

# Osteopathic Evaluation and Positional Plagiocephaly: A Descriptive Study on a Population of Children with ASD

Magda Di Renzo<sup>1</sup>, Alessandro Laurenti<sup>1</sup>, Federico Bianchi Di Castelbianco<sup>1</sup>, Elena Vanadia<sup>1</sup>, Massimiliano Petrillo<sup>1</sup>, Simona D'Errico<sup>1</sup>, Rosaria Ferrara<sup>2</sup>, Lidia Racinaro<sup>1</sup>, Monica Rea<sup>1</sup>

<sup>1</sup> Clinical Department, Institute of Ortofonia (IdO), Rome, Italy  
<sup>2</sup> Department of Social Medicine, Sapienza University, Rome, Italy

Email address: a.laurenti@ortofonologia.it

## ABSTRACT

The discipline of osteopathy is a whole person approach that incorporates medical and scientific knowledge using an array of manipulative techniques for diagnosis and treatment of several types of diseases (WHO). The osteopathic examination allows to locate somatic dysfunctions which are the hallmarks of health imbalance caused by stressful events, external or internal to the body, such as trauma and / or other pathologies. The objective of osteopathic treatment is to improve posture and motor skills, which are the prerequisites for a balanced and harmonious development of the body. The osteopathic evaluation of children with autism spectrum disorder allows the identification of dysfunctional aspects at a somatic level that can enrich the understanding of the child's health and behavior, starting from the structure / function relationship, including craniofacial dimorphisms and plagiocephaly. The present exploratory research has made it possible to detect the presence of signs of plagiocephaly in about half of a sample of 250 preschool and school age children with autism spectrum disorder; the 44% of these, shows signs of craniofacial dysmorphism, which indicates a continuous morphostructural adaptation not yet sufficiently considered as an interferent element in the overall development of the child. The observed incidence is consistent with the incidence of plagiocephaly in the pediatric population and supports the hypothesis that in children with autism spectrum disorder it may be useful to integrate the osteopathic expertise with the other health professionals involved in the diagnostic and therapeutic process. The authors conclude that osteopathic observation can contribute to the definition of the functioning profile of the children with autism spectrum disorder and their needs, in a global perspective of taking charge and individualization of care.

## METHODS

### 2.1. Participants

250 children with ASD, aged between 1.6 and 13.7 years, were recruited. Of these, 120 children (48%) showed signs of plagiocephaly. Children with plagiocephaly were aged from 1.6 to 13.6 years (mean 4.04 years; sd = 2.19 years). At the time of the research, 97% of children were under the age of 7. 90% of the children were male (N = 108). At the time of data collection for the research, the average score at the ADOS-2 was 17.40 (sd = 6.94).

### 2.2. Procedures

The children in the sample were recruited between 2016 and 2020. All children had received a diagnosis of autism spectrum disorder from public and private territorial services affiliated with the National Health System. The diagnosis was confirmed at the Institute of Ortofonia (IdO) in Rome, where the research was conducted by a multidisciplinary team, with decades of experience, which includes various professionals including as well as osteopaths. All children who showed evident signs of neurological damage or sensory deficit, children who presented craniostenosis and myogenic torticollis were excluded from the sample. The osteopath has been present at the IdO for several years and participates in the global and multidisciplinary assessment of children with ASD.

### 2.3. Measures

Argenta Classification of Positional Plagiocephaly Although various methods have been used to quantify and classify positional plagiocephaly, such as computed tomography (CT) or anthropometric measurements, the clinical observation is the simplest and most reliable method. As part of the integrated clinical evaluation shared with other professionals at the IdO, it was decided to use this observational protocol as it was non-invasive and easily usable with children, moreover corroborated by the palpatory examination, and therefore it proved to be a suitable tool for the research.

All patients are clinically examined in four positions. The first involves the observation of the child while he has a straightforward gaze position. This allows the observer to determine if there are asymmetries of the forehead and face. The second examination position takes place with the child seated, and the head is observed from above, while the child looks straight ahead. This allows for evaluation of forehead asymmetry, posterior cranial asymmetry, and ear malposition. The third position of the clinical examination takes place by looking at the back of the child's skull. This position allows confirmation of ear position and posterior asymmetry. The fourth examination position takes place by observing the child from a lateral position. This allows the observer to determine any degree of abnormal vertical growth of the skull, which can occur in severe plagiocephaly. Abnormalities are clinically visible or classified as present or not. For each of the five observed types of plagiocephaly, the practitioner assigns a score ranging from Level 0 (indicating no clinical sign) to Level 3 (significant presence of plagiocephaly signs).

## RESULTS

### 3.1. Descriptive

Of the 250 children with ASD who had the osteopathic examination, 120 children (48%) were found to have at least one sign of plagiocephaly. 90% of children with plagiocephaly are boys (N = 108) and for this reason gender differences have not been analyzed. At the time of assessment, they were 18 months to 164 months (mean 48.4 months; sd = 26.3 months); 97% were under the age of 7. As can be seen in Table 1 (Total column), among the 5 types of plagiocephaly the most detected is Type V.

Table 1. Frequency (and percentage) of children showing signs of plagiocephaly, in each of the 5 types (N = 120).

Type	Level 1	Level 2	Level 3	Total on 250
III	2 (0.8%)	1 (0.4%)	1 (0.4%)	4 (1.6%)
IV	3 (1.2%)	2 (0.8%)	0 (0%)	5 (2%)
V	59 (23.6%)	47 (18.8%)	5 (2%)	111 (44.4%)

### 3.2. Gender and Age Differences in the Distribution of Plagiocephaly Typology

No differences emerged in the frequency of the different types of plagiocephaly based on the age of the children (Chi Square = 3.617; P = .46) (see Table 2).

Table 2. Number of children (divided by age) with different types of plagiocephaly (N = 120).

Type	< 3 years old (N = 39)	3-4 years old (N = 33)	>4 years old (N = 48)
III	0	1	3
IV	1	1	3
V	39	31	42

## CONCLUSION

Plagiocephaly is a craniofacial dimorphism that does not resolve spontaneously, it evolves with bone growth. The results of this research lead to an important reflection in clinically re-evaluating plagiocephaly within a neonatal assessment of the very first months of life. This observational study highlights not only the high incidence of plagiocephaly even in children with ASD, but above all the degree of severity; the sample under examination does not fall within the age group in which it is possible to model the shape, and none of the children examined received osteopathic or other treatments to resolve plagiocephaly. The fact that the percentage of detected cases is comparable to that of the general population, underlines the need, as happens for children with typical development, to intervene early especially with children with ASD. In typically developing peers, there is numerous evidence of the benefits associated with osteopathic treatment in the presence of somatic dysfunctions; if we consider how much these are related to sensory, perceptual and motor alterations, it is clear that in children with an already altered profile, these can amplify dysfunctional behaviors and states of discomfort related to autism. It therefore seems important to us to guarantee children with ASD a global care, which does not neglect these aspects within a multidimensional assessment and an integrated therapeutic / care project.

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