.14468. PMID:34637585

29. Bleakley CM, Bieuzen F, Davison GW, Costello JT. Whole-body cryotherapy: empirical evidence and theoretical perspectives. *Open Access J Sports Med*. 2014;5:25-36. doi:10.2147/OAJSM.S41655. PMID:24648779

30. Klimenko T, Ahvenainen S, Karvonen SL. Whole-body cryotherapy in atopic dermatitis. *Arch Dermatol*. 2008;144(6):806-808. doi:10.1001/archderm.144.6.806

31. Nouri K, Chartier TK, Eaglstein WH, Taylor JR. Cryotherapy for psoriasis. *Arch Dermatol*. 1997;133(12):1608-1609. doi:10.1001/archderm.1997.03890480134028

32. Waldinger TP, Wong RC, Taylor WB, Voorhees JJ. Cryotherapy improves prurigo nodularis. *Arch Dermatol*. 1984;120(12):1598-1600. doi:10.1001/archderm.1984.01650480060020

33. Detrano SJ. Cryotherapy for chronic nonspecific pruritus ani. *J Dermatol Surg Oncol*. 1984;10(6):483-484. doi:10.1111/j.1524-4725.1984.tb01242.x

34. Fluhr JW, Herzog L, Darlenski R, Mentel T, Zuberbier T. Short-term heat application reduces itch intensity in atopic dermatitis: Insights from mechanical induction and real-life episodes. *Acta Derm Venereol*. 2024;104:adv40127. doi:10.2340/actadv.v104.40127. PMID:38887031

35. Wohlrab J, Mentel T, Eichner A. Efficiency of cutaneous heat diffusion after local hyperthermia for the treatment of itch. *Skin Res Technol*. 2023;29(2):e13277. doi:10.1111/srt.13277. PMID:36823504

36. Lewis Z, George DN, Cowdell F, Holle H. Effects of short-term temperature change in the innocuous range on histaminergic and non-histaminergic acute itch. *Acta Derm Venereol*. 2019;99(2):188-195. doi:10.2340/00015555-3077

37. Riccio D, Andersen HH, Arendt-Nielsen L. Mild skin heating evokes warmth hyperknesis selectively for histaminergic and serotoninergic itch in humans. *Acta Derm Venereol*. 2022;102:adv00649. doi:10.2340/actadv.v102.173. PMID:35083491

38. Pfab F, Athanasiadis GI, Huss-Marp J, et al. Effect of acupuncture on allergen-induced basophil activation in patients with atopic eczema:a pilot trial. *J Altern Complement Med*. 2011;17(4):309-314. doi:10.1089/acm.2009.0684

39. Tsai KS, Chen YH, Chen HY, et al. Antipruritic effect of cold stimulation at the Quchi acupoint (LI11) in mice. *BMC Complement Altern Med*. 2014;14(1):341. doi:10.1186/1472-6882-14-341. PMID:25239797

40. Carlsson CP, Wallengren J. Therapeutic and experimental therapeutic studies on acupuncture and itch: review of the literature. *J Eur Acad Dermatol Venereol*. 2010;24(9):1013-1016. doi:10.1111/j.1468-3083.2010.03585.x

41. Che-Yi C, Wen CY, Min-Tsung K, Chiu-Ching H. Acupuncture in haemodialysis patients at the Quchi (LI11) acupoint for refractory uraemic pruritus. *Nephrol Dial Transplant*. 2005;20(9):1912-1915. doi:10.1093/ndt/gfh955

42. Lee KC, Keyes A, Hensley JR, et al. Effectiveness of acupressure on pruritus and lichenification associated with atopic dermatitis: a pilot trial. *Acupunct Med*. 2012;30(1):8-11. doi:10.1136/acupmed-2011-010088

43. Gorski DH. Integrative oncology: really the best of both worlds? *Nat Rev Cancer*. 2014;14(10):692-700. doi:10.1038/nrc3822

44. Wenzel A. Basic strategies of cognitive behavioral therapy. *Psychiatr Clin North Am*. 2017;40(4):597-609. doi:10.1016/j.psc.2017.07.001

45. Ehlers A, Stangier U, Gieler U. Treatment of atopic dermatitis: a comparison of psychological and dermatological approaches to relapse prevention. *J Consult Clin Psychol*. 1995;63(4):624-635. doi:10.1037/0022-006X.63.4.624

46. Bridgett C. Habit reversal therapy: A behavioural approach to atopic eczema and other skin conditions. In: *Practical Psychodermatology*. John Wiley & Sons, Ltd; 2014:66-71. doi:10.1002/9781118560648.ch8

47. Weber MB, Fontes Neto P de T da L, Prati C, et al. Improvement of pruritus and quality of life of children with atopic dermatitis and their families after joining support groups. *J Eur Acad Dermatol Venereol*. 2008;22(8):992-997. doi:10.1111/j.1468-3083.2008.02697.x

48. Shenefelt PD. Biofeedback, cognitive-behavioral methods, and hypnosis in dermatology: is it all in your mind? *Dermatol Ther*. 2003;16(2):114-122. doi:10.1046/j.1529-8019.2003.01620.x

49. Zech N, Hansen E, Bernardy K, Häuser W. Efficacy, acceptability and safety of guided imagery/hypnosis in fibromyalgia - A systematic review and meta-analysis of randomized controlled trials. *Eur J Pain*. 2017;21(2):217-227. doi:10.1002/ejp.933

50. Stewart AC, Thomas SE. Hypnotherapy as a treatment for atopic dermatitis in adults and children. *Br J Dermatol*. 1995;132(5):778-783.

51. Shertzer CL, Lookingbill DP. Effects of relaxation therapy and hypnotizability in chronic urticaria. *Arch Dermatol*. 1987;123(7):913-916. doi:10.1001/archderm.1987.01660310081019

52. Schut C, Mollanazar NK, Kupfer J, Gieler U, Yosipovitch G. Psychological interventions in the treatment of chronic itch. *Acta Derm Venereol*. 2016;96(2):157-161. doi:10.2340/00015555-2177

53. Hedman-Lagerlöf E, Fust J, Axelsson E, et al. Internet-delivered cognitive behavior therapy for atopic dermatitis: A randomized clinical trial: A randomized clinical trial. *JAMA Dermatol*. 2021;157(7):796-804. doi:10.1001/jamadermatol.2021.1450. PMID:34009282

54. Evers AWM, Duller P, de Jong EMGJ, et al. Effectiveness of a multidisciplinary itch-coping training programme in adults with atopic dermatitis. *Acta Derm Venereol*. 2009;89(1):57-63. doi:10.2340/00015555-0556

55. van Beugen S, Ferwerda M, Spillekom-van Koulil S, et al. Tailored therapist-guided internet-based cognitive behavioral treatment for psoriasis: A randomized controlled trial. *Psychother Psychosom*. 2016;85(5):297-307. doi:10.1159/000447267

56. Andrade A, Kuah CY, Martin-Lopez JE, et al. Interventions for chronic pruritus of unknown origin. *Cochrane Database Syst Rev*. 2020;1:CD013128. doi:10.1002/14651858.CD013128.pub2. PMID:31981369

57. Zeidan F, Martucci KT, Kraft RA, Gordon NS, McHaffie JG, Coghill RC. Brain mechanisms supporting the modulation of pain by mindfulness meditation. *J Neurosci*. 2011;31(14):5540-5548. doi:10.1523/JNEUROSCI.5791-10.2011. PMID:21471390

58. Chen S, Jhaveri M. The efficacy of meditation for treatment of chronic pruritus: A pilot trial. *Journal of Investigative Dermatology*. 2015;135:S41-S41.

59. Bae BG, Oh SH, Park CO, et al. Progressive muscle relaxation therapy for atopic dermatitis: objective assessment of efficacy. *Acta Derm Venereol*. 2012;92(1):57-61. doi:10.2340/00015555-1189

60. Kabat-Zinn J, Wheeler E, Light T, et al. Influence of a mindfulness meditation-based stress reduction intervention on rates of skin clearing in patients with moderate to severe psoriasis undergoing phototherapy (UVB) and photochemotherapy (PUVA). *Psychosom Med*. 1998;60(5):625-632. doi:10.1097/00006842-199809000-00020

61. Demirtas S, Houssais C, Tanniou J, Misery L, Brenaut E. Effectiveness of a music intervention on pruritus: an open randomized prospective study. *J Eur Acad Dermatol Venereol*. 2020;34(6):1280-1285. doi:10.1111/jdv.16149

62. Schachner L, Field T, Hernandez-Reif M, Duarte AM, Krasnegor J. Atopic dermatitis symptoms decreased in children following massage therapy. *Pediatr Dermatol*. 1998;15(5):390-395. doi:10.1111/j.1525-1470.1998.tb01374.x

63. Lin L, Yu L, Zhang S, Liu J, Xiong Y. The positive effect of mother-performed infant massage on infantile eczema and maternal mental state: A randomized controlled trial. *Front Public Health*. 2022;10:1068043. doi:10.3389/fpubh.2022.1068043. PMID:36711419

64. Thomas KS, Bradshaw LE, Sach TH, et al. Silk garments plus standard care compared with standard care for treating eczema in children: A randomised, controlled, observer-blind, pragmatic trial (CLOTHES Trial). *PLoS Med*. 2017;14(4):e1002280. doi:10.1371/journal.pmed.1002280. PMID:28399154

65. Senti G, Steinmann LS, Fischer B, et al. Antimicrobial silk clothing in the treatment of atopic dermatitis proves comparable to topical corticosteroid treatment. *Dermatology*. 2006;213(3):228-233. doi:10.1159/000095041

66. Park KY, Jang WS, Yang GW, et al. A pilot study of silver-loaded cellulose fabric with incorporated seaweed for the treatment of atopic dermatitis: Silver-loaded cellulose fabric with incorporated seaweed for the treatment of AD. *Clin Exp Dermatol*. 2012;37(5):512-515. doi:10.1111/j.1365-2230.2011.04273.x

67. Araújo CP, Gomes J, Vieira AP, Ventura F, Fernandes JC, Brito C. A proposal for the use of new silver-seaweed-cotton fibers in the treatment of atopic dermatitis. *Cutan Ocul Toxicol*. 2013;32(4):268-274. doi:10.3109/15569527.2013.775655

68. Wiegand C, Hipler UC, Boldt S, Strehle J, Wollina U. Skin-protective effects of a zinc oxide-functionalized textile and its relevance for atopic dermatitis. *Clin Cosmet Investig Dermatol*. 2013;6:115-121.

69. Kim SH, Hwang SH, Hong SK, et al. The clinical efficacy, safety and functionality of anion textile in the treatment of atopic dermatitis. *Ann Dermatol*. 2012;24(4):438-443. doi:10.5021/ad.2012.24.4.438. PMID:23197910

70. Devillers ACA, Oranje AP. Wet-wrap treatment in children with atopic dermatitis: a practical guideline: Wet-wrap treatment in children with atopic dermatitis. *Pediatr Dermatol*. 2012;29(1):24-27. doi:10.1111/j.1525-1470.2011.01691.x

71. Janmohamed SR, Oranje AP, Devillers AC, et al. The proactive wet-wrap method with diluted corticosteroids versus emollients in children with atopic dermatitis: a prospective, randomized, double-blind, placebo-controlled trial. *J Am Acad Dermatol*. 2014;70(6):1076-1082. doi:10.1016/j.jaad.2014.01.898

72. Oranje AP, Devillers ACA, Kunz B, et al. Treatment of patients with atopic dermatitis using wet-wrap dressings with diluted steroids and/or emollients. An expert panel's opinion and review of the literature. *J Eur Acad Dermatol Venereol*. 2006;20(10):1277-1286. doi:10.1111/j.1468-3083.2006.01790.x