



Study of effectiveness of diamond fraise microdermabrasion in treatment of lichenified skin lesions

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ABSTRACT

Although used much less often since the introduction of laser resurfacing, dermabrasion continues to be a viable treatment that has been reported to have quicker healing times and being more effective in eliminating some types of lesions, particularly surgical scars. The present study was designed to assess the effectiveness of motor powered diamond fraise dermabrasion in treatment of lichenified skin lesions.

Patients with lichenified skin disease were divided into two groups; one in whom lichenification was treated with motor-powered diamond fraise (4x17 mm regular grit) dermabrasion and the other who were only kept on emollients. Clinical variables such as skin thickness and itching severity was assessed during 1 month of follow up period.

At the end of three sessions of dermabrasion, marked changes in skin thickness was observed in 35% of patients undergoing the procedure, while 57.5% patients showed moderate changes in skin thickness. Majority of the patients demonstrated a decrease in Pruritus severity score by 2 followed by 25% of patients who showed score decrement by 3. Patients treated with emollients only mostly demonstrated unchanged pruritus severity, while few showed a decrement in score by 1.

The study emphasizes the effectiveness of motor driven microdermabrasion in treatment of lichenified skin disease.

INTRODUCTION

Dermabrasion is an effective surgical technique used in dermatology for over 100 years for the treatment of a variety of dermatologic disorders, including photodamage, acne scarring, irregular scarring from skin graft and scarring from surgery or trauma [1]. Although used much less often since the advent of laser resurfacing, dermabrasion continues to be a viable treatment that has been reported to have quicker healing times and being more effective in eliminating some types of lesions, particularly surgical scars. Dermabrasion is usually performed at 6 to 12 weeks after a reconstructive procedure. Conventional dermabrasion uses either a diamond fraise (DF) or a wire brush as a cutting tool powered by a handheld motor rotating at 20 000 rpm [2]. Rapid planing of the skin is achieved through the combination of this rotational speed, the abrading attachment, and pressure applied by the operator. Owing to the importance of the skill of the operator, it is imperative for the patient to select doctors with significant experience with the procedure.

The procedure of dermabrasion encompasses three types of abrading attachments in common namely diamond fraises, wire brushes, and serrated wheels. Diamond fraises are stainless steel wheels having diamond chips of various coarseness bonded to its surface. The wire brush is a wheel with wires attached at various angles. The serrated wheel or diamond fraise is often used to soften the edges of skin removed with a wire brush.

The present case control study was designed to assess the effectiveness of motor powered diamond fraise dermabrasion in treatment of lichenified skin lesions.

MATERIALS AND METHODS

A case controlled study was designed in a tertiary care hospital in eastern India. Permission of the Institutional Ethical Committee was obtained for conducting the study. Informed consent was taken from all participants prior to their inclusion into the study. All patients having lichenified skin conditions like lichen simplex chronicus (LSC), lichenified psoriasis, lichenified polymorphic light eruption, lichen amyloidosis were included in the study. Patients who were previously treated and those who

denied undergoing the procedure were excluded from the study.

Patients with lichenified skin disease were divided into two groups namely case and control. Case group (Group 1) consisted of 40 patients with lichenified skin disease attending the dermatology outpatient department, in whom lichenification was treated with motor-powered diamond fraise (4x17 mm regular grit) dermabrasion. Lidocaine and prilocaine cream was applied under occlusion 2 hours before the procedure. Patients underwent three sessions at an interval of fifteen days. Dermabrasion was performed to complete contour correction. Hemostasis was achieved with pressure that was followed by application of moisturizer and a nonstick pressure dressing. While in case of control group (Group 2) composed of 20 patients with lichenified skin disease attending the same outpatient department were only kept on moisturizers. Clinical variable were studied during 1 month of follow up period.

Skin thickness was a subjective assessment done by observer by pinching skin between index finger and thumb of right hand. Itching severity was assessed by a scoring system with maximal score of 5. (Table 1)

RESULTS

The present study comprised of 60 study participants, out of

which 40 were in treatment group being treated with motorized dermabrasion (group 1), while 20 were in control group who were kept on emollients only. The demographic profile of the study participants has been duly tabulated in table 2.

Skin thickness was subjectively assessed by pinching skin between index finger and thumb of right hand. Changes in skin thickness were observed in three consecutive sessions (Day 0, day 15, and day 30) (Figure 1). In patients undergoing dermabrasion with motor powered DF, first session showed mostly moderate changes in skin thickness in 45% patients, while mild and moderate changes were observed in 30% and 25% respectively. At the end of three sessions of dermabrasion, marked changes in skin thickness was observed in 35% of patients, while 57.5% patients showed moderate changes in skin thickness. On the other hand, patients in control group who were only treated with emollients showed mild change in skin thickness in only 20% patients after one month, while majority of patients showed unchanged skin thickness. (Figure 2)

Decrease in Pruritus severity was assessed with the help of a severity score (Table 1). Patients undergoing dermabrasion process (Group 1) mostly (70%) demonstrated a decrease in Pruritus severity score by 1 after the first session. After the third session, 55% patients demonstrated a decrease in score by 2

Table 1: Severity Score

Pruritus without the need to scratch	1
Pruritus with the need to scratch but without excoriation	2
Pruritus unrelieved by scratching but without excoriation	3
Pruritus accompanied by excoriation	4
Totally restless	5

Table 2: Demographic Profile of study participants

	GROUP 1	GROUP 2
Mean Age (in Yrs)	58 \pm 1.3 (32-70)	47 \pm 1.12 (25-59)
Total Patients	40	20
Males	24	11
Females	16	9

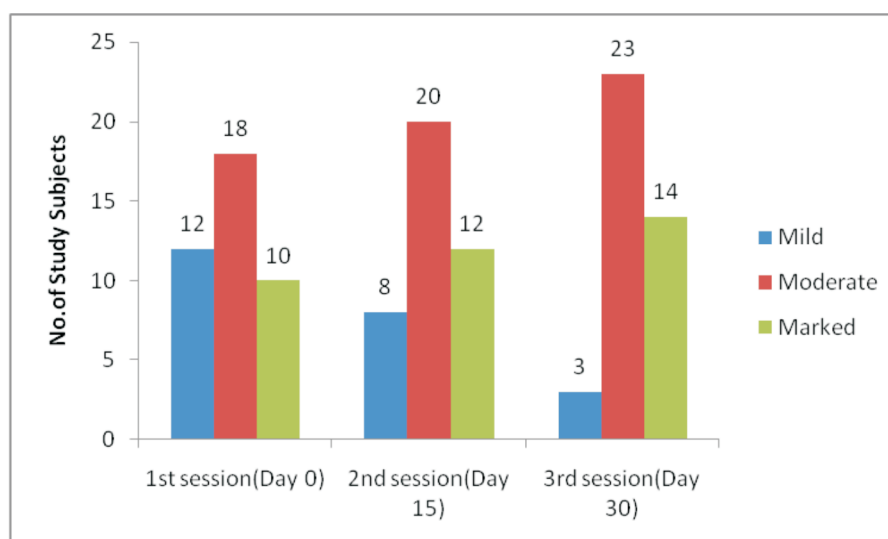


Fig 1 : Changes in skin thickness observed in Treatment Group

Table 3: Decrease in Pruritus severity observed [in No. of patients (%)] [Treatment Group]			
Session	Decrease by 1	Decrease by 2	Decrease by 3
1 st session(day 0)	28 (70)	9 (22.5)	3 (7.5)
2 nd session(day 15)	16 (40)	18 (45)	6 (15)
3 rd session(day 30)	8 (20)	22 (55)	10 (25)

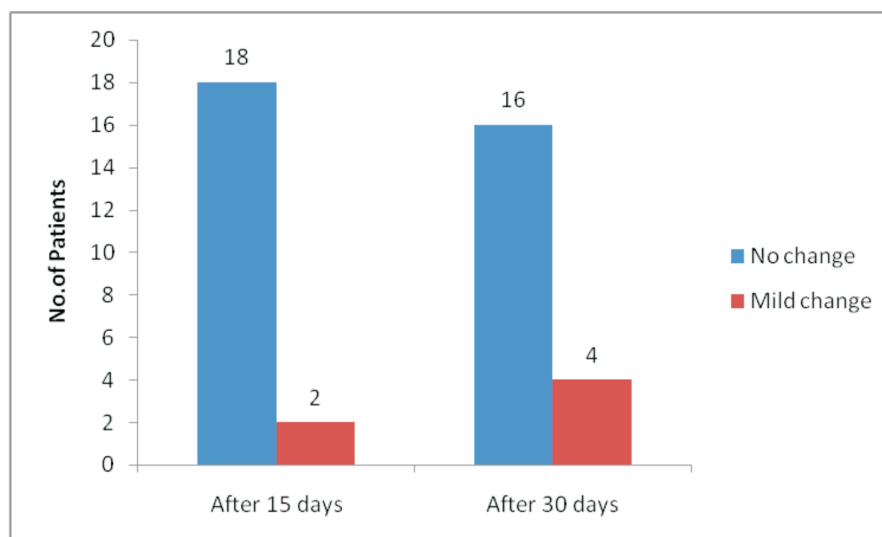


Fig 2 : Changes in skin thickness observed in Control Group

followed by 25% patients who showed Pruritus score decrement by 3 (Table 3). On the other hand, patients in the control group (Group II) who were treated with emollients only, mostly demonstrated unchanged Pruritus severity, while only 20% showed a decrement in score by 1 (Table 4).

DISCUSSION

Dermabrasion, practiced since many years, involves the controlled deeper abrasion of the upper to mid layers of the skin with any variety of strong abrasive devices including a wire brush, diamond wheel or fraise, sterilized sandpaper, salt crystals, or other mechanical means. The purpose of surgical dermabrasion is to help diminish the appearance of deeper scars and skin imperfections. Often the goal is to smooth the skin and, in the process, remove small scars, uneven skin tone from scars or birthmarks, sun damage, tattoos, age spots, Stretch marks or fine wrinkles. Dermabrasion is a mechanical surgical skin planing method which has remained popular partially due to its affordability and its effective results in comparison with newer laser method for certain dermatological conditions. The present case control study was designed to assess the effectiveness of motor powered diamond fraise dermabrasion in treatment of lichenified skin lesions.

In the present study, skin thickness was subjectively assessed in three consecutive sessions. Patients undergoing dermabrasion with motor powered DF, showed mostly moderate changes in skin thickness after the first session. At the end of three sessions of dermabrasion, marked changes in skin thickness was observed in 35% of patients, while 57.5% patients showed moderate changes in skin thickness. On the other hand, patients in control group who were only treated with emollients showed mild change in skin thickness in only 20% patients after one month, while majority of patients showed unchanged skin thickness.



Fig 3a : Before Dermabrasion



Fig 3a : After Dermabrasion

Table 4: Decrease in pruritis severity observed [in No. of patients(%)] [Control Group]

Days	No change	Decrease by 1	Decrease by 2
After 15 days	16 (80)	3 (15)	1 (5)
After 30 days	14 (70)	4 (20)	2 (10)

**Fig 4a : Before Dermabrasion****Fig 4b : After Dermabrasion**

Decrease in Pruritus severity was assessed with the help of a severity score where patients undergoing dermabrasion mostly demonstrated a decrease in pruritus severity score by 1 after the first session. After the third session, majority of the patients demonstrated a decrease in score by 2 followed by 25% of patients who showed score decrement by 3. Patients treated with emollients only mostly demonstrated unchanged pruritus severity, while few showed a decrement in score by 1.

The mechanism responsible for these clinical improvements of scars after the planing process (Figure 3,4) hints that dermabrasion restructures and layers collagen parallel to the lines of tension to smooth contour irregularities and eliminates the epidermal component by upward and horizontal migration of epithelial cells from viable adnexal structures[3]. Increase in collagen type I synthesis after superficial dermabrasion for photoaged skin has been too reported [4]. Ultrastructural and cell-cell and cell-matrix interactions after conventional DF dermabrasion has been examined where DF dermabrasion resulted in an increase in collagen bundle density and size with unidirectional orientation parallel to the epidermal surface when examined ultra structurally[5]. Dermabrasion also alters cell-cell and cell-matrix interactions between the epidermis and the dermis which is demonstrated by an up-regulation of tenascin expression throughout the papillary dermis and of $\alpha 6/\beta 4$ integrin subunit on the keratinocytes throughout the stratum spinosum epidermidis after dermabrasion. The alteration in tenascin expression may promote both epithelial cell migrations along the basement membrane zone and fibroblast movement across scar boundaries. The post dermabrasion alteration of integrin expression coincides with an increase in cell migration and may promote re-epithelialization across the scar, which leads to a more blended epidermal contour[2].

Manual use of abrading devices for dermabrasion, including wire brush, DF, sandpaper, Bovie scratch pads, abrasive cloth, and drywall or plaster sanding screen which are used in a back-and-forth or circular motion are also reported. Contrastingly,

motorized dermabrasion with a pear-shaped diamond fraise seemed a much easier and a faster technique than the manual one. This powered tool process however includes some limitations like blood splatter; the need for protective clothing; risk of lip, eyelids, hair, or gauze being caught in the instrument; and the added cost of the power instrument. Motor-powered dermabrasion produces a considerable amount of airborne blood and skin debris that is potentially hazardous to operating room personnel and requires specialized barrier methods. Furthermore, evidence exists that dermabrasion can generate aerosolized particles that may be transferred to large distances and may still linger hours after barrier protection devices have been removed.

Our study had certain limitations. The thickness of skin being a subjective finding may have lead to any possible observer bias. Pruritus was assessed according to patient's response which could have attributed to recall bias, if any.

CONCLUSION

The study emphasizes the effectiveness of motor driven microdermabrasion in treatment of lichenified skin disease. Moderate to marked changes in skin thickness was observed in patients undergoing the procedure, in comparison to those treated with emollients only. Marked decrease in pruritus severity was also assessed in patients treated with motorized dermabrasion.

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