WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

Ultraviolet Radiation – A Forgotten Art in the Treatment of Skin Conditions – An Expert Communication

Prof Dr. CK Senthil Kumar 1*, Prof. R. Balasaravanan [2]

1 Director, North East Christian University, Centre for Medical Education and Research, Dimapur, Nagaland, INDIA.
2 Professor, Kempegowda Institute of Physiotherapy, Bangalore, Karnataka, INDIA.

Physiotherapy means treatment offered by physical agents like temperature, electricity, mechanical agents etc. it is not system patterned only for allopathic medical system. It's a common aid to all medical systems because its non-invasive and drugless therapy. We have proved this in SJSACH where physiotherapists work hand in hand with Ayurvedic doctors.

Physiotherapy is being considered as a system of treatment mostly concerned with musculoskeletal system and neurological system. But there are various fields which physiotherapy attests to, like endocrine disorders, obstetrics and gynaecology, cardio respiratory, bio mechanics, hand rehabilitation, sports medicine, and cosmetics. The field of cosmetics include the treatment offered for skin and hair.

In this article I would like to put forth certain problems pertaining to skin to which Ultra violet radiation (physiotherapy modality) can help. This would give a good idea to Ayurvedic doctors to know where our services can be utilized.

ULTRA VIOLET RADIATION

Ultraviolet radiation is electromagnetic energy, which is invisible to the human eye, with wavelengths between 10 nm to 400 nm. There are three types of UVR depending on the wavelength namely UVA, UVB, UVC. Out of this UVA and UVC are harm less when given in a tailored dosage whereas UVB is harmful to human skin.

Step 1 - Erythema due to UVR:

The redness caused by ultraviolet radiation is uniform, not mottled, and there is a sharp distinct edge at the junction with an unexposed area, which indicates that it is capillaries in the dermis that primarily dilate and not the arterioles. Since UVB and C are largely absorbed in the epidermis it is considered that the reaction is due to the release of chemical substances. Histamine substances are invoked especially during the early development, as are certain prostagladins, which may be released from epidermal keratinocytes as well as prostacyclin from epidermal cells in the blood vessels of the dermis.

Step 2 - Pigmentation:

Pigmentation of the skin occurs as a result of both the formation of melanin in the deep region of the epidermis and the migration of melanin already formed into more superficial layers. This process takes a little time and is usually noticeable about 2 days after exposure.

Step 3 - Increased Skin Growth:

Stimulation by ultraviolet radiation provokes increased keratinocyte cell turnover so that the skin grows more rapidly for a time, leading to shedding of the most superficial cells at an earlier stage in their development than usual so that they remain in pieces, or even sheets, and can be peeled off. This peeling or desquamation varies with the intensity of applied ultraviolet radiation.

Step 4 - Vitamin D Production:

UVB is able to convert sterols in the skin, such as 7-dehydro-cholesterol to vitamin D which, after changes in the liver and kidneys, is able to facilitate the absorption of calcium from the intestine.

Step 5 - Immunosuppressive Effects:

Ultraviolet radiation appears to trigger immunosuppressive effects, both locally and systemically. This occurs because UVB destroys Langerhan's cells and stimulates the proliferation of suppressor T cells. When organisms invade the skin, the macrophage-like Langerhans cells gather some of the pathogen and transport it to the lymph nodes, which send out specific killer T cells. This immunosuppressive effect is believed to be the protective response to prevent an autoimmune attack on the skin cells that have been altered by ultraviolet radiation. Immunosuppressive effects may contribute to the development of skin cancer.

1. Psoriasis:

Psoriasis is a skin condition, which presents localized plaques in which the rate of cell turnover from the basal layer through to the superficial layer is too rapid. The epidermal transit time is reduced to about 5 days so that the keratinocytes do not change in the usual way. They keep their nuclei and tend to stick together forming the plaques.

The aim of ultraviolet irradiation is to decrease the rate of DNA synthesis in the cells of the skin and thus slow down their proliferation (immunosuppressive effect of UVR).80% of MED and increasing by 15% – 20% each time until an erythema occurs. Thus courses of whole-body UVB treatment are successfully employed for psoriasis, although several regimens involving adjuncts are in use, e.g., fish oil therapy.

Photochemotherapy for Psoriasis:

Psoriasis can be treated with radiations of UVA accompanied by a sensitizer. If a psoralen-type drug is given to the patient some 2 hours previously, he or she will become sensitive to UVA radiations, which will produce erythema at lower intensities than normal.

2. Acne Vulgaris:

This is a chronic inflammatory condition of the pilosebaceous unit especially affecting the face, chest, and back. Mild acne arising in adolescence is so common as to consider a normal feature. These are clumps of keratin, sebum, and bacteria, which block the follicle. Subsequently, an inflammatory response occurs which leads to the familiar papules and pustules. The effects of the ultraviolet are to Accelerate skin growth because peeling off the surface will remove the lesions and open the blocked ducts. Produce a non-specific inflammatory reaction to help control infection. Sterilize the skin surface temporarily. Cause some pigmentation, which may serve to make the papules less obvious. Treatment is only palliative and the condition usually returns within a few weeks of ultraviolet radiation. Irregular rates of desquamation may restrict the frequency of treatment and possibly produce mottled erythema.

3. Eczema:

Eczema is an inflammatory response in the skin, with associated oedema. The patient suffers marked itching with redness, scaling, vesicles, and exudation of serum on the skin. While it may be caused by external agents (contact dermatitis), a large group of patients have atopic eczema. It is often these who can benefit from mild ultraviolet treatment.

4. Chronic Infection (Infected Wound):

Infected open wounds such as pressure sores are sometimes treated with high doses of ultraviolet radiation. The doses given must be such to kill surface bacteria. The radiation from the Kromayer lamp is successful in killing bacteria in vitro. This may be particularly valuable in circumstances where antibiotics cannot reach the area in adequate proportions, if the infection is resistant to them or if they are contraindicated. Skin oxygenation is increased for some 48 hours after the treatment

5. Vitiligo:

Vitiligo is an autoimmune disease in which the destruction of melanocytes in local areas causes white patches to appear on the skin. In the darker-skinned, it becomes a serious cosmetic problem, which can be treated with topical psoralens and ultraviolet radiation to try to induce repigmentation. Both UVA and B stimulate melanocyte activity. UVA seems to provoke a darker and long-lasting tan although the protective effects do not seem to be so marked, UVB provokes more thickening

6. Protection for Hypersensitive Skin:

The polymorphic light eruption is the most commonest of photodermatoses and increased tolerance to sunlight can be achieved by a course of UVB, starting with a very low dose and gradually progressing.

7. Treatment of Vitamin D Deficiency:

Vitamin D3 is formed in the skin by the action of UVB and C on 7-dehydrocholesterol. Exposure to either artificial ultraviolet radiation or if available, natural sunlight is curative for vitamin D deficiency diseases. Some bed-bound elderly patients may benefit from artificial UVB to maintain vitamin D and calcium levels to counteract senile osteoporosis.

8. Treatment of Pruritus:

Pruritus occurs due to biliary cirrhosis or uraemia. The intractable and serious itching that can occur due to raised bile acid levels can be successfully treated by sub-erythemal whole-body UVB either alone or in combination with the drug cholestyramine.

Thus, UVR is a great asset for the physiotherapist in treating skin conditions. Dosages will differ according to the needs of the intervention.