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STUDY OF THE PARTICULARS OF POSITIONING OF PREMATURE BABIES FOR THE DEVELOPMENT OF FUNCTIONAL CLOTHING PRODUCTS

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Abstract: *The aim of the study is to present the functionality of clothing products intended for premature babies, developed in accordance with the requirements of care, positioning and monitoring during their stay in the neonatal therapy ward.*
Methods: The analysis of the medical personnel involved in the care of premature children was carried out; analyzed which types of positions are recommended for growth and development. All the positioning procedures were performed in the premises of the Gheorghe Paladi Chisinau Municipal Hospital, by the specialized medical staff.
Therefore, the functionality of the proposed clothing products is aimed at meeting the requirements of neonatal care and facilitating some medical procedures in the case of examination of patients by medical personnel.
Video recordings were made to observe the correctness of the positioning of the children, which will be a source of information for parents who will have the opportunity to get involved, so it can contribute to improving the care of premature children.

Key words: *specific positions, medical procedures, care assistance.*

1. INTRODUCTION

The premature child shows great deficiencies in the basic functions of the body: thermoregulation (it cannot ensure a constant body temperature), breathing, blood coagulation, enzyme, liver and kidney systems, acid-base balance or defense against infections. The appearance of the premature baby changes in the first days. The edemas disappear, which highlights the lack of subcutaneous adipose tissue, the ribs are prominent, the abdominal tone is not developed, etc. Care and correct positioning will ensure normal growth and development.

The Neonatal Intensive Care Unit (NICU) is a hospital intensive care unit specializing in the care of premature and sick newborns.

Within it are specialist doctors, nurses, other professionals and equipment for the care of premature children (figure 1.). When premature babies no longer need the care and specialized equipment of the NICU, they are transferred to the special care ward for premature babies. Each child is closely monitored by an on-call nurse and other specialists.

In the NICU there may be times when the lights are dimmed and it is quiet. This is due to the fact that premature babies need silence and as little noise as possible so as not to create anxiety and discomfort. Most premature babies will be placed in specially designed incubators and covered with a special blanket or will have a heated open cot. These will keep their body at the right temperature, but at the same time they will be monitored by the medical staff.

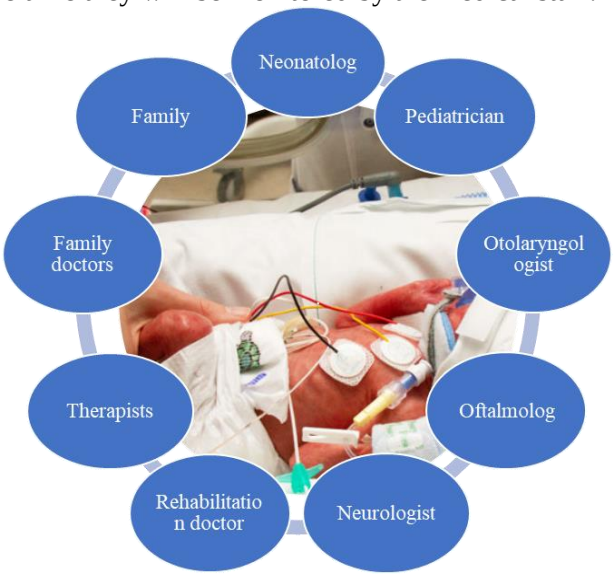

Fig. 1. The staff involved in the care and monitoring of the premature babies

The monitors will beep to alert staff if the child's breathing or heart rate is outside normal limits.

The following participate in the care and monitoring of premature babies:

- Specialized nurses: Each child in a NICU has an individual nurse at the bedside. This nurse is highly qualified, having additional studies in breastfeeding newborns, in addition to a nursing degree. The child nurse will be able to tell the most things about the condition of the child, the parents.
- There are also section managers NICU usually a nurse who is in charge of the whole unit.
- Neonatologists: Facilitate the adaptation of the premature baby and monitor the vital functions. Recommends nutrition and prescribes treatment, makes recommendations to other specialists.
- The Otorhinolaryngologist: treats infections of the nose, throat and ears, indicates audiological testing.
- The Ophthalmologist: performs the ophthalmological examination in the maternity ward, establishes the diagnosis, treats and dynamically follows the changes related to retinopathy of prematurity, prescribes the treatment.
- Neurologist: periodically examines for the detection of neuro-motor, social, cognitive developmental delay, prescribes treatment and makes recommendations if necessary.

- Therapists: a physiotherapist participates who positions the child, does gymnastics and corrects bad positions; the speech therapist helps to recover swallowing/feeding deficits; the psychologist participates in the attention deficit testing and the occupational therapist in the acquisition of life skills.

In the NICU there are also other professionals to help both parents and premature babies, these are social workers and pastoral workers. These staff can communicate and help with answers to some of the challenges of having a baby in the NICU – for example, worry and anxiety, family complications or concerns about the baby's development.

The care of the premature child in the NICU is aimed at the assessment and individualized care for the development of premature children. It focuses on the needs of the child and their family.

The need to reduce the child's stress during daily medical care by protecting sleep, reducing noise and providing body and soul warmth through the involvement of parents.

Parents are the ones who create a family environment full of love, warmth in which both parents are involved in the growth and development of the child.

Nurses follow each baby carefully and determine all their individual needs, form a complete picture of how the premature baby reacts and copes.

2. THE IMPORTANCE OF FAMILY INVOLVEMENT IN THE CARE OF PREMATURE INFANTS.

Family-centered care in the NICU is considered the best approach to care. It is a method of having a team that has a common goal, the well-being and proper development of the premature. Choosing the treatment and monitoring the condition of the premature child with the involvement of family members is a considerable support.

Positioning and handling premature babies are important for developing movement and helping the baby feel safe. Premature children are observed to be physiologically hypotonic [1-3], subject to the effects of gravity and immobilization on a firm surface for prolonged periods. Malpositioning can lead to postural disturbances, such as muscle imbalances and the development of a “flattened posture” [3-4], which have the potential to impact future development [5-7]. Correct positioning of preterm infants can reduce these disorders without harmful effects [6], [8-10]. The benefit of correct positioning is increased comfort and reduced stress in children [8-11].

The therapeutic positioning represents the recommended positions (table 1.) for the care of premature babies, these are the following inclined, supine and side lying. Some assistive tools are also used only in the hospital premises such as a blanket roll and the nest.

A nest gives the premature baby boundaries to push, which will remind him of the limits he had in the womb. Pushing against the edge of the nest will make him feel comfortable, safe and calm. It will also strengthen their bones and muscles.

Creating a nest is done in a few simple steps (figure 2):

• A "nest" is created using diapers or rolled blankets (depending on baby's size) in a "U" shape to provide boundaries against and minimize the effects of gravity.

Fig. 2. Steps in Creating a "Nest"

• Cover the rolled blanket with foil, flattening the top of the "U" shape and emphasizing the curve by conforming the wrap around the curve.

Premature babies love the feeling of a nest around their body and head. The child should be able to freely move his hands towards his face or change his position. A "cocoon" can be used to make the baby feel even tighter. This is done by placing a sheet over the baby's back and around the nest.

3. RESEARCH METHOD

The study focused on identifying the main positions recommended by the medical staff who care for premature babies that contribute to their growth and development. The preparation of some guides for parents would be useful sources of information and satisfaction of an efficient mechanism of collaboration between parents-children-medical staff.

Newborn positioning guidelines and practices should support optimal infant positioning and sleep while performing essential care giving activities. When developing guidelines for positioning practices, the following are recommended:

• appropriate standardized positioning strategies using alternative positioning media. Children positioned with alternative supports rather than traditional positioning methods (blanket rolls) have less asymmetry at hospital discharge [12];

• the premature baby positioned and handled in flexion, maintains alignment during all nursing activities;

• the position of the premature infant is evaluated with each experience and modified to support symmetrical development;

• positioning supports are removed in preparation for sleep.

Table 1. The recommended positions are as follows:

Position description	Figure
The inclined position (Figure 3.): a. Keep the head in a neutral position or with the chin slightly tilted towards the chest, to avoid hyperextension of the neck. b. Hands are allowed to be in close proximity to the face. c. Keep the shoulders rounded and fall forward using a baby nest (or similar positioning aid). d. The legs are kept hidden under the body and supported with limiters. e. Total hip abduction (frog-leg position) is avoided. f. A linen roll is placed under the chest and abdomen for support. g. Ensures hips are positioned below head level.	 **Fig. 3**
Lateral lying position (Figure 4.): a. Keep the head in the middle position. b. Supports the back and neck in a "C" shape. c. Keep the upper shoulder in a neutral (not retracted) position. d. Support is provided so that the back is slightly rounded. e. Hip and knee flexion is encouraged. f. Keep the legs flexed with limits for leg support. g. Support the side-lying position with swaddling or a heavy blanket roll around the infant's flexed back, this position will promote hands-together or hands-to-face movements in the midline.	 **Fig. 4**.
The supine position (Figure 5.): a. Keep the head on the midline or as close to the midline as possible. b. Avoid excessive neck flexion/neck extension and maintain slight neck extension especially for extreme preterm infants in order to have the head in a neutral position. c. Keep the shoulders rounded forward. d. Support (a roll of linen) is provided behind the shoulders to keep them slightly forward. e. Support the legs in flexion against strong limits for the leg to support. f. Hip and knee flexion is encouraged. g. Aids are used to achieve optimal positioning, such as a nest, blankets, linen rolls, and sheepskin.	 **Fig. 5.**

Bent and symmetrical postures are promoted by encouraging:

• Flexion and adduction of the shoulder and hip.

• Neutral ankle alignment with dorsiflexion. Neutral alignment of the head and neck whenever possible. Trunk flexion.

• Providing positioning aids and bedding according to the individual needs of the preterm: soft bedding such as sheepskin, nests and safe limits or swaddling should be used to maintain a

comfortable position and prevent skin problems. Water blankets or gel or water pillows are recommended to avoid abnormal head formation.

• Alternating position every 2 to 3 hours or when care is needed.

• Avoiding the use of oversized diapers, which can lead to hip external rotation and "frog leg" abduction.

• Ensure proper positioning of lines (such as endotracheal tube, nasogastric or nasogastric tubes, cardiac leads, or intravenous lines) to prevent tension, which can lead to deformation.

• Monitoring of breathing, color, oxygen saturation, heart rate, respiratory rate.

• Monitor the infant for behavioral cues that suggest discomfort and the need to change position.

• Observing each developing infant's ability to determine appropriate positioning and bed positions.

• Preparing the child before discharge by gradually removing limits and positioning aids.

• Initiate supine positioning before discharge so that children can adapt to sleeping positions at home [13-17].

4. RESULTS

The models developed as a result of the research carried out are original and designed in accordance with the requirements imposed on clothing for premature babies.

The clothing products were made of natural materials (100% cotton), which will allow the child's skin to breathe and provide protection against various chemicals and pathogens. The elements of the products were processed by edging, and the ends of the products were processed by covering seams. The designed products meet all the requirements and standards related to the manufacture of clothing for premature babies who have low weight.

Therefore, the functionality of the products was achieved by:

- structural elements for folding the front and back elements;
- closing systems positioned on the ends of the products, by simply attaching staples to the side lines, shoulders, product termination, etc.

The functional products proposed for this category of wearers are shown below and were dressed on a 44 cm mannequin:

a) b)

Fig. 6. Functional clothing products: a) overalls with sleeves; b) bodysuit with sleeves.

As a result of the recommendations and observations made by the medical staff, the clothing products were designed according to the need to facilitate the provision of medical assistance in a

short time and efficiently to premature babies in the NICU. The development of models of clothing products for prematurely born children took into account the following aspects:

• They meet the requirements, are functional and ensure good thermal insulation and monitoring of the child. and perform the following functions: functionality, thermal insulation and monitoring;

• Facilitates the following medical procedures:

- connecting to medical equipment for monitoring temperature, cardio-respiratory system, heart rate, respiratory rate;
- fixing therapy equipment (catheters, etc.);
- medical control to monitor the health status of the child.

5. CONCLUSIONS

Premature babies in the NICU are recommended the following: less noise, suitable lighting, minimizing pain, minimizing handling, avoiding strong smells, involving parents, relaxing as much as possible; care must be in quiet, separate, comfortable areas, and performed by the same responsible medical staff.

The benefits of the products depending on the correct positioning of the children.

The positioning of the premature baby in the NICU will be carried out by the competent staff, special attention will be given to those born prematurely under 32 weeks of pregnancy.

It is proven that the correct positioning of the premature has the following benefits:

- ✓ To provide postural support that has both an immediate and lasting impact on child development.
- ✓ To improve the shape of the head.
- ✓ To help protect fragile skin and joints.
- ✓ To promote flexion, proper alignment, isolation and comfort.
- ✓ To promote neurobehavioral and neuromotor stability of the infant.
- ✓ To improve oxygenation and support reduced activity and crying.
- ✓ To restore the state of sleep and increase the time spent in peaceful sleep.
- ✓ To reduce unnecessary energy expenditure and stress.
- ✓ To facilitate self-soothing behaviors and help the infant's organizational ability.
- ✓ To provide sensory exploration of self and environment.

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