

Scars in dermatology: Clinical significance

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A scar is a scar is a scar and only a scar if you don't ask why"

- Shelly and Shelly

A scar is a fibrous tissue replacement that develops as a consequence of healing at the site of a prior ulcer or wound. Cutaneous scarring is a macroscopic disturbance of the normal structure and function of the skin architecture manifesting itself as an elevated or depressed area, with an alteration of skin texture, color, vascularity, nerve supply and biomechanical properties.^[1]

Histologically, dermal scars are characterized by thickened epidermis with a flattened dermo-epidermal junction and an abnormal organization of the dermal matrix into parallel bundles of scar tissue collagen, as opposed to the normal basket weave pattern of dermal collagen. Scar collagen fibers have high proportions of type III collagen and fibronectin compared to the surrounding normal skin and are usually smaller and more densely packed. Elastic fibers are fragmented and abnormally organized in scars as compared to the normal dermis. Epidermal appendages such as hair follicles and sebaceous glands are usually absent in a scar.^[1]

The pathogenesis of raised skin scars is unclear. Fibroblasts from hypertrophic scars and keloids demonstrate excessive proliferative and low apoptosis properties. Fibrogenic isoforms of transforming growth factor β (TGF $\beta_{1,2,3}$) appear to play a central role in the pathogenesis process. TGF β_1 stimulates fibroblasts leading to proliferation and synthesis of procollagen RNA and hence, collagen formation. By upregulating the production of tissue inhibitor metalloproteinase and plasminogen activator inhibitor, TGF

β_1 protects the collagen from degradation.^[2]

CLASSIFICATION OF SCARS^[3]

1. **Fine line scars:** Surgical scars
2. **Wide (stretched) scars:** These develop when fine line surgical scars gradually become stretched and widened. They are typically flat, pale, soft, symptomless scars. Abdominal striae of pregnancy can be considered as variants of these.
3. **Atrophic scars:** These are flat or depressed below the surrounding skin. They are generally small and often round with an indented or inverted centre. They commonly arise after acne or chickenpox.
4. **Scar contractures:** Scars across joints or skin creases at right angles are prone to develop shortening or contracture. They commonly occur after burn injury across joints or skin concavities.
5. **Raised skin scars:**
 - a. **Hypertrophic scars:** These are raised scars that remain within the boundaries of the original lesion, generally regressing spontaneously after the initial injury. They are often red, inflamed, itchy, and even painful.
 - b. **Keloidal scars:** These are raised skin scars that spread beyond the margins of the original wound and invade the surrounding normal skin. A keloid continues to grow over time, does not regress spontaneously and almost invariably recurs after simple excision.
6. **Intermediate scar:** Scars that are difficult to categorize have been termed intermediate scars.

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DERMATOLOGICAL CONDITIONS WHICH RESULT IN SCARS

Many dermatological disorders can lead to cutaneous scarring. Table 1 enumerates a few of these conditions:^[4]

Scars do not just occur as a consequence of the healing process, but also have other clinical significance. They may serve as a clue for diagnosis by their typical morphology or may give rise to various dermatoses while some dermatoses may mimic scars. These aspects of scars are discussed below.

MORPHOLOGY OF SCARS AS A CLUE FOR DIAGNOSIS [FIGURES 1 - 3]

Scars seen in some of the conditions listed in Table 2 have a typical morphology^[5] and their specific location or morphology may provide a clue for diagnosis of the dermatological condition.



Figure 1: Morphea: Mimicking a scar



Figure 2: Lupus vulgaris arising within a scar

DERMATOLOGICAL CONDITIONS OCCURRING IN SCARS

Certain dermatological conditions arise from a scar and have a tendency to recur within the scar tissue. These disorders may occur in scars as a result of Koebner's phenomenon, inoculation of infectious agents, metastases or long-

Table 1: Dermatoses which result in scars

Table 1: Dermatoses which result in scars	
I. Infections	
a)	Fungal: Deep fungal infections like mycetoma Kerion variety of tinea capitis
b)	Bacterial: Dissecting cellulitis of scalp Erythema induratum Lymphogranuloma v venereum Lupus vulgaris Scrofuloderma Papulonecrotic tuberculid Granuloma inguinale
c)	Parasitic: Leshmaniasis
d)	Spirochetal: Tertiary syphilis
e)	Viral: Herpes zoster Varicella Small pox
II. Traumatic	
	Chloracne Factitial Chronic radio dermatitis Thermal burns Brown recluse spider bite
III. Neoplastic	
	Extramammary Paget's disease Morpheiform Paget's disease of the breast
IV. Congenital	
	Epidermolysis bullosa dystrophicans Ehlers-Danlos syndrome Degos disease
V. Others	
	Acne conglobata Acne vulgaris Atrophic lichen planus Cicatrical pemphigoid Epidermolysis bullosa acquisita Folliculitis decalvans Hidradenitis suppurativa Lichen Sclerosis et Atrophicans Mid-dermal elastolysis Morphea Poikiloderma vasculare atrophicans Pseudopelade Sarcoidosis Ulerythema ophryogenes

Table 2: Characteristic morphology of scars and the diseases causing scars^[5]

Morphology of scars	Diseases
Atrophic scars	
Thin, papyraceous, darkly pigmented scars over the elbows and knees with eventual stretching of scars over several months	Ehlers-Danlos syndrome
Cigarette paper wrinkling scar primarily in exposed areas	Mid-dermal elastolysis
Telangiectatic atrophic scars	Poikiloderma atrophicans vasculare, Chronic radio dermatitis
Soft, depressible papules	Anetoderma
Stretch mark scars	Striae atrophicans
Thin atrophic cribriform scars	Pyoderma gangrenosum
White, atrophic, faintly pitted scars of concha of ear	Discoid lupus erythematosus
Atrophic scar surrounded by papules arranged in annular pattern	Sarcoidosis
Pitted scars	
Bands of atrophic pits on cheeks lending the area a reticulate "Honeycomb-like" or "Worm-eaten" aspect	Atrophoderma vermiculatum
Bands of worm-eaten type scar on eyebrows	Ulerythema ophryogenes
Ice pick/ rolling/ boxcar/ pitted/ stellate/ crateriform scars	Acne
Multiple, small pitted scars of elbows	Papulonecrotic tuberculid
Raised scars	
Thickened red scar of sternal area	Keloid
Cobblestone aggregate scarring of occipital scalp	Acne keloidalis
Bands of scar tissue and bridging fibrosis in the axillae and groin that may restrict mobility of the tissue	Hidradenitis suppurativa
Varioliform / varicelliform scars	
Varioliform scars with hypo or hyper pigmentation	Pityriasis lichenoides et varioliformis acuta
Large varioliform scars near hairline or in the scalp	Acne necrotica (varioliformis)
Smooth, white, slightly depressed scars	Varicella
Varicelliform scar with porcelain-like zone of atrophy at the centre	Malignant atrophic papulosis (Degos disease)
Patterned scars	
A swarm of scars in a band	Herpes zoster
Bald, white stepping-stone scars of scalp	Pseudopelade
Bizarre, geometric scars	Factitial
Multiple depigmented scars-arms, legs, back	Excoriations
Congenital reticular scarring ^[6]	Congenital erosive and vesicular dermatitis
Others	
Scar with pearl-like milia cysts within it	Epidermolysis bullosa acquisita
Scar encircled by tumor	Regressing basal cell carcinoma
Small, smooth, shiny scars of scalp	Folliculitis decalvans

standing changes in the scars [Table 3]. In pseudoxanthoma elasticum, the disease process can be demonstrated in scars before the appearance of skin lesions. In such cases, a biopsy of the scar has been used for diagnosis of the disease.^[7]

DERMATOSES MIMICKING SCARS

Some dermatoses may clinically mimic a scar requiring careful examination and histopathological studies to confirm the diagnosis. The absence of history of prior injury should raise suspicion of these disorders [Table 4].

SPONTANEOUS SCARRING AND PSEUDOSCARS

Scars can occur without any history of previous trauma. These tend to occur in predisposed individuals. However, there may be prior trivial trauma, hemorrhage^[10] or dermatitis unnoticed by the patient.^[11]

Atrophia maculosa varioliformis cutis: In this condition, spontaneous atrophic linear, rectangular or varioliform scars with sharp margins develop over the cheeks of children and young adults.^[11]

Table 3: Dermatological conditions occurring in scars^[8]**Long-standing changes in scars**

- Amyloidosis
- Basal cell carcinoma
- Squamous cell carcinoma (Marjolin's ulcer)
- Melanoma^[9]

Koebner's phenomenon in scars

- Psoriasis
- Lichen planus
- Lichen sclerosus et atrophicans
- Sarcoidosis
- Pityriasis rubra pilaris
- Xanthoma
- Pseudoxanthoma elasticum

Metastases in scars

- Cutaneous endometriosis
- Crohn's disease

Inoculation or local spread in scars

- Lupus vulgaris (tends to recur in scars)
- Verruca

Table 4: Dermatoses that mimic a scar

- Morpheaform basal cell carcinoma
- Morphea
- Lichen sclerosus et atrophicans
- Malignant atrophic papulosis
- Idiopathic guttate hypomelanosis
- Dystrophic epidermolysis bullosa (Pasini variant)-albopapuloid lesions
- Desmoplastic trichoepithelioma

Stellate and discoid pseudoscars: Stellate pseudoscars are white, irregular or star-shaped atrophic scars occurring over the sun-exposed areas of the forearms. It is commonly seen in elderly individuals aged 70–90 years. Brown pseudoscars are known to occur over the shins of patients with diabetic dermopathy.^[10]

In most of the cases, except for cosmetic unacceptability, a scar is not a cause for much concern. However, a simple scar can be a site for the development of various dermatoses or it can undergo neoplastic changes over time. Hence, any long-standing scar with or without morphological changes, should be examined carefully and should be biopsied if necessary.

**Figure 3: Anetoderma: Soft depressible papule****REFERENCES**

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