# PATHOLOGICAL TYPES OF SCARS AND THEIR IMPACT ON TREATMENT

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# Pathological Types of Scars

Atrophic Scars

Normotrophic Scars

Hypertrophic Scars & Keloids

Mixed Scars

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# Factors affecting scar development

## Inflammation and Oedema

**Minimal**
↓
↓ TGF Beta 1 and 2
↓
↓ Active fibroblasts
↓
Insufficient Collagen Synthesis
↓
Atrophic Scar

**Adequate**
↓
Adequate TGF Beta 1 and 2
↓
Active fibroblasts Slightly ↑
↓
sufficient Collagen Synthesis
↓
Normotrophic Scar

**Extensive**
↓
↑ TGF Beta 1 and 2
↓
↑ Active fibroblasts
↓
Excessive collagen synthesis
↓
Hypertrophic scar

**Nonhomogenous**
↓
Uneven conc. TGF Beta 1 and 2
↓
↑ uneven conc. Active fibroblasts
↓
collagen synthesis in Islets
↓
Mixed scar

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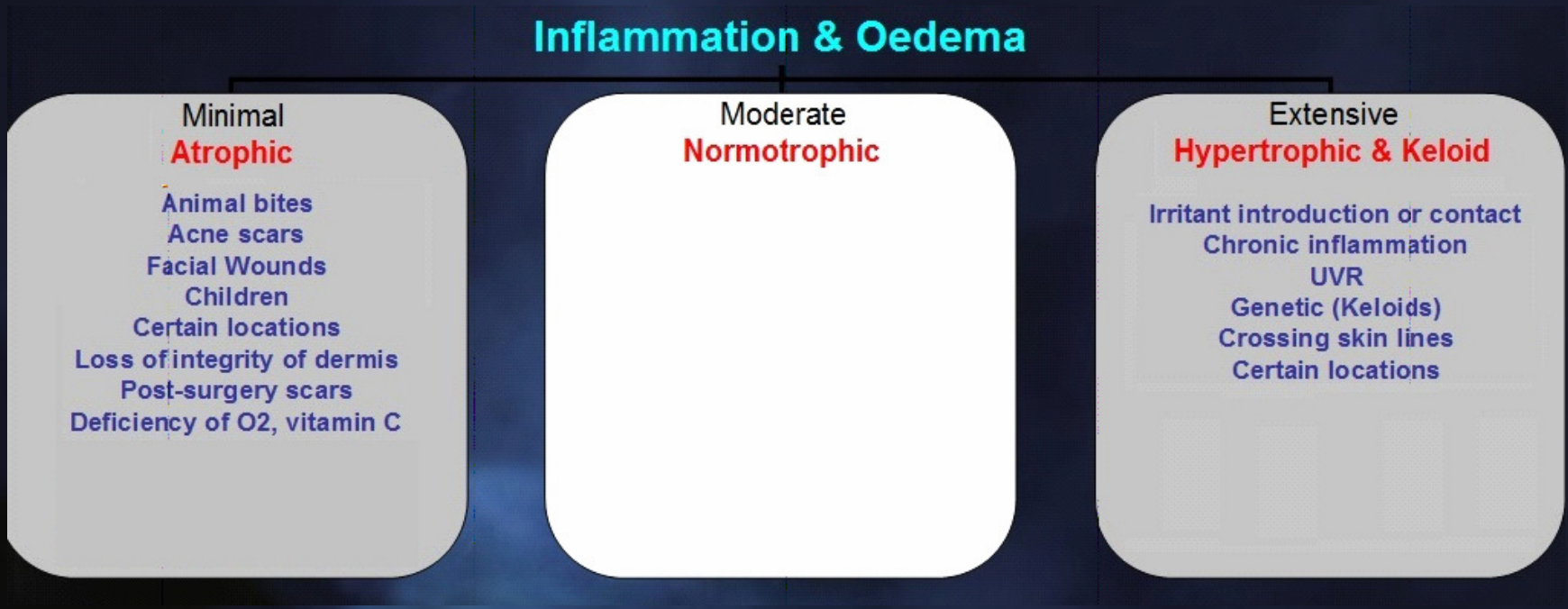
# Factors affecting scar development

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# Management of Scars
## *is a combination therapy*

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# Normotrophic Scars

**Inflammatory stage**
Debridement
Oedema Control (alpha chemotrypsin)
NSAIDs
Antibiotics

**Proliferarion Stage**
Contractubex
Compression silicone sheeting (areas famous for hypertrophic scarring)
Enzymotherapy
Cryodustruction

**Maturation Stage**
Compression hydration
Dermaroller
Vit C applications (Ascorbic acid)
Microdermabrasion
Peeling
Enzymotherapy
Cryodestruction
PDL

# Enzymotherapy

- **Proteolytic enzymes dilute necrotic mass**
- **Hyaluronidase depolymerizes hyaluronic acid.**

# Occlusive Hydration

- **Maximal hydration of the scar formation zone**
- **Reduction of transepidermal water loss**
- **Acceleration of cell migration**
- **Increase of fibroblast proliferation and synthetic activity**

# Cryotherapy

- Evens overhanging scar edges
- Reduces interstitial edema

# Early Microdermabrasion

- Evens and improves the scar surface
- Clears away the epidermal (lipidic) skin barrier of the scar area along with epidermis, which enables medicinal products to penetrate freely into the skin.
- Scar bottom is elevated by the vacuum to the surrounding skin level, counteracting myofibroblasts

Better avoided in Fitzpatrick skin phototypes 4-6

# Medium & Deep Chemical Peel

- TCA 30-50% sessions

# LASER

- NON Ablative PDL for erythematous scars eliminates vascular component
- Fractional $CO_2$ Laser for non-erythematous scars

# Collagen Induction Therapy (CIT)

## *Dermaroller*

- Creates minute channels stimulating islets of collagen synthesis

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# Atrophic Scars

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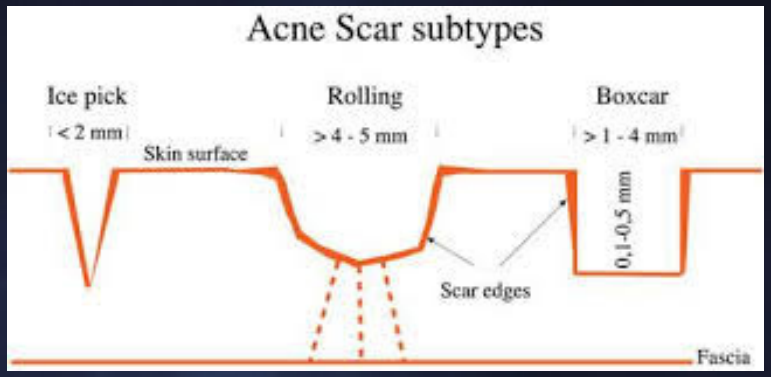
# Types of Atrophic Scars





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# Management of Atrophic Scars

**Scar considered fresh during 1st year, golden time of treatment is first 7-9 months**

**Aims**

- To Smoothen scar demarcation line
- To even overhanging scar edges
- Transdermal induction of collagen synthesis
- To elevate Scar bottom

**Tools of management in Fresh atrophic scars**

?? Enzymotherapy (Proteolytic Serrapeptase, Nattokinase and Hyalorinase) / Topical creams
Occlusive Hydration (Till wound bottom reaches skin level)
Cryotherapy
Microdermabrasion (NOT FOR ICEPICK ATROPHIC SCARS)
Dermaroller
Peeling
Laser Correction

**NO CONTRACTUBEX**

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# Management of Old Atrophic Scars

**Tools of management**

**Dermaroller**

**Laser Correction of erythematous scars / Laser or Peeling for nonvascularised Scars**

**Subcision (Nokor needle)**

**Excision / Punch excision**

**Hydration**

**Microdermabrasion**

**Autofibroblasts**

**Autologous Fat Transfer / Fillers [only after subcision]**

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# Nokor needle

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# Pathological Scars

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# Pathological Scars

| Feature | Hypertrophic Scars | Keloids |
|---|---|---|
| Incidence | Frequent | Rare |
| Time of Development | Soon after injury | May take months |
| Genetic Predisposition | None | Present |
| Race | None | Related to skin Colour |
| Sex | None | Females |
| Age | Children | 10-30 Years |
| Extension | Within wound | Outgrows wound area |
| Natural History | Subsides with time | Rarely subsides |
| Sites | Areas of Motion<br>Scars crossing joints or skin lines | Areas of little motion<br>Sternum, shoulders, ear lobules |
| Aetiology | Tension ?? | Unknown |
| Content | ↓ Calcium<br>↓ Magnesium<br>↓ Mucinous ground substance<br>↑ Fibroblasts<br>↑ Foreign body reaction | ↑ Calcium<br>↑ Magnesium<br>↑ Mucinous ground substance<br>↓ Fibroblasts<br>No Foreign body reaction |
| Fast Blue collagen stain | Blue | Reddish |
| Response to treatment | Good | Poor |

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# Management of Hypertrophic Scars & Keloids

**Aims:**

**Reduction of Scar Mass +/-** Induction of new proper collagen synthesis

**Improving texture and elasticity of scar**

**Treatment options are similar but Hypertrophic scars have better prognosis**

**A solitary tool of management seldom works**

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# Management of Hypertrophic Scars & Keloids

**Non Invasive**

***Occlusive dressings / Compression therapy***

***Intralesional corticosteroid injections (decreases TGF Beta 1 and Inflammatory mediators)***

Intralesional Immunomodulators (Interferon) injections: Inhibits type I,II,IV Collagen synthesis

Intralesional Calcium Channel Blockers (Verapamil): ↓ collagen synthesis & ↑ collagenase production

Intralesional Antineoplastic Agents 5FU, Belomycin, Tamoxifen & Doxorubicin

Topical Immunosuppressant Tacrolimus ointment: Inhibits TNF alpha

Topical Retinoic Acid (Retin-A): Inhibits DNA synthesis in fibroblasts and lymphocytes (Not FDA approved)

Topical Imiquimod 5% cream "*Aldara*" (Immune response modifier): Decreases collagen synthesis (Not FDA approved)

Botulinum toxin

**Minimally Invasive**

Cryosurgery for small lesions (affects microvasculature causing cell damage via intracellular crystals, leading to anoxia)

Radiation therapy

Light therapy (IPL)

Laser therapy (Non Ablative PDL & Fractional)

**Surgical Excision**

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# Management of Hypertrophic Scars & Keloids

| |
|---|
| **First-line treatment** |
| **Cryotherapy,** May cause hypopigmentation, pain |
| **Intralesional corticosteroids.,**May cause discomfort, skin atrophy, telangiectasia |
| **Silicone sheeting** |
| **Pressure dressing for six to 12 months** |
| |
| **Second-line and alternative treatment** |
| **Surgical excision,** If *alone*, can be followed by more aggressive growth in up to 84% of cases |
| **Combined cryotherapy and intralesional corticosteroid injection** |
| ***"Triple keloid therapy"*** **(surgery, corticosteroids, and silicone sheeting)** |
| **Pulsed dye laser** |
| **Intralesionl Verapamil and silicone sheeting** |
| **Intralesional Fluorouracil,** Effective; May cause hyperpigmentation, wound ulceration |
| **Bleomycin tattooing,** Effective; May cause pulmonary fibrosis, cutaneous reactions |
| **Postsurgical intralesional interferon,** Expensive; May cause pruritus, altered pigmentation, pain |
| **Radiation therapy alone or Postsurgical,** May cause cancer, hyperpigmentation, paresthesias |
| **Onion extract topical gels (e.g., Contractubex, Mederma),** Limited effect alone |

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## Compression

- Mechanically holds growth
- Compresses scar vasculature leading to anoxia

## Dermabrasion

- Microdermabrasion and rotation dermabrasion have little value
- Might stimulate collagen synthesis

- Sandabrasion may have a role

## Radiation

- Effect disputable
- Risk of malignancy
- Age and site restrictions

# Pulsed Dye Laser (585 nm)

**Induces photothermolysis, resulting in microvascular thrombosis**

**Limited value, best if used early in combination with other modailities**

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Promising therapies that aim at decreasing collagen synthesis

Antiangiogenic factors, including vascular endothelial growth factor (VEGF) inhibitors

Phototherapy (photodynamic therapy [PDT]

UVA-1 therapy, narrowband UVB therapy)

Transforming growth factor (TGF)–beta3

Tumor necrosis factor (TNF)-alpha inhibitors (etanercept)

Recombinant human interleukin (rhIL-10)

# THANK YOU

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