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### RESEARCH ARTICLE

#### A REVIEW ARTICLE ON DERMOGRAPHISM: ETIOLOGY, CLINICAL MANIFESTATIONS AND TREATMENT

V. Supriya, A. Navya Nandini, Satheesh S. Gottipati and Dr. P. Srinivas Babu  
Vignan Pharmacy College, Vadlamudi, Guntur(District)-522213.

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#### Abstract

A common benign condition of the skin in which people show welts or hives on their skin after rubbing or scratching is called dermatographism, also known as physical urticaria or skin writing. And it is the most common form of physical urticaria seen in about 2 - 5 % of the population. Generally, people who are with dermatographism are healthy. Physical urticaria has neither age limitations nor bias towards a particular race or even gender differences. It can appear at any age inclusive of children however, this condition is mostly seen in adolescents. The causes of dermatographia are idiopathic. Its pathogenesis entails the release of histamines from mast cells in the blood. Various symptoms shown by the patients suffering from dermatographism are inflammation of the skin, blisters, and pruritus due to exposure to pressure like belts, waistbands, and tight clothing. After the irritation of the skin, symptoms appear within 5 - 7 minutes with no lasting marks and symptoms which disappear in 30 minutes. It can be as erythematous wheals in the dermis with innumerable causes. Despite fact that dermatographism is typically observed in the skin, it can also affect mucous membranes such as the vulva and oral mucosa (lips). The diagnosis was done based on the history of the patient whereas a dermatographometer is used to confirm the disease condition. Urticaria is classified as symptomatic and asymptomatic dermatographism in which symptomatic requires treatment until the symptoms are subsided while asymptomatic does not require any management. As dermatographia is not mortal, it can be managed by avoiding stimuli and by decreasing anxiety and stress. Avoiding exposure of skin to shear forces completely is likely impossible. So, Antihistamines are used as a first-line treatment including steroids, phototherapy, or immunosuppressive agents.

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#### Introduction:-

Dermatographia or skin writing is termed as an abnormal whealing reaction of the skin because of local trauma<sup>1</sup>. It is the most frequent form of chronic inducible urticaria<sup>5</sup>. It can be seen at any place on the skin however it was least appears on the genitals and scalp. Although in the oral cavity minute oedema appears at the site where pressure has been applied. People with this condition are generally in a good health but many latest studies have reported that dermatographia has occurred in patients suffering from scabies, infections, diabetes mellitus, thyroid diseases, and

**Corresponding Author:- V. Supriya**

Address:- Vignan Pharmacy College, Vadlamudi, Guntur(District)-522213.

also during menopause. The physical urticaria can also be seen after the administration of some drugs like cephalosporins, famotidine, penicillin's & atorvastatin<sup>2</sup>. At times of emotional stress, many physiological factors possibly contribute to urticaria flare-ups<sup>3</sup>.



**Fig1:-** Skin writing<sup>16</sup>

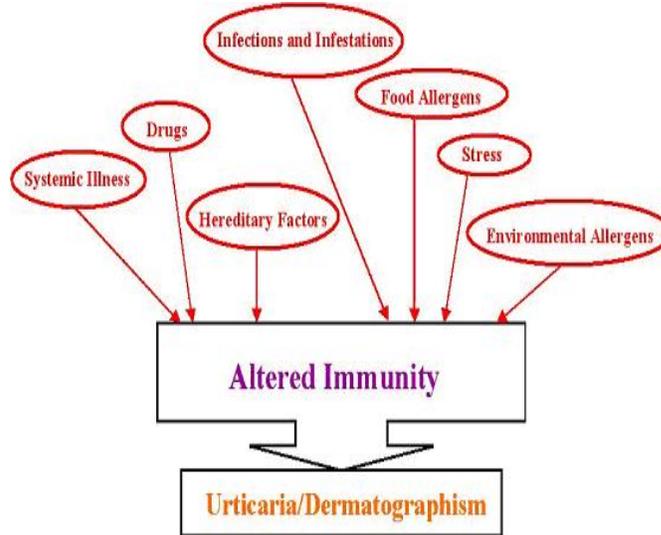
There are various stages in this condition, starting with red lines, later by broadening of the erythema and formation of linear wheal after 2 minutes of pressure which fades away within 45 minutes<sup>2</sup>. It is divided into symptomatic and simple dermographism. Whereas symptomatic dermographism involves mild pruritus, simple dermographism takes place when the axon flare reflex is less in size than the linear wheal of the triple response<sup>7</sup>. Physical urticaria can be seen regardless of age but its incidence peaks in the second and third decades of life. Its significance or clinical relevance is uncertain<sup>8</sup>.

### **Types Of Dermographism:**

Simple and symptomatic dermographism, Follicular dermographism, Delayed dermographism, Cholinergic dermographism, Cold-precipitated dermographism, Exercise-induced dermographism, Red dermographism, Yellow dermographism, White dermographism, Black dermographism<sup>7</sup>.

### **Etiology:**

However, the etiology of physical urticaria is uncertain. The release of histamine is a suspected mediator of erythema, pruritus, and edema<sup>6</sup>. Some studies suggest that deficiency of an enzyme or inhibitor, involving kinins as they are activated by scratching or trauma results in dermographism<sup>1</sup>.



**Fig2:-** Causes of dermatographism<sup>17</sup>

Dermatographism can also be seen after the administration of some drugs like cephalosporins, famotidine & atorvastatin<sup>2</sup>. Many external factors like stress, food, or environmental allergens, normally contribute to flare-ups<sup>3</sup>.

### **Clinical Manifestations:-**

In Physical urticaria symptoms are appeared primarily by physical or environmental triggers<sup>9</sup>. Pruritus can occur in the case of symptomatic dermatographism nevertheless in most cases itching can be seen slightly or even absent<sup>7</sup>. In immediate dermatographism, linear wheals and a red flare appear within 2-4 minutes and settle in 30-45 minutes after stroking<sup>5</sup>.

Whealing and pruritus may be seen after aggressive exercises involving trauma like gymnastics and football. In some people, a hot water bath can worsen pruritus<sup>7</sup>.



**Fig 3:-** Pruritus in dermatographism<sup>18</sup>

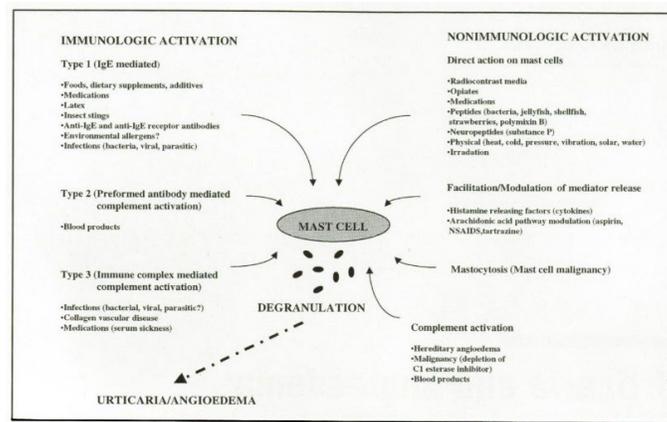


**Fig4:-** Hives in dermographism<sup>19</sup>

In cold contact urticaria, symptoms appear within a few minutes and are only seen at the sites of exposure to cold air or liquids. However, in extensive cold contact (for example., swimming in cold water) it may cause systemic reactions inclusive of shock. Development of angioedema normally appears within 6-8 hours delay in Delayed pressure urticaria<sup>9</sup>. Dermographism with vulvar symptoms can be seen with burning, swelling, itching or pain which can intensify with menstruation, sexual activity or wearing tight clothing<sup>10</sup>.

### Pathophysiology:

As we know that the mechanism behind physical urticaria is unknown. Some factors trigger the antigen which interacts with the immunoglobulin E of mast cells and then releases histamine (an inflammatory mediator) into the tissues. This results in leakage of small blood vessels which allows fluid to accumulate in the skin<sup>12</sup>.



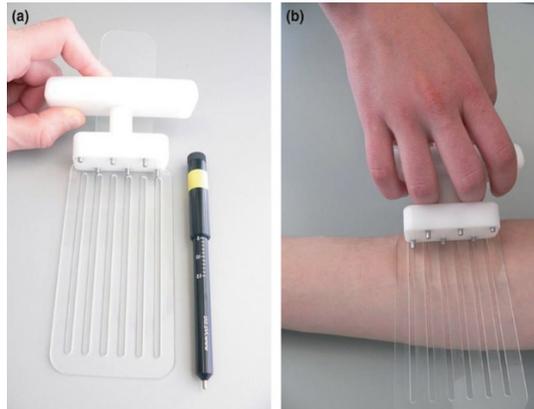
**Fig5:-** Pathophysiology of urticaria<sup>20</sup>

### Diagnosis:

Dermographism is generally diagnosed by noticing clinical responses after using modest pressure on the skin<sup>4</sup>. It can be diagnosed using a calibrated instrument called a dermatographometer which is a firm object used to stroke the skin that provokes wheal & flare responses<sup>11</sup>.

A dermatographometer has a graded stylus that applies uniform pressure over the skin and then reports the response of the skin<sup>4</sup>. This instrument can help in observing disease progress and evaluating therapeutic efficacy<sup>11</sup>.

Another test that is used to determine physical urticaria is the Fric test, it has a plastic comb with six smooth steel tips in two horizontal rows about 20mm apart. To avoid scratching the skin each tip has 3mm of the slightly rounded end<sup>13</sup>.



**Fig6:-** Fric tester (left) and demographic tester (right)<sup>21</sup>

To elicit dermographism from a microcytosis skin biopsy is required<sup>5</sup>. In the case of differential dermographism, false dermographism should be ruled out. It is similar to dermatographism but with a different mechanism. It has several different forms including black, yellow and white.

Black dermographism can be seen after exposure to metallic objects. White dermographism is common in atopic individuals. Due to the deposition of bile in the skin yellow dermographism is seen<sup>14</sup>.

### **Treatment And Management:-**

Some patients do not require treatment as their symptoms are mild. However, 40% of people experience severe itching in their daily lives<sup>15</sup>. Most patients with dermographism are asymptomatic<sup>14</sup>. Avoiding triggers such as temperature, diet, fabrics or dry skin is the best way to treat physical urticaria. Lifestyle modifications might be able to decrease symptoms naturally<sup>15</sup>.

Therapy is required only in the case of symptomatic dermographism which includes H1 antihistamines such as loratadine or cetirizine. Combination with H2 antihistamines treats pruritus if H1 antihistamines are not adequate. A sedating antihistamine Hydroxyzine is appropriate medication and it can be administered before going to bed.

Over-the-counter medication such as vitamin C 1000mg is a supportive therapy taken daily. It helps in degrading histamine.

Some researchers are conducting trials on omalizumab as it is an anti-IgE monoclonal antibody that has 58% efficacy on 300mg and 72% efficacy on 150mg.

Light therapy shows some improvement in treating physical urticaria however patients relapse within 1 to 3 months of completing therapy<sup>14</sup>.

### **General measures to be taken in dermographism:**

Don't wear tight clothes, avoid triggers such as vigorous rubbing with clothes or hot water, treat causes if known such as scabies, and use antidepressants<sup>5</sup>.

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