Psychomotor development of a child with arthrogryposis in the context of standards for normal psychomotor development

Olga Supryn[1]

[1] Józef Piłsudski University of Physical Education in Warsaw, Poland

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Abstract

Background: Arthrogryposis multiplex congenita (AMC) is not considered as a separate disease entity, but rather a descriptive diagnosis that is used to label more than three hundred individual conditions of various aetiologies. A therapy for a child with arthrogryposis is a challenging and lengthy process aiming at achieving maximum functional capacity. A crucial component of physiotherapy is setting realistic therapeutic goals and working with the child's parents or carers to ensure continued improvement.

Aims: Analysis of the psychomotor development of a child with arthrogryposis in the 1st year of life in the context of standards for normal psychomotor development, as well as a review of the literature on arthrogryposis and the psychomotor development in the 1st year of life.

Material and methods: The study investigated the case of a girl with arthrogryposis affecting the joints of the upper and lower limbs. The case study method was used, with the following techniques: interview (with the child's mother), analysis of medical records and photographic documentation, and scale and test techniques (based on a point evaluation of the child's spontaneous activity using the "Functional Assessment Scale for Preschool Patients". Assessments were carried out monthly for the first year of the girl's life.

Results: Based on the conducted observation and scoring of the child's spontaneous activity carried out with the "Functional Assessment Scale for Preschool Patients", the studied girl with arthrogryposis in the first 12 months of her life showed mainly a moderate level of activity in the area of fine motor skills (dexterity), while in the area of self-service she had a moderate and high level of activity, which is a favourable prognostic factor for her quality of life.

Conclusion: The examined child with arthrogryposis shows a delay in psychomotor development during the first 12 months of life. The child has not reached all the developmental milestones predicted for the 1st year of life. In order to support psychomotor development, it is essential to implement early, comprehensive, and multidisciplinary rehabilitation and to use appropriately selected orthopaedic supplies.

Key words

arthrogryposis, psychomotor development, case study.

Introduction

The term "arthrogryposis" was introduced in 1903 and is derived from two Greek words: arthro meaning joint and gryposis meaning bent, twisted; the term describes a syndrome of congenital multi-joint contractures of unknown aetiology [1].

Arthrogryposis multiplex congenita (AMC) is not considered as a separate disease entity, but rather a descriptive diagnosis that is used to label more than three hundred individual conditions of various aetiologies. A common characteristic of these conditions is the presence of congenital, mostly non-progressive joint contractures, occurring in at least two different areas of the body. The above classification includes the so-called classical arthrogryposis- amyoplasia, the clinical features of which are symmetrical, severe contractures usually affecting both upper and lower limbs. Congenital contractures are defined as a restriction of passive and active range of motion in a given joint or joints with associated structural and/or functional abnormalities of the surrounding soft tissues such as the joint capsule and periarticular ligaments [2-4].

Arthrogryposis is one of the rare diseases, meaning it is a condition affecting 1 person in 2000 and less frequently [5]. Arthrogryposis is diagnosed in one case per 3000 births, with equal incidence in both genders [6-9]. Other sources estimate the incidence of these cases in Europe at 1:12 000 of the population, with one-third being fatal [10].

According to scientific reports, physiotherapeutic improvement in a child with arthrogryposis should be carried out early, comprehensively, and multidisciplinary, with the cooperation of a variety of specialists: paediatrician, orthopaedist, medical rehabilitation physician, and physiotherapist [4,11]. An orthotist, who can select the most suitable orthopaedic supplies according to the needs of a patient, should also take part in therapy [2].

It is crucial to ensure that the treatment process is tailored to each child individually but also that the general principles of improvement in arthrogryposis are followed. Firstly, the use of isolated treatments and rehabilitation does not result in improved functional status and increased joint mobility. Preventative treatment must be complemented with surgical procedures to release in the soft tissues surrounding the joints and the use of orthopaedic supplies to improve mobility and consolidate the achieved correction. However, the deformities have a strong tendency to recur, which must be mentioned to the child's parents, whose active participation in the rehabilitation process is essential [1].

A therapy for a child with arthrogryposis is a challenging and lengthy process aiming at achieving maximum functional capacity. Neurophysiological methods such as NDT-Bobath and the Vojta methods, and at a later stages also neuromuscular rolling, can be used in the improvement process according to the Proprioceptive Neuromuscular Facilitation (PNF) concept. Depending on the case, manual therapy can also be used to improve or maintain joint mobility. Pool exercises and swimming lessons, occupational therapy, dog therapy, music therapy, and other forms that motivate the child to move can complement the therapeutic approach. A crucial component of physiotherapy is setting realistic therapeutic goals and working with the child's parents or carers to ensure continued improvement [6]. This should be an integral part of the therapy and should include instructions on proper care: putting the child down, changing positions, carrying, feeding, and other activities carried out with the child [11].

Techniques employed to increase joint mobility include: relaxation massage and stretching within the muscle attachments (mainly myofascial release techniques), joint mobilisation controlled by ultrasound, corrective kinesiotaping applied on the dorsal side of the hand to stimulate carpus and finger joints extension, foot mobilisation in accordance with the Ponseti method, plaster casts on the lower limbs placed for 7 to 10 days to shape the structures of the foot, to obtain a greater range of passive mobility in the ankle joints, and to emphasise the use of the obtained range of

movement in different situations and at different speeds. Developmental stimulation techniques include: positional therapy, stimulation of sensory systems, proprioceptive stimulation for hand opening, techniques employing reflexes to stimulate upper limb function, head holding etc., and stimulation of the sucking reflex [10].

Aims

The aim of this study was to evaluate the psychomotor development of a girl with arthrogryposis in the first 12 months of her life in the context of standards for normal psychomotor development, and to describe her medical history.

Material and methods

The research material was obtained from the mother of a female child, born on 20/01/2019 at 41 weeks. Natural childbirth without complications, Apgar score was 9 points. At the beginning of the pregnancy the woman developed a haematoma on the uterus, which had absorbed by the 12th week. Further course of pregnancy was normal. At birth, the child exhibited severe osteoarticular deformities, impaired passive and active movements of the limbs, which turned out to be congenital multiple-joint contractures characteristic for arthrogryposis. In addition, the right hip joint suffered a grade IV dislocation and both lower limbs were plastered to correct the clubfoot. The infant was placed under specialist medical care after birth and was hospitalised for 8 days. Since the 2nd week of her life, she has been under the care of the Arthrogryposis Treatment Centre of the Children's University Hospital in Krakow where she was diagnosed with arthrogryposis [12].

In the 9th month of life, the girl had a surgery on her dislocated right hip joint. Physiotherapeutic methods (Vojta, NDT-Bobath, PNF) were used in the child's rehabilitation, elements of the Sensory Integration Method were introduced as well as osteopathic and manual therapy techniques [12].

The girl is now 14 months old and the set goals in her rehabilitation is to stand on her own and work on the axial alignment of her right lower limb, which tends to rotate externally at the hip joint. The child is under constant care of an orthopaedic surgeon and requires orthopaedic treatment (orthoses to correct clubfoot and orthoses for upright standing) [12]. In the course of this disease, rehabilitation services are also necessary as they aim to develop the best possible level of independence for the child and therefore the family additionally takes private services. The child's parents are qualified physiotherapists, which also increases the availability of therapy [12].

From the parents' accounts, the girl achieved developmental milestones, which are graphically depicted in **Fig. 1**.

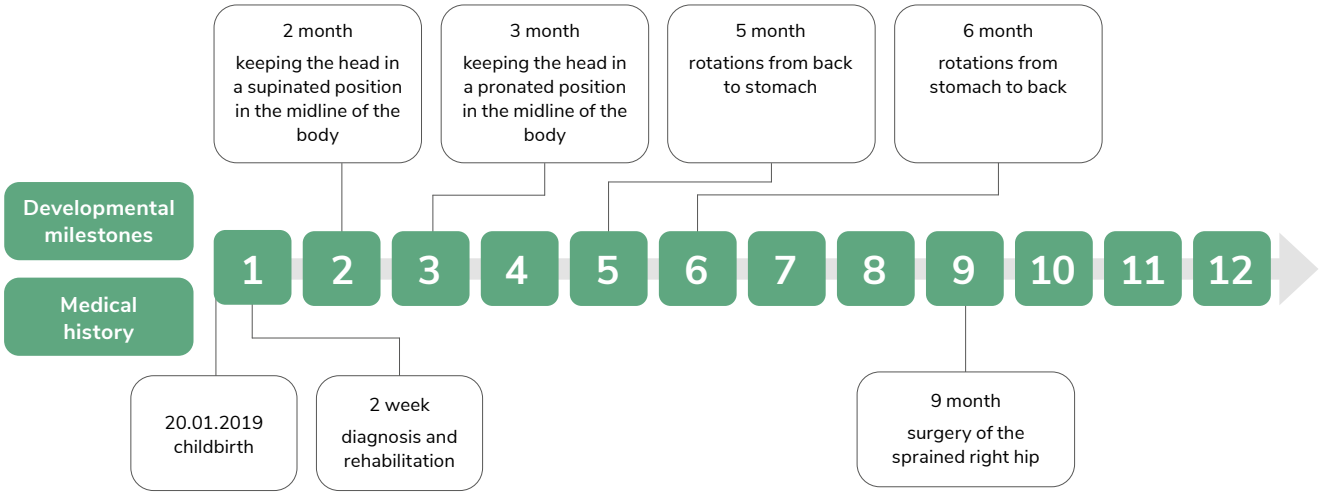

Figure 1. Timeline showing the developmental milestones reached by the child in the first year of life based on the key medical history data [12].

The child still does not crawl, does not sit up on her own but when sat down she can hold the position from when she was 14 months old. She does not stand on her own, verticalization started at 14 months of life. The greatest changes in the child's development are evident in the mobility of individual joints and in fine motor skills. According to the mother, the child's psychological and social development is satisfactory, she makes eye contact, reacts to sounds and follows toys with her eyes. During specialist visits (paediatrician, orthopaedist) and physiotherapists, no abnormalities concerning cognitive development were observed, only problems related to and resulting from mobility restrictions in the joints, which are the essence of arthrogryposis [12].

This research was carried out for the purposes of a master's thesis [12] with the use of the individual case study method in which techniques such as: interview (with the child's mother), analysis of medical documentation (hospital discharge, health booklet), and photographic documentation provided by the parents were employed, in addition it was based on a point assessment of the child's spontaneous activity evaluated using the "Functional Assessment Scale for Preschool Patients". The evaluations were carried out monthly for the first 12 months of the child's life using assessment cards: postural control, motor control, dexterity, and self-service in similar, optimal, and comfortable for the child conditions (she was rested, changed, and fed). Points of 0 to 2 were given based on the adopted criteria for evaluating the child's various skills, their interpretation was provided under each table (**Tables 1-4**) containing a summary of the assessed areas in each month of the child's life. The point evaluation carried out during the child's 1st year of life was supported with information on the child's current functional status at 14th month of life, which, due to prevailing Coronavirus pandemic at that time, was obtained by phone from the girl's mother. Observation of the child's spontaneous activity was combined with responses to questions posed to the child's parents. On this basis, the following values were determined (points 1-5):

1. Individual activity indexes in each of the four domains indicated above, obtained using the following formula:

$$\frac{\text{activity index (AI 1, AI 2, AI 3, AI 4)}}{\text{age of child in months}} = \text{total score}$$

Legend: *AI 1 – in terms of postural control; AI 2 – in terms of motor control; AI 3 – in terms of dexterity; AI 4 – in terms of self-service.*

2. Activity level for each of the four domains indicated above, where the range of activity index values (AI 1, AI 2, AI 3, AI 4) corresponds to the following child activity levels (AL 1, AL 2, AL 3, AL 4): 0-1= very low, 1-2= low, 2-3= medium, 3-4= high:

Legend: *AL 1 – in terms of postural control; AL 2 – in terms of motor control; AL 3 – in terms of dexterity; AL 4 – in terms of self-service.*

3. Global activity index (GAI) obtained using the following formula:

$$\text{global activity index (GAI)} = \frac{\text{(AI 1+AI 2+AI 3+AI 4)}}{4}$$

4. Global activity level (GAL), where the range of Global Activity Index (GAI) values corresponds to the following child's GAL: 0-1= very low, 1-2= low, 2-3= medium, 3-4= high.

5. Changes in the activity rate in the course of development, the so-called trend line.

Changes in the activity index during the course of development, the so-called trend line. Each activity indicator, including the global activity level, provides a measure of the child's current activity level, the higher the child's global activity level and in terms of specific domains (postural control, motor control, dexterity, self-service), the higher its value. The trend line allows for precise tracking of the change in activity level over time due to increasingly detailed activity index values and shows changes in the functional status of the same child during psychomotor development.

Results

This research assessed child's individual abilities regarding the assumption and maintenance of postural control (**Table 1**) and evaluated their performance: in motor control (**Table 2**), dexterity (**Table 3**), and self-service (**Table 4**).

Table 1. Assessment of psychomotor development of the studied child in the field of postural control in particular months of the first year of life [12].

Age (month)	Abilities	Score
1.	while lying on the stomach shows a flexion position of the lower limbs while lying on the back puts the head asymmetrically - once on one cheek and once on the other	0 1
2.	while lying on the back, holds the head in the midline for a few seconds while lying on the stomach, demonstrates a short burst of support on the forearms and wrists	2 1
3.	while pulling up from the supine position, keeps the head in the axis of the spine while lying on your stomach, supports on elbows and keeps head in the midline for at least 1 minute	0 2
4.	while lying on back lifts up and holds the pelvis resting on the head and feet (sternum) while lying on back lifts up and holds the pelvis and bends in all the joints of lower limbs	0 0
5.	while lying on one side or the other, holds the position for about 1 minute (head raised above the ground) while lying on the stomach, holds the position on one forearm (body weight is on the extended side)	1 0
6.	while lying on the stomach, holds the support on both straightened upper limbs and open hands (temporarily pulls the stomach off the ground) while holding under arms, stands on straightened lower limbs	0 0
7.	while supporting with hands in front between lower limbs, holds a sitting position while supporting on one upper limb assumes and maintains a slanted sitting position	0 0
8.	maintains a quadriplegic position holds a sitting position with arms at sides	0 0
9.	assumes and maintains a sitting position with a straight back and straightened lower limbs (straight sit) stands by the equipment for at least 1 min.	1 0
10.	sits stably without support (e.g. on a chair) assumes and maintains at least 1 minute of straight kneeling	0 0
11.	stands and holds for at least 1 minute on one leg stands by equipment for at least 1 min holding on with one hand	0 0
12.	stands unsupported for at least 30 s squats from a standing position but will not rise back to a standing position	0 0

Legend: *0 – the child cannot assume and maintain the position, 1 – the child assumes the position with physical help and maintains it independently, 2 – the child assumes and maintains the position independently.*

Table 2. Assessment of psychomotor development of the studied child in the field of motor control in particular months of the first year of life [12].

Age (month)	Abilities	Score
1.	demonstrates an automatic gait while lying on the stomach, moves the head from side to side	0 1
2.	while lying on their back, alternately lift their lower limbs slightly above the ground (kicking) while lying on their stomach, raise their head above the ground in the median line	0 2
3.	while lying on the back lifts both lower limbs simultaneously above the ground and holds them for about 1 minute while lying on the stomach lifts the head up and turns it to both sides	0 2
4.	while lying on the back lay down on one side and then on the other side while lying on the stomach, shifts the weight of the body supported once on one elbow and then on the other	1 0
5.	while lying on the stomach performs the so-called swimming pattern while performing asymmetric front support, pulls the knee under the abdomen on the unsupported side	0 0
6.	rolls from back to belly while lying on the stomach, rotates on its own axis (clockwise)	2 0
7.	rolls from stomach to back performs a pattern of asymmetric crawling	2 0
8.	swings on all fours: laterally (from hand to hand and from knee to knee); in front and back (from hand to knee) and up and down (towards the heels and back) changes position from a slanted sit to a quadruped position and back	0 0
9.	quadrupeds asymmetrically stands up on equipment	0 0
10.	moves in straight kneeling position walks around furniture with a back-and-forth step holding on to it with both hands	0 0
11.	walks on the spot (holding on with both hands) walks with a step back and forth holding on with one hand	0 0
12.	walks forward while held by two hands goes up and down stairs on all fours but cannot get down	0 0

Legend: *0 – the child cannot perform a motor activity, 1 – the child performs a motor activity with physical assistance, 2 – the child performs a motor activity independently.*

Table 3. Assessment of psychomotor development of the studied child in the field of dexterity in particular months of the first year of life [12].

Age (month)	Abilities	Score
1.	has both hands fisted and the thumb tucked into the fist demonstrates an active hand grasp reflex	2 2
2.	periodically opens hands u puts thumb in mouth and sucks on it	2 0
3.	brings both hands together in the midline and puts them in mouth holds a small object (rattle) in their hand and moves it	1 2
4.	while lying on the back, grasps an object with both hands in the median line while lying on the back reaches out his hand to an object on the same side of the body and touches it (grip from the side)	2 1
5.	while lying on the back, reaches out a hand to an object on the opposite side of the body and grasps it (grabbing beyond the center line) while lying on the stomach in support on one forearm, reaches forward with the free hand to a toy, grabs it and puts it in the mouth	2 0
6.	while lying on the back, grasps with the whole hand (straight hand grip, no thumb opposition) passes objects from hand to hand, shakes them, and taps them	0 2
7.	while sitting, grasps an object above the head with one hand and then the other while lying on the back, reaches symmetrically both feet and puts them to the mouth (foot/foot, hand/foot/mouth coordination)	0 0
8.	grasps toy particles with index finger and thumb (tweezers) uses both hands to play, rotates toy in hands	2 2
9.	puts a bottle in the mouth and takes it out, holding it with two hands takes off the cap (or diaper over the face)	2 2
10.	claps both hands grips an object with fingertips (pincer grip)	1 2
11.	bumps two toys against each other drops and picks up a toy	2 1
12.	waves a hand as good-bye (doing "bye-bye") can stack one toy on top of another	2 2

Legend: *0 – the child cannot perform a motor activity, 1 – the child performs a motor activity with physical assistance, 2 – the child performs a motor activity independently.*

Table 4. Assessment of psychomotor development of the studied child in the field of self-service in particular months of the first year of life [12].

Age (month)	Abilities	Score
1.	has an active sucking and swallowing reflex has an active seeking reflex along the entire nerve V	2 2
2.	has an active seeking reflex from around the mouth sucks vigorously from the breast or bottle	2 2
3.	puts hands in mouth places pacifier in mouth and takes it out	0 0
4.	releases one object from hand to reach for another gathers food with upper lip from spoon	2 2
5.	bites off a bite moves food around in mouth with tongue	2 2
6.	takes and swallows food served otherwise than from the breast (bottle, spoon) displays chewing and grinding movements of the gums	2 2
7.	holds a bottle to the mouth while feeding with hands accepts different consistencies and textures of foods	2 2
8.	drinks from a closed drinking cup picks up small objects with index finger and thumb	2 2
9.	eats by putting properly prepared pieces of food into the mouth shows objects of interest with a finger	2 2
10.	lifts and pushes large objects uses hands to lift food to mouth and bites off pieces of soft food (e.g., crisps)	0 1
11.	picks up food with a spoon drops small objects into the hole	0 0
12.	opens cabinets, pulls out drawers, and opens boxes to pour out contents inserts and removes toys from different places	2 2

Legend: *0 – the child cannot perform a motor activity, 1 – the child performs a motor activity with physical assistance, 2 – the child performs a motor activity independently.*

Next, individual activity indices were calculated for each month of the child's life for each of the four domains assessed (AI 1 – for postural control, AI 2 – for motor control, AI 3 – for dexterity, AI 4 – for self-service) and the GAI; fractional values were rounded to the thousandths (**Table 5**).

The corresponding child activity level for each of the four domains assessed (AL 1 – for postural control, AL 2 – for motor control, AL 3 – for dexterity, AL 4 – for self-service) and GAL were then assigned to the above values, as shown in the following table (**Table 6**).

On the basis of the obtained values of the activity index the so-called trend line was determined, showing the changes in the course of development for each of the four assessed domains (AI 1 – for postural control, AI 2 – for motor control, AI 3 – for dexterity, AI 4 – for self-service) (**Figure 2**) and the GAI in each month of the child's life (**Figure 3**).

Table 5. Individual activity index values for postural control (AI 1), motor control (AI 2), dexterity (AI 3), and self-service (AI 4), and GAI for each month of a child's life [12].

Age (month)	**AI 1**	**AI 2**	**AI 3**	**AI 4**	**GAI**
1.	1	1	4	4	2.5
2.	2	1.5	3	4	2.625
3.	2	1.667	3	2.667	2.334
4.	1.5	1.5	3	3	2.25
5.	1.4	1.2	2.8	3.2	2.15
6.	1.167	1.333	2.667	3.333	2.125
7.	1	1.429	2.286	3.429	2.036
8.	0.875	1.25	2.5	3.5	2.031
9.	0.889	1.111	2.667	3.556	2.056
10.	0.8	1	2.7	3.3	1.95
11.	0.727	0.909	2.727	3.182	1.886
12.	0.667	0.833	2.833	3.25	1.896

Table 6. Activity level of postural control (AL 1), motor control (AL 2), dexterity (AL 3), self-service (AL 4), and GAL for each month of a child's life [12].

Age (month)	**AL 1**	**AL 2**	**AL 3**	**AL 4**	**GAL**
1.	very low	very low	high	high	medium
2.	low	low	medium	high	medium
3.	low	low	medium	medium	medium
4.	low	low	medium	medium	medium
5.	low	low	medium	high	medium
6.	low	low	medium	high	medium
7.	very low	low	medium	high	medium
8.	very low	low	medium	high	medium
9.	very low	low	medium	high	medium
10.	very low	very low	medium	high	low
11.	very low	very low	medium	high	low
12.	very low	very low	medium	high	low

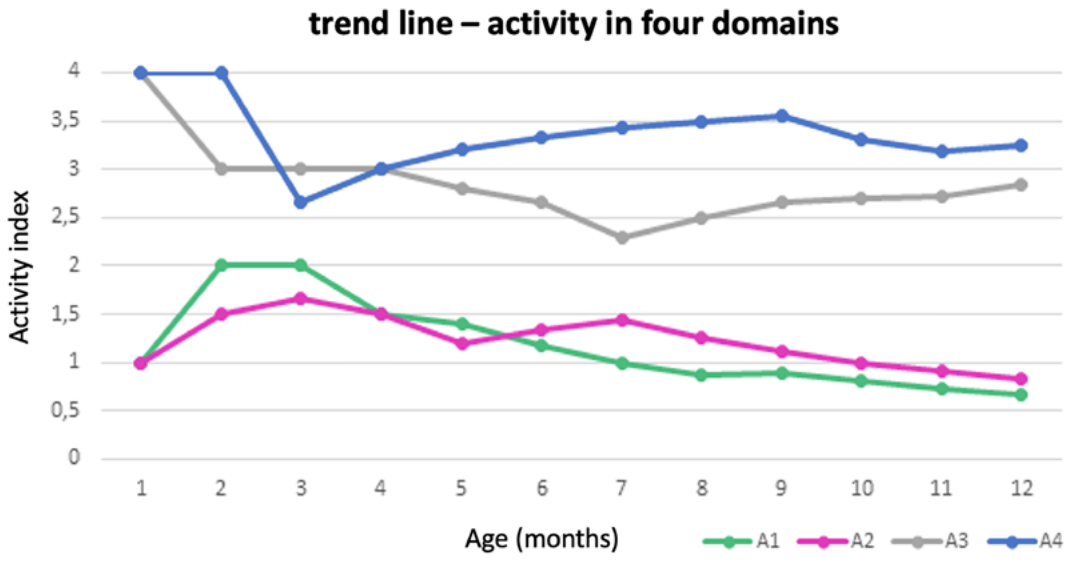

Figure 2. The trend line showing changes in the values of individual activity indices in each domain: postural control (AI 1), motor control (AI 2), dexterity (AI 3), and self-service (AI 4) in each month of the child's life [12].

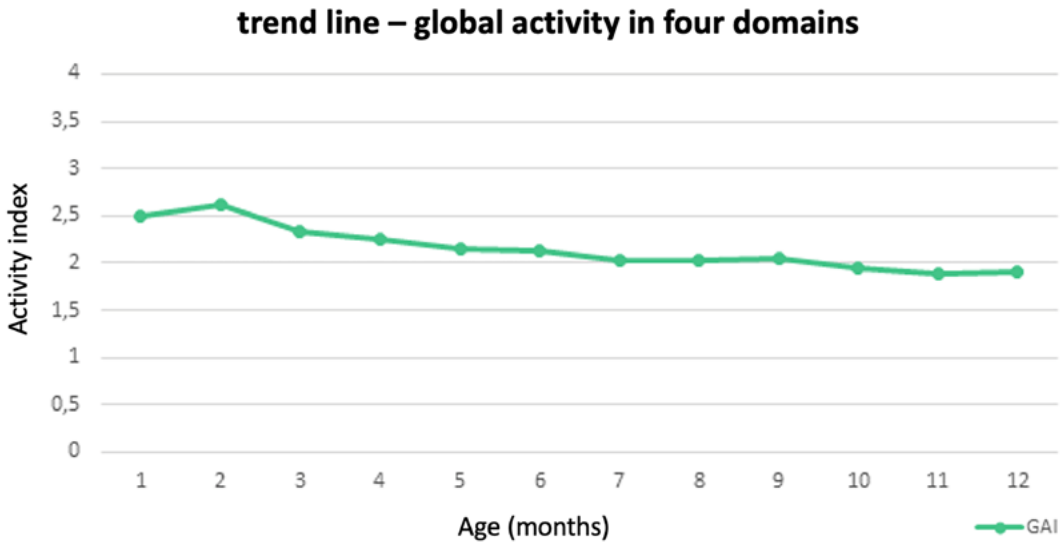

Figure 3. Trend line showing changes in GAI values in each month of a child's life [12].

Discussion

Arthrogryposis is one of rare diseases [5]. As emphasized by numerous researchers, its etiopathogenesis is multifactorial [2,11,12]. However, any cause leading to decreased foetus movement may be responsible for the development of congenital contractures in a baby [4,8,13]. Arthrogryposis is a descriptive diagnosis for more than three hundred diseases of various aetiologies, which share the common feature of having congenital, mostly non-progressive joint contractures occurring in at least two areas of the body [3,4,8].

This paper described a case of a girl with amyoplasia, the most commonly diagnosed form of arthrogryposis, which is characterized by symmetrical, abnormal development of limb muscles, replaced by fat and connective tissue, which may also affect the joints of all limbs; usually children show normal intelligence without significant craniofacial defects or visceral abnormalities [8,13]. The clinical condition of the described child, diagnosed with the above classical type of arthrogryposis, confirms these characteristics. Amyoplasia in this case primarily manifests itself as congenital, non-progressive, symmetrical, severe joint contractures of the upper and lower limbs, no craniofacial or visceral anomalies are found, intelligence and social development are also without noticeable irregularities. The girl demonstrates a typical limb joint position: internal rotation at the shoulder joint, extension and pronation at the elbow joint, palmar flexion and elbow abduction at the carpus joint, fixed finger flexion, flexion, abduction and external rotation at the hip joint and flexion at the knee joint. Recurring deformities include dislocated hip joints and clubfoot.

If appropriate treatment is not implemented in patients with arthrogryposis, their ability to move independently and carry out daily activities decreases. The quality of life is primarily determined by the function of the upper limb and the ability to perform activities related to personal hygiene [2]. Based on the observation and scoring of the child's spontaneous activity measured with the " Functional Assessment Scale for Preschool Patients ", the examined girl with arthrogryposis in the first 12 months of life demonstrated mostly moderate levels of activity in the area of fine mo-

tor skills (dexterity), while in the area of self-care she had moderate and high levels of activity which is a favourable prognostic factor of her quality of life. The function of the girl's upper limb is at a fairly good level, which suggests that she will be able to lead an independent and autonomous life in the future.

The treatment of arthrogryposis is usually based on a phased surgical treatment and long-term rehabilitation to consolidate the effects of the surgery and prevent aggravation of the child's growth deformity [14]. The aim of the treatment is to achieve the maximum possible function for each child through an early and multidisciplinary approach, including the improvement of gait and self-care; it is important to acquire the skills that are necessary for independent adulthood [15]. An orthotist, who will select the appropriate orthopaedic supplies depending on the patient's needs, should also be involved in the treatment [2]. Presented guidelines were applied in the treatment of the described child - surgical treatment of the dislocated right hip joint was carried out, and complex and multidisciplinary rehabilitation was implemented early. Various physiotherapeutic methods were used to support the child's psychomotor development (including the Vojta method, NDT-Bobath, PNF, SI). The patient also received carefully selected orthopaedic equipment, such as orthoses for the correction of clubfoot and for upright standing. The physiotherapy services aim to achieve the best possible level of independence and maximum possible function for the girl and to improve her quality of life.

During infancy and childhood, the child undergoes many dynamic changes, and the psychomotor development follows a specific pattern of skills acquisition, which in each case takes on an individual character depending on innate and environmental factors. The milestones can serve as a basis for observing and monitoring the child's development, which can help to spot possible abnormalities and delays in psychomotor development [16]. The age at which a child reaches developmental milestones can sometimes vary considerably, however, the delay in acquiring these key skills should not exceed 6 weeks [17]. The child described in this case study achieved some of the developmental milestones expected for the first year of life, these were: keeping the head in a prone position in the midline of the body at 3 months old and rotating from back to front at 5 months old. The child does not crawl, sit, or stand on her own, although these are the skills that should be acquired in the first year of life. Sitting and verticalization were performed passively from the child's 14th month of life. Impaired acquisition of key motor skills and delayed psychomotor development may be a result of increasing difficulty in mastering progressively more complex motor activities and positions due to the girl's joint limitations in her upper and lower limbs.

Conclusions

According to the observation of the child's spontaneous activity and an interview conducted with the mother, the examined girl with arthrogryposis demonstrated a delay in psychomotor development during the first 12 months of life, especially visible in the second half of life in the sphere of postural control and motor control. The development of dexterity (fine motor skills) and self-care has been fairly good throughout the study period. The child has not reached all the developmental milestones expected for the first year of life, such as sitting, crawling, standing up, and walking; this may reflect the impact of upper and lower limb joint limitations resulting from arthrogryposis on gross motor skill development. The obtained results on individual activity indicators for postural control and motor control showed low and very low levels of activity in these domains, presenting a decreasing trend. This may indicate increasing difficulty in acquiring successive, increasingly complex motor activities and positions due to the child's limitations. With regard to dexterity, the child demonstrates primarily a moderate level of activity, while self-care is characterized by a

moderate to high level of activity, which is a good prognostic factor in the child's achievement of independent and autonomous living in the future. The global activity index over the months of a child's life shows a downward trend as illustrated by the trend line; however, psychomotor development needs to be assessed in terms of individual domains, which may show different patterns of change in activity levels over time. In order to support the child's psychomotor development, it is necessary to implement early, comprehensive, and multidisciplinary rehabilitation and to apply appropriately selected orthopaedic supplies. Due to the lack of data in the literature on the course of psychomotor development in children with arthrogryposis in the context of normal psychomotor development patterns, it is necessary to carry out further detailed research on this matter.

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