

## Sandpaper Dermabrasion for Treatment of Acne Scars and Amateur Tattoos in Dark Skinned Individuals

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### ABSTRACT:

#### BACKGROUND:

Dermabrasion is an abrasive process used to remove the epidermis and superficial dermis to treat a variety of skin conditions.

#### OBJECTIVE:

To evaluate sandpaper as a tool for dermabrasion for the treatment of acne scar and amateur tattoo.

#### PATIENTS AND METHODS:

This is an open labeled therapeutic trial. It was conducted at the outpatient department of Dermatology and Venereology - Baghdad Teaching Hospital, during the period between January 2003 and December 2004.

Ten patients (seven males and 3 females) were enrolled in this work. Their ages ranged from 20-34 years with the a mean  $\pm$  SD of  $26.80 \pm 4.34$  years. Five with acne scars on their faces and 5 with amateur tattoos in the upper extremities.. From each patient history was taken and physical examination was performed. Pre-operative medications and instructions were given to each patient. The procedure was done under local anesthesia. Postoperatively all patients were instructed to use steroid-antibiotic ointment and hydroquinon-tretinoin thereafter. Follow up was done after 1 week, 1 month, and 3 months. Repeated sessions may be needed 1 month apart.

Acne scars: Lesions were assessed for correction of contour (unchanged, partially changed, or completely changed), and for complications that might follow.

Amateur tattoos: Lesions were assessed for percentage of pigments removal (70%, 80%, 90%, and 100%), and for complications that might follow.

#### RESULTS:

Ten patients completed the study.

Acne scar group: Three patients achieved partial change of contour after 2 sessions, while complete change of contour was noticed in 2 patients after 4, and 6 sessions respectively. The procedure resulted in very fine, less noticeable scar with smooth contour of the skin which was acceptable in all patients.

Amateur tattoos group: Complete removal of pigments was achieved in one patient, more than 90% in 3 patients, and more than 80% in 1 patient.

No significant complications were seen apart from mild erythema and mild infection in one patient with amateur tattoo. Temporary post inflammatory hypopigmentation in two patients with tattoo. Three patients had mild scar after removal of tattoo.

#### CONCLUSION:

Sandpaper dermabrasion is an effective mode of treatment for acne scar and amateur tattoo. It is safe in dark skinned people.

**KEY WORDS:** dermabrasion, acne scars, tattoo

### INTRODUCTION:

Dermabrasion is an abrasive process to remove the epidermis and superficial dermis resulting in a smoothening of contour irregularities <sup>(1)</sup>. It is an

effective surgical procedure for treatment of variety of dermatological lesions <sup>(2)</sup>.

The purpose of dermabrasive surgery is to organize or re-structure the collagen of papillary dermis without injuring the reticular dermis <sup>(3)</sup>.

The success of surgical abrasion is dependent on the ability of the skin to re-constitute a new epidermal layer from deep lying dermal appendages. For this reason, favourable healing is seen in regions of the skin that have the largest

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number of adnexal structures and where the skin is thickest. The face with the exception of the eyelids, consists of thick skin, well endowed with epithelial adnexa, and heals rapidly after surgical planing. Re-epithelialization begins from the wound margins and from within the epidermal appendages that remain after dermabrasion<sup>(1)</sup>.

Dermabrasion is a useful modality when employed for certain dermatological lesions like acne vulgaris<sup>(4)</sup> and tattoo<sup>(5)</sup>. There is a variety of abrasive instruments available to perform dermabrasion like wire brush, diamond fraise, sand paper, curette, rasp, burrs, wheels, and others<sup>(4)</sup>. Non ablative 1,064 nm Nd:YAG laser had been used for treating acne scars resulted in significant collagen increases in the dermis<sup>(6)</sup>. Good results were achieved with the CO<sub>2</sub>-Laser in the treatment of tattoos<sup>(7)</sup>. Dermabrasion had limitations in the treatment of dark skin people<sup>(4)</sup>.

So the aim of this work to evaluate the effectiveness and safety of sandpaper dermabrasion to remove acne scars and tattoos in dark skinned peoples.

### PATIENTS AND METHODS:

This an open labeled therapeutic trial which was carried out in the Department of Dermatology & Venereology - Baghdad Teaching Hospital during January 2003 - December 2004.

Ten patients were enrolled, their ages ranged from 20 to 34 years with a mean  $\pm$  SD of  $26.8 \pm 4.34$  years. Seven were men & 3 were women ( male: female = 2.33: 1)

Two types of lesions were treated by sandpaper dermabrasion. Five patients had facial acne scars, and 5 patients had amateur tattoos in the upper extremities. In all patients a pre-operative evaluation was done which included:

**1- History:** Patients were questioned about any bleeding tendency, viral infections including (HIV, hepatitis, herpes simplex, common or plane wart ,or molluscum infections). Also any drug allergy especially for lidocaine & antibiotics. Any history of oral intake of isotretinoin in the last 1 year or history of dermabrasion, peels or laser

**2- Physical examination:** Was done for each patient including:

*Acne scars:* Sauscer like acne scars on the cheeks were chosen.

*Tattoos:* All were amateur tattoos. The tattoos were produced by introduction of burned rubber, soot, or India ink.

**3-Preoperative medications:** Tretinoin topical cream 0.05% daily applied at night for 2-4 weeks.

**4- Instructions:** Special instructions were given to

the patients including avoidance of smoking 1-2 weeks pre-operatively, and avoid any drug that leads to decrease clotting time for 2 weeks pre-operatively, such as aspirin.

**5- Photos:** Photographs were taken preoperatively, postoperatively, and during follow up visits using a mercury digital camera cyberplx S-450V at the same place and a fixed illumination and zoom.

### DERMABRASION PROCEDURE:

In all patients dermabrasion was done under local anesthesia using lidocaine 2% locally infiltrated into the area to be dermabraded. Then cryoanesthesia by ethyl chloride spray was done on the same area.

The sandpaper was used as a tool. These sandpapers are commercially purchased from the market. They are made in Germany, of aluminum oxide crystals, size 80 (Figure- 1). These sandpapers were sterilized by autoclave.

When the area to be dermabraded was anesthetized, an antiseptic was used to sterilize the particular area, then the sandpaper was wrapped around a barrel of 5 ml syringe. The skin was abraded slowly in a back and forth movement with even pressure across the skin surface. The process continued until the appearance of fine punctate bleeding. These were guidelines to the proper depth of abrasion. In addition in case of tattoo the procedure is continued until the disappearance of the pigment.

### POST OPERATIVE CARE:

All patients followed the same postoperative care instructions which consist of cleaning the area with antiseptics, then washing the area with normal saline, followed by application of an equal weights of tetracycline and betamethasone ointments topically twice daily for 3-7 days.

After re-epithelialization which took about 7 days in case of acne scars, the patients were encouraged to apply sun screen with a sun protection factor of more than 15 and a combination of equal weights of hydroquinone 4% cream with tretinoin 0.05% cream, and instructed to avoid any unnecessary sun exposure.

### EVALUATION:

Follow up was done after 1 week, 1 month, and 3 months.

**I. Acne scars:** At each visit each lesion was assessed for the followings:

1. Correction of contour (unchanged, partially changed, or completely changed).
2. Skin erythema according to a 0 to 3 standardized color scale, in which 0 indicates no erythema and 3 severe erythema.

3. Presence or absence of infection.
4. Presence or absence of hypertrophic scar.
5. Pigmentary changes.
6. Presence or absence of milia.

Another session was given after one month if improvement was not satisfactory.

II. Tattoo: The lesions were examined for:

1. Percentage of pigments removal (70%, 80%, 90%, and 100%).
2. Skin erythema according to the previous standardized color scale.
3. Presence or absence of infection.
4. Presence or absence of hypertrophic scar.
5. Pigmentary changes.
6. Presence or absence of milia.

Another session was given after one month, if pigments remaining were more than 30%.

Evaluation was done by the treating physician, and by another dermatologist. Photographs were also compared, and the patient opinion has recorded.

#### **RESULTS:**

Ten patients completed the study. All had skin type III and IV.

**1. Saucer likec acne scars :** Five patients with acne scars situated on the cheeks.

Three patients received 2 sessions which resulted in partial change of contour.

One patient received 4 sessions which resulted in complete change of contour

One patient received 6 sessions which resulted in complete change of contour (Table-1).

The mean number  $\pm$  SD of sessions was  $3.20 \pm 1.79$ . The improvement judged by the treating physician, another dermatologist, and patient satisfaction. All patients were satisfied with the

results. The scars became less noticeable, very fine, with smooth contour of the area, (Figures 2).

**2. Tattoo removal:** Five patients were included. The mean number  $\pm$  SD of sessions was  $2.80 \pm 0.45$ . The number of sessions for each patients depends on pigment remaining (Table-2). The site and the size of the tattoos are illustrated in the (Table-3).

One patient had complete removal of pigments. In 3 patients 90% of pigments were removed, and in another patient 80% of pigments were removed (Figure- 3).

Regarding the side effects of dermabrasion in both groups:

**1. Erythema:**

- Patients treated for acne scars: All showed mild erythema (grade-1) disappeared within the first month after the last session.

- Patients treated for tattoo: Four had mild erythema (grade-1). One patient had erythema (grade-2). The erythema disappeared in all patients within the first month after the last session.

**2. Infection:** Mild infection (impetigo) was noticed in one patient with tattoo removal and it cleared with antibiotics.

**3. Hypertrophic scar:** No patient has this complication.

**4. Hypopigmentation:** Two patients had temporary hypopigmentation after tattoo removal. It was disappeared in within 2 months.

**5. Hyperpigmentation:** No patient had noticeable hyperpigmentation after the procedure.

**6. Bleeding:** Bleeding during the operation was very mild.

**7. Pain:** Pain after the operation was so mild that analgesics were not needed.

**8. Scar:** Three patients with tattoo removal had mild scar at the area.

**Table (1): Number of sessions of dermabrasion for the treatment of acne scar.**

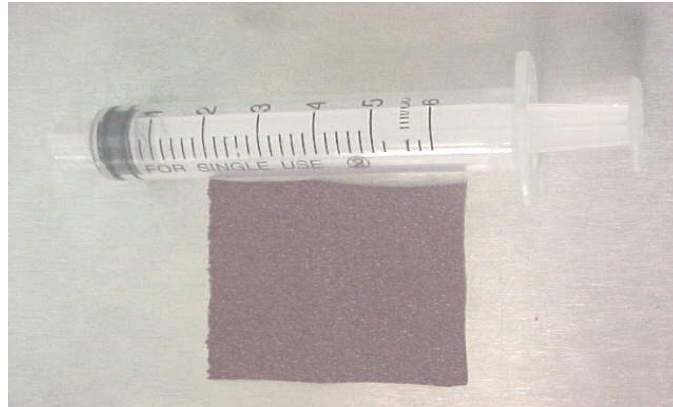
Patient no.	No. of sessions
1	2
2	2
3	2
4	4
5	6
Total	16

**Table (2): Number of sessions of dermabrasion for the removal of tattoo.**

Patient no.	No. of sessions
1	2
2	3
3	3
4	3
5	3
Total	14

**Table (3): The site and size of amateur tattoos.**

Patient no.	Site	Size/ cm <sup>2</sup>
1	Dorsum of left forearm	3cm <sup>2</sup>
2	Dorsum of left hand	2cm <sup>2</sup>
3	Left arm	5cm <sup>2</sup>
4	Right forearm	14cm <sup>2</sup>
5	Dorsum of left index	2cm <sup>2</sup>



**Figure -1: Sandpaper with 5ml syringe.**



**Figure-2 (A ): Patient with acne scars**



**(B): Same patient after dermabrasion before dermabrasion**



**Figure 3 (A): Patient with amateur tattoo before dermabrasion.**



**(B): After Dermabrasion, showing postinflammatory hypopigmentation**

## DISCUSSION:

Iverson (1947) noticed favorable results in treating traumatic tattoo injuries by manual abrasion with sandpaper<sup>(8)</sup> McEvitt (1950) described a similar technique for the treatment of acne scars<sup>(9)</sup>.

It had been mentioned that there were limitations in the treatment of dark skin people by dermabrasion<sup>(10)</sup>. This study was arranged to reevaluate the safety of dermabrasion in the treatment of acne scars and tattoos in dark skinned people.

Sixteen sessions of sandpaper dermabrasion were done to 5 patients with acne scars. There were an overall good cosmetic results and with minimal transient side effects. The results were satisfactory to all patients. No postinflammatory hyperpigmentation was seen. This was similar to other study done for dark skinned people<sup>(11)</sup>.

Other method of therapy is chemical peeling using trichloroacetic acid (TCA) 35% concentration in combination with Jessner's solution for the treatment of acne scars achieved similar results to the present study<sup>(12)</sup>.

Nd:YAG laser(1064nm) was used in the treatment of acne scars with comparable results and side effects<sup>(6)</sup>. Single pass CO2 laser skin resurfacing has been a favored treatment modality for acne-scars in skin types I-IV with similar results to the present study<sup>(13)</sup>.

Fourteen sessions of sandpaper dermabrasion were done for 5 patients with amateur tattoos. The method was very effective in removing tattoo because more than 80% of tattoo was removed in all patients operated on. The dermabrasion was well tolerated by most of our patients.

Kuperman-Beadé used 3 types of laser in the treatment of tattoo, Q-switched ruby laser(694nm); Q-switched Nd:YAG laser(532,1064) and Q-switched alexandrite laser(755nm). They achieved similar results and side effects compared to this study<sup>(14)</sup>.

The mechanism responsible for clinical improvement of acne scars after dermabrasion is unknown. There may be an increase in collagen type I synthesis<sup>(15)</sup>. The dermabrasion restructures layers of 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<sup>(10)</sup>.

The mechanism involved in removing tattoo pigment is not understood completely, but most likely involves the release of ink particles into extracellular space with subsequent lymphatic drainage, and rephagocytosis of smaller residual

ink particles, and the elimination of pigment by formation of scale-crust<sup>(16)</sup>.

Sandpaper dermabrasion had less risk of injury from equipments to the eyelids or lips compared with the other instruments like diamond fraise and wire brush<sup>(17)</sup>.

## CONCLUSION:

Sandpaper dermabrasion is an effective, cheap and safe for the treatment of acne scars and tattoos in dark skinned people.

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