

# Comparison of neurodermatitis management based on effectiveness and safety

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**Abstract.** Neurodermatitis, also known as atopic dermatitis or atopic eczema is the long-term inflammation in the skin. There are many different kinds of therapies without clear conclusions and recommendations as to which therapy is the most effective and safest. This paper aims to compare the effectiveness and safety of four commonly used therapies: steroid therapy, traditional Chinese medicine (TCM), Phototherapy, and habit reversal. The methodology used was through gathering/searching papers with keywords such as, “neurodermatitis management, atopic dermatitis, habit reversal, steroid therapy,” and comparing the effectiveness and safety of the varying therapies. The results showed us that studies concerning the different therapies should be explored and more therapies need data for us to come to a clear recommendation.

**Keywords:** atopic dermatitis, habit reversal, steroid therapy, traditional Chinese medicine, physical therapy.

## 1. Introduction

Habit reversal is the act of altering one's reaction toward the symptoms of Neurodermatitis. It is often used as a training to prevent and minimize effects of tics, trichotillomania, nail biting, skin picking and other habit behaviors [1]. In a research done by Rosenbaum and Ayllon [2], habit reversal is approached using the relaxation training, stroking, and patting. There has been little experiment into habit reversal and its effects with neurodermatitis, therefore the evidence is limited to research. In Rosenbaum and Allyson's research, 4 patients with neurodermatitis underwent habit reversal training for 6 months. The relaxation training was instructed to all patients. If they felt the urge to scratch their wounds, they would need to place their hands on their lap or beside their body and squeeze their fists. If it was irresistible, patients would need to stroke or pat the area instead of scratching. Every time the patient scratched. At the end of the 6-month trials, 1 out of 3 patients' neurodermatitis was eliminated, while the other patients had lower symptoms of neurodermatitis [3]. To conclude, Habit Reversal Training is one of the potential therapies that will be evaluated based on effectivity and safety in the following parts.

Topic corticosteroids are medicines often used to treat rashes, eczema, and dermatitis [4]. It can come in different dosage forms, such as ointment, cream, foam, and lotion. Depending on the Topical corticosteroids (TCS) type and intensity, it can be available over the counter or prescribed. There are mainly two methods to treat neurodermatitis using TCS. Applying a great potency of TCS and gradually decreasing it over time is one method. While slowly increasing the intensity of treatment

based on the reaction of patients and using lower potency of TCS for a longer period is the second method that can be used [5].

The methodology used in treating neurodermatitis should always be based on the intensity of the patient's condition.

Traditional Chinese medicine (TCM) approaches the patients through a mindset that the symptoms/problems are caused by inner dysfunction in the body [6]. Due to its historical value, TCM is part of the belief of Confucianism, and the literati theory. It has numerous approaches, from moxibustion (the burning of dried herbs near the body) to cupping to acupuncture [7]. Since neurodermatitis is associated with neurological dysfunction, acupuncture uses the needles to stimulate the nerve fibers and relieves the serious itching of neurodermatitis.

Phototherapy also called light therapy, is the act of exposure to direct or artificial sunlight at various controlled wavelengths. It is often used to treat medical disorders such as, seasonal affective disorder, cancer, and skin wound infections, as well as skin inflammatory diseases such as neurodermatitis, psoriasis, and eczema. Conventionally, the approach to treating skin inflammatory diseases has always utilized ultraviolet (UV) light, while there are low-level light therapies (LLLT) and varying lasers that have also proven to be successful [8].

There is no clear recommendation yet to which is the best, especially concerning the safety and effectiveness of treatments for neurodermatitis. Therefore, this paper compares the effectiveness and safety of the three therapies: Steroid therapy, Traditional Chinese Medicine (TCM) and Habit Reversal.

## **2. Habit reversal training**

### *2.1. Effectiveness of habit reversal training*

The effectiveness of habit reversal is majorly based on the patients' neurodermatitis severity. In one case study, the patient (Sandra) with the mildest symptoms scratched around her ankle, about 3 inches up to her leg [9]. After 6 months of the habit reversal treatment, Sandra's neurodermatitis was completely healed. Before the habit reversal training, Sandra scratched her ankle about 10.1 times per day, after a 3-month follow up there were significant decreases in the area and redness of the skin. This study shows that the Habit reversal treatment is the most effective for patients with milder cases, such as Sandra. It will be ineffective for patients with more severe symptoms of neurodermatitis due to its lengthy time and uncertainty for results.

### *2.2. Safety of habit reversal training*

Habit reversal treatment is a conventionally safe therapy for patients because there is little to no harm involved. Relaxation training has the probability that can cause mental trauma to the patients due to the resistance they must undergo. The resistance of the scratching may leave them stressed and uncomfortable in that position. Following the instructions for 6 months, the habit reversal therapy can also be a risk if it is not conducted correctly, the severing of skin condition will also be at risk.

## **3. Topical corticosteroids**

### *3.1. Effectiveness of topical corticosteroids*

Throughout history, it has been proven numerous times that TCSs are effective in reducing the intensification of lesions, and its itches, and in preventing the recurrence of it [7]. There are two Special Application Methods of TCS that may increase the effectiveness of the two treatment methods described above. Simple Occlusive Dressing can be done after applying TCS onto insensitive skin areas for short periods of time. It can increase the effect of TCS by several dozens, and speed up the process of reducing lesions. While Wet Wrap Therapy is quite similar to simple occlusive dressing but dilutes TCS using moisturizer or a wet dressing. Although it is not a standardized application method, it is often used for patients with acute, erosive lesions who cannot tolerate the standard application of TCS [7]. The wet wrap therapy does not increase the efficacy of TCS but rather acts as a transition for

patients to use the standard application method. Besides applying TCS the conventional way, there are also special application methods that may speed up the process, making it more effective and allow the patient to adjust to the application of TCS.

### *3.2. Safety of topical corticosteroids*

Although the usage of TCS has been proven effective, studies show safety concerns for its long-term uses should not be ignored. Compared to systemic reactions, local side effect is the main safety concern. The most common side effects found in the local area of neurodermatitis are telangiectasia, bruising, stretch marks, rebound flares, and much more [7]. Rebound flares happen due to atrophy which is the degeneration of organs or cells that will leave the skin to be vulnerable and exposed to infections. If the special application method, simple occlusive dressing is used long-term the risk of side effects will increase. When using wet wrap therapy at home, patient compliance and training must not be ignored. If at a hospital, medical professionals should conduct this therapy for the patient.

## **4. Traditional Chinese medicine**

### *4.1. Effectiveness of traditional Chinese medicine*

Studies have reported positive outcomes with TCM interventions in reducing pruritus and improving overall skin condition. In the review article by Lin Yang, it has been found that acupuncture is an effective treatment for neurodermatitis. It reduces one of its most important and influential manifestations of neurodermatitis, itching. It is done by stimulating nerve fibers that will interfere with the transmission of itching [9]. Numerous studies found that acupuncture can help speed up metabolism, strengthen fiber cells, reduce local inflammation, and improve microcirculation. According to the meta-analysis, TCM also reduces the generally high recurrence rate of neurodermatitis [10].

### *4.2. Safety of traditional Chinese medicine*

The safety of Traditional Chinese Medicine will vary depending on the type of treatment method the patient uses and the practitioner's experience [11]. TCM is generally considered safe when administered by trained practitioners. However, in the research on the Efficacy and Safety of Acupuncture, needle fainting is something to be aware of. Although needle fainting can be subsided after rest, mental trauma also takes a big role in safety. If the patient doesn't feel safe enough to follow the therapy due to trauma, TCM is not the best therapy.

## **5. Phototherapy**

### *5.1. Effectiveness of phototherapy*

UV light-based treatment has proven to be effective and commonly used in treating moderate neurodermatitis. There are many different UV light sources that can be taken into consideration; Natural sunlight, BB-UVB, UVA, NB-UVB, UVA1, and systemic psoralen plus UVA (PUVA) all show improvements in the clinical symptoms of neurodermatitis. Due to the varying light sources that can be used, there are also many different treatment guidelines and reviews on neurodermatitis that should always be taken into consideration. Based on the comparison, clinical trials also suggest that NB-UVB is more effective than BB-UVB or UVA1. Therefore, NB-UVB and UVA1 are most commonly used in Europe [8]. NB-UVB is the most recommended phototherapy treatment due to its low-risk profile, efficacy, and availability [8].

Out of a few reports, LLLT blue light has also been shown to be effective in reducing neurodermatitis. When the blue lights were at wavelengths of 400 and 495 nm skin lesions and itching was reduced. A full-body blue light trial was also shown to be effective in reducing clinical symptoms [8]. In the report, blue light was used as an additive to the patient, who could be using TCS at the same

time. Knowing this information, we can observe that blue light can improve the efficacy of LLLT and other therapies as well [12].

### 5.2. *Safety of phototherapy*

Due to the use of UV light, all UV treatments pose the long-term risk of developing skin cancer or accelerated skin aging [8]. Since the intensity of the risk is solely based on different kinds of UV light, the risk can be chosen by specific UV lights. Low-level laser/light therapy (LLT) is an attempt to develop UV-free devices to lower the risk of adverse side effects for the patient. Either due to the limited reports or knowledge we have about LLLT, there have been no adverse effects from using this technology. It is safe to say that LLLT can be a great and safer alternative to UV treatment but also a safe “add-on” to other therapies. This is because it does not pose any adverse effects even with other methods [13].

## 6. Conclusion

According to different papers, Habit reversal is a great therapy because it doesn't pose any harm to the patient instead, it trains them to be persistent and resist the urge to itch the inflammation of the skin. It was also shown that it was very effective in reducing and almost eliminating neurodermatitis in patients with lighter conditions. This makes people believe that at the early stages of neurodermatitis Habit reversal is the best therapy.

Next, phototherapy is one of the safest and most effective therapy. Depending on the varying UV lights, the risk of developing cancer varies as well. NB-UVB has been proven to be one of the safest UV lights that can also effectively reduce neurodermatitis in the patient. It is also one of the most common practices, giving us more data that allows us to truly understand its safety. LLLT is also very great in complimenting different therapies with blue light to increase its efficacy in reducing neurodermatitis. As an “add-on” therapy it also does not pose any adverse effects that we currently know of.

TCM, however, is least effective in treating neurodermatitis because it has safety and effectiveness concerns. As it is not limited to acupuncture, doctors prescribe a mix of burned herbs for the patient to boil and drink. Due to the mix of herbs, it tastes very bitter which discourages patients to try this therapy. TCM has poor patient compliance not only due to the inedible taste of the prescribed herbs but also because of safety concerns regarding acupuncture. Acupuncture is invasive, for inexperienced medical professionals, this is a safety issue. It is a high risk for patients if the doctor is not trained properly and accidentally locates the needle in the wrong spot or too deep.

Topical corticosteroids may also cause adverse reactions such as iatrogenic skin diseases or infections if the patient has any allergies. When the doses are decreased neurodermatitis might reoccur, and if it is a high dosage, in the long-term it creates many side effects as well. Therefore, it is neither highly nor poorly effective in treating neurodermatitis.

In order to compare the effects of the different therapies, this review carried out this comparison to see the effectiveness and safety of Habit Reversal, Topical Corticosteroids, Traditional Chinese Medicine, and Phototherapy. And came to the conclusion that out of the four therapies Phototherapy was the most effective and safe one. Habit Reversal and TCS don't mainly pose long term concerns, while TCM is the least effective and safe therapy for treating neurodermatitis. As the results are based on current knowledge, it is recommended to individually decide on which therapy fits the best based on the patient. We hope in the future there will be more studies to explore further therapies for neurodermatitis and other skin inflammatory diseases.

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