

# Acanthosis Nigricans: Understanding Causes, Treatments, and Treatments

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**Abstract:** *Acanthosis Nigricans is a common skin condition characterized by dark, thick, velvety patches often found in skin folds such as the neck, armpits, and groin. This article discusses the causes, symptoms, and treatment options for Acanthosis Nigricans, emphasizing its association with insulin resistance and obesity. Early detection and intervention are crucial for preventing more severe health issues. The article also highlights the significance of lifestyle changes in managing the condition and provides practical advice for affected individuals. The purpose of this article is to provide an in - depth understanding of Acanthosis Nigricans, its causes, symptoms, and treatments, with a focus on its association with insulin resistance and obesity. This article is significant as it sheds light on a prevalent skin condition that serves as an indicator of underlying metabolic disorders, emphasizing the importance of early detection and lifestyle changes in managing the condition.*

**Keywords:** Acanthosis Nigricans, Velvety Patch, Dark Neck, Dark Underarms and Thighs and Thick Dirt on Neck Area

## 1. Introduction

Acanthosis Nigricans is a condition that causes areas of dark, thick, velvety skin in body folds and creases. It typically affects the armpits, groin, and neck. It tends to affect people with obesity. Rarely, the skin condition can be a sign of cancer in an internal organ, such as the stomach or liver.

Treating the cause of Acanthosis Nigricans might restore the usual colour and texture of the skin.

Acanthosis Nigricans (AN) is a skin lesion characterized by hyperpigmentation and papillary hypertrophy and is associated with several systemic illnesses.

It is classified into four types (Curth et al):

- Malignant AN (Type I) - a cutaneous paraneoplastic syndrome associated with adenocarcinoma
- Pseudo - AN (Type II) - associated with several syndromes in which obesity and endocrinopathies especially the insulin resistant state co - exists
- True benign AN (Type III) - familial, present at birth or beginning in childhood
- Drug - induced AN (Type IV) It is suggested that most, if not all patients with AN have either clinical or subclinical Insulin Resistance (IR). The IR state is associated with several manifestations e. g., IGT/DM, hypertension, dyslipidaemia, disorders of blood coagulation, accelerated atherogenesis, ovarian thecal hyperplasia and functional hyperandrogenism. Measures to counter IR may delay or prevent these manifestations.

## 2. Specific Statistics

According to some studies, the prevalence of acanthosis nigricans in obese children can range from 13% to 36%.

Among adults, the prevalence can vary widely depending on the population studied, with rates as high as 74% in individuals with type 2 diabetes.

### Symptoms:

The main sign of acanthosis nigricans is dark, thick, velvety skin in body folds and creases. It often appears in the armpits, groin and back of the neck. It develops slowly. The affected skin might be itchy, have an odour, and develop skin tags.

### Causes:

**Insulin Resistance:** Most people who have acanthosis nigricans have also become resistant to insulin. Insulin is a hormone secreted by the pancreas that allows the body to process sugar. Insulin resistance is what leads to type 2 diabetes. Insulin resistance is also related to polycystic ovarian syndrome and might be a factor in why acanthosis nigricans develops.

**Certain Drugs and Supplements** - High - dose niacin, birth control pills, prednisone and other corticosteroids may cause acanthosis nigricans.

**Cancer** - Some types of cancer cause acanthosis nigricans. These include lymphoma and cancers of the stomach, colon, and liver.

### Pathophysiology

Acanthosis Nigricans (also called Velvety Plaques) - this is a thickening of the outer layer of skin resulting in a discoloration of brown - to - black. They can develop in the folds of the armpit, groin and/or neck and can start showing up during childhood or adulthood. Seeing this condition suggests diabetes or simply obesity. In rare cases acanthosis nigricans occurring in other places, such the hands or lips, may indicate an internal malignancy.

**What Causes Acanthosis Nigricans?**

Acanthosis Nigricans can affect otherwise healthy people, or it can be associated with certain medical conditions. Sometimes Acanthosis Nigricans is congenital (something a person is born with). It also can occur as a result of obesity or an endocrine (glandular) disorder. It is frequently found in obese people with diabetes or a tendency towards diabetes and is most common among people of African descent.

Most people with Acanthosis Nigricans have an insulin level that is higher than that of people of the same weight who do not have Acanthosis Nigricans. Eating too much of the wrong foods, especially starches and sugars, can raise insulin levels. There are many other probable causes of Acanthosis Nigricans, including:

- Addison's disease, a condition caused by a deficiency of hormones from the adrenal gland.
- Disorders of the pituitary gland within the brain.
- Growth hormone therapy.
- Hypothyroidism (low levels of thyroid hormone caused by decreased activity of the thyroid gland).

Due to increase in insulin, there is an increase in level of IGF - 1, which binds to its receptor on keratinocytes and fibroblasts. This promotes cellular proliferation and inhibits apoptosis, resulting in thick hyperpigmented skin.

Oral contraceptives – it contains oestrogen and progestin which influences insulin sensitivity and glucose metabolism, which later contributes to hyperinsulinemia.

Rarely, people with certain types of cancer can also develop Acanthosis Nigricans.

**How does obesity cause skin problems?**

Changes in the physiology of the skin in obesity include:

- Altered epidermal barrier leading to increased transepidermal water loss.
- Increased production of sebum by the sebaceous glands.
- A thickened layer of subcutaneous fat leading to larger skin folds and increased sweating (hyperhidrosis).
- Impaired lymphatic flow in the subcutaneous tissue leading to lymphoedema.
- Impaired collagen production leading to poor wound healing.

**Mechanical factors affecting the skin relating to obesity include:**

- Increased pressure on the feet due to the weight.
- Stretching of the skin during weight gain.
- Increased moisture and friction between the skin folds.
- Decreased sensitivity to pain due to poor vascularisation to nerve endings, which can lead to ulcer.

**Dynamic Tests:**

Plasma glucose and serum insulin levels were estimated after a 12 hour overnight fast basally and at 60, 90 and 120 min. after a 75 - gm. glucose load (OGTT). Insulin Tolerance Test (ITT) with measurement of Glucose Disposal Rate (GDR): After a 10 hour overnight fast, 0.1 IU/Kg. body weight of Purified Porcine Insulin was administered, and blood was collected for glucose estimation at - 10, 0, 10, 20, 30, 40, 50 and 60 min. after the injection. Patients were monitored at the

beside for symptomatic/asymptomatic hypoglycaemia using a glucometer.

**Acanthosis in underweight people?**

When acanthosis nigricans develops in people who are not overweight, a medical work - up should be done. Rarely it is associated with a tumour, most commonly of the stomach or gut. In these cases, acanthosis can be seen in extra places, such as the lips or hands and is unusually severe.

**Acanthosis in Children:**

Eating too much of the wrong foods, especially starches and sugars, can cause insulin resistance. This will result in elevated insulin levels. Most patients with acanthosis nigricans have a higher insulin level than those of the same weight without acanthosis nigricans. Elevated levels of insulin in most cases probably cause acanthosis nigricans. The elevated insulin levels in the body activates insulin receptors in the skin, forcing it to grow abnormally. Reducing the circulating insulin by dieting or medication can lead to improvement of the skin problem.

**3. Approach and Methodology****How is Acanthosis Nigricans Diagnosed?**

The diagnosis is made clinically, including a thorough history of current and past medical conditions, family history, and medications. If there is diagnostic uncertainty, a biopsy can be sent for histopathological analysis and confirmation. Abrupt onset in a thin individual should alert the physician to the possibility of an underlying malignancy, prompting an appropriate history, examination, and investigations.

Acanthosis Nigricans association with hormonal disorders:

- 1) **Insulin:** High levels of insulin, often due to insulin resistance, are a common cause. This is frequently seen in conditions like type 2 diabetes and polycystic ovary syndrome (PCOS).
- 2) **Growth Hormone:** Elevated levels of growth hormone, such as in acromegaly, can contribute to acanthosis nigricans.
- 3) **Thyroid Hormones:** Hypothyroidism can sometimes be linked to acanthosis nigricans.
- 4) **Cortisol:** Conditions leading to high cortisol levels, such as Cushing's syndrome, can be associated with this skin condition.

**How is Acanthosis Nigricans Treated?**

Eating a special diet can help reduce circulating insulin and may lead to some improvement of the acanthosis nigricans. Other treatments to improve skin appearance include Retin - A, 20% urea, alpha hydroxy acids, lactic acid, topical vitamin D, and prescription - strength salicylic acid. These are only minimally effective, however.

Acanthosis nigricans caused by a drug may go away once the medication is stopped.

**Treatment for AN includes the following:**

- **Lighten skin colour:** Prescription creams, ointments, and gels.
- **Reduce skin thickness:** Laser treatments.
- **Decrease odour and discomfort:** Antibiotics you apply to the skin and antibacterial soaps.

- **Help clear the skin:** Retinoids (may be a cream or pill)

### Can Acanthosis Nigricans Be Prevented?

When acanthosis nigricans is related to obesity, weight management is an important part of prevention. A diet that contributes to reduced insulin also can help prevent acanthosis nigricans.

Other preventive strategies include treating medical problems that are linked to acanthosis nigricans (such as hypothyroidism) and avoiding medications that tend to cause or worsen the condition (like birth control pills).

### Supplements that may help in managing acanthosis nigricans:

- 1) **Chromium:** May improve insulin sensitivity and help regulate blood sugar levels.
- 2) **Alpha - Lipoic Acid:** Known for its antioxidant properties, it can improve insulin sensitivity and reduce inflammation.
- 3) **Fish Oil (Omega - 3 Fatty Acids):** Can reduce inflammation and improve insulin sensitivity.
- 4) **Vitamin D:** Deficiency in vitamin D is often associated with insulin resistance, so supplementation might help.
- 5) **Cinnamon:** Known for its ability to improve insulin sensitivity and lower blood sugar levels.
- 6) **Berberine:** An herbal supplement that can help improve insulin sensitivity and reduce blood sugar levels.

### We offer these tips to patients who have Acanthosis Nigricans (AN):

Maintain a healthy weight. Obesity is the most common cause of AN in adults and children. Studies have found that people's skin often clears completely with significant weight loss. You can find out what your healthy weight is by calculating your body mass index.

Before using a bleaching cream, exfoliant, or other skin care product to fade the dark colour, ask a doctor if you should use it. These products rarely fade AN and can irritate your skin, making AN worse.

Find out if you have a medical condition that is causing AN. Diabetes and other medical conditions can cause AN. Doing things that improve the medical condition often help to clear the skin.

Find out if a medicine you take is causing AN. Some medicines can cause AN. Be sure to tell your doctor about all the medicines you take. If medicine is causing your AN, you may be able to switch to another medicine.

### What is the Differential Diagnosis for Acanthosis Nigricans?

- **Confluent and Reticulated Papillomatosis** occurs more commonly in females with a mean age of 18–21 years. Reticulation is heterogenous instead of homogenous as seen in acanthosis nigricans. Pigmentation is not associated with peripheral reticulation in acanthosis nigricans.
- **Erythrasma:** characterized by well - demarcated red patches with possible scaling, found mainly in the

intertriginous regions. A Wood Lamp exam showing coral - red fluorescence is helpful in distinguishing it.

- **Intertrigo:** characterised by erythematous patches with possible pruritis and tenderness. It is nonspecific inflammation that is worsened by humidity. History of pruritus and morphology are helpful distinguishing features.
- **Post - inflammatory Hyperpigmentation:** this is localised and site - specific to the skin inflammation, and often there is a history of skin trauma or irritation.
- **Tinea Versicolor:** Hyperpigmentation of tinea versicolor presenting on the neck can be confused with Acanthosis Nigricans. Differentiation can be made by skin scale direct mycology.

## 4. Conclusion

In conclusion, Acanthosis Nigricans is a significant dermatologic condition that often indicates underlying metabolic issues such as insulin resistance and obesity. Early detection and lifestyle modifications are crucial in managing the condition and preventing more severe health complications. Further research and clinical observation are necessary to fully understand the pathophysiology and improve treatment options for patients.

### Diagnosis and Management:

- **Identification:** AN is diagnosed based on its characteristic appearance and distribution. A thorough medical history and physical examination are crucial.
- **Underlying Causes:** Identifying and addressing the underlying cause is essential. This might involve managing insulin resistance, losing weight, or treating hormonal imbalances.
- **Monitoring:** Regular follow - ups are important, especially if AN is associated with underlying conditions like diabetes or potential malignancies.
- **Treatment:** While there is no specific treatment for AN itself, improving the underlying condition often reduces the severity of skin changes. Topical treatments such as retinoids, and procedures like laser therapy, may also be used to improve the skin's appearance.

Regular follow - ups are important, especially if AN is associated with underlying conditions like diabetes or potential malignancies.

The prognosis for AN largely depends on the underlying cause. When associated with benign conditions, addressing those causes often leads to improvement.

In cases linked to malignancy, prognosis depends on the size and type of cancer.

Overall, AN is a significant dermatologic sign that warrants comprehensive evaluation and management to improve the patient outcomes and quality of life.

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