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Fabric Design for Men's Under Body Undergarment to Improve Dandruff Dermatitis

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Research Article

Abstract

This article is based on descriptive - experimental method, dealing with new designs of men's upper body (or vest) undergarments, which are in two areas of fabric and clothing design with the ability to cure the dandruff dermatitis. Dandruff dermatitis is a skin disease that is more common in men and its initial symptoms are redness, itching and inflammation on the scalp head, face, the area that integrates with the abdomen and upper chest which causes the scaling, inflammation and itching. In this article, an attempt has been made by designing clothes vest (undergarment) and torso that make good contact with the chest area helps to improve the disease. First, the fabric used in this research was electrospun by the active ingredient of Pyrithione Zinc. In the undergarment design section, for better and appropriate coverage in the chest sternum region, two methods were used, as springs in the embroidered box as well as adjustable tape with the ability to separate from the torso. The designs are inspired by motifs taken from embossed molding belonging to the Sassanid period and also unglazed earthenware vases discovered from the Shush region. Finally, clothes were designed that other than just covering the desired area can help to improve dandruff dermatitis.

Keywords: Undergarment; Pyrithione Zinc; Dandruff Dermatitis; Clothes Design

1. Introduction

The vest (or undergarments) is intended to protect the shirt against body sweat and odor. Undergarments also act as a protective layer on the skin against fabrics that may be thick and hard or texture that can irritate the skin. If the undergarment is light, delicate and slight elastic, then the

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outerwear will look very smooth and tidy. People with sensitive skin often complain about the wear of buttons and seams that touches on their bodies. There are also many fabrics that cause itchiness or sensitive skin due to roughness (Hale, 2013).

Until the 18th century, regular bathing was not popular among the people, and therefore wearing undergarment would prevent the clothes from getting dirty (www.medievalists.net). Until the 15th century, some parts of shirts were on display, such as collars and sleeves, and undergarment was worn under the main garment. At the beginning of the twentieth century, the use of undergarments to protect the uniform became common among soldiers. Soldiers in the tropical areas often wore only one undergarment to cover their tops (www.medievalists.net). Then by the Hollywood stars as well as veterans soldiers who continued to use this cover after the end of World War II, evolved into modern T-shirts and current special undergarment. In the book “Eight thousand years of the history of the Iranian tribes clothing”, came across document about clothing of the Medes, which refers to the body short tunics undergarment of the Medes, which the Greeks called ketones. In this book, quoting Strabo and Xenophon: Undergarment (Keaton) is mentioned as a part of cavalry clothing. Also, in the other part of this book, the author writes about the Persian men's undergarment: Underneath the loose, pleated dress, the Persians wore white shorts as well as a tight-fitting white shirt. According to Strabo, it was made of soft white cloth, which is very much similar to the undergarment of recent centuries. Referring to this issue can be a field of research for those researchers who work in the field of clothing history (Ghebi, 2006).

Undergarments are provided either as short or long sleeves and in some cases without sleeves. Also, different types of undergarments with collars, round, seven or v collar, shirt collar, Henley collar, open chest collar, ringer or with the names: baseball, cap sleeve, raglan and shirt have their audience, to be used in different cases and depending on the type of covering. Other factors such as color, type and size of the undergarment are also important. The material of an undergarment, according to its use mentioned earlier, should be prepared with a high percentage of cotton fibers to absorb the sweat and help maintain a normal body temperature with a relaxing and soft feeling. Cool in summer and warm in winter are among the properties of cotton fibers. Also, cotton fibers are anti-allergic and have the least amount of skin reactions. However, synthetic fibers cannot absorb enough moisture and sweat of the body, as a result, it is possible to develop skin disorders and allergies. In addition to natural fibers, some recycled fibers are also used, that many of their physical and chemical properties are similar to natural fibers such as cotton. For example: Bamboo fibers, like silk, have a smooth strand that allows the skin to breathe and stay cool. The fibrous state of bamboo fibers absorbs moisture therefore, any sweat will be absorbed from the skin. Viscose, made from cellulose, is neither a natural fiber such as cotton nor a synthetic fiber such as polyester. Viscose is an inexpensive fabric and, chemically viscose is similar to cotton. Medal fibers are a type of rayon fiber made from beech tree wood and can be combined with cotton or spandex fibers. Spandex synthetic fibers, due to their very high elastic properties, help undergarment to give the person the necessary comfort for daily activities.

Seborrheic dermatitis is a very common complication and many people are unknowingly suffering from this complication. In general, 4% of the world's population has seborrheic dermatitis. Seborrheic dermatitis and dandruff are common skin problems that affect the seborrheic areas. Inflammation affects the scalp, the face, the area that integrates with the abdomen and upper chest, and causes scaling, inflammation, and itching. Dermatitis means skin abrasions that are red and inflamed and cause itchy skin. Seborrhea means that these skin lesions occur in oily areas of the skin; such as the face, scalp, and middle of the chest (sebaceous glands of the skin, or sebaceous glands, are microscopic glands in the skin that produces an oily/waxy substance called sebum (fat).

This substance is secreted to waterproof the skin and hair of mammals) (Gupta, 2004). This problem can occur at any age after puberty and is more common among men than women. Of course, new born may also develop seborrheic dermatitis on the scalp and in the areas that come in contact with the diapers, but this problem will go away after a few months.

No obvious differences in the incidence of the disease were observed between ethnic group. In fact, dandruff starts at puberty, reaches its peak, and its severity is around the age of 20, and it is less common among people over 50 years of age. The symptoms of seborrheic dermatitis vary from person to person. Numerous factors have been suggested as the causative or aggravating factor of this disease which includes: 1- Inheritance, 2- Some infections; such as purulent sore throats; geographical location, and climate (Psoriasis lesions worsen in cold weather, and improve in temperate or hot and humid weather) (Del Rosso, 2011).

Seborrheic dermatitis is thought to be caused by a fungus called Malassezia, and seborrheic dermatitis occurs when the fungus overgrows or the immune system overreacts to it. But what is Malassezia? And how does it behave on the skin? Germinated yeasts are often lipophilic and part of the normal flora of the human skin and warm-blooded animals, including the human scalp, and under certain opportunistic conditions their proliferation increases. (Lipophilic is a chemical compound that has the ability to dissolve in fats). Fluor-normal, or the microorganism in humans that is located on the skin, mucous membranes and digestive tract, and it has affected diseases and disorders such as dandruff and seborrheic dermatitis, which affect more than 50% of humans, and as a result, yeasts in the scalp have increased proliferation, which has increased scaling and physical and mental discomfort. This complication sometimes occurs in moist areas of the skin such as the skin under the breasts, midline of the buttocks, armpits and wrinkles on the abdomen skin. In this case, the skin of these areas becomes shiny and pink and cracked (Sampaio, 2011).

2. Treatment of Dandruff Dermatitis

In the view of modern medicine, this disease has no definitive cure, but it is combated by various methods such as topical treatments, light therapy, systemic and biological drugs. A variety of intrinsic and environmental factors such as fat secretion, skin surface, fungal colonization, individual sensitivity and interaction between these factors, genetic, biochemical studies and research on animal models have been done, to provide better treatment strategies and efforts to provide guidance for future research and treatment (Dessinioti, 2013). Dessinioti has used topical corticosteroids, topical salicylic acid, and antifungal medications orally or topically. In severe and chronic cases, oral antibiotics and even oral corticosteroids are sometimes prescribed. Although there is no definitive treatment for seborrheic dermatitis, but with the said measures, it can be easily controlled. Phototherapy is also widely used to treat skin diseases. This type of treatment is significantly effective and may change the patient's life by eliminating the lesions. Phototherapy is one of the most socially acceptable treatments for the patient. The final result is usually clearing the lesions and eliminating the disease with sunburn (tanning). Principles of Photobiology: Phototherapy is the treatment of skin diseases by devices with non-ionizing electromagnetic radiation with or without the addition of photoactive drugs (UVB), (PDT) and photodynamic therapy (PUVA) include and photo chemotherapy is a combination treatment of a light-absorbing chemical (photoactive) and phototherapy (Foley, 2003). To treat seborrheic dermatitis, the amount of fungus on the surface of the skin must be reduced. For this purpose, special creams and shampoos should be used in a controlled and long-term manner. Also, Steroid creams are used to temporarily relieve itchy skin. In fact, the treatment of this disease is based on the relief of related symptoms, especially itching and maintenance with long-term treatment. Because the main

mechanisms of underlying pathogenesis include the proliferation of Malassezia and inflammation, the most common treatment is with antibiotics and local inflammation. The other widely used treatment methods are coal, lithium coal. Therapeutic methods such as topical inhibitors of calcinurin and metronidazole and the above-mentioned statement are used. But alternative methods have also been reported, such as tea tree oil. Some factors that should be considered before choosing a treatment include effectiveness, side effects, ease of use, and patient age. Interestingly, systemic treatment is required only for extensive lesions that do not respond locally (Clark, 2015). The topical treatments and medications used to treat the disease discussed above. In particular, the studied articles on the effectiveness of topical zinc in the treatment of seborrheic dermatitis to determine its effect on the treatment process, the previous studies have shown that zinc compounds have also been effective in the treatment of this disease (Reeder, 2011; Sánchez-Bayo, 2005). Pyrithione Zinc is pale yellow powder water soluble and has antifungal and antimicrobial properties. Pyrithione Zinc is one of the main treatments for dandruff and seborrheic dermatitis. Topical formulation of pyrithione zinc in the calmative base can be used as an effective topical treatment. Many consumers are exposed to high doses of this drug on a daily basis and have serious concerns about it, but several studies and research done on the estrogenic activity of pyrithione zinc and it is an essential nutrient for humans and effectively prevents UV damage, and it should be noted that Pyrithione acts as a unit to improve zinc absorption. Therefore, further research to address the existing concerns, in addition to the fact that the Food and Drug Administration (FDA) has introduced Pyrithione Zinc as safe and effective against dandruff. It has also been shown to have positive effects, including antifungal properties and no estrogenic activity was found for it (Sánchez-Bayo, 1990).

Pyrithione Zinc is an organic metal compound used as an antimicrobial agent for a wide range of microorganisms. This compound prevents the growth of bacteria, fungi, algae and mold. Pyrithione Zinc is used in many products due to its antimicrobial properties. This compound has been used as a fungicide in anti-dandruff shampoos for decades. Pyrithione Zinc is also used as an antifouling agent instead of tin compounds in ships. Common applications include industrial, adhesive, paint, wire or cable insulation and floor coverings, and for non-textile use and mainly for the treatment of dandruff, dermatitis and psoriasis (Ferioli, 2006; Yamaguchi, 1995).

The nanofiber is compared with ordinary fibers. Electrospinning method can be used for a wide range of materials. Today it is used commercially to produce nanofibers with various diameters. The electrospinning process involves applying an electric field to pull the solution continuously from the syringe needle. In electrospinning, charge will be generated using the high voltage applied to the polymer fluid. When the charge in fluid reaches to a critical value, a direction of fluid forms at the tip of the needle (Zohoori, 2017). The Electrified Jet moves to morphology of the collector plate.

3. Practical Work Process and Materials used in Therapeutic Fabrics

3.1. Therapeutic Cloth Preparation

Due to the difficulty of the chemical reaction between the fibers and the Pyrithione zinc, the use of electrospinning method is a suitable method to combine the fabric with the Pyrithione zinc. Therefore, Pyrithione -zinc material with a voltage of 20 kW, and feeding at the rate of 0.3 ml per minute on a 100% cotton cloth was completed by electrospinning method and then fixed it and prepared to cure the disease. After preparing the fabric and the collected information, design and sketches were prepared. Then the approved five designs were implemented in Photoshop and

Marvullus environment, the necessary explanations regarding the analysis of each of the five designs has been provided.

Table 1 Specification of the chemical material used

Material name	Company name	Specification
100% cotton	Yazd Baf	Weight (100g/m2)
Pyrithione Zinc	Sigma-Aldrich	3266713

After electrospinning and soaking the cotton cloth with pyrithione zinc, an attempt has been made in the next step, to use a therapeutic cotton cloth (electrospun with pyrithione zinc) used in such a way that the surface of the fabric is in direct contact with the chest surface. The four direction of the chest that is up, down, right and left and back of the clothes a elastic fabric to be used to allow the correct method of treatment. It should be noted that in the initial and linear designs, the hatched sections indicate the use of elastic fabrics.

3.2. Practical Workflow and Analysis of Clothes Designing Steps

In this stage, using different and appropriate techniques, with the research method, type of indicators, etc. to study the consistency of the data collected based on the nature of men's upper part undergarment, as well as studies Pyrithione zinc and dandruff dermatitis, to present a suitable clothing design set by considering the body anatomy of the upper body area.

3.3. Upper Body Muscles

Clothes design, that is, undergarment that should have a good and relaxing relationship with the person, especially the sick person with skin disease. Therefore, attempts have been made to make designs according to the anatomy of the human body.

Fig 1 Familiarity with upper body muscles from three directions

Fig 2 Examining the muscle function in the shoulders and armpits

In the upper body, the muscles that need to move freely mut be considered more in designing process. Because when in the process of doing work, the muscles involved have to withstand the pressure of this process in proportion to the difficulty and the amount of energy consumption, and this in turn causes the person to need a cover that meets to sustain these conditions and make it easier for him. Therefore, in some design sections, elastic fabric should be used to make the correct treatment path possible and this creates additional pressure in terms of texture type. Therefore, in the designs process, the design was first designed after studying all the aspects involved in it, both in terms of applicability and type of fabric, and in terms of air passage and comfort. Then, among the sketches made, a number of designs were selected and placed on the image of the upper torso muscle in men, to ensure that the undergarment or torso does not interfere with the freedom of muscle action. In the next step, motifs from the Sassanid era that can be applied in men's clothing were selected and finally the design was executed using Marullus software.

3.4. Initial Sketches

Fig 3 Initial sketch of the first set

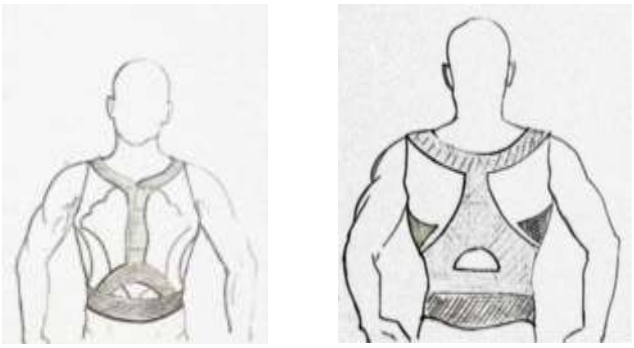

Fig 4 Initial sketch of the second set

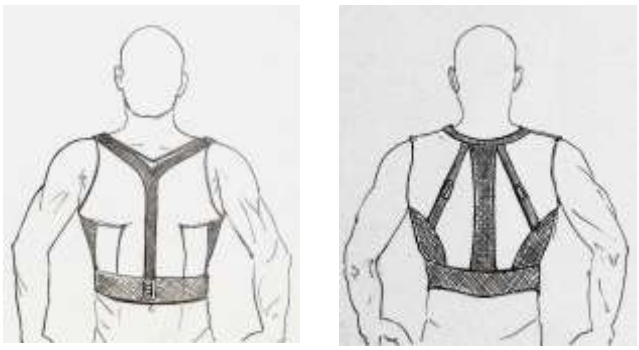

Fig 5 Initial sketch of the third set

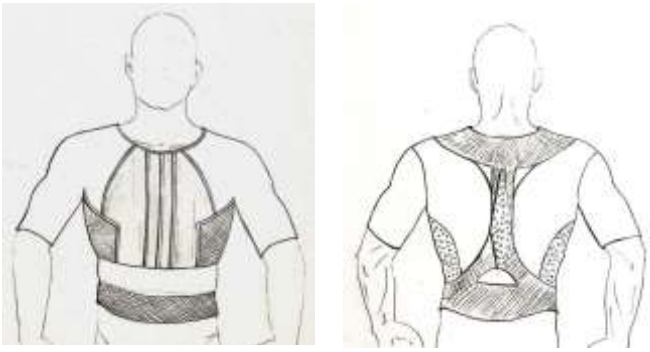

Fig 6 Initial sketch of the fourth set

Fig 7 Initial sketch of the fifth set

In the above figures, the initial sketches are presented and sections of the clothes that are made of elastic fabric are marked with hatches.

4. Analysis of the First Set

In this design, the motif of the Sassanid era is inspired by the unglazed earthenware vase discovered from the Shush region (Tazehibi, 2014), through which the therapeutic cloth was executed in the form of a design on the chest and in accordance with the spread of the disease. The belt part which is shown in gray, is made of elastic material. While implementing in the Marvullus software shows the sewing place of this section. Below one will see that the design is first adapted to the muscular torso and then the final execution done. In connection with the choice and implementation of color, some things were considered, which are as follows: usually, torsos are used today more than undergarment, and the scope of its use has been extended to sports training classes and even sports fields. Therefore, considering the color scheme other than white or cream skin color, which is appropriate for use beneath the shirt, and in terms of not affecting the appearance of outerwear, if used is seen as a functional wear. Also, among the colors, red and blue are more important in sports spaces, especially among men, and also in the medical world today, blue is one of the appropriate color themes. Even to the extent of blue along with white is used in clothes wear. But in terms of color psychology, blue color causes a feeling of calm, coldness, thinking and even in some cases low blood pressure and aggression. According to the above materials, the color was chosen to address both the category of beauty and the effect of color on the patient's mood. So that the patient does not consider the use of the above clothing as a purely therapeutic and imposed and does not separate the patient from other people in the society. As a result, it can be a factor to eliminate the possibility of the stresses and problems that existed for the patient.

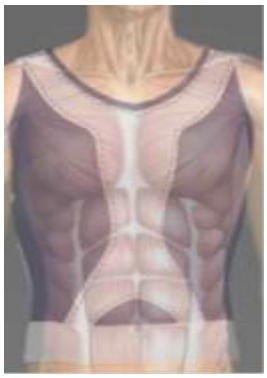

Fig 8 Design execution on the torso

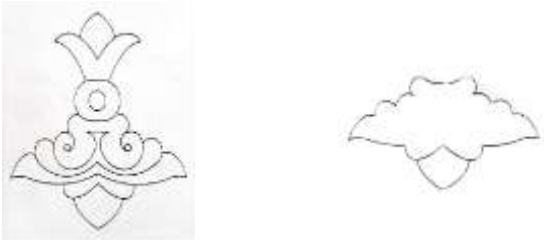

Fig 9 Simplifying the Sassanid motif

Fig 10 Set one

5. Analysis of the Second Set

In the implementation of the second plan, another motif is inspired from the projected molding belonging to the Sassanid period. The therapeutic fabric, which is white and made of cotton, is cut in the shape of the mentioned motif and added to the under lying fabric with a fine lace texture in cherry red color. The use of mesh and elastic texture helps the patient's skin to breathe better by air passing through the fabric and feel cool and comfort. Also, the gray sections in the design show elastic fabric to place the therapist section on the chest and in the sides to prevent the lace fabric from creasing according to its softness and type of texture.

On the back of the torso, the elastic section is displayed in gray, and takes up more space to make the dress look beautiful. Of course, in the semicircular section of the middle shape behind the torso and on the shoulders, here again the lace fabric has been used to make the air move easily in the upper part of the torso. The red color lace fabric was chosen, a color that is psychologically happy and full of energy, and removes the person from isolation and increases the motivation. And it is one of the colors welcomed by men. In studies done on seborrheic dermatitis, various factors are effective in its formation, stress is one of it, in this case it is better to replace red with blue. Of course, it should be noted that cherry color is basically red, that by adding black color slightly reduces its energy.

Fig 11 Sassanid motif

Fig 12 Second design execution on the torso

Fig 13 Second set

6. Analysis of the Third Set

In this design, the elastic section is considered in the form of an adjustable strip with the ability to separate from the torso, so that the patient can, if diagnosed by a doctor, only adjust the box created by the elastic waistband. Whenever not needed can remove the elastic belt from his/her torso. The elastic belt design, in addition to making the therapeutic fabric touch the skin of the body at the chest, also allows the upper part undergarment to be used for two purposes. So that during day-time the patient or individual can use the torso as a white undergarment under their shirt and sometimes use it as a therapeutic. The two designed straps proportionate to the shape of the body are covered from the head region and from the front it is connected to the relatively wide waistband.

It should be noted that the two straps on the front of the dress are in the V-shape and are sewn from the shoulder to the back strap in the shape of a half crescent. It can be adjusted with two buckles on the back and front, and from left and right sides of the back of the dress is attached to the elastic section with a dense and strong white texture attached to the waistband. All the above-mentioned sections can be separated from the torso with a strap that is considered on the belt and the front of the dress. In that case, the undergarment can be used under the shirt only with white and cream color. This product has been suggested only with white and cream colors due to its dual nature. The choice of black color for the two straps and the belt attached to it, in combination with the two colors white and cream, shows masculine dignity. While the two colors white and black create a beautiful and familiar contrast. The color cream, as a calm and hospitable color, shows a gentle and harmonious move on the cloth.

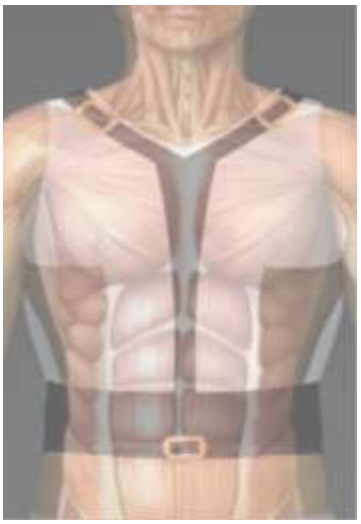

Fig 14 Executing the third design on the torso

Fig 15 Third set

7. Analysis of the Fourth Set

This time, in the design of the torso, instead of using elastic fabric or restraining belts in the middle section of the chest, springs are used in women lingerie for evening or bridal dresses. It creates a hollow in the middle of the chest and the therapeutic cloth is in contact with the skin. The following is an example of the use of these springs. Of course, gray color elastic fabric has been used to keep the torso in good shape and not to change the clothes during the activity, so that the

elastic section moves behind the shoulders and crosses the middle section and the spine and finally connects to the elastic section around the waist. In this design, sleeves have been added and back of the dress, considering the lace fabric with coarse texture, an attempt has been made to create a texture, so that the work is simple and moves the viewer's eye on the work surface. This work is implemented with the cuts and seams created in the front section of the dress. In the design, to achieve the possibility for the therapeutic fabric touch the patient's skin, and by making cuts and seams around the middle part of the chest, can develop the torso out of its simple form and present it with regard to the upper section. The studies related to men's clothing have shown that have used more lines, geometric and angled and surfaces.

In addition to geometric and angular cuts, it is important to pay more attention to the shape of the collar in designing men's clothing. Therefore, the movement of the two blue parts on the back side of the two shoulders and the same movement under the chest area in the front section of the dress and the similarity of these cuts to the bird's wings, overshadows the simplicity of the collar. Using blue color may be a good option for design that resembles the shape of a moving bird's wing.

Fig 16 Pictures of spring embroidery on clothes

Figure showing the position of the springs between the chest and the elastic section under the chest connecting to the shoulders.

Fig 17 Fourth set

8. Analysis of the Fifth Set

First, design a torso with a lace fabric and a delicate elastic texture (used in the crawl section of the chest of women's undergarment) and using the springs in the embroidered box. Then the belt of the lower section of the torso pass through the inside the two stirrups on the left and right seam t-shirt. It should be noted that these stirrups should be large so that if the belt passes through the stirrup, the T-shirt will not be pulled on both sides and no crease created in it. Springs in connect with the patient skin are placed in the joints connecting this section. But since in this part, two different units, namely the torso, which is body's fit, and the T-shirts, which is the free fit of the dress, and these two must be together, hence, the creases resulting from this collision must be seen. Therefore, by using embroidered piece of intertwined strips (or ribbons), an attempt is made to solve this problem. And only the therapeutic cloth and embroidered patches with the ability for air flow through the intertwined strips in the chest section, so as not to cause sweat and harassment to the patient. The following sections are presented briefly. The above T-shirt can be offered in various colors, but the torso must be presented with a cream color and the patient's skin color so that it is not visible under the T-shirt. It should be noted that in the figure, only the middle section of the chest in the torso is shared with the T-shirt, and the other sections of the torso will be hidden under the T-shirt. In all the presented designs, three factors were considered in selecting the fabric; making it possible to cure the disease; comfort and suggesting the best option. Finally, it was tried to make the designs practical and in some cases with the benefit of Iranian art and motifs to be identified.

Fig 18 Marking the torso under the T-shirt

It should be noted that in the figure, only the middle section of the chest in the torso is shared with the T-shirt and the other sections of the torso are hidden under the T-shirt.

9. Conclusion

In this article, due to the lack of appropriate wear to the specific conditions of patients with chest dandruff dermatitis, as well as the problems that have caused this wear to receive no attention, the researcher decided to present new designs of men’s upper body undergarment due to this problem, in order to create good coverage in the middle chest area and to help eliminate the dandruff dermatitis. Therefore, the fabric was electrospun by the active ingredient of pyrithione Zinc. In the undergarment design section, for proper coverage in the chest area, two methods were used, first

the use of springs in embroidered boxes and elastic fabrics, and second adjustable straps with the ability to detach from the torso. The designs were inspired by motifs taken from embossed molding belonging to the Sassanid period and also unglazed earthenware vases discovered from the Shusha region. On the other hand, the colors psychology was used to design these undergarments, and the final work was presented in the form of five designs, each of which was designed with reasoning.

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