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Non-surgical scar revision

By Michael J. Visconti, DO, Emily R. Davis, DO, and Kent J. Krach, MD, FAAD

Introduction

- Aesthesis of scar is the single most important patient-perceived determinant of surgical outcome
 - Quintessential scar: imperceptible, fine line, level with the surrounding skin, camouflaged by natural creases/folds
 - Undesirable scar: thick, wide, raised, or depressed, erythematous, telangiectatic, interruption of natural relaxed skin tension lines (RTSLs), track marks
- **Preoperative discussion managing and setting realistic expectations is vital**
 - Scar formation is an inevitable aspect of the healing process.
 - The goal is to improve the appearance of the scar rather than erase.
 - Scars may take up to and beyond a year to mature so often the best scar revision is a tincture of time.

Preoperative considerations

- Medical/social history:
 - Cigarette smoking (dose dependent effect; discontinue 3 weeks prior), history of hypertrophic/keloidal scarring, diabetes mellitus, malnutrition, uncontrolled hypertension, acute congestive heart failure, history of congenital heart defects, prosthetic heart valve, joint replacement, HSV (prophylaxis 1 gram valacyclovir 2-5 days prior to procedure), blood thinners (INR <3 for warfarin), systemic corticosteroids, cyclosporine, VEGF-inhibitors, oral tyrosine kinase inhibitors, oral supplements (discontinue all unnecessary supplements 10 days prior)
- Surgical sites prone to poor wound healing:
 - Shoulders, central chest, upper back, proximal arms

High-yield therapeutic modalities

| | MoA | Timing | Dosing | Technique | Adverse effects |
|--|--|---|--|--|-----------------|
| Class I corticosteroids <ul style="list-style-type: none"> • Cream • Ointment • Intralesional solution | Decreased fibroblast activity/collagen production | One month postoperative (fibrofatty tissue present) | 0.1 -1.0 mL of triamcinolone (TAC) 10-40 mg/mL, every two to six weeks * 40 mg/mL is most optimal | Inject within the largest portion of the scar within the dermis | Atrophy |
| Imiquimod <ul style="list-style-type: none"> • Cream | IFN- α induces collagen breakdown and decreases TGF- β (driver of keloid formation) | Variable, as early as the night of procedure | 5% cream, 12 packets | Nightly for eight weeks, poke hole in packet to reduce overuse and waste | Skin irritation |

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| High-yield therapeutic modalities | | | | | |
|--|---|--|---|---|--|
| | MoA | Timing | Dosing | Technique | Adverse effects |
| Silicone <ul style="list-style-type: none"> • Gel • Cream • Oil • Sheets • Embedded tape | Unclear; occlusion/hydration of stratum corneum and cytokine-mediated signaling to dermal fibroblasts | Variable; upon removal of sutures or full epithelialization of wound | Concentrations range as high as 100%; commonly sold with hypochlorous acid (anti-inflammatory agent) | Apply every 12-24 hours for at least two months; prolonged fixed application (two to seven days) may be effective in severely hypertrophic/keloid scars | Skin irritation, unsightliness of products, difficulty securing product |
| 5-Fluorouracil <ul style="list-style-type: none"> • Intralesional | Inhibition of fibroblasts (via TGF- β 2 gene) → decreased collagen production | Variable; as early as one week postoperatively | Max = 150 mg/treatment with most evidence in 20-45 mg/treatment range; distributed in one bottle of 50 mg/mL; max chemotherapy infusion dose is 1500 mg | Variable, repeat weekly to every other week to monthly | Pain, burning, ulceration (avoid superficial injection), hyperpigmentation |

| Lower-yield therapeutic modalities | | | | |
|--|--|--|--|--|
| | MoA | Timing | Technique | Adverse effects |
| Massage | Mechanically suppresses the dermis → thinning, cessation of oxygen/nutrient supply, reduction in edema | Recommendation is to wait one month | Apply emollient, then firm pressure to blanch the scar, massage for 10 minutes, one to two times per day | Time consumption, frictional irritation, contact dermatitis |
| Pressure therapy <ul style="list-style-type: none"> • Garment | Theorized reduction in collagen synthesis | One to three weeks after wound closure; up to six months postoperatively | 15-25 mmHg of pressure garment for at least 23 hours per day over 6-12-month period | Pain, skin irritation, unsightliness of garment, prolonged application requirement |
| Vitamin E (tocopherol) <ul style="list-style-type: none"> • Oil, gel, cream, compounds | Theorized to enhance scar remodeling through antioxidant and anti-inflammatory properties | Variable (immediately vs. 4-6 months postoperatively) | Apply one to three times daily for up to 12 months | Allergic contact dermatitis (33%), erythema multiforme-like and urticarial eruptions |
| Radiotherapy | Inhibiting fibroblast proliferation, diminishing collagen synthesis | Initiated within 24-48 hours postoperative | 15-20 Gy (standard unit of radiation); split over five to seven sessions | Erythema, hyper/hypopigmentation, edema, desquamation, ulceration, atrophy |

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| Clinical pearl | |
|---|---|
| <p>Intralesional administration of triamcinolone/5-FU (1:9 TAC:5-FU ratio) has greater efficacy than monotherapy</p> <p>Median number of sessions required: three</p> | <p style="text-align: center;"><i>Instructions:</i></p> <p>Obtain 1 ml syringe with 30g needle Draw up 0.1 ml (4 mg) of 40 mg/ml TAC Combine with 0.9 ml (45 mg) of 250 mg/5 ml 5-FU Average dose of 5-FU per treatment: 20-45 mg (0.4-1.0 ml)</p> |

References:

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