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BODY POSTURE CORRECTION CLOTHES FOR CHILDREN

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ABSTRACT

More and more small children are having problems with bad body posture. In the first phase of their lives correction is easier to accomplish. Different types of body posture correctors have been developed for children but most of them do not offer attractive eyesight to children, so they do not like it. OTKA No. 112506. "3D Dynamic Modeling of the Spine", with the help of OE, BME and SOTE, provides the opportunity to develop a body posture corrector in clothes for pre-school children. The aim of the research work is to provide child-friendly children's wear that can effectively help with proper posture, comfortable to wear and the good for the kindergarten children. The research work analyzes the age, physical and psychological development level of the chosen age group, the age-group of three to six years old. I listen to their movement culture, and the motifs, figures and silhouettes they like as well as the kindergarten fashion. I also analyze the possibilities of improving the childish neglect, the aids used, their design, their raw materials and their operating principle. In design the choice of raw materials is a very important aspect, since stability and comfort, and the free space are equally important to children. Body comfort and proper hygiene are large determined by the basic material, technological development and production of clothing. Using smart textiles to improve comfort, we plan to develop maintenance clothing.

Key words: *bed body posture, body comfort, body correction clothes*

1. INTRODUCTION

Good body posture is important for everyone. Bad body posture can eventually lead to severe spinal problems, so it is important to pay attention to correct posture and to correct the problems that are already present. The most common problem is bad body posture or different spinal injuries. There may be several reasons for their development: this may be due to sedentary lifestyle, weakness of the muscles, anatomical problems or just bad habit.

In today's state of science, orthosis supplies already include compression garments made of a special material that is able to stimulate muscles and provide an effective support level to maximize posture stability.

The aim of the research work is to design a child-friendly children swear that can both help the correct body posture, comfort and aesthetically pleasing children's tastes.

During the design of the dress, I analyze the most common childhood spinal problems and the existed medical aids which their used, their raw materials as well as their operating principles. During planning, it is important to choose the raw material, since stability and comfort, and the free space are equally important for the child.

2. CHARACTERIZATION OF 3-6 YEARS OLD CHILDREN

During this time, the child becomes a sensomotorous person who already talks and can interact with other people. Higher intellectual skills develop after two years of age and their

development is faster and better if the sensory-motor functions are well developed. In the third to seventh year, it is the most important period of sensory motor integration. The brain of children is the most receptive to the various sensations during this period, and can best handle them at this time.

The children have strong urge to learn. They are interested in everything they are very active. He also learns a lot about his own body. The child's responses are adaptive and become more and more complex. Its sensory-motor integration capacity is developed by each complex response.

The child enjoys movement. They are often seen in running, galloping, jumping. These activities will make them happy because it develops their sensory motor skills. They are regularly pushing their boundaries, trying dangerous things, as they also sharpen their senses, learning through them. Games on the playground also help to improve their nervous system. They sense gravity; they learn to fall, their movement more and more skilful. Children of three or six are already using tools. They use to learn the spoon, fork and knife, but also the shovel, rake, and sieve. Learning all these tasks will build upon the information you have learned and stored previously. For adults, these actions are natural, but body sensations are needed to make the brain aware of how to dig a hole in the sand, pluck the soup into the mouth and put it in our clothes.

At the end of this period, you can see clearly, especially for girls, the refinement of motor skills. They play games like hopping school, jumping rope, clapping hands games for which advanced motor skills are required. Boys in this age are more concerned with building games or with sports. (1)

2.1. The fashion of kindergarten children

At the beginning of kindergarten, children learn how to dress on their own, how to use a zipper, wrap a shoelace, and knit buttons. It is practical to give clothes that are easy to pick up, remove, provide enough freedom to jump, play games and of course easy to clean. Especially they wear a little top with pants, and skirts.

At design, however, it should be noted that at this time the relative size of the head is large enough for the body, so it is advisable to secure a closure at the shoulder of the garment with a button or patent so that the small one can easily hide on the neck of the garment. Most children are dressed in patterns that are applied by different techniques to garments. Many printed textiles are already used, but are also popular with screen printing, printed patterns and puff prints.

In this age, children like to express their own taste, have a strong opinion about what they like and what they do not. They like to express this in their dress, they have definite ideas about what they want to wear. Naturally, they are influenced by the media and various tales and animated films. They like to wear the latest games and fashion garments decorated with patterns that their best friend is wearing.

2.1.1. Girls

Most of the nursery girls love to dress. They love to try their mother's clothes, shoes (especially high heels) or dress up for the characters of their favourite fairy tale: princess, fairy, or ballerina with teddy bears, crowns and swimsuit. If they could do these clothes would wear every day, but the majority of the parents are more conservative, so usually in the street or kindergarten they wear only the average clothes in general.

- Colours: The girls' absolute favourite colour is pink, all shades of it are very popular from the worst pinks to the pale, pastel pink. In addition, purple, red, yellow, lighter colours are in the favourites. Of course, everything that is glittering, sequined, pearly, and cute is the desire of the heart of the little girls of the ages.

- Patterns: If we go to a children's clothes shop, we can hardly see uniforms without patterns in for this age group, although there are some simple geometric patterns clothes, like spotted. Most favourite patterns include dressed in fairy-tale figures, princess patterns, and animals (mostly kitten, dog, jasmine, fox) representing pieces of flowers, scents and fruits.

It is very important that in this age group gender identity begins to become aware, so girls love to dress completely differently from boys. First, when time lets you dress in skirts or dresses, and you can also start using accessories: hair bows, haircut, necklace, apron, etc.

2.1.2 Boys

Boys in the kindergarten age also like to hide in the skin of others, to try their daddy's tie, shoes, or dress up as a superhero, princess or athlete.

- Colours: They mostly like to wear "sweeter" colours: blue, green, brown, khaki, orange, and all these shades of cultivation. Among the boys, the sparkling pieces of girlish are less popular.
- Patterns: The absolute favourite of the ages is the super hero pattern. They want to identify with them, be super strong, fly, protect other people. They are also very popular with the design of other figurines and cartoons, dinosaurs, monsters, animals, machines, technical devices (robots, computers, telephones)

3. CHANGES BODY AT KINDERGARTEN AGE

During the three or four years of the kindergarten, spectacular body changes occur, the children are prolonged, the size of the head decreases with respect to body size. (2)

The 4-7 age-old children are scaled, age is decisive, but dress sizes match the height meter in centimetres. The reason for this is that during this period there may be large differences in the height of the children of the same age. This dimensioning helps parents to find the size appropriate to their child. (3) The table 1. shows the changes in the body size of the kindergarten age children.

Table 1: Size chart(3)

Size (year)	**3**	**4**	**5**	**6**	**7**
Body high	98	104	110	116	122
Chest	58	60	62	64	66
Waist	58	59	60	60	61
Hip	64	66	68	68	70

3.1. The body posture

The spine is the axis of the human body, its most important role is the formation of posture. It provides the body free movement at one time and maintains balance and stabilizes the body. Its static role is to dampen the physical forces and vibrations of the body. It also carries the full body weight, protects the spinal cord and internal organs. The backbone connects the lower and upper limbs, as it is connected to the bones of the chest and the pelvic bone. It serves as a stable frame for the bony formulations that attach to the bony formulation, to the tonsils and to the muscles.

The spine is comprised of 33-35 vertebrae and 23 disc intervertebral discs. The spine can be divided into 5 sections, which are the cervical, dorsal, lumbar, sacral and tail bones. In these sections, the vertebral structural features specific to the particular phase can be observed. These differences explain the different functions of each section, but they have the same structure in their bases as the basic

The body posture is the relative position of individual parts of the body. The posture-retaining muscle, associated tendons, joints, and ribbons are involved in continuous and manifold activity in this dynamic equilibrium state.

The functions of human posture should work together to ensure proper holding and movement. Static and dynamic functions have a mutually beneficial effect on each other.

Posture sensation and later control is also a very important task for the body. This requires the help of the sense organs of the human body. With the eyes and our eyes, we perceive how our body stands, and the ear and the balancing body help in the correction process.

One of the prerequisites for correct posture detection is that all joints of the body can be fully and freely moveable because any joint movement may have a negative effect on posture.

Good body posture is when the physiological spine curves show an adequate, harmonious image, and if the body reinstates it as necessary, it improves incorrect holding. To accomplish this, it is essential to have the proper features of the spine and the effective functioning of the body's dynamic parts, muscles, tendons and ribbons.

In the case of proper posture, the human body can be characterized by the least muscular effort to maintain balance; ergonomically this posture is most favourable to the whole body.

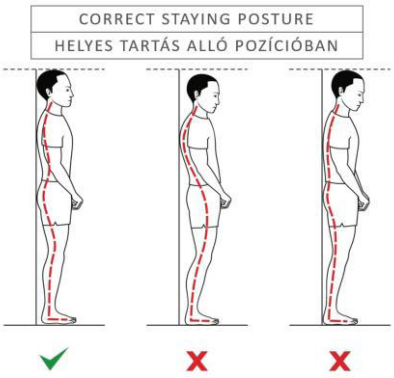

Figure 1. Correct staying posture

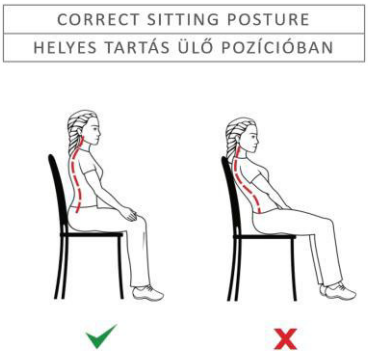

Figure 2. Correct sitting posture

The reflexes in addition to our will and thoughts control the proper functioning of the muscle groups that hold the support. These balancing movements continue to take place when the body appears to be motionless.

The center of gravity also wanders, depending on how some of our muscles work now. In addition, posture is affected by the respiratory technique.

The spinal column's physiological curvatures evolve in parallel with human motion and result in the formation of forces acting on the body as an elastic force.

When the curvature increases, the muscles of the spine need to hold the body in the same position against a greater force, and greater effort is needed. In the case that the curvature of the spine is smooth, the spine loses its elasticity, the function and location of the muscles that move the spine are different. Thus, the muscles become inactive and weaken. In these cases, the spinal column is overloaded.

Balanced equilibrium is essential for posture-retaining muscles so that they can hold the body. The coordination of the transverse muscles is necessary for the joints to be able to stand in the middle position. This co-operation ensures that the joints can move around the entire physiological trajectory.

If the muscles leave something out of the equilibrium for some reason, the uneven loading of the joints will begin, which will lead to dust and other lesions. There may be several causes for the breakdown of the muscle mass, which can be caused by the lack of sport and movement from everyday life, the steady-state static or dynamic force, but can also be caused by tiredness or pain.(4)

3.2. Bed posture

Bad body posture is mention when a scoliosis has not yet, but bad posture is beginning. After a while, it is about to be a constraint, and this can be permanent if it develops in childhood. Neglect and delay treatment for scoliosis and lead to back pain in adulthood. In the case of abnormal support, there is no alteration in the vertebrae, in particular the muscles supporting the spine, the weakness of the musculature of the back. Sometimes, for example, when a child grows suddenly and muscles suddenly cannot stand the bigger weight. However, psychological reasons may be the cause of obtuseness.

There are four types of bed body posture:

- flat back: the back of the back rib and the lumbar cuff decrease, therefore the back flat
- kypholordic back: the degree of thorax is normal but the lumbar spine is increased
- sway back: dorsal bump is normal, but lumbar is enhanced
- convex back: the dorsal rib spreads to the lumbar spine (4)

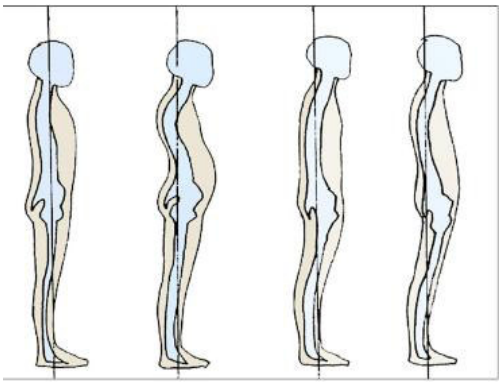

Figure 3. Body postures

4. BODY POSTURE CORRECTION AID

The body posture problems in childhood, first, the physician should consult with you about the movement or use of medical aids. The most commonly recommended forms of motion are the special spine gymnastics, the child's yoga and swimming.

Spine corrector aids are also designed for adults and children. There are devices that provide proper "hold" and strengthen muscles in different parts of the body. In the following chapters, I will present some of the features without completeness.

4.1. Body posture supporting straps

Both straps and pants of different designs are widely used to improve the posture of children and adults. Their principle of operation is that they mimic the body for a good posture with a slight pull and grip, and muscles are motivated to function and strengthen.

– Backing of shoulders
– Adjustable (Velcro, Fittings)
– Stable fastening but at the same time comfortable to move
– Flexible, strong air permeable raw material
– Sponge for convenience
– Suitable for everyday wear, does not weaken the muscles, it only reminds the wearer of the correct holding

– Reverse 8 format
– They often use magnets in them (5)

Figure 4. Posture supporting straps (5)

4.1.1. Body posture supporting belts

There are several solutions to the maintenance belts, which are recommended to relieve the lower back of the spine at the beginning of the problem or in the case of backbone or lower back pain.

- Compression
- Strong canvas, side with rubber bands, or elastic but strong material
- Breathable material
- Adjustable, generally Velcro closure
- Removable scaffolding provides support
- At the back of the sacrum, on the site between the hip and the large moles and the symphysis on the front

Figure 5: Body posture supporting belts (6)

4.1.2. Body posture supporting clothes

Analysis of these tools reveals that devices must be free to move, but they must also keep the body. For this purpose, the DMO system was developed, that is, the dynamic medical orthoses. Their appearance has been made possible by the development of material technology, has been present in foreign practice for more than 10 years, only in Hungary for a few years. The method can be used effectively for over-movement disorders, muscle development disorders and balance problems. (9)

Figure 6: Body posture supporting clothes (7)

5. DESIGN

The main concept of design, using well-known maintenance techniques, is designed to design a child's outfit that has a strong aesthetic function besides its health function; it also meets the tastes of the children and the trends. In the present phase of the research, the design process fulfills only the functional requirements.

5.1. General expectations

When designing children's clothes, we want to take the children's taste in the future. The colours and patterns are tailored to the trend of 2018/19 children's wear, the harmony of colours and patterns, and the children's taste.

The most important requirement for underwear products is that it does not have any health-damaging effect. Parents prefer natural materials (cotton). Children love to wear clothes made of materials that are comfortable to wear and breathability. To create a functional outfit, you will need a high elastic Polyester Lycra blend material, with elasticity providing convenient compression and maintenance support. Strengthening of the reinforcements with additional components, in contact with the skin, does not cause irritation.

It is an important expectation that it is easy to give up on the child and ensure proper holding after taking the picture. During cleaning, do not deteriorate product quality, easy to clean, washable. Do not deteriorate the quality of the material during extended periods of use. The longer you keep your original status.

5.2. Functional clothes design

For the functional design of the dress, I have two models, a little boy (6 years old) and a little girl (5 years old). For both of them, the orthopedic physician diagnosed the negligent condition. Their throats are pressed, their backs convex.

Both children need 3-point correction. The dress is tailored to a unique size. During the first test the metering has taken place. Experimental work is being carried out in the current phase of research work. There are three possible configurations of Figures 7, 8, 9.

Figure 7: Back cross model with elastic pant in front

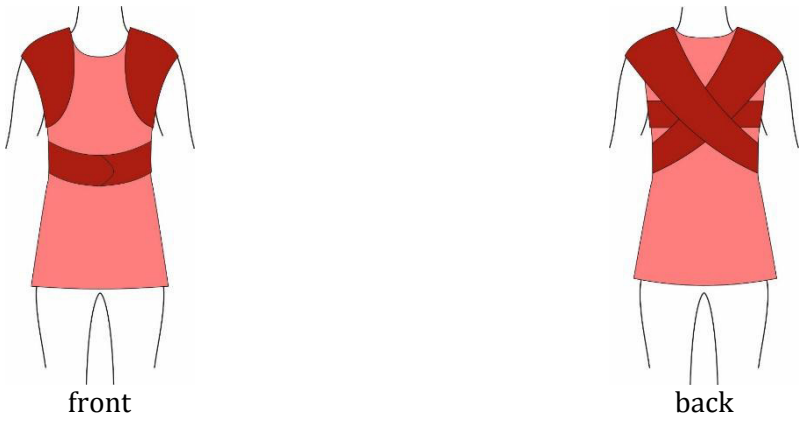

Figure 8. Back cross model +forced pant and elastic pant in waist

Figure 9. Double corss back with elastic pant in front

Conclusion

When designing maintenance-enhancing children swear, the goal is to provide a child-friendly medical aid and wear it as a down jacket in winter and as a t-shirt in summer. The design must take into account the essential characteristics of the orthoses, the parents' expectations and the properties of the available materials. During the research work, the raw materials have been purchased; the patterns are finished for the two models. We are also planning to prepare and test the presented dresses for the children, of course, in consultation with an orthopaedic doctor. In addition, the tests are based on the rehearsals of the clothes, as well as tensile tests, which can turn out to be effective. We want to document the effectiveness of

the dress with the instruments developed by BME for this purpose. The research work is carried out by the OTKA 112506 supported by the competition.

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