

# Grenz Rays

Grenz rays, a form of non-ionizing radiation, have been utilized in dermatology since the 1920s. Though their use has declined significantly with the advent of newer, more effective therapies, they continue to serve a niche role in managing certain dermatological conditions. Originally regarded as a primary treatment modality, Grenz ray therapy is now primarily reserved for cases where other treatments have proven inadequate.

## Mechanism of Grenz Rays

Grenz rays are a type of radiation that is often described as ultrasoft radiation, with a much lower energy than more commonly known forms of radiation, such as X-rays or gamma rays. They are produced at low kilovoltages, resulting in very shallow tissue penetration. Approximately 50% of the energy from Grenz rays is absorbed within the first half millimeter of tissue, limiting their depth of action to the skin's superficial layers. Unlike higher-energy radiation modalities, which have the potential to cause deeper cellular damage, Grenz rays have a very limited penetration power, reducing the risk of systemic effects and deep tissue injury.

Due to their low energy and minimal penetration, Grenz rays are classified as "ultrasoft" radiation. They primarily exert their therapeutic effect in the epidermis and dermis, making them useful in treating inflammatory skin conditions without the risks of deeper radiation damage or systemic toxicity. In terms of electromagnetic properties, Grenz rays are similar to ultraviolet light but differ in their energy levels, being lower than UVB light and non-penetrating beyond the skin's surface.

## Clinical Applications of Grenz Rays

Historically, Grenz rays were used for a variety of dermatological conditions, particularly inflammatory skin disorders that were resistant to more conventional treatments. Their applications today are more targeted, with a focus on conditions that have not responded to other therapies. Notable indications include:

- ***Inflammatory Dermatoses:*** Grenz rays have been used effectively in conditions such as psoriasis, atopic dermatitis, and contact dermatitis. These conditions often involve persistent skin inflammation, and Grenz rays can provide symptomatic relief by modulating the inflammatory response in the skin. Grenz rays have been found to help reduce erythema, scaling, and pruritus, particularly in localized areas resistant to topical treatments.
- ***Mycosis Fungoides:*** Grenz rays are occasionally used in the treatment of the last remaining patches of mycosis fungoides, a cutaneous T-cell lymphoma. In such cases, Grenz rays can help to eliminate localized lesions that have not responded to more conventional therapies like topical steroids or systemic immunosuppressants.

- **Lichen Simplex Chronicus:** Conditions like lichen simplex chronicus may benefit from Grenz therapy due to its soothing effect on the skin and its ability to reduce inflammation and pruritus. Grenz rays have been found to alleviate the symptoms of chronic itching, which is often resistant to standard treatments.
- **Hailey-Hailey Disease:** Grenz rays have shown efficacy in treating Hailey-Hailey disease, a genetic condition characterized by recurrent skin blistering and erosions. The therapy can help manage the chronic inflammation and reduce flare-ups, particularly in localized areas.
- **Anogenital Itching:** In cases of anogenital pruritus, including pruritus ani, Grenz rays can be helpful in alleviating the persistent itching and discomfort associated with these conditions. The treatment works by reducing inflammation and promoting skin healing.

### **Treatment Protocols**

The standard protocol for Grenz ray therapy involves administering treatments over several sessions, usually weekly or bi-weekly, for a course lasting three to four weeks. Each treatment session typically delivers low doses of radiation, with the total dose usually staying below 200 Rads per session to minimize side effects. Doses exceeding 200 Rads may cause a mild sunburn reaction, with erythema and a persistent tan that can last several months.

In most cases, treatments are repeated only two to three times annually, with follow-up sessions for maintenance therapy as needed. The therapy is well-tolerated, and the superficial nature of the radiation minimizes the risk of long-term side effects like hair loss, which can occur with higher doses of radiation. Moreover, there is no significant risk of permanent skin damage, making it a relatively safe option when other therapies have failed.

### **Safety Considerations and Risks**

Although Grenz rays are classified as low-energy radiation, it is crucial to adhere to proper safety protocols to minimize any potential risks. The low penetration depth of Grenz rays means that the surrounding tissues are largely unaffected, but cumulative radiation exposure, particularly over multiple treatments, should still be monitored. The risk of carcinogenesis with Grenz rays is considered minimal due to their non-ionizing nature and shallow tissue penetration, unlike the higher-energy forms of radiation used in cancer therapy.

Nevertheless, dermatologists must ensure that Grenz ray therapy is administered carefully, with appropriate dosages and treatment intervals, to avoid overexposure. The main concern is the potential for radiation burns, which can occur if treatment is not well-managed. Regular monitoring of skin response during the treatment course is essential to ensure patient safety.

### **Conclusion**

Grenz rays represent an important but specialized tool in dermatologic therapy. Though their use has declined with the development of newer, more targeted treatments, they remain a valuable option for managing certain persistent or refractory inflammatory skin conditions. Their role in treating localized skin issues, particularly in diseases like mycosis fungoides, psoriasis, and atopic

dermatitis, makes them a useful adjunct to other therapies. However, given the advances in dermatology, Grenz rays are no longer considered a first-line treatment but are rather employed when other modalities have failed to achieve satisfactory results.

## References

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