Chapter 9
Sclerosing Dermatitis

Keywords Morphea • Scleroderma • Lichen sclerosus

The sclerosing dermatitis pattern is generally characterized by dermal sclerosis, usually with little inflammation (Fig. 9.1).

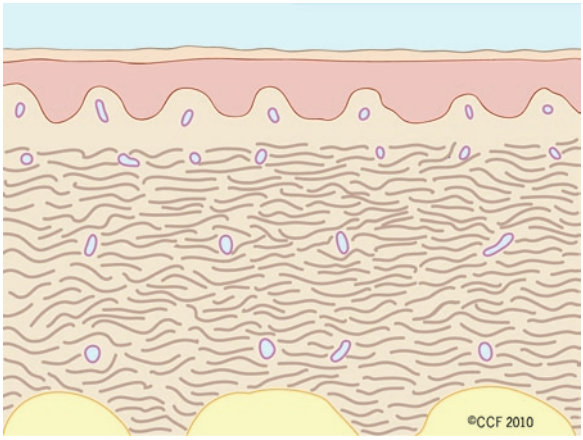

Fig. 9.1 *Schematic representation of fibrosing dermatitis*. This pattern is characterized by fibrosis/sclerosis of the dermal collagen. It manifests as thickened swollen collagen fibers with decreased space between collagen bundles and loss of adnexal structures. The inflammatory infiltrate is usually sparse

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Morphea/Scleroderma

Clinical Features

Morphea, also known as localized scleroderma, is characterized by localized, indurated plaques, usually on the trunk. The plaques frequently have a hypopigmented center surrounded by a violaceous border. Scleroderma is a multisystem connective tissue disease, which is divided into two major clinical groups:

Group 1: Limited disease involving hands, forearms and face, often have calcinosis, Raynaud's phenomenon, esophageal dysmotility, sclerodactyly, telangiectasias (CREST) syndrome.

Group 2: Diffuse cutaneous sclerosis and frequent visceral involvement. Patients have indurated skin, sclerodactyly, hyperpigmentation with perifollicular pigment retention and telangiectasias.

Microscopic Features

Morphea and scleroderma are both characterized by fibrosing inflammation in the dermis and are histologically indistinguishable from each other. Early lesions of morphea are characterized by superficial and deep, perivascular and interstitial infiltrate of lymphocytes and plasma cells (Fig. 9.2). Occasionally, eosinophils or neutrophils are seen, and some lymphocytes may be seen in the basal layer. In the early phase, thickening of collagen bundles is subtle and may be unrecognizable. It is uncommon for the early forms of the lesions to be biopsied, but it is important to be aware of these features when presented with a clinical diagnosis of morphea

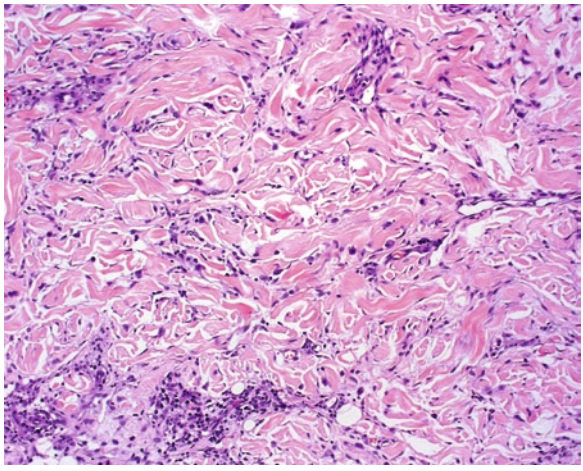

Fig. 9.2 *Early morphea*. In the early, inflammatory phase, a biopsy may demonstrate a superficial and deep perivascular lymphoplasmacytic infiltrate without appreciable dermal sclerosis

Table 9.1 Key microscopic features: morphea/scleroderma

- Dermal fibrosis with swollen collagen bundles
- Early lesions have perivascular lymphoplasmacytic infiltrate
- Decreased periadnexal fat
- Loss of adnexal structures in late lesions

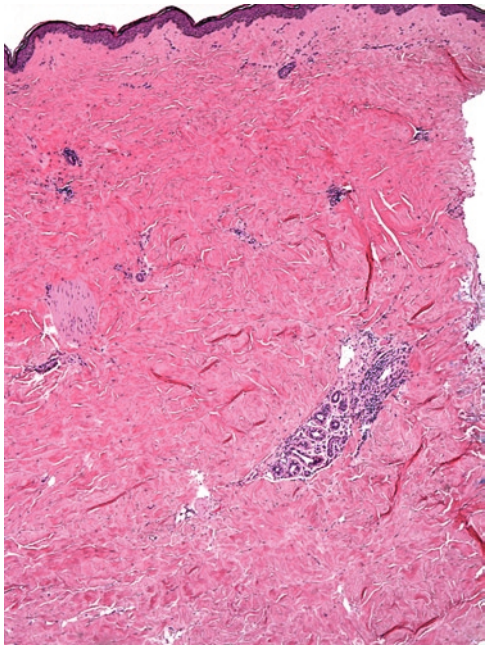

Fig. 9.3 *Well-developed morphea*. In more developed lesions there is dermal sclerosis with swollen collagen fibers and decreased space between collagen bundles of the reticular dermis. This case still has a perivascular inflammatory infiltrate, which is not always present in advanced lesions

without histologic evidence of significant dermal fibrosis (see sample reports at the end of the chapter).

In fully developed lesions, the inflammatory infiltrate is less dense and may be absent, and the dermal collagen changes are pronounced. The collagen bundles of the reticular dermis are thickened and swollen resulting in a compacted appearance with decreased space between collagen bundles of the reticular dermis (Fig. 9.3). The fibrosis of the dermis results in the so-called square biopsy sign. In most punch biopsies, the scanning appearance is somewhat wedge-shaped with the biopsy tapering with increasing depth. In contrast, punch biopsies from morphea or scleroderma are not wedge-shaped. Due to the sclerotic changes in the dermis, the peripheral edges of punch biopsies of morphea or scleroderma are parallel to each other resulting in a square or rectangular appearance to the biopsy on scanning magnification (Fig. 9.4). There is a sparse to mild perivascular lymphoplasmacytic infiltrate (Fig. 9.5). Some cases also show homogenization of the papillary dermis. See Table 9.1.

As the process develops, there is a loss of periadnexal fat and adnexal structures may degenerate or be completely absent. Over time, the fibrosing process can

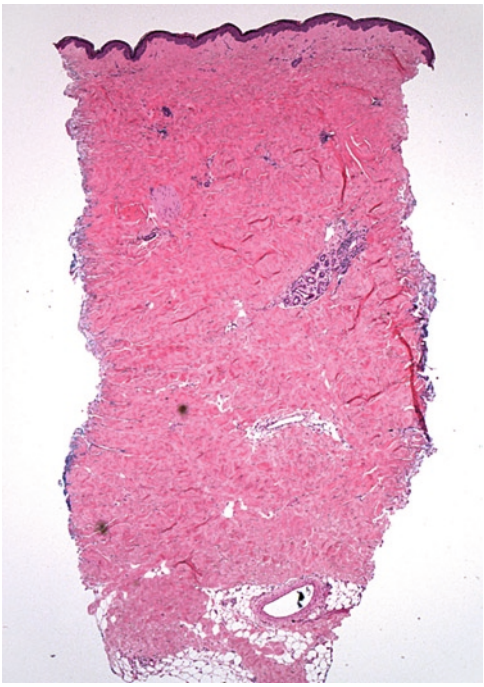

Fig. 9.4 *Square-biopsy sign*. On scanning magnification, punch biopsies from morphea/scleroderma have parallel, rather than tapered, sides

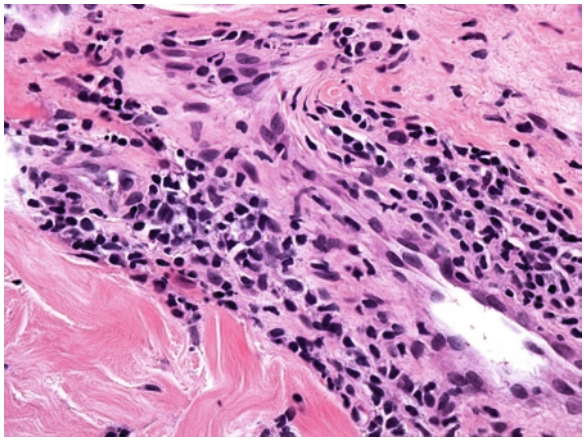

Fig. 9.5 *Perivascular infiltrate of morphea/scleroderma*. Frequently, even in advanced lesions, there is a remnant of the perivascular lymphoplasmacytic infiltrate

impinge on the superficial subcutaneous fat. Some cases can show extension of the fibrosing process along the subcutaneous septae (Fig. 9.6). Occasional cases of morphea show preferential involvement of the subcutaneous septae with limited involvement of the dermis. Cases with this pattern have been termed morphea profundus, or deep morphea.

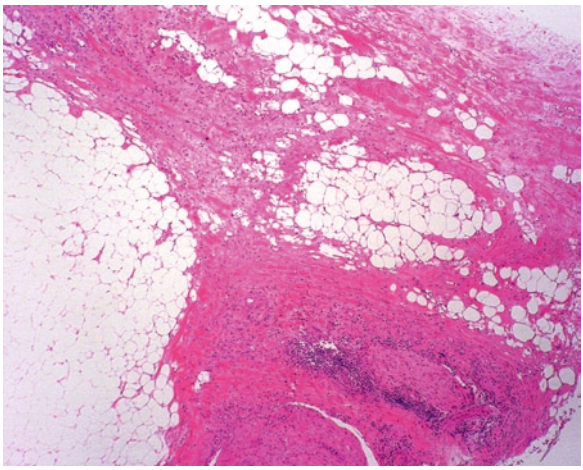

Fig. 9.6 *Deep morphea.* In some cases the process may extend along subcutaneous septae or be centered in the subcutis

Differential Diagnosis

The differential diagnosis of morphea and scleroderma includes each other. They are indistinguishable except by clinical findings. There can be significant overlap with lichen sclerosus, especially in earlier lesions of morphea. The collagen changes of lichen sclerosus are predominantly found in the papillary dermis and superficial reticular dermis. There is usually some evidence of interface change. Interface change is not a typical feature of morphea. There are some cases with sufficiently overlapping features suggesting that at least some cases of lichen sclerosus (usually cases presenting outside the anogenital area) and morphea exist along a spectrum. See the section on lichen sclerosus below for a more detailed description.

It is also important to distinguish morphea from normal back skin. Skin from the back normally has a thicker reticular dermis. As a result, the biopsy may show the "square biopsy" sign on scanning magnification, but does not have the decreased spaces between collagen bundles.

Late stage lesions of necrobiosis lipoidica can simulate morphea. In the former, granulomatous changes can be subtle and fibrosis marked. Both conditions can have plasma cells. A clue to the diagnosis of necrobiosis lipoidica is that an elastic tissue stain will show near absence of elastic fibers, while elastic fibers are mostly preserved in morphea.

Nephrogenic systemic fibrosis, formerly named nephrogenic fibrosing dermatopathy, occurs in patients with renal disease, and most (~90%), but not all, are undergoing renal dialysis. It has been associated with the use of the radiologic contrast agent Gadolinium. Patients develop large symmetric areas of hardened skin on the extremities, often with brawny hyperpigmentation. Histologically, biopsies show an increase in CD34-positive fibroblasts in the dermis and subcutis, associated with

thickened collagen bundles (Fig. 9.7). The fibrosing process of morphea has fewer fibroblasts. Unlike morphea, increased mucin may be seen. Plasma cells are not a feature of nephrogenic systemic fibrosis.

Chronic radiation dermatitis is a complication of radiation exposure. Changes in the reticular dermis can resemble those of morphea with decreased space between collagen bundles and loss of adnexal structures. The dermal blood vessels are ectatic and may show prominent hyalinization. Characteristic pleomorphic fibroblasts, so-called "radiation fibroblasts," help distinguish this entity from morphea/scleroderma (Fig. 9.8).

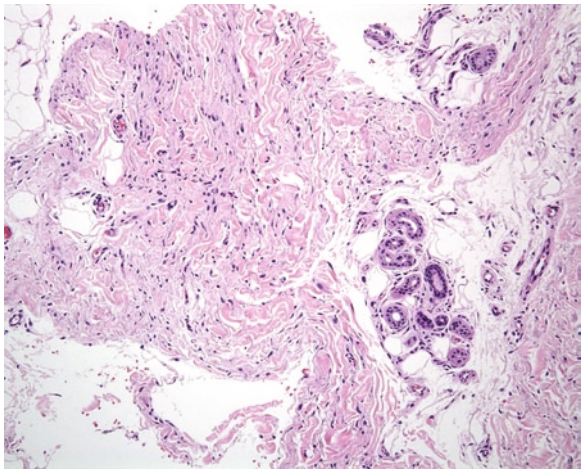

Fig. 9.7 *Nephrogenic systemic fibrosis*. This fibrosing dermatitis is characterized by a proliferation of fibroblasts and dermal fibrosis

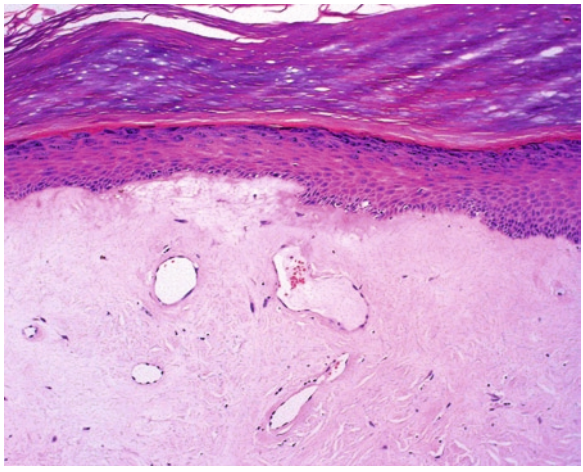

Fig. 9.8 *Chronic radiation dermatitis*. In radiation associated dermal sclerosis, there is dermal fibrosis with ectatic blood vessels and pleomorphic radiation fibroblasts

Eosinophilic fasciitis can be confused with morphea profundus. It is a fibrosing process that extends along fibrous septae with no or only limited involvement of the reticular dermis. Although called eosinophilic fasciitis, eosinophils are only infrequently seen in the biopsy specimen. It is associated with peripheral eosinophilia. Distinction from morphea profunda usually requires correlation with clinical parameters. Eosinophilic fasciitis is widespread, associated with joint symptoms and approximately half of the cases are associated with recent strenuous activity.

Finally, scar can be confused with morphea, especially in later stages of the scar, when the fibroblastic proliferation has receded. For practical purposes, this is less of an issue as a history of trauma, or prior procedure is usually known in the setting of scars. Practical tips are summarized in Table 9.2.

Table 9.2 Practical tips: morphea/scleroderma

- On low power "square biopsy" – but must differentiate from normal back!
- Fibrosis recognized by decreased spaces between collagen fibers of reticular dermis
- Early lesions may not show significant fibrosis but still clinically resemble morphea: look for lymphoplasmacytic infiltrate

Lichen Sclerosus

Clinical Features

Lichen sclerosus, also referred to as lichen sclerosus et atrophicus, presents as white plaques with overlying epidermal atrophy. The atrophy results in a wrinkled appearance to the overlying epidermis. Lesions are frequently pruritic. There is a predilection for the anogenital region, but approximately 20% may present in other locations. There is a small risk (<5%) for development of squamous cell carcinoma, typically in cases involving genital skin.

Microscopic Features

The earliest lesions resemble interface dermatitis with basal vacuolization and a lichenoid infiltrate resembling lichen planus (Fig. 9.9). Basement membrane thickening is a feature as well as telangiectatic blood vessels with or without papillary dermal hemorrhage. Follicular plugging and psoriasiform hyperplasia may be present in focal areas. The epidermis in lichen sclerosus frequently shows reactive changes related to excoriation consisting of compact hyperkeratosis and a thickened granular layer. As the lesions progress, the epidermis becomes atrophic and the characteristic dermal changes develop with edema and homogenization of the papillary dermis (Fig. 9.10). In later lesions, the superficial dermis is sclerotic, resembling

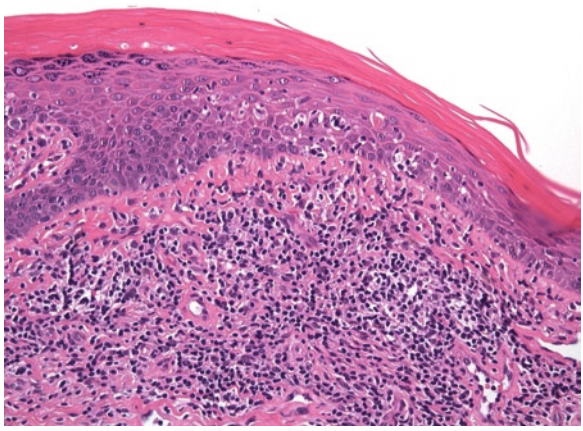

Fig. 9.9 *Early lichen sclerosus* has the appearance of an interface dermatitis resembling lichen planus with a band-like lymphocytic infiltrate, hyperkeratosis and a thickened granular layer

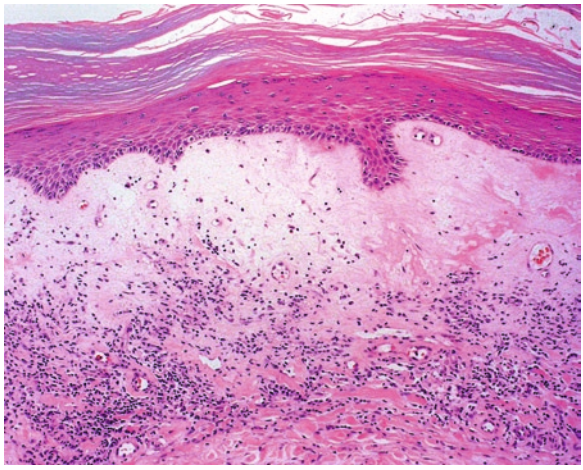

Fig. 9.10 *Lichen sclerosus*. The epidermis has compact hyperkeratosis with some thickening of the granular layer. The papillary dermis has the characteristic edema and homogenization of the papillary dermis. Note how the lichenoid infiltrate is beneath the zone of altered collagen

the changes of morphea (Fig. 9.11). There is a loss of dermal elastic fibers that can be demonstrated by elastic tissue stains, though this is not necessary for the diagnosis. See Table 9.3 for a summary of microscopic features.

Differential Diagnosis

The primary differential diagnosis of early lichen sclerosus is lichen planus. Distinguishing between these entities may not always be possible. Basement membrane thickening and psoriasiform hyperplasia are not features of lichen planus,

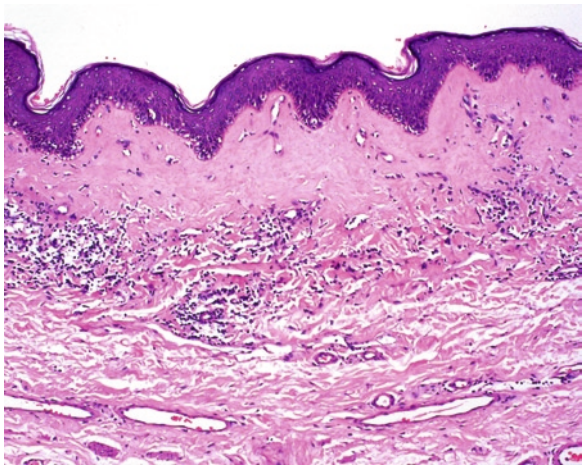

Fig. 9.11 *Lichen sclerosus, late stage*. As the process evolves the papillary dermis can become fibrotic

Table 9.3 Key microscopic features: lichen sclerosus

- Early lesions
  - Lichenoid infiltrate of lymphocytes and plasma cells
  - Psoriasiform epidermal hyperplasia may be present early
  - Basement membrane thickening may be present
- Established lesions
  - Homogenized or sclerotic papillary dermis
  - Scattered lymphocytes and plasma cells beneath altered collagen
  - Atrophic epidermis with compact hyperkeratosis and thickened granular layer

and when present, allows for distinction. Loss of papillary dermal elastic fibers is also not seen in lichen planus. Plasmacytosis mucosae, so-called Zoon's balanitis or Zoon's vulvitis, may also be confused with early lichen sclerosus. In men, plasmacytosis mucosae occurs exclusively on the glans/foreskin in uncircumcised older patients. In women, the labia minora or vestibule are affected, though it is much less common in women. Microscopically, there is a band like infiltrate of lymphocytes and plasma cells, but the epidermis has a different appearance than lichen sclerosus. There is spongiosis, parakeratosis, a diminished or absent granular layer and lozenge, or diamond-shaped keratinocytes (Fig. 9.12). Neutrophils are also commonly seen in the stratum corneum. Established lesions of lichen sclerosus with fibrosis of the papillary dermis can be confused with morphea if the alteration of the collagen extends into the upper reticular dermis. In such cases, it may be necessary to provide a descriptive diagnosis (see sample reports). See Table 9.4.

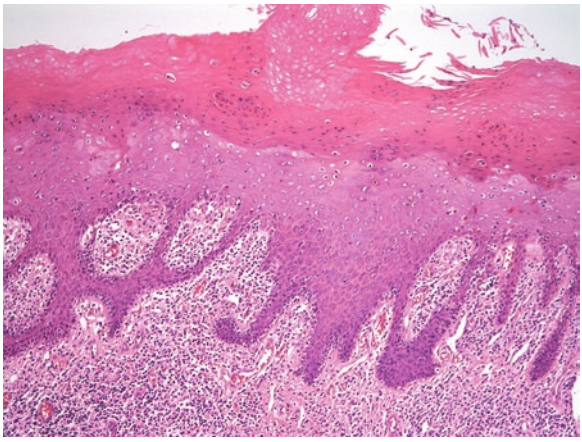

Fig. 9.12 *Plasmacytosis mucosae (Zoon's balanitis/ vulvitis).* Plasmacytosis mucosae also has a band-like infiltrate that can be confused with early lichen sclerosus or lichen planus. The epidermal features are different with spongiosis and a diminished granular layer

Table 9.4 Practical tips: lichen sclerosus

- Consider the possibility of early lichen sclerosus in any interface dermatitis of genital skin
- Distinguishing early lichen sclerosus from lichen planus can be very difficult (i.e., basement membrane thickening and other distinguishing features may not be evident). A descriptive of lichenoid interface dermatitis is acceptable in this situation (see sample reports)
- Remember that lichen sclerosus may occur outside the anogenital area
- In cases with histologic overlap with morphea, a descriptive diagnosis of "sclerosing dermatitis" is appropriate (see sample reports)

Sample Reports: Morphea/Scleroderma

Example 1: This sample report reflects the setting where morphea is suspected, but there is no significant dermal fibrosis.

Clinical history: R/O morphea.

Diagnosis: Superficial and deep perivascular lymphoplasmacytic infiltrate, see comment.

Comment: Within the dermis, there is a mild superficial perivascular lymphoplasmacytic infiltrate. No significant dermal fibrosis is seen. In the appropriate clinical context, this could represent the early, inflammatory phase of a lesion of morphea. Clinicopathologic correlation is recommended.

Example 2: In this example, the clinical diagnosis is not provided, but the features are classic for morphea/scleroderma.

Clincial history: Depressed plaque on trunk.

Diagnosis: Morphea/scleroderma, see comment.

Comment: The dermis shows marked sclerosis characterized by swollen, compacted collagen fibers with loss of adnexal structures. There is a sparse perivascular lymphoplasmacytic infiltrate. Depending

on the clinical presentation, the biopsy findings are consistent with morphea or scleroderma. Clinicopathologic correlation is recommended.

Sample Reports: Lichen Sclerosus

Example 1: This is a sample report for a case where it is difficult to distinguish lichen sclerosus from lichen planus.
Clinical history: R/O lichen sclerosus.
Diagnosis: Lichenoid interface dermatitis, see comment.
Comment: There is some compact hyperkeratosis and a mildly thickened granular layer. Within the dermis, there is a lichenoid infiltrate of lymphocytes with admixed plasma cells associated with interface change. The histologic features are compatible with early lichen sclerosus, but the possibility of lichen planus cannot be entirely excluded.

Example 2: This sample report reflects a biopsy outside the anogenital area where there are overlapping features of morphea and lichen sclerosus.
Clinical history: R/O lichen sclerosus.
Diagnosis: Sclerosing dermatitis, see comment.
Comment: The epidermis is atrophic with effacement of the normal rete peg architecture. There is homogenization of the papillary dermis, and sclerosis of the upper reticular dermis. This biopsy has overlapping features of lichen sclerosus and morphea. Some consider these entities to represent a morphologic spectrum of the same process. Clinicopathologic correlation is recommended.

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