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Diabetes-related skin signs:

what the skin can tell us

Diabetes mellitus is a chronic disease that affects glucose metabolism. It occurs when the pancreas does not produce enough insulin or when there is resistance to it, leading to elevated glucose levels because it cannot be metabolized. When blood glucose remains elevated for a prolonged period, it affects blood vessels, nerves, the immune system, and wound healing. All these changes can be reflected in the skin of our patients and may even be one of the first signs of this disease. In other cases, however, cutaneous alterations appear over time and can provide clues about disease control. In this article, we will review the main cutaneous manifestations associated with diabetes, why they occur, and how they can be treated.

WHY DOES DIABETES AFFECT THE SKIN?

To understand the skin signs associated with diabetes, it is important to know how they occur. This happens because excess glucose in the blood can cause:

- Skin dehydration and alteration of its barrier function, leading to dryness and itching.
- Damage to blood vessels and circulation, reducing the supply of oxygen and nutrients to the skin. In addition, impaired circulation makes wound healing more difficult.
- Alteration of the immune system, increasing the risk of infections.
- Neuropathic alteration (nerve damage), which reduces skin sensitivity, especially in the feet. Loss of pain sensation may delay the detection of injuries.
- Chronic inflammation, which contributes to structural changes in the skin.

CUTANEOUS SIGNS OF DIABETES

Dryness, skin thickening, and itching

Xerosis (skin dryness) is one of the earliest and most frequent signs of diabetes. It can appear anywhere on the body, although it is especially common in the extremities.

Dryness is due to water loss through the skin associated with hyperglycemia. This can cause itching, a feeling of tightness, and the appearance of fissures or cracks, especially on the feet, which serve as an entry point for bacteria and fungi, increasing the risk of infections. Therefore, maintaining good skin hydration is very important for prevention.

Another notable finding is that the skin of patients with diabetes is thicker than that of the general population. This phenomenon is thought to be due to abnormal glycation of collagen in hyperglycemic states, as well as increased collagen synthesis stimulated by insulin. The hands and feet are the most affected sites, favoring joint limitation.

Limitation of joint mobility (diabetic cheiroarthropathy)

Following skin thickening, the joints become contracted, beginning in the fingers, although stiffness may later extend to the wrists, elbows, ankles, knees, toes, and even the spine.

The development of this complication is related to the duration of diabetes and its control, so its appearance is less likely if blood glucose levels are well controlled over time.

Acanthosis nigricans

FIGURE 1. Acanthosis nigricans in the axilla. Image from Hughes EK *et al*. Acanthosis Nigricans. Treasure Island (FL): StatPearls Publishing; 2023. PMID: 28613711. Under CC BY-SA 4.0 license, via Wikimedia Commons.

Acanthosis nigricans is characterized by darkening and thickening of the skin with a velvety texture. It appears more frequently in skin folds such as the neck, axillae, or groin and does not cause symptoms (neither pain nor itching).

It is associated with insulin resistance and may help to suspect it when it appears before the diagnosis of type 2 diabetes mellitus. »

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» *Diabetic dermopathy*

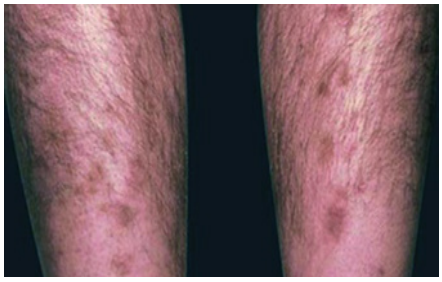

FIGURE 2. Diabetic dermopathy. Image from Duff M *et al*. Cutaneous manifestations of diabetes mellitus. Clin Diabetes. 2015;33(1):40-48. Under CC BY-NC-ND 3.0 license, via Open-I. DOI: 10.2337/diaclin.33.1.40.

Appearance of brown, rounded, or oval spots, usually located on the anterior surface of the legs. They do not cause discomfort and do not require treatment. Their appearance reflects changes in small blood vessels of the skin and usually occurs after several years of diabetes progression.

Bullous diabetic dermopathy (bullosis diabeticorum)

Some people with diabetes develop tense blisters similar to those that appear after burns, but without pain or an apparent cause. They are usually located on the legs and feet. Their origin is still unknown but seems to be related to involvement of small blood vessels in the skin.

Necrobiosis lipoídica

FIGURE 3. Necrobiosis lipoidica. Image from Mendes AL *et al*. Diabetes mellitus and the skin. An Bras Dermatol. 2017;92(1):8-20. Under CC BY-NC 4.0 license, via Open-I. DOI: 10.1590/abd1806-4841.20175514.

It is less common but quite characteristic. It begins as small reddish areas that, over time, become yellowish with well-defined borders. Its usual location is on the legs, in the pretibial region. The skin in these areas is more fragile, becomes atrophic, and may ulcerate easily. Although it is not related to diabetes control, it is more common in individuals with long-standing diabetes.

Escleredema

FIGURE 4. Skin thickening of the neck and back in a patient with scleredema adultorum of Buschke. Image from Kalantari Y et al. Sclerosing diseases of the skin. J Dtsch Dermatol Ges. 2025;23(10):1282-1300. Under CC BY 4.0 license. DOI: 10.1111/ddg.15835.

Appearance of hardened, thick, reddish skin on the upper back and neck, with an "orange peel" appearance.

It is due to the accumulation of collagen and mucin due to inadequate glucose metabolism and microvascular damage.

It is associated with long-standing diabetes mellitus and poor glycemic control. However, improvement in diabetes control does not appear to influence scleredema, which has a complex treatment.

Carotenoderma

Orange discoloration of the skin, mainly affecting the palms and soles, due to increased carotene levels in the blood. This is caused by reduced liver capacity to convert beta-carotenes into vitamin A, as well as metabolic alterations associated with the disease. It is benign and does not require treatment, except for appropriate dietary control.

Facial erythema (rubeosis)

Facial rubeosis occurs due to dilation of blood vessels in the cheeks, probably as a consequence of changes caused by hyperglycemia.

Skin infections

FIGURE 5. Interdigital intertrigo caused by Candida albicans (athlete's foot). Photo by Grook Da Oger, under CC BY-SA 3.0 license, via Wikimedia Commons.

As previously mentioned, skin infections are more frequent in people with diabetes, especially when glucose control is inadequate.

They may be bacterial in origin, such as folliculitis or furuncles (in hair-bearing areas), abscesses (large collections of pus), cellulitis (deep skin infection), or infections around the nails. They usually present with redness, pain, and increased local temperature.

They may also be caused by fungi, more frequently in moist and folded areas such as the axillae, groin, under the breasts, or between the toes and nails. Fungal infections present with redness, itching, or scaling, sometimes accompanied by whitish exudate, as seen in certain types of Candida infections of the skin, oral mucosa, or genital area.

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FIGURE 6. Eruptive xanthomas on the extensor surface of the arms. Image from Shrestha A et al. Eruptive xanthoma as a warning sign of uncontrolled hypertriglyceridemia presenting with acute pancreatitis and uncontrolled type II diabetes mellitus: a case report. Clin Case Rep. 2024;12(6):e8926. Under CC BY 4.0 license. DOI: 10.1002/ccr3.8926.

Eruptive xanthomas
Reddish or yellowish papules that appear over weeks or months, associated with elevated triglyceride levels in patients with poorly controlled diabetes. They are mainly located on extensor surfaces such as the knees, elbows, or buttocks. They improve with better diabetes control.

Diabetic (neuropathic) ulcers
Appearance of painless ulcers in pressure areas, such as the feet. They are associated with loss of sensation due to involvement of sensory nerves, which reduces perception of touch, pressure, and temperature. Without this protection, foot trauma goes unnoticed and may lead to ulcer formation. In addition, impaired healing, circulation changes, and increased risk of infection contribute to worsening and difficulty in healing.

Dry acral gangrene
Necrosis (tissue death) caused by interruption of blood flow, usually in the toes. The skin becomes cold, dry, and wrinkled, with a mummified appearance, brown or black in color. If blood flow is not restored, amputation may be required.

THEREFORE, WHAT CAN BE DONE TO CARE FOR THE SKIN?

Although some skin signs cannot be completely avoided, many can be prevented or improved with simple measures:

- Maintain good glucose control.
- Moisturize the skin daily, especially after showering.
- Use mild soaps and avoid very hot water.
- Dry skin folds thoroughly.
- Regularly check the skin (especially the feet).
- Consult a physician if any lesion does not heal or worsens. D

CONCLUSIONS

- Diabetes can manifest in many ways in the skin, including dryness, redness, color changes, itching, infections, or poor wound healing.
- Proper diabetes control helps prevent and manage these signs.
- Recognizing these changes helps detect problems early and improves patients' quality of life.
- Skin care is an integral part of diabetes management. Paying attention to what the skin shows us can make the difference between a minor complication and a serious problem.
- Patient education and daily self-care are as important as any medical treatment.

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