

# First year infant motor asymmetry origins and prevention: parental awareness survey

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## Abstract

**Objective of the study** was to survey the parental awareness of the origins of infant motor asymmetry and its prevention methods.

**Methods and structure of the study.** We have analyzed the relevant study reports by the national and foreign researchers to design and run a parental survey. We sampled for the survey parents ( $n=50$ ) of 0-1 year-olds diagnosed with torticollis. The questionnaire survey was run on the Vkontakte online platform in the "Parents and Teachers! Our children" category. The survey data were grouped and ranked by the formula.

**Results and conclusions.** As found by our survey, postnatal and congenital torticollis was diagnosed in 54% and 46% of the infant motor asymmetry sample, respectively, with the postnatal torticollis diagnosed within the first two months in 77% of the group ( $p \leq 0.05$ ).

Dominating among the origin of infant motor asymmetry in the parental opinions are the muscle tone disorders and poor physical development (ranked 1 and 2, respectively); whilst the visual and auditory system disorders are ranked the last by the parents who obviously underestimate these causes of infant motor asymmetry. In the infant motor asymmetry prevention toolkit, the parents mostly favored massage and postural corrections (ranked 1 and 2, respectively), with only a few respondents believing that visual and auditory analyzers should be trained to effectively prevent infant motor asymmetry.

The parental awareness survey data and analysis found that the families are mostly unaware of influences of the visual, auditory and vestibular system progress on the infant motor asymmetry, with only a few respondents knowing the importance of these systems for motor skills and movement coordination development by sensitive infant-motor-asymmetry-prevention trainings. We believe that the first-year infant motor asymmetry issues deserve further special studies, with a special priority to new promising asymmetry prevention and correction methods, models and tools accessible for physical education at home.

**Keywords:** *symmetry, asymmetry, preventive care, first year infant, motor development.*

**Background.** Notions of "symmetry" and "asymmetry" are relevant for many modern sciences from mathematics to philosophy. The first-year infant physical development theory and practice widely apply the concepts of postural and motor symmetry/ asymmetry [5] ratable by mirror images of specific bodily parts [4]. Infant motor asymmetry can be interpreted as the clinical condition with

notable abnormalities in the bodily shape, posture or mobility of different etiologies, locations and severity classes. It is the idiopathic asymmetry due to unclear reasons that are presently ranked the most common, followed by symptomatic asymmetry known to arise from many structural or systemic disorders [11]. It is not unusual that a newborn child is immediately diagnosed with some asymmetry in

the head inclination in either preferred direction in prone position due to the protective reflex, or preference of some leg in the stepping reflex tests.

Infant motor asymmetry is normally diagnosed in the 1-3 months and includes asymmetric tonic cervical reflex due to the child feeling stable in this position upon testing the extremes within the individual movement range to find the midline [1, 7]. The midline posture development process goes via the left/ right, front/ back and upper/ lower bodily parts being balanced. This is the first step in the body balance mastering process [8]. To attain due symmetry, the extensor and flexor muscles need to be activated in the most harmonious and balanced manner, with signals from the analyzer systems processed by the central nervous system [7].

As far as the symmetry/ dissymmetry concept by P. Curie is applied for interpretation of the infant movement development process, it should be mentioned that postural/ motor dissymmetry is always associated with asymmetry of the origins of this condition [3]. For example, a dissymmetric effect of the preferred head inclination gives rise to child torticollis. When asymmetry develops, it alters the income data flow from the visual analyzer; plus the distorted position of the head affects operations of the vestibular apparatus; and the data flow from proprioceptors via muscles of the neck and body is also distorted by asymmetry in this relevant bodily part(s). The habitual distortions in the visual analyzer and vestibular system operations result in the bodily asymmetry [9].

**Objective of the study** was to survey the parental awareness of the origins of infant motor asymmetry and its prevention methods.

**Methods and structure of the study.** We have analyzed the relevant study reports by the national

and foreign researchers to design and run a parental survey. We sampled for the survey parents (n=50) of 0-1 year-olds diagnosed with torticollis. The questionnaire survey was run on the Vkontakte online platform in the “Parents and Teachers! Our children” category. The survey data were grouped and ranked by the following formula:

$$\Sigma = \frac{(n+1)n}{2} = \frac{(6+1)6}{2} = 21,$$

with n – questions, and  $\Sigma = 21$  – total questions corresponding to the total points scored by the responses.

**Results and discussion.** Torticollis is one of the most common motor asymmetry in the infants, with congenital muscular torticollis ranked the third most common congenital musculoskeletal abnormality after hip dislocation and clubfoot [10, 12]. Postnatal torticollis is the health condition that can be prevented by corrective practices in the 0-1 year period, with special efforts to exclude asymmetric moves. Analysis of the most popular asymmetry prevention method finds 20% of them designed in the 0-1 year-olds. However, families are still largely unaware of how important it is to control motor progress of their infants in this period with a special emphasis on motor symmetry. Families normally excuse themselves by “home chores”, “shortage of knowledge and skills” and “shortage of practical experience for physical education at home”, and this is the reason why we believe that parental awareness surveys could be beneficial in this situation [2].

It should be emphasized that torticollis is classified into the congenital and acquired/ postnatal, albeit both of them are much similar in the symptoms and diagnostic and therapeutic methods [6].

**Table 1.** Parental awareness of the origins of infant motor asymmetry and its prevention methods

Question	Options	Option number: 1 to 6	Average score: 1 to 6 points
What is the origin of infant motor asymmetry?	Muscle tone disorders	1	2,5
	Poor physical development	2	2,64
	Forced and prolonged postural constraints	3	3,9
	Joint dysfunctions with limitations for the amplitudes	4	3,94
	Nervous control disorders	5	3,94
	Visual and auditory system disorders	6	4,08
How the infant motor asymmetry may be prevented?	Massage	1	2,5
	Postural corrections	2	2,74
	Gymnastics	5	3,56
	Shants Collar	4	3,88
	Motor development and coordination training	3	4
	Visual and auditory system development practices	6	4,32



As found by our survey, postnatal and congenital torticollis was diagnosed in 54% and 46% of the infant motor asymmetry sample, respectively, with the postnatal torticollis diagnosed within the first two months in 77% of the group ( $p \leq 0.05$ ). We tested and profiled by parental awareness of the origins of infant motor asymmetry and its prevention methods: see the survey data in Table 1 hereunder.

Dominating among the origin of Infant motor asymmetry in the parental opinions are the muscle tone disorders and poor physical development (ranked 1 and 2, respectively); whilst the visual and auditory system disorders are ranked the last by the parents who obviously underestimate these causes of infant motor asymmetry. In the infant motor asymmetry prevention toolkit, the parents mostly favored massage and postural corrections (ranked 1 and 2, respectively), with only a few respondents believing that visual and auditory analyzers should be trained to effectively prevent infant motor asymmetry.

**Conclusion.** The parental awareness survey data and analysis found that the families are mostly unaware of the influence of visual, auditory and vestibular system progress on the infant motor asymmetry, with only a few respondents knowing the importance of these systems for motor skills and movement coordination development by sensitive infant-motor-asymmetry-prevention trainings. We believe that the first-year infant motor asymmetry issues deserve further special studies, with a special priority to new promising asymmetry prevention and correction methods, models and tools accessible for physical education at home.

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## References

1. Bragina N.N., Dobrokhotova T.A. Human functional asymmetries. *Meditcina publ.*. 1981. P. 40.
2. Voloshina L.N., Kondakov V.L., Kopeykina E.N. et al. Preschooler motor activity control in terms of family education in aspect of sociological analysis. *Teoriya i praktika fiz. kultury*. 2020. No. 8. pp. 47-49.
3. Curie P. On Symmetry in Physical Phenomena, Symmetry of an Electric Field and of a Magnetic Field. *Selected works*. 1966. pp. 95-113.
4. Nikiforov Y.B. Motor asymmetry in preschoolers. *Novaya nauka, strategii i vektory razvitiya*. Ufa. 2017. No. 3. pp. 25-27.
5. Chermit K.D., Shakhanova A.V., Zabolotniy A.G. et al. Predictive capabilities of "symmetry-asymmetry" dualism to estimate biological foundations of health, development and aging processes of human body. *Biosfera i Chelovek [Biosphere and Man]*. Proceedings international scientific conference. Maykop. 2019. pp. 427-431.
6. Emilbekov M.E., Maymerova G.Sh., Furtikova A.B. et al. Clinical features of torticollis course in children of Kyrgyzstan. *Byulleten nauki i praktiki*. 2019. V. 5. No. 4. pp. 125-130. <https://doi.org/10.33619/2414-2948/41/13>.
7. Barthel K., Mannell S. Integrating Therapeutic Approaches in Pediatrics, a 3-day integrated learning experience. 2014. <http://heart-spacept.com/blog/the-yin-and-yang-of-postural-control>.
8. Bly L. Motor skills acquisition in the first year of life. An illustrated guide to normal development. Arizona, Therapy Skill Builders. 1994.
9. Johnson M.B., Emmerik V.R. Is head-on-trunk extension a proprioceptive mediator of postural control and sit-to-stand movement characteristics? *Journal of Motor Behavior*, 2011. pp. 491-498.
10. Jun-Ho Kim, Tae-Hoon Yum, Jong Sup Shim. Secondary Cervicothoracic Scoliosis in Congenital Muscular Torticollis. *ClinOrthop Surg*, 2019. No. 11(3). pp. 344-351.
11. Michalska A. The differential diagnosis of asymmetry in infants. *European Journal of Pediatrics*, 2016. pp. 335-341.
12. Petronic, I. Congenital muscular torticollis in children: distribution, treatment duration and outcome. *European Journal of Physical and Rehabilitation Medicine*, 2010, Vol. 46. No. 2. pp. 153-158.