

# Wound Dressing after CO<sub>2</sub> Laser Resurfacing using a New Dressing Material : Medifoam

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## Wound Dressing after CO<sub>2</sub> Laser Resurfacing using a New Dressing Material : Medifoam<sup>®</sup>

CO<sub>2</sub> laser resurfacing procedure on the face is an increasingly popular and highly effective for patients with facial rhytids and scarring. And there is a variety of dressing materials available for wound care after CO<sub>2</sub> laser resurfacing. Among the dressing method, the authors have been used the Medifoam<sup>®</sup> (Il Dong Pharmaceutical Ltd. & Biopol Ltd., Seoul, Korea ; a hydrocellular semi-permeable dressing material) after CO<sub>2</sub> laser resurfacing. A total of 20 patients were treated for scar face and wrinkles (mainly scar face including small pox scar face) with ultra-pulsed CO<sub>2</sub> laser (Coherent, Palo Alto, USA). No pretreatment was done. The basic protocol of laser resurfacing was that, first pass was 300mJ on the shoulder of scar, second pass with 250 - 200 mJ, and feathering with 150mJ. Immediately after the procedure, the wound must be cleansed and dried well so that the Medifoam<sup>®</sup> sticks better and early contamination is avoided.

Medifoam<sup>®</sup> was fixed to wound surface using surgical tape or surgi-net. First dressing change was done after 24 - 48 hours according to the amount of exudates. Because of the high absorption ability of the Medifoam<sup>®</sup>, dressing change was not necessarily needed on postoperative day 1. Another dressing changes were done on days 3, 6, 9 postoperatively for evaluating wound healing & observation. The epithelialization was usually completed within 9 days in all cases. During the dressing change, there were no exudates outside, less crust, and less thin layer of gel formation on the wound surface than any other dressing materials. Also there was no detachment of reepithelialized layer on removing the dressing materials. The use of the Medifoam<sup>®</sup> after CO<sub>2</sub> laser resurfacing accelerates the healing time, reduces the pain and anxiety of the patients due to exudates, reduces the inconvenience of the patients and surgeons by less dressing changes, and reduces the cost.

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## I. Introduction

As CO<sub>2</sub> laser resurfacing has achieved the effective results for treating facial rhytids and scars revision, CO<sub>2</sub> laser resurfacing has become an increasingly popular procedure. The various kinds of dressing materials have been developed for effective wound care in the postoperative resurfacing area. Among them, proper dressing materials and methods has been employed in consideration of the wound healing time, economy, convenience, feeling and severity of sequela after treatment. Most commonly used dressing materials are Duoderm<sup>®</sup> (Conva Tec, Princeton, USA), Tegaserb<sup>®</sup> (3M Corp., Minneapolis, USA), Replicare Ultra<sup>®</sup> (Korea Smith & Nephew, Seoul, Korea), Flexzan<sup>®</sup> (Dow-Hickam, Surgarland, USA), Omiderm<sup>®</sup> (Omikron Scientific Limited, Rehovot, Israel), Biobrane<sup>®</sup> (Dow-Hickam, Surgarland, SA) and Allevyn<sup>®</sup> (Korea Smith & Nephew, Seoul, Korea). The merits and demerits of each product are well-known through many Studies and Papers.<sup>1-4</sup> Medifoam<sup>®</sup> (hydrocellular type of dressing, Il Dong Pharmaceutical Ltd. & Biopol Ltd., Seoul, Korea) has been used for wound healing in a skin graft donor site and has shown the excellent results (Fig. 1). With these results, authors applied Medifoam<sup>®</sup> to the wound healing after CO<sub>2</sub> laser resurfacing and got the good results as well. Author hereby reported the effectiveness, theoretical ground and the variety of clinical applications of Medifoam<sup>®</sup> in the wound healing following resurfacing procedure with literature review.

## II. Materials and Methods

### A. Subjects

Test was performed from October, 2001 to February, 2002 and Medifoam was applied to 20 patients who received CO<sub>2</sub> laser resurfacing treatment in the department of plastic surgery at this hospital. The patient ages ranged from 21 years old to 59 years old, the average age was 33.8 years old. 16 females and 4 males were involved in this study. Observation period ranged from 4 months to 9 months. On average the patients were observed for 7 months.

Full face laser resurfacing were performed on 3 cases of Small pox scar, 15 cases of traumatic scar and 1 case of aging face.

### B. Surgery and Treatment

To prevent Herpes infection in the wound regions, all cases of patients took 500mg of Famvir<sup>®</sup> (Antiviral, Korea Smith Kline Beecham, Seoul, Korea) from the day before procedure to 7<sup>th</sup> day after procedure once daily. Except this, no special pretreatment was done. In case of antibiotics, 3<sup>rd</sup> generation of Cepha-antibiotic was administered intravenously for the whole period of hospitalization from the day before procedure. (In case of local anesthesia, it was continued until the next morning of operation day, In case of systemic anesthesia, it was continued until the 2<sup>nd</sup> day of operation) After release from hospital, oral antibiotics was administered until day 5 from treatment while the steroid medicine was not used. In case of painkiller, it was prescribed for

the patients during the hospitalization as injection form if the patient required only. After release from hospital, oral NSAID was prescribed for 3 days. CO<sub>2</sub> laser (Ultra-pulse CO<sub>2</sub> laser; Coherent lasers, Palo Alto, USA) resurfacing procedure for the treatment of traumatic scar revision was performed under the condition of local anesthesia. The procedure was varied according to the severity of scar. The basic protocol of laser resurfacing was that, first pass was 300 mJ on the shoulder of scar, second pass with 250 mJ, and feathering with 150mJ.(pattern & size was varied on a case by case basis) Separated epidermis layer was removed using dry gauze and wet gauze in the process of procedure. Immediately after the procedure, the wound must be cleansed and dried well so that the Medifoam<sup>®</sup> sticks and early contamination is avoided. In case of wrinkle and small pox scar, the procedure was performed under the condition of systemic anesthesia. The intensity of CO<sub>2</sub> laser resurfacing was controlled in accordance with facial parts divided by cosmetic purpose. The treatment during the process and after procedure was same with those of traumatic scar. Dressing following procedure was performed using Medifoam<sup>®</sup>. Change of Medifoam<sup>®</sup> following procedure was determined by the amount of exudates. In general, the dressing change was done on the day 1, 2, 6 after procedure. However, if the outside of Medifoam<sup>®</sup> was not wet, the dressing change was not necessarily required on postoperative day 1. The dressing change was done on the day 2.

After the completion of reepithelialization, the patients were educated to use the moisturizer & UV screens for 3 months and the patients kept well this instruction.

### III. Results

As described, dressing after procedure was determined according to the amount of exudates, and the wound condition and the infection was evaluated during changing of the Medifoam<sup>®</sup> on the postoperative day 1, 3 and 6. Generally, the wound healing was completed on the postoperative day 9(Fig.2). During the changes of Medifoam<sup>®</sup>, the surface of Medifoam<sup>®</sup> was kept dry. Also we found less crust and less coagulum formation on the wound surface than any other dressing materials which were used by Authors. There was no detachment of reepithelialized layer on removing the dressing materials(Fig.3) which was occasionally found in other dressing changes. The use of the Medifoam<sup>®</sup> after CO<sub>2</sub> laser resurfacing reduced the pain and the inconvenience of the patients. There was no sequela such as delayed wound healing or infection during observation period after procedure.

### IV. Discussion

After epithelial layer and papillary dermis was detached by selective thermal injury due to CO<sub>2</sub> laser resurfacing, reepithelialization of epithelial layer was done at adnexal structures such as hair follicles or sebaceous glands for 7 days to 14 days. It was well known that rejuvenation of dermal layer was done for

minimum 90 days through the collagen production of fibroblast derived from reticular dermis.<sup>1,5</sup>

A moist environment expedited the epidermal regeneration and reduced the pain occurred during the process of epidermal regeneration in the burn, donor site of split skin graft and wound following skin resurfacing. Semi-occlusive dressing was employed for moist environment and it was reported that the hypertrophic scar formation in the burn was decreased. It was not revealed how moist environment may affect wound healing. However, it was well known that it involved in the increase of mobile rate to epidermal layer, pH, PO<sub>2</sub>, PCO<sub>2</sub> and maintenance of growth factors.<sup>1,5</sup>

Medifoam® (hydrophilic polyurethane foam material) used by Authors for wound care following CO<sub>2</sub> laser resurfacing has a three-layered structure consisting of a protective layer, a hydrophilic absorption layer, and a non-adherent, wound contact layer. Protective layer is made of semi-permeable thin PU film and is to protect from bacterial invasion and maintains optimal moisture vapor transmission. Absorption layer is made of hydrophilic PU foam and absorbs lots of exudates faster and holds it. Wound contact layer is a permeable PU membrane consisting of the micro pores of less than 20um in diameter. Wound regions after CO<sub>2</sub> laser resurfacing had to be cleaned and dried completely so that Medifoam® can be fixed to wound. Medifoam® showed its high absorption ability of exudates and rapid regeneration of epithelium compared with other

dressings. It was thought that Medifoam® provided more ideal moist environment. Upon dressing changes, it proved that there was less crust and less coagulum on the wound surface than any other dressing materials. There was no detachment of reepithelialized layer on removing the dressing materials which was occasionally found in other dressing changes. The use of the Medifoam® after CO<sub>2</sub> laser resurfacing accelerates the healing time, reduces the pain and the inconvenience of the patients. There were no exudates outside. In case of CO<sub>2</sub> laser resurfacing under the condition of local anesthetic, as the patient has to visit the hospital for observation of the progress and wound healing after release from hospital on the day of resurfacing procedure, the use of Medifoam® decreased the frequency of visit until the epithelialization was completed and could return to normal routine without anxiety due to exudation. In case of CO<sub>2</sub> laser resurfacing conducted for full face to treat small pox scar or facial wrinkle revision under the condition of systemic anesthetic, the wound care was performed with same procedure. The patients left hospital on postoperative day 3 after dressing. Dressing changes were done on day 6, 9 postoperatively.

In most cases, the dressing changes were done 4 times normally during resurfacing procedure to completion of epithelialization. In this study, we found that the use of Medifoam® resulted in the expedite wound healing, reduction of pain, improvement of patient's convenience and reduction of sequela.

## V. Conclusion

CO<sub>2</sub> laser resurfacing has become an increasingly popular procedure in the treatment of facial rhytids and scar revision. Accordingly, the wound care following CO<sub>2</sub> laser resurfacing has become more and more important. The advent of various dressing materials resulted in the reduction of delayed treatment, infection, pain and exudates mobility appeared during the process of wound care. There have been many studies proving that moist environment is important for wound healing.

Authors have experienced the faster wound healing, increase of patients' convenience, reduction of pain and sequela by using Medifoam<sup>®</sup> (hydrophilic polyurethane foam dressing) in the wound care following CO<sub>2</sub> laser resurfacing. Accordingly, we hereby reported our experiences.

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