Filling Up the Valleys

Man has tried and sought to erase wrinkles and scars for millennia. Sadly, however, the most effective and permanent techniques have fallen into disuse and neglect due to lack of training in universities, lack of awareness on the part of both physicians and patients, and heavy mass marketing of injectable fillers. Dermal grafting is a standard, time honored method for permanent correction of deep facial defects. Our goal as dermatologists is to generate the best results for our patients, and also to develop our personal skills and talents to the utmost.

Before you can sand down the mountains, you must fill up the valleys (depressed scars, facial irregularities, and deep wrinkles). Disadvantages and drawbacks of methods in common use include:

1) *Hyaluronic acid fillers:* These are temporary, expensive, and the results usually vanish within months.
2) *Semi-permanent or permanent manufactured (artificial) fillers:* These must be placed too deeply to effectively efface scars or wrinkles, may migrate with time, and may cause granulomas.
3) *Punch excision or scar excision:* The scar or suture marks from this procedure can often look worse than the original defect. Dehiscence is a potential disaster, especially given the fine sutures usually placed on the face.
4) *Punch Grafting:* The loss of a graft or failure of the graft to take can create a deep obvious hole.

The best methods for filling deep defects include:
1) *The "CROSS" technique,* in which 70% to 100% trichloroacetic acid (TCA) is applied via toothpick to pitted scars or "large pores" on the nose. This is often quite effective, but care must be taken to place the TCA only into the pore and not the surrounding tissue.

2) *Punch elevation,* often used with tumescent anesthesia, is far more effective with much less risk of failure of the procedure. With this technique, deep rigid scars between 1mm and 4mm in diameter are scored on the surface with a 2.0mm to 4.0mm punch, varying in 0.25mm increments. A 5/0 or 6/0 Vicryl suture is inserted on one side of the scoring, carried through the center of the unremoved skin, and out the other side, and tied very loosely so as not to squeeze the punched tissue or to force it down deeper toward the dermis. The suture is used to elevate the bottom of the scar upwards until it is flush with the adjacent skin. With punch elevation, it is important not to excise the graft but rather to leave it in place, attempting to elevate it very slightly with a suture. Each graft is then covered with steri-strips with Mastisol followed by the application of Mupirocin Ointment, Telfa Pad, and Hypafix.

3) *Lipoinjection,* properly performed, can be quite effective for large depressed areas such as tear troughs, areas of lipoatrophy, or cellulite dimples. It is quite technique sensitive and may need to be repeated. The fat is extracted via syringe after insertion of tumescent anesthesia and may be centrifuged. However, the material is free, and most patients can spare some extra!

4) *Dermal grafting*. The advantages are the material is autologous; it is permanent and will not migrate; the material is free; it is non-allergenic; the operators' dermatologic surgical skills can be utilized with minimal risk of cysts, and permanent correction of deep defects, if care is taken during dissection of the grafts.

Surgical Procedures
During the preoperative visit, consent is obtained, and photos are taken with lab work drawn. Prescriptions are given for pre-op antibiotics, pain medication, and possibly a Medrol DosePak. At this time, consider a test spot both for dermabrasion and chemical peeling.

Patient Selection: The techniques are effective for deep wrinkles, nasolabial or perioral folds, and broad soft acne scars pliable enough to be elevated via grafting. Rigid or pitted scars or "large pores" are best treated via punch elevation.

Surgical Procedure: The patient is NPO after midnight and is given oral anesthesia with Diazepam, Meclizine, and Oxycodone or Hydrocodone orally. Because of the use of oral medications, an IV line must be inserted to keep open, with vital sign monitoring via pulse oximetry, and monitoring of blood pressure and heart rate.

Nerve blocks are then performed of the supraorbital, supratrochlear, lateral zygomaticotemporal, temporal, mental, paranasal, and lateral mandibular nerves. Tumescent anesthesia is then performed with 0.1% Xylocaine with Epinephrine 1 1,000,000 with or without added sodium bicarbonate.

An excision is then performed behind one or both ears, depending on the amount of material that needs to be removed. A very deep ellipse is performed down to the fascia encompassing deep fat and dermis. After closure of the defect, the epidermis, sebaceous glands, and hair follicles are carefully dissected free under magnification leaving a large ellipse of deep dermis and fibrous fat.

Dissection is then performed under magnification, cutting the dermis/fat tissue into strips or small grafts, depending upon the type of defect to be filled. These are placed into a petri dish filled with iced normal saline.

Scars or defects are first undermined with a Nokor needle to create a pocket. Nasolabial folds are first undermined with a Nokor needle, and then widened with a metal probe. Smaller grafts are inserted with jeweler's forceps into the defect or scar, and a surgical snare is used to pull the "Julienne strip" through the nasolabial folds, leaving excess tissue visible at the top and bottom. All of these incisions (each 1 to 2 mm in size) are then closed with 5/0 or 6/0 Vicryl sutures to prevent extrusion of the grafts, followed by steri-strips with adhesive. A dressing is applied generally with Telfa and Hypafix.

FIGURE 1. Patient before & after dermal grafting for soft broad acne scars.

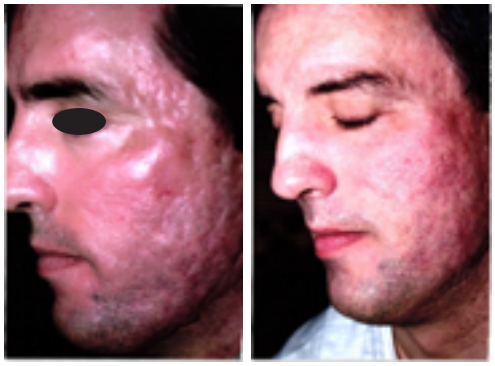
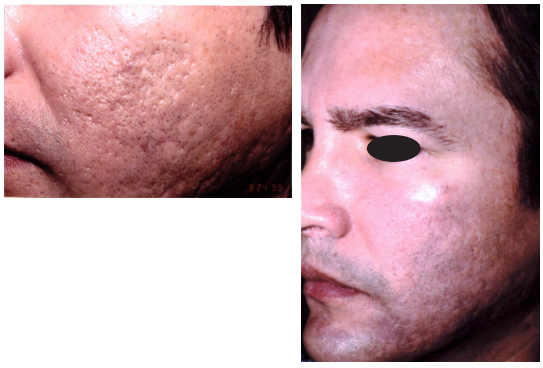


FIGURE 2. Patient before and after punch elevation followed by dermabrasion for pitted acne scars.



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Sanding Down the Mountains

Many acne scars are 1mm to 2mm deep, and any laser (if one exists) that can penetrate more than 100 microns (= 0.1mm) deep runs a large risk of scarring from the heat generate. Manual dermabrasion, whether via wire brush, or diamond fraise, dermasanding, is, and has been, the gold standard for the treatment of acne scarring and deep facial lines.

The 5 keys to a successful full-face wire brush dermabrasion include:

1) Adequate oral sedation, nerve blocks, and tumescent anesthesia.
2) The mandatory use of an aerosol spray, -30° F to -60° F to create temporary rigidity that negates the rubbery texture of skin and prevents skipping of the dermabrasion wheel.
3) The "triangular stretch" technique for each patch, generally 4cm x 4cm. Two of the triangles are stretched by the medical assistant and one by the physician's non-dominant hand, using sterile cloth towels. The cloth towels are also used to protect the eyes, ears, nose, and mouth during the spraying procedure.
4) Proper depth selection, with the wire brush extending into the reticular dermis (where fine striated lines are visible) but not into the deep dermis (a ragged appearance implies that you have gone too deeply).
5) A wire brush is used for larger scars and/or lines, whereas a diamond fraise will penetrate less deeply.
6) Edge feathering with chemical peeling and/or the use of a diamond fraise described below.

Patient Selection: Test spots performed at least 4 weeks prior to the procedure are nearly always mandatory and help deselect the 1% of patients who might develop a scar from the procedure. They also give the patient reassurance that the procedure will be effective, generally performed on a very small scar or wrinkled area.

Preoperatively, consent is obtained, lab work is performed, and preoperative photos are taken. Prescriptions are given for antibiotics, a Medrol DosePak, and Acyclovir if there is any history of herpes simplex.

Pre-op sedation is obtained with oral Valium, Meclizine, and Oxycodone or Hydrocodone, followed by tumescent anesthesia, inserted after the performance of blocks of the supraorbital, supratrochlear, lateral zygomaticotemporal, paranasal, mental, and marginal mandibular nerves. Proper overhead lighting is mandatory, and magnification may be of benefit to the surgeon.

A Bell hand engine is most effective for dermabrasion utilizing a soft wire brush for the forehead, regular wire brush for acne scars, cheeks, or deeper wrinkles, with diamond fraise for the infraorbital areas, perioral areas around the lips, feathering into the hairline at least 1cm to anticipate future possible hairline recession, for the nose (unless deeper scars are present), and onto the neck with a very fine diamond fraise. The eyelids are generally peeled with Jessner's solution plus 25% trichloroacetic acid solution. It should be emphasized that dermabrasion must be performed by a physician.

Following the dermabrasion, a moist dressing is applied, secured to the face by Kling, Kerlix, or Hypafix. This is changed in 1 day and 3 days. Healing is quite rapid, with a pink appearance visible after 3 days, and reepithelization generally complete in 7 days. Erythema disappears completely, and although patients have a near normal appearance at 28 days, sunscreens must be applied for months. Greasy postoperative creams should be avoided, as these may tend to cause milia. Dermabrasion may be repeated for isolated areas, but on the first procedure, the entire face must be treated with one technique or another in order to avoid lines of demarcation.

Drawbacks to Techniques Currently in Vogue:

1) *Chemical peels* work quite well for finer wrinkles, but are less effective for deeper acne scars, deep wrinkles, and nasolabial folds.
2) *Micro needling:* The fact that no heat is generated decreases the risk of side effects or harm, but it is only minimally effective, since many microscopic skip areas are left remaining.
3) *Fractional lasers:* Because of the fact that skip areas are present, and heat is generated, the techniques are often less effective and desirable, and there is prolonged erythema with risk of scarring. Laser heat penetrates at most 100 microns into the skin, but many scars are 1 to 2 mm deep - therefore, lasers do not go as deeply as often required.
4) *Heat generating machines or ultrasound techniques:* These may produce waffling, with unpredictable results, prolonged erythema, and a risk of scarring.
5) *"Platelet rich plasma"* is generated by the dermabrasion itself, since the patient's platelets create clotting. However, the injection of separate blood-derived platelet enriched plasma has not been proven to erase scars.

Advantage of a Full-Face Wire Brush Dermabrasion Include:

1) Uniformity of results.
2) There is direct operative control, vs laser with computer chip.
3) Immediate results can be seen while performing the procedure, with instant touchup of scars not completely erased by the first pass.
4) Healing is far faster than that with a laser, with much quicker resolution of erythema.
5) Minimal or no postoperative pain.
6) Greatly decreased cost, since the equipment used is of very low cost.
7) The equipment will not become obsolete, unlike lasers, which may be supplanted by newer models within several months.

FIGURE 1. African American patient before and after punch elevation followed by dermabrasion for acne scars.

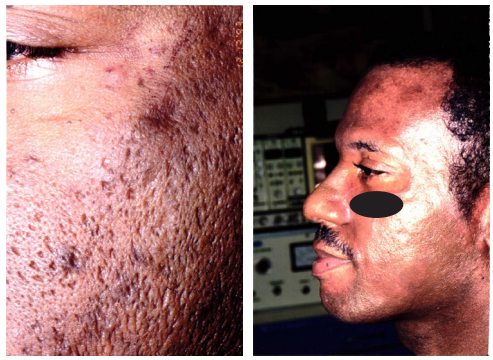
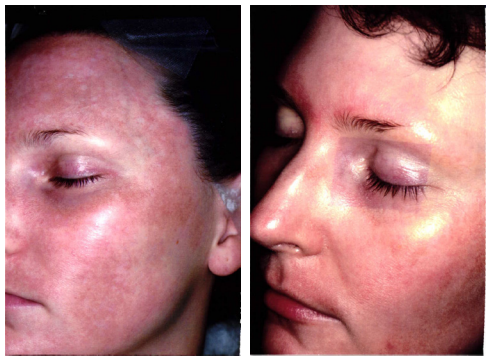


FIGURE 2. Patient before and after full-face wire brush dermabrasion for acne scars and dyspigmentation from a prior attempt at dermabrasion with a Diamond Fraise without Cryo Spray.



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