

An Update on Sandpaper in Dermabrasion with a Different and Extended Patient Series

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Abstract

Background Dermabrasion is an accepted method for improving the appearance of facial scars. It allows the epidermis to regenerate as a smooth surface after the defective dermis and epidermis have been removed. Several methods and instruments are currently being employed for dermabrasion. This study is an update on a forgotten or abandoned technique. We extended the patient range and saw that this technique was one procedure used before laser systems became available. It is still effective and the cheapest procedure for treatment of these patients. Dermabrasion is effective not only for burn scars but also for depressed, acne, hypertrophic, and trap-door scars, cellulite, and tattoos.

Methods The authors performed this technique on 38 patients with different diagnoses.

Results Each patient was reviewed separately. The obtained result in each patient was reviewed with regard to patient satisfaction. In no patient was the result worse compared to the original scar, burn, or injury. Mild wound

infections were seen in only four cases but they were not severe. They were controlled with systemic antibiotic therapy.

Conclusion Dermabrasion with sandpaper is effective not only for burn scars, but also for other types of scars (acne, depressed, trap-door, hypertrophic), tattoos, cellulite, and antiaging.

Keywords Epidermis · Dermis · Dermabrasion with sandpaper · Scar · Acne · Cellulite · Tattoo

Currently, there are three methods available for skin resurfacing: chemical, mechanical, and laser. These techniques produce a controlled injury which must be to the appropriate depth in order to treat the target pathology and achieve the desired result. One type of dermabrasion was first introduced in 1953 by Dr. Abner Kurtin, a New York dermatologist. This technique combined a hand machine with either diamond-studded fraises or wire brushes. It was used for the correction of photodamage or scarring. Gouges and deep scarring could easily occur while doing the procedure. The advantage of this technique is that one has direct control over the depth of injury. Very light, delicate dermabrasion could eradicate the most superficial problems. By going deeper into the papillary and reticular dermis, deep scars can often be improved. The art of dermabrasion is to know how deep to go. If one goes too deeply, scarring will occur. If one does not go deep enough, the results will be suboptimal [1].

Dermabrasion has remained an effective and reliable resurfacing option for perioral rhytides, acne scars, traumatic facial scars, and rhinophyma. We extended the patient indication ranges and the treatment area. Sandpaper is inexpensive, portable, and widely available. Although

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the use of dermabrasion with sandpaper is found in only a few studies, most were on burn and postsurgical scars [2, 3]. This article presents the effectiveness of this technique on burn scars, postsurgical scars, acne scars, tattoos, cellulite, depressed scars, and hypertrophic scars with long-term follow-up results.

Materials and Methods

Improvement in the treated half of scars was seen in 80% of patients after at least 10 months (between 10 months and 6 years, average = 29 months). A total of 41 patients with postsurgical scars, burn scars, acne scars, cellulitis, and depressed scars were evaluated for use of this technique. Fifteen patients had acute burn scars (five male, 10 female; average age = 27.7 years); nine patients had postsurgical scars (five male, four female; average age = 30.2 years); two patients had acne scars (two male; average age = 25.5 years); two patients had cellulitis (two female; average age = 36.5 years); six patients had depressed scars (three male, three female; average age = 23.8 years); three patients had hypertrophic scars (two male, one female; average age = 27.3 years); two patients had periorbital wrinkles (two male; average age = 42 years); and one patient had tattoos (one male; age = 37 years). Dermabrasion with sandpaper at the acute stage of the burn was performed on all patients with burn scars. Most of the burns were in the head and/or neck region (average area = 5–8%). For patients with other types of scars, scar maturation must be completed (one must wait a minimum of 1 year after the original injury) before dermabrasion with sandpaper is performed.

All sandpapers were sterilized with ethylene oxide gas. The scars were gently abraded, starting with No. 80 sandpaper, until pinpoint bleeding was observed. The area was then smoothed with No. 100 or 120 sandpaper. After the entire face or other region was dermabraded, gauze soaked in lidocaine with epinephrine was placed over the skin to provide both anesthesia and hemostasis. The technique was the same in all patients. The key to dermabrasion with sandpaper is that the sandpaper is wrapped around a sterile roll of gauze (see Video 1).

An occlusive wound dressing such as Vigilon or Omiderm is placed directly over the ointment. Patients are given detailed postoperative wound care instructions that include gentle cleansing one time a day, application of an occlusive ointment, and strict warnings not to prematurely disrupt any crusting. They are told to avoid sun exposure for 3 months while their skin is healing. In all patients with burns, dermabrasion with sandpaper was performed on the first day of the burn injury to prevent infection and extension of the damage. For burned patients, the best

results were obtained in second-degree superficial and/or partially deep burn injuries. In patients with postsurgical scars or posttraumatic scars, only patients with matured scars were included in the study.

Case Reports

Case 1

A 18-year-old male was injured by fired oil in his workplace. A 4% scald with mixed-depth areas on his face resulted (Fig. 1a). The first day after the burn injury he underwent dermabrasion with three different grades of sterile sandpaper (Nos. 80, 100, 120) to remove the necrotic tissue. Specific permission was obtained from his parents for use of this method. After dermabrasion, the wounds were irrigated with copious amounts of saline, and an occlusive wound dressing such as Vigilon or Omiderm was placed directly over the ointment for 11 days. The dermabraded wound was left to second healing. The early



Fig. 1 (a) Preoperative view of the patient. (b) Four years after dermabrasion, excellent cosmetic appearance is seen on his face

postoperative result was satisfactory, but four years after dermabrasion it was excellent (Fig. 1b).

Case 2

A 34-year-old female patient consulted us because of an old left frontal and upper-lid depressed scar. Nine years previous she was injured in a traffic accident; the scar was the result of suturing in the emergency room. When she came to us, there was a wide scar (Fig. 2a). We performed dermabrasion with three grades of sandpapers all over the scar. Next, an occlusive wound dressing such as Vigilon or Omiderm was placed directly over the ointment over the dermabraded wound for 11 days. Two years after dermabrasion the patient was satisfied with the result (Fig. 3b).

Case 3

A 25-year-old male patient came to us because of acne scars. He had undergone medical treatment by a



Fig. 2 (a) Preoperative view of the patient. (b) Two years after dermasanding with sandpaper; the patient found the result very satisfactory

dermatologist for 4 years. Two acne scars have not healed. (Fig. 3a). We performed dermabrasion on the acne scars with three different grades of sterile sandpaper. Next, an occlusive wound dressing such as Vigilon or Omiderm was placed directly over the ointment over the dermabraded wound for 10 days. Three years after dermabrasion, the patient found the result very good (Fig. 3b, c).

Case 4

A 38-year-old female patient was admitted to our clinic for bilateral leg cellulitis. Her medical history revealed five past pregnancies. She also underwent mesotherapy 12 times, exercised, and wore leg molds. However, satisfactory results were not obtained (Fig. 4a). She was operated on under spinal anesthesia and dermabrasion was performed in one stage. Three different grades of sandpaper (Nos. 80, 100, and 120) were used for her legs. After dermabrasion, the wounds were irrigated with copious amounts of saline, and ointment gauze was applied for 14 days. The dermabraded wound was left to secondary healing. Sixteen months after dermabrasion, the cosmetic result was considered good (Fig. 4b).

Case 5

A 37-year-old male patient was admitted to our clinic for treatment of a tattoo on his arm. He had gotten the tattoo 12 years ago but now he wanted it removed. The tattoo had been causing discomfort in situations for 4 years (Fig. 5). He was operated on under local anesthesia and dermabrasion with three different grades of sterile sandpaper (Nos. 80, 100, and 120) was performed in one stage. After dermabrasion, the wounds were irrigated with copious amounts of saline and ointment gauze was applied for 13 days. The dermabraded wound was left to secondary healing. Four years after dermabrasion, the cosmetic result was considered very good (Fig. 5b).

Case 6

A 30-year-old male patient came to us because of old frontal and glabellar hypertrophic scars. He had been in a traffic accident 3 years before that caused multiple injuries to his frontal and glabellar region. All the injured areas were sutured in the emergency room. When he came to us, there was multiple hypertrophic scar tissue in his frontal and glabellar region (Fig. 6a). We performed dermabrasion with three grades of sandpaper to the frontal region. Next, an occlusive wound dressing such as Vigilon or Omiderm was placed directly over the ointment over the dermabraded wound for 13 days. The wound was left to secondary healing. Five years after dermabrasion the result was found as excellent (Fig. 6b, c).

Fig. 3 (a) Preoperative view of the patient. (b, c) Three years after dermabrasion with sandpaper, the patient finds the result very good

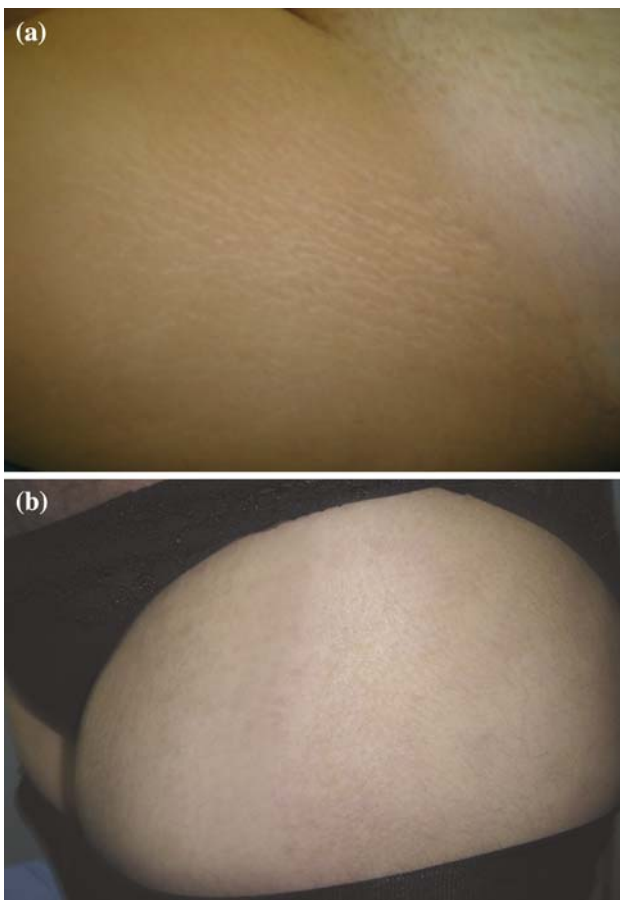


Fig. 4 (a) Preoperative view of the patient (close view). (b) Sixteen months after dermabrasion, the good cosmetic appearance is seen on her leg

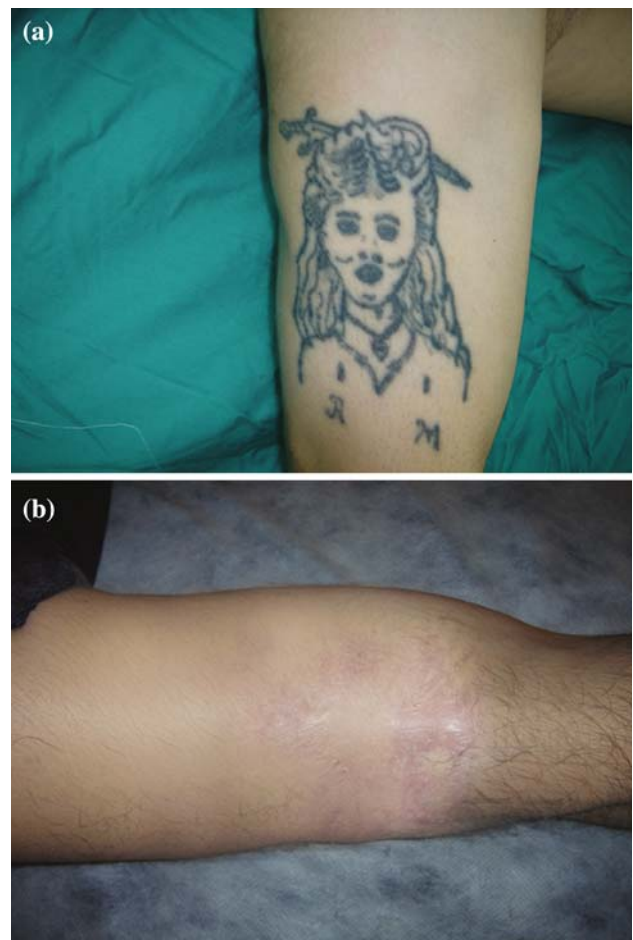


Fig. 5 (a) Preoperative view of the patient. (b) Four years after the operation, a very good result is seen on his arm

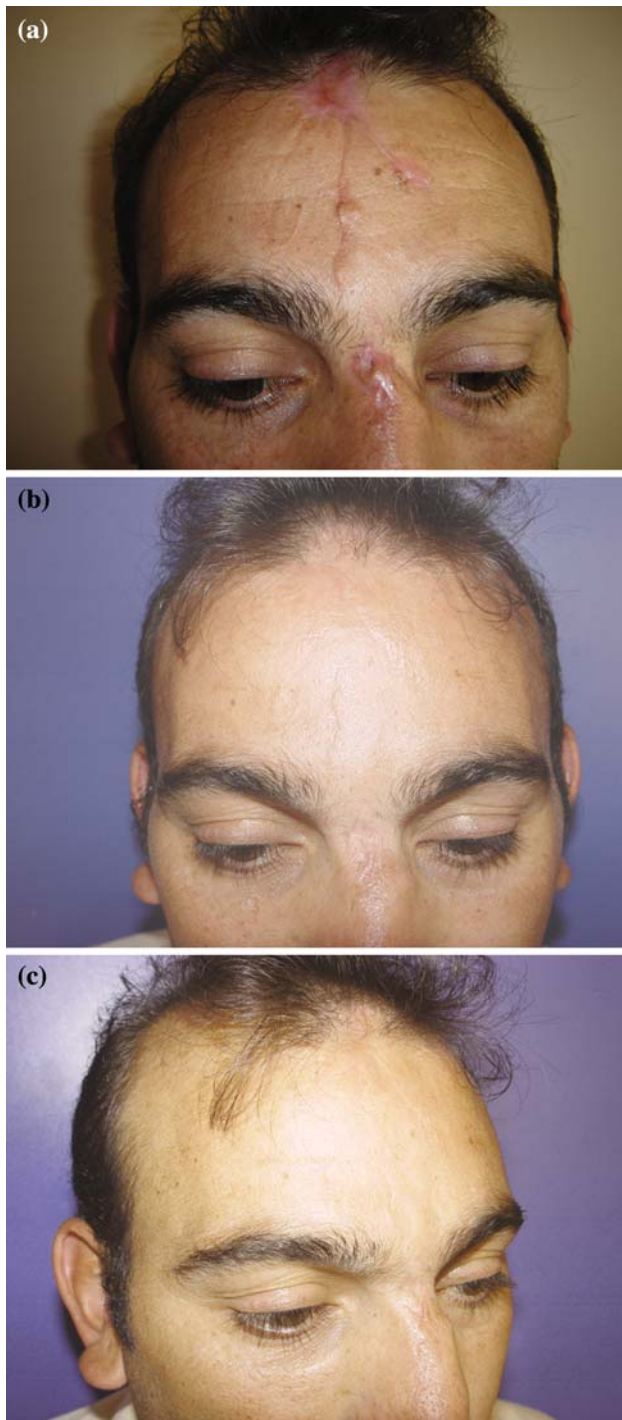


Fig. 6 (a) Preoperative view of the patient. (b, c) Five years after dermabrasion, the excellent results are seen from different angles

Case 7

A 48-year-old male patient came to us because of periorbital wrinkles. He had suffered from this situation for 3 years. When he came to us, there were thickened multiple periorbital wrinkles (Fig. 7a). We performed dermabrasion with three grades of sandpaper to all the

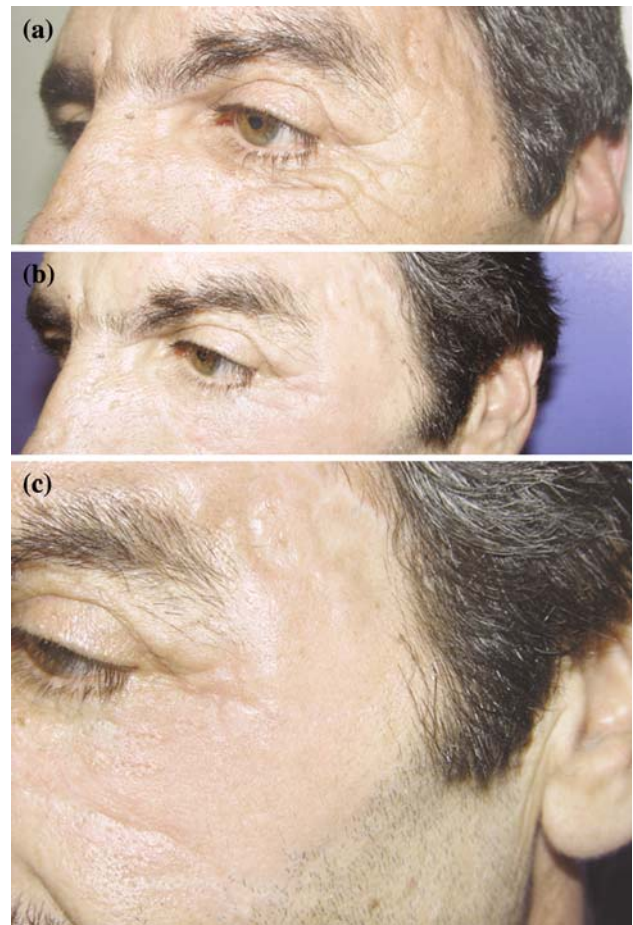


Fig. 7 (a) Preoperative view of the patient. (b, c) Two years after dermabrasion, the very good results are seen from closer angles

wrinkles. Next, an occlusive wound dressing such as Vigilon or Omiderm was placed directly over the ointment over the dermabraded wound for 10 days. The wound was left to secondary healing. Two years after dermabrasion, the result was considered very good (Fig. 7b, c).

Results

Improvement in the treated half of scars was seen in 80% of patients after at least 10 months (between 10 months and 6 years, average = 29 months) (95% confidence interval = 60–100%), and 81% had an excellent response. In 10% of patients the unsanded side looked better than the old scar. All patients graded their results as not good, same, good, very good, or excellent (Table 1). One-stage dermabrasion with sandpaper was performed on all the injured patients. In all patients with burns, dermabrasion with sandpaper was performed on the first day of the burn injury to prevent infection and extension of the damage. The best results were obtained in second-degree superficial and partially deep burn injuries. In patients with postsurgical

Table 1 Patient characteristics

Age (years)	Gender	Preexisting pathology	Localized area	Follow-up	Patient satisfaction
21	M	2nd Degree superficial burn	Face (4%)	36 months	Excellent
30	M	2nd Degree superficial and partial deep burn	Face (5%)	6 years	Excellent
33	F	2nd Degree superficial burn	Head and neck (6%)	4 years	Excellent
5	M	2nd Degree superficial burn	Face (5%)	3 years	Excellent
17	F	2nd Degree superficial and partial deep burn	Head and neck (6%)	30 months	Very good
29	F	2nd Degree superficial burn	Face (4%)	3 years	Excellent
25	F	2nd Degree superficial burn	Head and neck (7%)	2 years	Excellent
65	F	2nd Degree superficial burn	Head and neck (5%)	1 year	Excellent
40	F	2nd Degree superficial burn	Head and neck (7%)	22 months	Very good
41	F	2nd Degree superficial burn	Head and neck (8%)	18 months	Excellent
37	M	2nd Degree superficial burn	Head and neck (5%)	20 months	Very good
19	F	2nd Degree superficial burn	Head and neck (6%)	36 months	Excellent
22	F	2nd Degree superficial burn	Head and neck (4%)	5 year	Excellent
13	F	2nd Degree superficial burn	Head and neck (7%)	2 year	Very good
18	M	2nd Degree deep burn	Face (4%)	4 year	Excellent
29	M	Trap-door deformity	Frontal region	4 years	Excellent
35	F	Old injury	Left frontal region	3 years	Excellent
22	M	Old injury, wide scar	Frontal region	2 years	Excellent
38	F	Old injury, wide scar	Glabellar region	4 years	Excellent
26	F	Old injury	Frontal region	3 years	Excellent
29	M	Old injury, wide scar	Arm	3 years	Good
36	M	Old injury, wide scar	Deltoid	2 years	Very good
37	M	Old injury	Facial	12 months	Excellent
20	F	Old injury	Facial, peroral	10 months	Very good
25	M	Acne scar	Right facial	16 months	Very good
26	M	Acne scar	Left facial	20 months	Very good
38	F	Cellulite	Bilateral Leg	16 months	Good
35	F	Cellulite	Abdominal	20 months	Good
37	M	Tattoo	Arm	4 years	Good
36	M	Aging wrinkles	Periorbital	2 years	Very good
48	M	Aging wrinkles	Periorbital	3 years	Very good
30	M	Hypertrophic scar	Frontal region	5 years	Excellent
31	F	Depressed scar	Tibia anterior	1 year	Excellent
37	M	Depressed scar	Face	2 years	Excellent
23	F	Hypertrophic scar	Arm	3 years	Good
29	M	Hypertrophic scar	Arm	2 year	Same as its old view
19	M	Depressed scar	Arm	3 years	Same as its old view
22	F	Depressed scar	Leg	1 year	Good
34	F	Depressed scar	Face	2 years	Excellent
30	M	Depressed scar	Face	2 years	Very good

scars or posttraumatic scars, hypertrophic scars (but only matured scars) were included in this study. The better results were obtained in patients with trap-door scars, mature hypertrophic scars, and depressed scars, but not in keloids. The size of the scar was also important. The wider the scar, the less acceptable the results, whether dermasanding was performed or not. Meanwhile, the size of the scar correlates with its last appearance after dermabrasion.

In all cases, we avoided skin grafting because of its cosmetic appearance in the future. For all dermasanded patients, an occlusive wound dressing such as Vigilon or Omiderm was placed directly over the ointment over the dermabraded wound for a minimum of 10 days (range = 10–15 days) to prevent contamination.

Skin infections were seen in four patients (two burn patients, one facial scar patient, one tattoo patient) but were

not serious. The infections were caused by insufficient sterile conditions and were not related to the sandpaper. These mild skin infections were controlled with wide-spectrum antibiotic therapy. Five days of intravenous second-generation cephalosporines were given to these patients. No extra complications were seen.

Discussion

There are not too many dermabrasion options or alternatives. TCA (trichloroacetic acid), a derivative of acetic acid, has been used in the treatment of aging skin since the early 1960s. It was one of the first agents developed for chemical peeling and is still one of the most versatile. TCA is most commonly used in 35% concentrations for medium-depth peeling. The most common problem after TCA is hyperpigmentation, especially in darker-skinned individuals. Hypertrophic scarring can also occur if the peel reaches the reticular dermis and is often seen in the perioral and mandibular regions. Another chemical peeling agent is phenol. Phenol, also known as carbolic acid, is a protein precipitant that causes extremely rapid denaturation and coagulation of surface keratin. Peeling with phenol has become a standard to which other resurfacing methods are compared. However, because of the depth of treatment, phenol peeling has a longer recovery period and increased morbidity. Phenol is detoxified in the liver and excreted by the kidney. Toxic doses of phenol could injure both the liver and the kidneys. Atrial and other arrhythmias have been seen after rapid phenol absorption. The most serious complication among the chemical peelings is scarring. The major reason for this is not being able to balance the depth of the resurfaced skin.

Another option in dermabrasion is laser resurfacing. The effect of the laser on skin is heat generation that causes photocoagulation of tissue. Laser resurfacing is dose dependent and based on pulse energy and the number of passes; treatment can be as deep as the upper reticular dermis. Nowadays, this is popular. Two lasers that are commonly used for cosmetic resurfacing are the CO₂ and the erbium:YAG (yttrium-aluminum garnet) laser. CO₂ laser resurfacing is associated with increased morbidity, erythema, and hyperpigmentation; a significant risk of scarring; and a high incidence of hypopigmentation. The erbium laser has increased affinity for water, does not coagulate blood, and has less effect on the dermis [4–6].

Mechanic dermabrasion is another accepted method for improving the appearance of facial scars. It allows the epidermis to regenerate as a smooth surface after the defective dermis and epidermis have been removed. Several methods and instruments are currently being employed for dermabrasion. Sandpaper wrapped around a motor-driven cylinder is effective in broad, flat areas but is difficult to use

around the eyes, nose, and folded areas. A wire-mesh brush with multiple short, curved, stainless-steel wires driven by a motor is useful, but the skin is easily abraded too deeply, it is hazardous to use the device near the eyes, and gauze sponges are easily enmeshed in the rapidly whirling brush.

Deep dermal burns are initially difficult to evaluate and they sometimes heal spontaneously. Dermabrasion is a useful alternative to early excision of the scar. Skin grafts are not always required and the aesthetic results are excellent. Dermabrasion could be considered for all deep dermal burns and particularly for facial burns and those caused by scalds [7–9]. Using sandpaper by hand is more effective and safer. However, the surgeon's hand can become tired if there is wide area to be dermasanded. In this technique, (1) sandpaper is wrapped around rolls of sterile gauze. This is a more effective and easy method than the handle (the fingers cannot get tired). (2) There are no systemic side effects such as in chemical peeling or chemabrasion (cardiotoxicity and hypo- or hyperpigmentation after or peroperative peeling). With these chemical agents, control of the depth of the dermabrasion can be difficult. With our technique, depth is related to our fingers. The results in nonfacial regions such as the upper extremities, trunk, or lower extremities are not as satisfactory as in the facial region because the facial region has a rich vascular network. Because of this, healing is faster and the appearance of the scar tends to be less visible. In the extremities and trunk, the risk of scarring is inherent.

Conclusion

Derma sanding is still an effective procedure. In our study, dermabrasion with sterile sandpaper is inexpensive (20 cents for three pieces of sandpaper in Turkey) and requires no further experience. It can also be performed easily everywhere on the body under local anesthesia or general anesthesia. Although it takes a long time, it has significant effects on the treatment of many scars over a long-term follow-up period. One of the major advantages of this technique is that it requires no extra equipment such as a motorized instrument or assistance from another surgeon. There can be one disadvantage in this technique, recurrence of the old scar. This is very important. We did not have any results that were worse than the original scar (no hypo- or hyperpigmentation, uncontrolled depth). For aesthetic surgery, this must be very important.

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