

## **Improving the functional properties of three-dimensional fabrics in sportswear for the disabled**

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### **Abstract**

due to motor handicapped sportsman “Disability Challenger” suffering of hard in movement and a lot of Injuries resulting of Friction with Wheelchair or floor during sports practice so the research suggest using three dimension knitted fabric of double fabric to decrease the Friction ration and to realize comfort . Clothing is divided according to the type of activity into work clothes, evening clothes, morning clothes, evening clothes in addition to sports clothes. Sportswear is one of the most important requirements for sports activities for different games. The rapid development of fiber production and the multiplicity of methods and techniques of production according to "modern chemical theories, which relied on more than a technique to acquire fiber new properties in addition to the production of smart fibers have a reaction speed and interact with the nature of use and change the shape and nature according to different variables of temperature difference Or secretions of sweat and physiological changes of the human body associated with exercise of all kinds .so the search aim to Procedure tests on produced fabric of three dimension knitted fabric and the search Importance appear in study The optimal fabric to produce three dimension knitted fabric sportswear to achieve easy to move and achieve high ratio of absorption.

Nine samples of fabrics had produced using different fabric and double knit construction with different space using a gauge (7) flat knitting machine.

The study results showed that The three dimension double layer weft knitted executive methods have an effect on the natural and mechanic properties of the fabrics, and Sample number ( 8 ) of boucle fabric and double construction using cotton/lycra fabric is the ideal sample in (water absorption ,thickness and bursting resistance .so the searcher suggest using it to produce sample.

### **Key words:**

Fashion design –sportswear - motor handicapped –three dimension knitted

## Introduction

The art of design is considered one of the applied arts that depends on both technical and scientific methods without separating them. It is not a skill, but it combines beauty and benefit. Fashion design is one of the most important basic arts.

The clothes are divided according to the type of activity into work clothes, evening clothes, morning clothes and evening clothes, in addition to sports clothes. Sportswear is one of the most important requirements for sports activities for various games. The rapid development in the production of fibers and the multiplicity of methods and techniques for its production, according to "modern chemical theories that relied on more than one technology to give fibers new properties, in addition to the production of smart fibers that have a speed of reaction and interact with the nature of use and change. From its shape and nature according to the different variables of temperature difference or sweat secretions and the physiological changes of the human body accompanying the exercise of all kinds, and among those techniques is three-dimensional knitting, which is one of the modern techniques that appeared in the field of knitting.

Where three-dimensional fabrics are considered one of the modern technological developments, where the interrelationship between all of the scientific, industrial and technical progress plays a role in serving the final product in terms of its properties and aesthetic appearance to achieve the efficiency of functional performance. It depends on the work of protrusion and a decrease in the produced fabrics to obtain the anthropomorphism in the cloth to reach to 3D technology. This study is concerned with the category of people with motor disabilities, a condition in which sufferers suffer from a defect in their motor abilities, affecting the manifestations of their social, mental and emotional development, which necessitates their need for special education. It includes cases of cerebral palsy, spinal disorders, muscle atrophy, multiple sclerosis and epilepsy, which is a state of deficit in the field of bones, muscles and nerves limits their ability to use their bodies naturally and flexibly as normal, which negatively affects their participation in one or more of their life activities and imposes restrictions on their participation in routine school activities, and they may be disabilities of congenital or acquired sources. Despite the handicap of this category of society, they participate in sports in their own courses and win world championships. These courses are known as the Paralympic Games.

The Paralympic Games are the second largest international tournaments in the world. They are the Olympic Games for people with disabilities, whether intellectual or organic. They are held immediately after each Olympic session and are subject to supervision by the International Paralympic Committee for the Handicapped.

These courses are divided into two types: group courses and individual courses. The group courses include wheelchair basketball, seating volleyball, bell ball for the blind and football for the deaf, while the individual courses include strength games for all kinds of disabilities, weightlifting for the physically challenged, swimming and table tennis (Egyptian Paralympic Committee 2017). An exploratory study was conducted in the market and some sports centers for the disabled were also visited and some problems of theirs were found. From this point of view, the idea of this research revolves around the possibility of applying the three-dimensional knitting technique to the clothes of athletes with motor disabilities. We will ensure their comfort, improve performance and endurance, reduce injuries and feel with shocks.

**Research problem**

- 1- Lack of care for sports clothing fabrics for the physically disabled and their suitability to the functional properties of three-dimensional fabrics
- 2- The presence of some injuries during and some playing in a way that is not suitable for the job

**Research Importance**

- 1- Paying attention to the fabrics of sportswear for people with special needs.
- 2- Improving players' performance and reducing injury rates.
- 3- Creating distinctive designs that are compatible with functionality.

**Research Aims**

Access to the best sportswear in terms of functional and aesthetic properties to improve the performance of players

**Research hypotheses**

- 1- There is a relationship between the thickness of the three-dimensional fabrics and the comfort of the physically disabled player and the suitability of sports clothing for performance
- 2- There is a relationship between the absorption of three-dimensional fabrics and the comfort of the physically disabled player and the suitability of sports clothing for performance
- 3- There is a relationship between the explosion resistance of the three-dimensional fabrics and the comfort of the physically disabled player and the suitability of the sportswear for performance
- 4- There is a relationship between the weight of the three-dimensional fabrics and the comfort of the physically disabled player and the suitability of sports clothing for performance

**Research Methodology**

Analytical Experimental Method.

**Search Limits**

Human limits: The research revolves around the category of special needs (people with disabilities).

Spatial boundaries: - Damietta Governorate

Time limits:- 2018/2019

**Results**

At the end of the research, we find that the research hypotheses have been fulfilled, and they can be summarized as follows:-

1. The different executive methods of the three-dimensional weft knitting fabrics with double installation affect the natural properties, the different executive methods led to the difference of (number of rows and columns - thickness - weight)
2. The different executive methods of the three-dimensional weft knitting fabrics with double installation affect the mechanical properties: the different executive methods led to the difference of (the explosion resistance of the fabrics - water absorption)
3. The sample (8) achieves the best quality parameter for most of the physical and mechanical properties.

4. Sample (9) achieved the lowest quality coefficient for all physical and mechanical properties.
5. The heat treatment of double structure weft knitting has achieved the desired purpose of protrusion and depression allowing air permeability.

## Recommendations

- The study recommends making sportswear using three-dimensional knitting of double fitting.
- The category of challengers with disabilities must be taken into account, as they are a category with a high degree of activity and mental abilities that qualify them to excel in all areas.

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