



VITILIGO: A REVIEW

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Abstract : Vitiligo is an autoimmune depigmentation disorder where the body produces antibodies against melanocytes, causing white patches in the body. This chronic condition results in melanin loss, which is caused by stress on melanocytes, the pigment-producing cells in the skin. Often dismissed as a cosmetic issue, vitiligo can have severe psychological effects, impacting daily life. This review provides an overview of current knowledge about vitiligo, including various medical treatments available to prevent progression and induce skin repigmentation. The review also explores the types and treatments of vitiligo and their availability in the market.

Keywords: Vitiligo , Depigmentation , Melanocytes , Melanin, Autoimmune

I. Introduction :

Vitiligo is an autoimmune disorder causing skin depigmentation and white patches, resulting from the combined immune system's destruction of melanocytes [1]. Vitiligo, an autoimmune disease causing selective melanocyte loss, is classified into two major forms: nonsegmental vitiligo (NSV) and segmental vitiligo (SV), influenced by genetic, environmental, metabolic, oxidative stress, and cell detachment abnormalities [2]. An autoimmune disease causes depigmented macules and patches due to melanocyte destruction or skin function loss. These marks appear in various body parts, including skin, hair, and mucous membranes, with macules being less than 1 centimetre wide [3]. The disorder's natural history can be either rapid, stable spread over months, or relentless, persistent spread over years [4]. Vitiligo can be treated through various methods like phototherapy, surgery, and topical therapies. However, current treatments are suboptimal and may not be effective for all patients. Targeted therapies, such as biologics targeting cytokines and small-molecule inhibitors targeting intracellular signaling molecules, are emerging as promising therapeutics for autoimmune diseases. These therapies help understand the molecular mechanism of vitiligo and guide more precise treatment, making them more convenient for patients [5].

II. Epidemiology :

Vitiligo affects 0.5% to 2% of the global population, with equal prevalence among males and females. It grows at every age, but typically occurs in young people aged 10-30. However, almost 50% of people develop vitiligo after age 40. Despite its prevalence, vitiligo is more common in youthful and moderately aged individuals. Non-segmental vitiligo grows at every age, but is more prevalent in young people. Epidemiological studies show that vitiligo is more prevalent in young people [16]. NSV, or non-

Smoking vitiligo, affects both males and females, with women and girls seeking consultation more frequently due to the greater negative social impact. The disease usually develops in young people between the ages of 10 and 30, with 25-50% of vitiligo patients developing it before the age of 10 years, almost half of patients before 20 years, and 70-80% before 30 years. SV tends to occur at a younger age than NSV, with 87% of cases occurring before 30 years and 41.3% before 10 years. The mean age of onset is 15.6 years, with the earliest reported onset being immediately after birth. Most cases are less than 3 years in duration at the time of diagnosis.

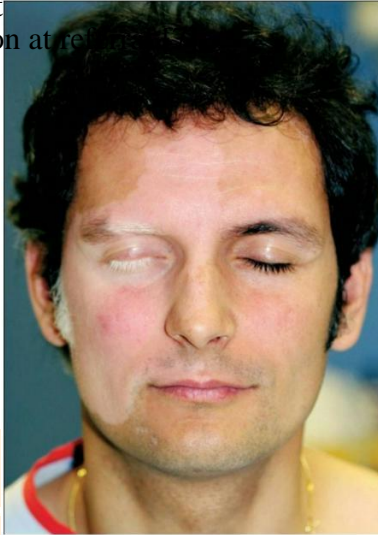


fig1 :impact of vitiligo on face [8].

III. Types of Vitiligo

There are three primary types of vitiligo:

- 1) Segmental Vitiligo
- 2) Non-Segmental Vitiligo
- 3) Mixed Vitiligo

1. Segmental Vitiligo:

Segmental vitiligo is an autoimmune disease that affects about 30% of children diagnosed with vitiligo and responds well to topical treatment. It causes rapid colour loss on one side of the body but can become more stable after 6-12 months. Segmental vitiligo is less common, affecting only 5-16% of people with vitiligo and typically appears at a younger age. It affects areas of skin attached to nerves in the dorsal roots of the spine. Conventional treatments like topical steroids and phototherapy may not work for this type of vitiligo. It is less common and less common than nonsegmental vitiligo.

2. Non-Segmental Vitiligo:

Vitiligo is an autoimmune disease that often appears on both sides of the body, with 90% of cases being nonsegmental vitiligo. It is most common in areas exposed to the sun, such as the face, neck, and hands. Nonsegmental vitiligo develops slower than patches in only one body area and often appears equally on both sides with some symmetry. Some researchers consider subtypes of nonsegmental vitiligo as subtypes. The development of these types is slower than patches in only one area.

- **Acrofacial:** This primarily occurs on the face, scalp, genitals, and fingers or toes.
- **Mucosal:** This condition predominantly occurs in the mucous membranes and lips.
- **Generalized:** Generalized vitiligo is a condition where patches are scattered across various body areas without a specific area or size.
- **Universal:** In this rare type of vitiligo, depigmentation covers most of the body.
- **Mixed:** This rare type of vitiligo can result in both segmental and nonsegmental vitiligo in a person.
- **Rare variants:** This encompasses various rare variations of vitiligo.

3. Mixed Vitiligo

The mixed Vitiligo intersection of both types occurs in rare cases where segmental becomes non-segmental [9,10].

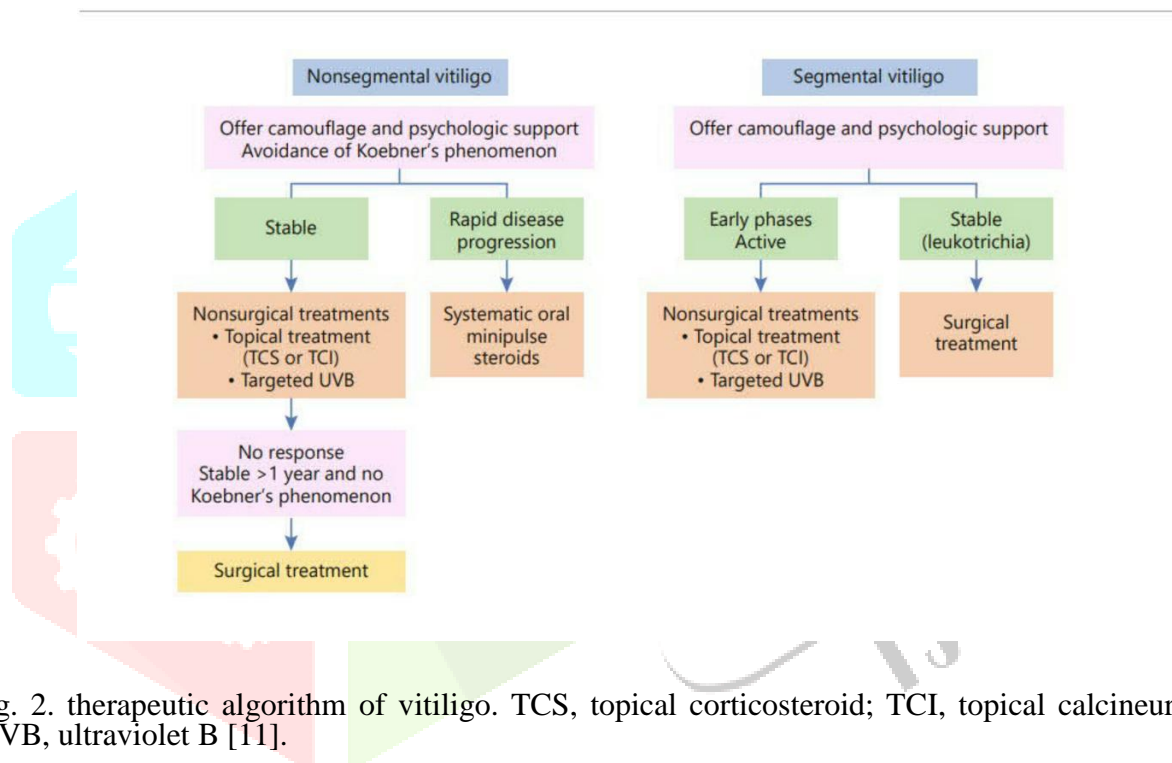


fig. 2. therapeutic algorithm of vitiligo. TCS, topical corticosteroid; TCI, topical calcineurin inhibitor; UVB, ultraviolet B [11].

IV. Symptoms of Vitiligo:

Depigmentation, the primary symptom of vitiligo, is the loss of natural pigment or color, affecting any part of the body.

- Milky-white patches, typically found on the hands, feet, arms, and face, can appear anywhere on the skin.
- Hair can turn white in areas where skin loses pigment, such as the scalp, eyebrows, eyelashes, beard, and body hair.
- Mucous membranes, including the inside of the mouth or nose, are essential for maintaining bodily functions.



fig 3 : milky- white patches on skin [12].

People with vitiligo can also develop:

- Concerns about appearance can lead to low self-esteem or a poor self-image, which can negatively impact the quality of life.
- Uveitis is a term that refers to the inflammation or swelling of the eye.
- The text describes an ear infection [13].

V. Causes:

Vitiligo is a condition where pigment-producing cells (melanocytes) die or stop producing melanin, the pigment that gives skin, hair, and eyes color. The reason is unknown, although it could be connected to:

- An autoimmune condition is a disorder characterized by an imbalance in the immune system.
- Family history (heredity)
- A trigger event, such as stress, severe sunburn, or skin trauma, can lead to a condition.
- An estimated 20% of people with vitiligo have a first-degree relative with the condition due to genetics.
- The autoimmune response refers to the body's immune system attacking and killing melanocytes.
- Oxidative stress, caused by an imbalance between oxygen molecules and antioxidants, can potentially result in vitiligo.
- Environmental factors such as emotional distress, sunburn, or chemical exposure can potentially cause vitiligo.

A family history of vitiligo increases the risk, but certain autoimmune diseases also increase it, with 15-25% of vitiligo patients having another autoimmune condition.



fig 4 : skin impact by vitiligo [14].

Other autoimmune conditions include:

- thyroid disease
- Addison disease
- pernicious anemia
- psoriasis
- rheumatoid arthritis
- systemic lupus erythematosus [15,16]

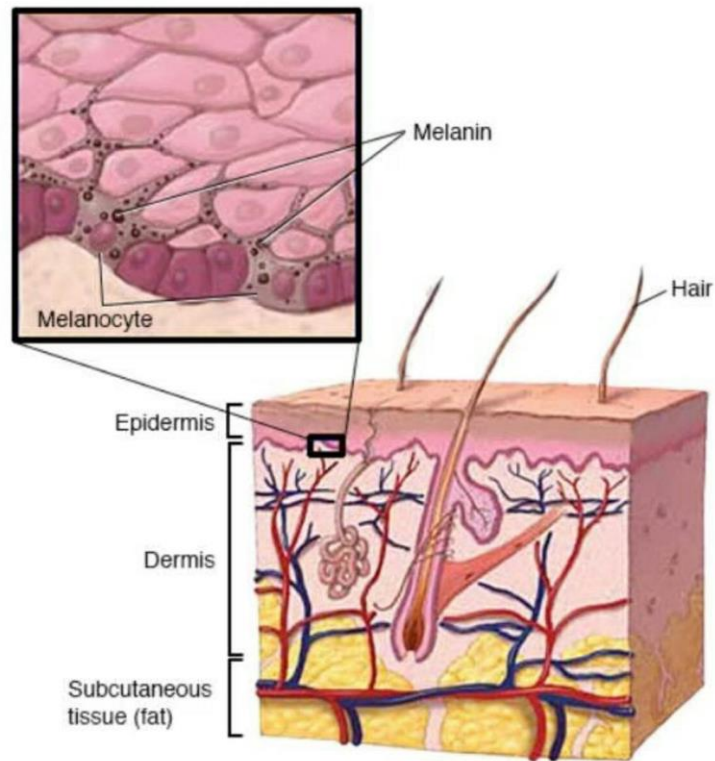


fig. 5 Skin layers and melanin

Melanin is a natural pigment that gives your skin its color. It's produced in cells called melanocytes [17].

VI. Diagnosis:

Vitiligo is diagnosed through a doctor's thorough physical examination, including a close skin evaluation. Wood's lamp, or black light, is sometimes used to examine affected areas, which can cause the affected areas to appear chalky and bright. This ultraviolet light is used to diagnose the condition .

Other tests can include :

- ✓ Blood tests are conducted to detect other autoimmune diseases.
- ✓ An eye exam is conducted to detect uveitis, an eye inflammation often linked to vitiligo.
- ✓ A skin biopsy involves examining a small sample of skin under a microscope to detect missing melanocytes in depigmented vitiligo skin, allowing doctors to diagnose the condition [18].

VII. Treatment:

Treatment for vitiligo aims to restore skin color or even tone, depending on factors such as age, skin involvement, affected areas, disease progression, and life impact. Treatment can slow discoloration and restore normal color, but results can vary and may take months. Several treatments or combinations may be used until a dermatologist finds the best fit. Treatment may not last or prevent new vitiligo development, and some treatments carry serious side effects. A thorough discussion with a dermatologist is crucial to understand potential side effects and ensure the best course of action.

The treatment options may include:

- 1) **corticosteroids**
- 2) **Vitamin-D derivatives calcineurin inhibitors**
- 3) **Photochemotherapy [psoralen plus UV-A (PUVA)** 4) **Topical Psoralen with sunlight (PUVA sol)**
- 5) **Phototherapy (UV-A, narrowband UV-B)** Phototherapy with ultraviolet-A light plus psoralen that is taken internally or applied to the skin. Lasers can be used on small areas. 6)
- Surgical techniques**
- 7) **Excimer laser**
- 8) **Topical prostaglandin E (PGE2)** 9)
- Combinations of topical therapies 10)
- Light treatment**
- 11) **Complementary and integrative therapies** are also used as; ginkgo biloba and levamisole, because of their immune modulating properties.
- 12) **No treatment except for makeup** to even skin tone.
- 13) **Self-tanning products** may be the initial recommendation, but they can be time-consuming and may not result in a natural-looking result.
- 14) **Corticosteroid creams** effectively control inflammation and restore color in vitiligo, but treatment may take months and may cause side effects like thinning, streaks, lines, dryness, and damage.
- 15) **Corticosteroid injections or pills** may be used if vitiligo is progressing quickly.

- 16) Immune-modulating medications may be effective for small, lighter skin cases, but side effects may be linked to lymphoma and skin cancer.
- 17) **Phototherapy**, often combined with corticosteroids or immune system medications, can slow or stop the development of active vitiligo. It takes months to see improvement and six months for full effect. Most people require two to three treatments per week, causing skin redness, itching, and burning.
- 18) **Depigmentation** is a treatment for vitiligo, removing any remaining color and gradually lightening the affected skin to blend with discolored areas. It requires daily applications for nine months to up to four years, causing redness, swelling, itching, and dry skin, and permanently causing white skin.
- 19) If phototherapy and medications are unsuccessful, surgery can restore skin tone by evening out color, but it can also cause infection, scarring, bumpy skin, spotty color, vitiligo patches, or non-recoloration.
- 20) Skin grafting involves transferring small sections of normal skin onto lighter patches.
- 21) Blister grafting involves creating skin blisters through suction and transplanting the tops of these blisters to lighter skin.
- 22) Cellular suspension transplant involves removing normal skin tissue cells and placing them in a solution that is then transplanted to the affected areas.
- 23) Treatment for vitiligo involves developing coping strategies to manage unwanted attention and embarrassment, which can negatively impact mental and social health. Support groups and counseling therapy can help maintain a positive outlook.
- 24) **Skin grafting**
- 25) **Blister grafting**
- 26) **Tattooing** (Micro pigmentation)
- 27) **Tofacitinib citrate, an arthritis drug**, has shown promise in inhibiting Janus kinase, an enzyme linked to vitiligo.
- 28) **Kalpabhati** is a natural remedy that can effectively treat vitiligo.
- 29) **Photochemotherapy**
- 30) **Piperine**, an alkaloid derived from black pepper, has been found to exhibit anti-vitiligo activity.
- 31) **Lifestyle remedies** like daily sunscreen use, avoiding tanning beds and sun lamps, and avoiding tattoos can protect skin and improve its appearance [19,20,21].

VIII. Conclusion:

Modern food habits may contribute to the development of vitiligo, an autoimmune disorder caused by oxidative stress. Despite effective treatments, vitiligo remains incurable. Management involves various therapeutic options, medical, and surgical methods, but complete repigmentation is often unsuccessful. New insights into vitiligo pathophysiology and therapeutic targets could improve disease control and outcome. Further research is needed on surgical method trials.

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