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# Low Level Light Could Work on Skin Inflammatory Disease: A Case Report on Refractory Acrodermatitis Continua

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Low level laser or light treatment on the various clinical condition is getting considerable attention now. However, there has been no report about the clinical effect of low level polarized polychromatic noncoherent light (LPPL) on the inflammatory skin disease. We experienced a case of acrodermatitis continua in a pregnant woman refractory to any conventional treatment including the most potent topical steroid. She was successfully treated with LPPL. LPPL could be a possible treatment modality producing substantial clinical result in inflammatory skin condition without any side-effect.

**Key Words:** Low Level Light; Acrodermatitis Continua; Inflammatory Skin Disease

## INTRODUCTION

History of applying light as a therapeutic remedy dates back to ancient Egypt. In dermatologic field, ultraviolet A (UVA: 320-400 nm) and ultraviolet B (UVB: 280-320 nm) has been mainly focused. Many phototherapeutic and photochemical modalities using UVA and UVB have been developed and used effectively in many inflammatory skin diseases such as psoriasis and atopic dermatitis (1, 2). Low level laser or light was introduced by Mester and colleagues in the late 1960s and has been mostly used in rheumatoid arthritis, wound healing, postherpetic neuralgia and recovery following nerve injury (3).

To our best knowledge, there has been no report about clinical effect of low level polarized polychromatic non-coherent light (LPPL) on inflammatory skin condition. This report concerns a successful LPPL treatment in a pregnant patient suffering from recalcitrant acrodermatits continua.

## CASE DESCRIPTION

In October 2009, a 40-yr-old woman presented with severe erythematous pustular eruption and exfoliation on all fingertips and on the paraonychia of her nails (Fig. 1A). She was 7 weeks pregnant at the very first visit to our clinic.

When she delivered her first child twenty months ago, erythema and pustules developed on one of the fingertips and extended on to every fingertip. She was diagnosed as an acrodermatitis continua by skin biopsy at the other clinic when the initial skin lesion developed. She had been treated with the topical steroid and narrow band ultraviolet B (NBUVB) phototherapy, which produced a partial response. Her skin lesion worsened a lot after her second conception and did not respond at all to any topical agents (including 0.05% clobetasol propionate ointment), or NBUVB phototherapy when she was referred to our clinic. We checked the possible aggravating factors making her pustules refractory to the conventional treatment. Routine laboratory examination was all within normal limits. Bacterial and fungal cultures from the pustules turned out negative. She has a 10-yr history of plaque psoriasis on her knees and elbows and it has been controlled well with the topical calcipotriol ointment alone.

Her pregnancy was the major hindrance in applying any oral agents. We recommended NBUVB phototherapy at first. However, she refused it after the previous ineffective treatment of NBUVB. Therefore, we designed the treatment with the exposure of LPPL (Bioptron, Bioptron 2®, Bioptron AG, Swiss, 480-3,400 nm, 95% polarization, exposure dose 10 J/cm$^2$) and topical steroid application (much less potent than the topical preparation she had used before) twice a week.

In two weeks (after only 4 treatments), the clinical resolution was impressive and no pustules were found (Fig. 1B). Topical methylprednisolone aceponate 0.1% cream was switched to a ceramide-containing moisturizer and she has been treated twice



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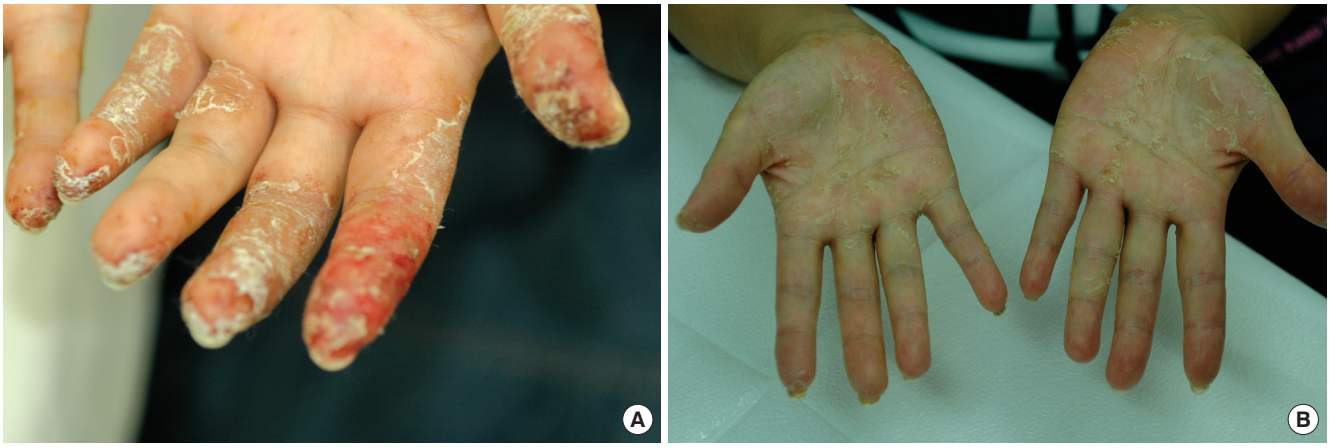

**Fig. 1.** Low level polarized polychromatic noncoherent light treatment. (**A**) Before treatment. Severe pustules, erosion and exfoliation on the erythematous bases on every fingertip of the patient were detected. (**B**) After four treatment sessions, skin lesion remarkably improved. No pustules were found.

or once a week with LPPL exposure (10 J/cm$^2$) and her improved skin condition sustained during the rest of the whole pregnancy. Her baby was born healthy without any noticeable abnormality. No side-effect was reported. Over 10 months of follow-up, no recurrence or flare-ups of skin lesion was noticed.

## DISCUSSION

Acrodermatitis continua is considered as a variant of pustular psoriasis but some authors classify this dermatosis as a separate entity based on its clinical features (1). This patient developed acrodermatitis continua after a long history of mild plaque type psoriasis. Therefore, this case supports that acrodermatitis continua may be a variant of psoriasis. Interestingly, her psoriatic plaques were well controlled using topical calcipotriol ointment alone, while newly developed sterile pustules on her fingertips were refractory to any conventional treatment.

Four times of topical steroid application and the co-exposure to LPPL showed an excellent clinical result and this effect maintained for several months without any further topical steroid application. It cannot be said that LPPL alone produced a rapid clinical resolution in this patient. Topical steroid might play a certain role to suppress the disease activity at the beginning of the treatment. However, she had used the most potent topical steroid (0.05% clobetasol propionate ointment) before visiting our clinic and it was ineffective, though. LPPL with the topical steroid application appeared to provide outstanding clinical improvement in this patient. Even after the topical steroid was changed to the topical moisturizer instead, there was no recurrence or aggravation of the skin lesion. The clinical disease process of acrodermatitis continua can spontaneously wax and wane (1). However, natural clinical course cannot fully explain the rapid improvement in this patient and sustaining result. Therefore, we could say that LPPL could work successfully on the inflammatory skin disease.

Low level light treatment on various clinical conditions is getting considerable attention now (4-7). Its use was generally limited in wound healing, relieving various rheumatic condition and pain control before (3, 8). The mechanisms of action is not clear, although it was explained in terms of photobiomodulation (5-10). Biomodulation is the process of changing the natural biochemical response of a cell or tissue within the normal range of its function to stimulate the cell's innate metabolic capacity to respond to a stimulus (3-6). When biomodulation occurs from a photon transferring its energy to a chromophore, it is referred to as photobiomodulation (3, 8). The photobiomodulation has been found to normalize the jeopardized cellular milieu in various disease condition and promote spontaneous healing (4-9). Recent studies showed that photobiomodulation could regulate the inflammatory responses, too (5, 7, 9, 10). LPPL was proven to have anti-inflammatory effect on chronic tendonitis and gingivitis in several reports (5, 7). Others demonstrated that the exposure of a small area of the human body to LPPL (480-3,400 nm, 12 J/cm$^2$) decreased in the elevated pro-inflammatory cytokine levels and increased in the anti-inflammatory factor concentration (10). The decrease of proinflammatory cytokine such as TNF-α, IFN-γ, and IL-2 and anti-inflammatory effect after LPPL exposure may pose a suitable explanation of the clinical result of LPPL in the inflammatory skin disease.

This case gives intimation that LPPL could be a possible treatment modality producing substantial clinical result in inflammatory skin condition. Further studies with more patients and about the mechanism of action are required.

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