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The use of selected osteopathic therapies in pediatric care

Abstract

The aim of this study was to analyse the available literature on the use of osteopathic medicine in paediatrics and to assess the methodological quality of selected studies. Publications concerning the application of osteopathic manipulative treatment (OMT) and selected osteopathic techniques in newborns, preterm infants, and children with various health conditions, including plagiocephaly, ADHD, scoliosis, and headaches, were analysed. The reviewed studies assessed both the diagnostic potential of osteopathic medicine and its potential therapeutic effects. The methodological quality of the studies was evaluated using the Down and Black criteria.

The results of the analysis indicate the potential application of osteopathic methods in selected areas of paediatrics; however, the findings were heterogeneous, and some of the analysed publications had methodological limitations, including small sample sizes and the use of case reports. The available evidence suggests that selected osteopathic interventions may have beneficial effects; however, it does not allow their effectiveness to be conclusively established across all of the clinical conditions analysed. Further research is warranted, particularly randomised controlled trials involving larger patient populations, to provide a more comprehensive assessment of the effectiveness and safety of osteopathic medicine in paediatrics.

Keywords: osteopathic medicine, osteopathic manipulative treatment (OMT), paediatrics, preterm infants, newborns, craniosacral therapy
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Introduction

Paediatric conditions are characterised by a broad spectrum of symptoms and may include developmental disorders, acquired dysfunctions, and injuries (Scott et al., 2015; Strazzer et al., 2026). Despite the diversity of health problems, parents most commonly consult a paediatrician as the first healthcare professional, and less frequently a physiotherapist or osteopath. In some conditions, particularly those of neuromuscular origin, appropriately performed diagnostic assessment and properly selected osteopathic management may

constitute a supportive component of the recovery process (Posadzki et al., 2022). At the same time, the number of publications, particularly randomised studies investigating the effectiveness of osteopathic methods in children and adolescents, remains limited. This may be partly attributed to difficulties in participant recruitment and ethical considerations associated with conducting research involving children, particularly when control and placebo groups are used. Therefore, it is reasonable to collect and analyse the currently available data on the application of osteopathy in paediatrics.

Previous studies indicate that selected forms of tactile stimulation, including massage, tactile-kinaesthetic stimulation, and Osteopathic Manipulative Treatment (OMT), may be associated with beneficial effects on weight gain, motor and neurodevelopment, as well as with reduced length of hospitalization and support for the development of parent–infant bonding in preterm infants (Raith et al., 2016; Mollà-Casanova et al., 2023; Rodovanski et al., 2023). An important component of the management of the youngest patients is also early and appropriately selected assessment of neurological development. One of the tools used for this purpose is the assessment of General Movements (GMs), which comprise age-specific repertoires of spontaneous motor patterns observed from approximately the 9th week of gestation to around the fifth month of post-term age (Einspieler et al., 1997; Einspieler, Prechtl, 2005). The General Movements Assessment (GMA) enables the assessment of the integrity of the developing nervous system based on endogenously generated movement patterns (Cerritelli et al., 2014). Studies have demonstrated its high predictive value for neurological development, comparable to that of magnetic resonance imaging (MRI) and exceeding that of some other methods, including cranial ultrasonography and neurological examination (Bosanquet et al., 2013).

Osteopathic management is based on manual therapeutic interventions aimed at supporting normal physiological functioning and homeostasis affected by somatic dysfunctions (*Task Force on the Low…*, 2016). In the paediatric population, including preterm infants, various manual techniques are used, including craniosacral therapy, myofascial release techniques, balanced ligamentous tension techniques, and indirect fluid flow techniques (Posadzki et al., 2013; Lanaro et al., 2017; Posadzki et al., 2022).

Craniosacral therapy occupies a particular place among these methods. Its classical theoretical foundations derive from the concept of the primary respiratory mechanism and assume a relationship between the mobility of cranial structures, meningeal tension, fluctuations in cerebrospinal fluid (CSF), and the palpable cranial rhythmic impulse. According to this approach, intervention directed at the structures of the skull and sacrum is assumed to influence the functioning of the craniosacral system. However, it should be

emphasised that the physiological basis of this concept remains a subject of debate, and contemporary reviews indicate limited evidence supporting the classical model of the primary respiratory mechanism (Bordoni, Escher, 2023; Mériaux et al., 2024).

According to the classical concept, the primary respiratory mechanism comprises five basic components, including the inherent motility of the brain and spinal cord, the rhythmic circulation of cerebrospinal fluid, and the dynamic tension of the dura mater. According to the underlying assumptions, changes in the shape of central nervous system structures are thought to influence the pulsatile flow of cerebrospinal fluid and the tension of meningeal structures. An important component of this concept is also the functional connection between the skull and the sacrum. Within the osteopathic model, the continuity of the dura mater, extending from the structures of the cranial vault through the foramen magnum and vertebral canal to the sacrum, is assumed to form an anatomical connection between the skull and pelvis. This assumption constitutes one of the foundations of the concept of the Primary Respiratory Mechanism used in craniosacral therapy (*Task Force on the Low…*, 2016).

According to this model, the craniosacral rhythm occurs in two principal phases – flexion and extension. These phases are attributed to specific changes in the position and mobility of the cranial bones, including widening or narrowing of the skull in the frontal plane and rotation of paired bones. Within the classical approach, palpatory assessment of the frequency, amplitude, and quality of the rhythm is intended to provide functional information and guide the selection of appropriate manual techniques. The procedures used are generally indirect and performed with minimal force (Nelson et al., 2006; Bordoni, Escher, 2023; Mériaux et al., 2024). However, it should be emphasised that both the reliability of palpatory assessment of this rhythm and the physiological basis of the proposed mechanism remain subjects of scientific debate.

The aim of this study is to review selected bibliographic data concerning the application of osteopathic techniques in paediatric management.

References review methodology

A literature review was conducted to investigate the application of osteopathic techniques in the paediatric population. The search was performed in the JAOA (The Journal of the American Osteopathic Association) and OSTMED.DR databases using keywords and MeSH terms related to the topic under investigation. The search was conducted in English and included publications published between 2000 and 2025. The search strategy included, among others, terms related to paediatric osteopathy, craniosacral therapy, osteopathy in developmental disorders, and craniosacral therapy in children.

The review included randomised controlled trials (RCTs), prospective and retrospective cohort studies, controlled clinical trials (CCTs), interrupted time series (ITS) studies, studies with three measurement time points, and case reports. The analysis included infants, children, and adolescents up to 18 years of age. Publications concerning, among others, developmental disorders, neuromuscular diseases, congenital abnormalities, cerebral palsy, and postural abnormalities were considered. Eligibility required the use of osteopathic techniques and an assessment of intervention outcomes. Studies in which pharmacological treatment or surgical intervention constituted the primary treatment method were excluded, as were non-English-language publications and studies for which the full text was unavailable.

The search identified 109 records, including 89 from the OSTMED.DR database and 20 from JAOA (Fig. 1).

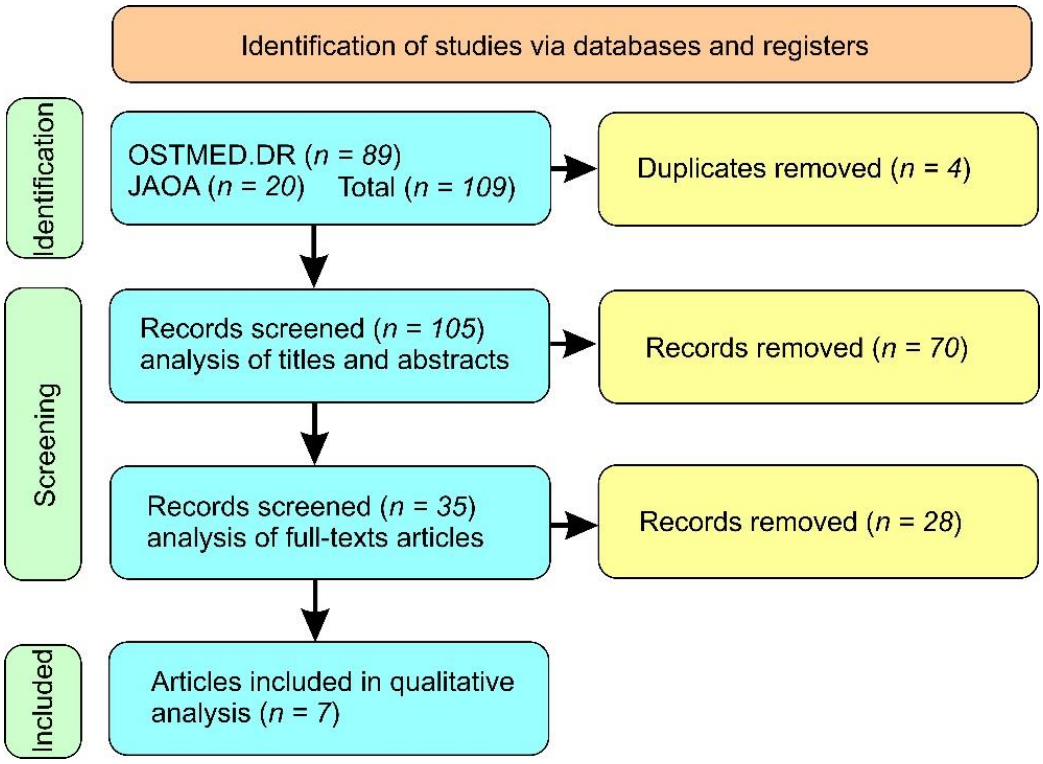


Fig. 1. PRISMA flow diagram used for the search for articles reporting studies involving the use of osteopathic techniques in children

After the removal of duplicates, 105 publications remained. Based on the analysis of titles and abstracts, 70 studies that did not meet the thematic or temporal eligibility criteria were excluded. Of the remaining 35 publications, a further 28 were excluded following full-text assessment because they did not meet all inclusion criteria. Ultimately, 7 articles were included in the analysis. Unfortunately, it was not possible to find methodologically homogeneous articles, which constitutes a certain limitation in the analyzes undertaken.

For each included publication, information was collected on the study design, sample size, methodology, intervention used, and outcomes obtained. Methodological quality was assessed using the Downs and Black (1998) questionnaire, which comprises 27 items addressing reporting quality, external and internal validity, and confounding factors. Based on the resulting scores, the publications were classified into four quality categories: high (21–27 points), moderate (14–20 points), limited (7–13 points), and low (<7 points) (Jäkel, Hauenschild, 2011).

Articles included in the detailed analysis

Seven articles concerning the osteopathic treatment of children with various conditions were included in the analysis, all of which met the established inclusion criteria. The included studies comprised two randomised controlled trials (RCTs), two case studies, and three retrospective studies (Tab. 1).

Tab. 1. Characteristics of the studies included in the detailed analysis involving the use of osteopathic techniques in children; abbreviations: RCT – randomised controlled trial, OMT – Osteopathic Manipulative Treatment, OMTh – Osteopathic Manual Therapy

Authors	**Type**	**Subject**
Filisetti et. al., 2020	Prospective and retrospective comparative studies	Assessment of disorders associated with positional plagiocephaly and the introduction of a new early intervention model based on an approach integrated with osteopathy.
Heineman, 2018	Case study	Manipulative osteopathic treatment for headaches in children undergoing orthodontic intervention.
Feely, Kapraun, 2017	Case study	The effect of osteopathic manipulations on progressive childhood scoliosis.
Raith et. al., 2016	RCT	Investigation of the short-term neurological effects of craniosacral therapy as an ideal form of osteopathic manipulative treatment (OMT) due to its gentle kinaesthetic stimulation.
Accorsi et. al., 2014	RCT	Determining the impact of osteopathic manipulative therapy (OMTh) on attention tasks in children with ADHD.
Pizzolorusso et. al., 2013	Retrospective studies	Osteopathic assessment of somatic dysfunctions and the craniosacral strain pattern in preterm and full-term infants.
Davis et. al., 2007	Prospective and retrospective comparative studies	Fascial and spinal movement restrictions as correlates of muscle spasticity in children with cerebral palsy.

Filisetti et al. (2020) focused on assessing disorders associated with positional plagiocephaly and presenting an early intervention model based on an integrated osteopathic

approach. The study constituted an analysis of clinical data from newborns receiving care within the “Neurodevelopment Follow-up and paediatric Osteopathy” program at Desenzano del Garda Hospital in Italy. The program, funded by the Italian public healthcare system, was aimed at newborns at risk of developmental disorders. It provided an early intervention model based on an integrated osteopathic approach to neurodevelopmental problems and paediatric rehabilitation.

Heineman (2018) presented a case report concerning the use of osteopathic manipulative treatment for headache in a child and its relationship to ongoing orthodontic treatment.

Feely and Kapraun (2017) described a case report concerning the osteopathic management of paediatric scoliosis. The patient's medical history did not indicate a clear cause of the scoliosis. The family history revealed mild, asymptomatic idiopathic scoliosis in the mother and untreated, non-progressive scoliosis in the 10-year-old brother, as well as leg-length discrepancy in the father. The patient was first examined by paediatric orthopaedists at 12 months of age. The examination revealed chest wall deformity and displacement of the cardiac apex to the left, with no other abnormalities. Initial radiographic assessment showed an RVAD value of 46.9°, and the initial diagnosis was asymptomatic, progressive infantile idiopathic scoliosis (IIS).

Raith et al. (2016) investigated the short-term neurological effects of craniosacral therapy in preterm infants. The therapy was considered a form of osteopathic manipulative treatment (OMT) characterised by gentle kinaesthetic stimulation. The study was conducted as a randomised controlled pilot trial. The authors focused on assessing General Movements (GM) in preterm infants receiving craniosacral therapy. The General Movement Assessment (GMA) was used to evaluate the immediate effects of the intervention.

Accorsi et al. (2014) investigated the effects of osteopathic manual therapy on concentration during task performance in children with attention-deficit/hyperactivity disorder (ADHD). Specifically, differences in Biancardi-Stroppa test performance were assessed between children who received Osteopathic Manual Therapy (OMTh) in combination with conventional care and those who received conventional care alone.

Pizzolorusso et al. (2013) presented the results of an osteopathic assessment of somatic dysfunctions and craniosacral strain patterns in preterm and full-term newborns. The authors conducted a retrospective review of data concerning preterm and full-term newborns admitted to a neonatal intensive care unit (NICU). The aim of the study was to determine the prevalence of somatic dysfunctions and abnormalities in cranial strain patterns based on osteopathic structural examinations.

Davis et al. (2007) conducted a factor analysis of fascial and spinal mobility restrictions and their relationship to muscle spasticity in children with cerebral palsy. Inclusion criteria comprised a diagnosis of cerebral palsy with spasticity as the predominant clinical feature, a previous diagnosis made by a paediatric neurologist before the age of 12 years, completion of a baseline assessment, and provision of informed consent. Exclusion criteria included, among others, recent therapeutic interventions, such as botulinum toxin type A injections administered within the four months preceding study enrolment.

Research procedures and techniques employed

The analysed literature on the use of osteopathy in children included studies involving different patient populations and clinical problems. The individual studies differed in terms of study design, sample size, type of osteopathic intervention applied, and assessed parameters. The characteristics of the individual studies are presented below, including their study populations, procedures used, and assessment methods. The main characteristics of the analysed studies are summarised in a table (Tab. 2 – Appendix 1).

Filisetti et al. (2020) presented the experience of an early intervention and neurodevelopmental follow-up program in which an integrated osteopathic approach was applied to newborns and infants. The program operated for eight years and included 530 newborns. Of these, 310 children had positional plagiocephaly. Children were referred to the program for various reasons, including prematurity, plagiocephaly, postural abnormalities, torticollis, foot deformities, functional gastrointestinal disorders, minor neurological disorders, sleep disturbances, and other developmental problems.

The management included an integrated osteopathic approach and recommendations for supporting the child's development at home. The assessment included, among other aspects, the musculoskeletal system, cranial structures, body posture, and motor function. Osteopathic management was individualised according to the abnormalities identified. The authors described it as part of a broader early intervention program aimed at supporting the child's functioning and development. The program included continued follow-up during the first years of life. The analysed material included children followed between 2011 and 2018. The study population excluded, among others, children with craniosynostosis, severe prematurity, certain congenital anomalies, and severe neurological disorders. Given the nature of the publication, it should be emphasised that this was an analysis of the clinical experience of the program rather than a randomised controlled trial.

Heineman (2018) presented a case report of a 10-year-old girl with persistent headache. The patient had previously experienced milder episodes of headache that resolved

spontaneously; however, in the period preceding the consultation, the symptoms became more severe and persistent. She had previously been assessed by a paediatrician and subsequently presented to a manual medicine and osteopathy clinic.

The osteopathic examination identified abnormalities involving, among other areas, the occipito-atlantal region, the cervical and thoracic spine, the pelvis, the sacrum, and cranial structures. Following informed consent, OMT was initiated. The treatment included, among other techniques, muscle energy techniques, techniques applied to the thoracic cage and sacrum, and osteopathic cranial manipulation. At the follow-up visit one week later, the patient reported substantial improvement. Further management also included cranial osteopathic manipulation directed at the previously described tension pattern. The symptoms eventually resolved. However, it should be emphasised that this was a single case report and that OMT was applied in conjunction with the removal of a previous orthodontic intervention. Therefore, the observed improvement cannot be attributed unequivocally to OMT alone.

Feely and Kapraun (2017) presented a case report of a girl with progressive infantile idiopathic scoliosis. At 12 months of age, the child was diagnosed with scoliosis with a curve measuring 46.9°. Initially, standard orthopaedic management involving casting was implemented. At 14 months of age, during the first osteopathic consultation, the curve measured 52°. At that time, the child was wearing a Risser cast extending from T1 to L5.

The osteopathic examination described, among other findings, a reduced cranial rhythmic impulse, temporal bone dysfunctions, C1 rotation, sacral torsion, and pelvic malalignment. OMT was applied to the head, cervical spine, sacrum, and pelvis. During subsequent visits, various osteopathic techniques were used, including direct and indirect techniques, articulation techniques, osteopathic cranial manipulation, balanced ligamentous tension techniques, and myofascial techniques. Initially, visits were scheduled at monthly intervals. At 17 months of age, following removal of the cast, the curve measured 23°. The parents subsequently decided not to proceed with repeat casting as recommended by the orthopedic team. For approximately the following 12 months, OMT was the only consistently applied therapeutic intervention and was performed once a month. At 28 months of age, radiographic examination showed no evidence of scoliosis, with a curve measurement of 0°. A total of 11 OMT sessions were performed over approximately 14 months. In this case, the outcome following cast treatment and subsequent 14 months of OMT was very good.

Raith et al. (2016) conducted a randomised pilot trial involving 30 preterm infants born between 25 and 33 weeks of gestation. Participants were randomly assigned either to an intervention group receiving standardised craniosacral therapy or to a control group receiving

standard care. After two years of follow-up, 25 children remained in the study: 12 in the intervention group and 13 in the control group.

The intervention consisted of 20-minute sessions administered twice weekly for three weeks. The primary outcome measure was the General Movements Assessment (GMA), while the General Movements Optimality Score (GMOS) was used as a secondary outcome measure. Assessments were performed at successive time points, and the data were analysed using a linear mixed-effects model accounting for, among other factors, group, measurement time, and individual differences between participants.

Accorsi et al. (2014) conducted a randomised controlled trial at the Child Neuropsychiatry Centre in Macerata, Italy. The study was conducted from November 2008 to September 2009. Participants were children aged 5–15 years with a diagnosis of ADHD. Of 400 outpatients, 28 were enrolled in the study and randomly assigned to either an intervention group (n = 14) or a control group (n = 14). Exclusion criteria included, among others, secondary ADHD, intellectual disability, anxiety disorders, pervasive developmental disorders, bipolar disorder, and other specified psychiatric and neurological disorders. Information was also collected on pharmacotherapy, psychosocial interventions, sleep, physical activity, and selected somatic problems.

The intervention group received OMTh in addition to standard care, whereas the control group received standard care alone. The intervention was individualised according to the participant's age and clinical status. Techniques included myofascial release techniques, craniosacral techniques, balanced ligamentous tension techniques, and balanced membranous tension techniques. Participants in the intervention group received six 40-minute sessions. The first two sessions were scheduled one week apart, followed by four sessions at two-week intervals, over a total period of 10 weeks.

Pizzolorusso et al. (2013) conducted a retrospective analysis of data concerning preterm and full-term newborns hospitalised in the neonatal intensive care unit at Spirito Santo Hospital in Pescara, Italy. The study covered the period from November 2009 to April 2010. Of the 205 medical records reviewed, 50 newborns were excluded because of severe medical conditions. Ultimately, 155 newborns were included in the analysis: 85 boys (54.8%) and 70 girls (45.2%).

An osteopathic structural examination was performed for each newborn within the first two weeks of hospitalization. Assessments were performed with the infant in the supine or prone position, either in an open crib or incubator. Somatic dysfunctions and cranial deformation patterns were assessed, among other parameters. Somatic dysfunction was determined according to the TART criteria, which include tissue texture abnormalities,

asymmetry, altered positional findings, and motion restriction. Cranial assessment included, among other parameters, patterns of compression, flexion, extension, torsion, side-bending, and sphenoid base synchondrosis deformation. The presence of intraosseous lesions within the cranial bones and sacrum was also recorded. Cranial patterns were assessed using, among other methods, the vault hold and fronto-occipital hold. Statistical analysis was performed using descriptive statistics and the χ^2 test.

Davis et al. (2007) analysed data from 57 children diagnosed with spastic cerebral palsy. The study focused on the relationships between fascial restrictions, spinal motion restrictions, and the severity of muscle spasticity.

A structured osteopathic examination form was used to assess fascial restrictions and spinal mobility. The severity of spasticity was assessed using a 100-mm visual analogue scale. Fascial and spinal motion restrictions were assessed using a four-point scale, where 0 indicated no restriction and 3 indicated severe restriction. The authors analysed the structure of the relationships between the assessed variables using confirmatory factor analysis. Latent factors corresponding to fascial restrictions and spinal motion restrictions were identified, and their relationships with the level of spasticity were subsequently assessed. Both factors were correlated with the assessment of muscle spasticity. The study was analytical in nature and investigated the relationships between parameters used in osteopathic assessment and spasticity. It was not, however, a study evaluating the therapeutic effectiveness of OMT.

Clinical benefits

A comprehensive summary of the effects of OMT, compared to control groups and baseline conditions in the analysed experiments, is presented in table. (3).

Tab. 3. Results of studies on the use of osteopathic manipulative treatment (OMT) and osteopathic assessment in children; GMA – General Movements Assessment; GMOS – General Movements Optimality Score; OMTh – Osteopathic Manipulative Therapy

Study	Type of study	Parameters evaluated	Population	Main result
Filisetti et. al., 2020	Observational study	Head shape and symmetry, head mobility, posture, motor and neurological development.	Newborns and infants with positional plagiocephaly.	During the follow-up period, improvements were observed in parameters related to head shape, symmetry, and head mobility. Among the 192 children with restricted head rotation, 163 (85%) achieved full rotation following the first intervention.
Heineman, 2018	Case study	Headache, cervical spine mobility.	A 10-year-old girl.	Following a course of treatment involving OMT and a modification of the previous orthodontic treatment, the resolution of headaches and improved mobility of the cervical spine were

				observed (causality uncertain).
Feely, Kapraun, 2017	Case study	Curvature of the spine	Infant with progressive idiopathic scoliosis.	Spinal curvature decreased following cast treatment and OMT. After 12 months of OMT alone, radiographs showed no evidence of scoliosis (findings are not generalizable).
Raith et. al., 2016	Randomised controlled pilot study.	GMA, GMOS	Preterm infants born between the 25th and 33rd week of pregnancy.	No significant differences were observed between the intervention and control groups regarding GMA or GMOS. Furthermore, no deterioration in the assessed parameters was found in the intervention group.
Accorsi et. al., 2014	Randomised controlled study	Biancardi-Stroppa Modified Bell Cancellation Test.	Children aged 5–15 with ADHD.	In the OMTh group, greater improvement in test performance – in terms of both accuracy and speed – was observed compared to the control group.
Pizzolorusso et. al., 2013	Observational study	Somatic dysfunctions and craniosacral tension patterns.	Preterm and full-term newborns.	Dysfunctions were most frequently identified in the pelvis, sacroiliac joints, lumbosacral junction, spine, and cranial structures. The study did not evaluate the effectiveness of OMT.
Davis et.al., 2007	Observational study, factor analysis.	Fascial restrictions, spinal mobility, spasticity.	Children with cerebral palsy.	Associations were demonstrated between latent factors related to fascial restrictions and spinal mobility and the level of spasticity. The study did not evaluate the therapeutic effect of OMT.

Filisetti et al. (2020) presented clinical experience related to the use of osteopathic management in children with positional plagiocephaly. The study assessed, among other parameters, head shape and symmetry, head and neck mobility, posture, spontaneous motor activity, and neurological development. The authors described improvements in most of the assessed parameters during follow-up. Among the 192 children with restricted head rotation, 163 (85%) achieved full freedom of rotation in both directions at the second assessment, performed after the first intervention. The remaining children showed improvement after a subsequent intervention. Neurological development and functions related to posture and motor activity were also assessed. The authors described improvements in the abnormalities observed during the course of management. However, it should be emphasised that the study was observational in nature and involved a complex therapeutic approach. Therefore, the observed changes cannot be unequivocally attributed to OMT alone.

Heineman (2018) presented a case report of a 10-year-old girl with persistent headache. The management included OMT, while her previous orthodontic treatment was modified concurrently. Following the intervention, resolution of the headache and improved cervical spine mobility were observed. Given the nature of a single case report and the use of more than one intervention, it is not possible to determine to what extent the observed improvement was directly related to OMT.

Feely and Kapraun (2017) presented a case of an infant with progressive infantile idiopathic scoliosis. At the beginning of treatment, the spinal curve measured 52°. After approximately 12 months of regular OMT, radiographic examination showed no evidence of scoliosis. During further follow-up, the authors reported maintenance of a stable spinal alignment. Given the nature of a single case report, this result should be interpreted with caution. The study does not allow the effectiveness of OMT to be assessed in children with scoliosis or the influence of the natural course of the condition and other factors to be excluded.

Raith et al. (2016) conducted a randomised pilot trial investigating the effects of craniosacral therapy on General Movements in preterm infants. The study included infants born between 25 and 33 weeks of gestation. The quality of General Movements was assessed using the General Movements Assessment (GMA) and the General Movements Optimality Score (GMOS). No statistically significant differences were found between the intervention and control groups in either the overall GMA score or the GMOS. No significant interaction between group and measurement time was observed either. The results of this study did not confirm a beneficial effect of craniosacral therapy on the assessed parameters of motor development in preterm infants. At the same time, no deterioration of the assessed parameters was observed in the intervention group. However, the absence of significant between-group differences should not be interpreted as evidence of treatment effectiveness.

Accorsi et al. (2014) assessed the effects of OMTh on attention functions in children aged 5–15 years with ADHD. The study included 28 children who were randomly assigned either to a group receiving OMTh in addition to standard care or to a group receiving standard care alone. Following the intervention period, accuracy and speed of performance on the Biancardi-Stroppa Modified Bell Cancellation Test were assessed. The OMTh group demonstrated greater improvement in both parameters compared with the control group. The findings suggest a possible beneficial effect of OMTh on selected parameters of attention-test performance. However, interpretation of the results is limited by the small sample size and methodological limitations of the study.

Pizzolorusso et al. (2013) assessed the occurrence of somatic dysfunctions and craniosacral strain patterns in preterm and full-term newborns hospitalised in neonatal units. The study involved a single osteopathic assessment and was observational in nature. Somatic dysfunctions were identified, among other areas, in the pelvis, sacroiliac joints, lumbosacral junction, spine, and cranial structures. The findings are primarily descriptive in nature. They may provide information on the prevalence of specific features identified during osteopathic assessment of newborns and may serve as a basis for generating hypotheses regarding further

management. However, they do not allow the effectiveness of OMT to be assessed or the conclusion that treatment of the identified dysfunctions provides specific clinical benefits to be drawn.

Davis et al. (2007) analysed the relationships between measures of fascial restrictions and spinal mobility and spasticity in children with cerebral palsy. Factor analysis demonstrated correlations between latent factors corresponding to fascial restrictions and spinal mobility restrictions and the assessment of muscle spasticity. The study provided preliminary data on the relationships between selected measures used in osteopathic structural assessment and the level of spasticity. However, it was not a study evaluating the effectiveness of OMT. The observed correlations also do not allow causal relationships to be inferred between fascial restrictions or spinal mobility and spasticity.

Quality of the studies included in the analysis

The study by Accorsi et al. (2014) achieved the highest score according to the applied Down and Black criterion, receiving 24 points (Tab. 4).

Tab. 4. Summary of critical appraisal scores for the analysed studies based on the Downs and Black (1998) Checklist; A – Raith et al., 2016, B – Feely, Kapraun, 2017, C – Filisetti et al., 2020, D – Accorsi et al., 2014, E – Pizzolorusso et al., 2013, F – Heineman, 2018, G – Davis et al., 2007; Y – yes (yellow), N – no (blue), U – unknown (grey)

	Study	A	B	C	D	E	F	G
Reporting	1	Y	Y	Y	Y	Y	Y	Y
	2	Y	Y	Y	Y	Y	U	Y
	3	Y	Y	Y	Y	Y	Y	Y
	4	Y	Y	N	Y	Y	Y	U
	5	U	N	N	Y	Y	N	Y
	6	Y	Y	Y	Y	Y	Y	Y
	7	N	N	Y	Y	Y	N	Y
	8	Y	N	Y	Y	Y	N	Y
	9	Y	N	Y	Y	Y	N	Y
	10	Y	N	N	Y	Y	N	Y
External validity	11	U	N	Y	Y	Y	N	Y
	12	Y	N	Y	Y	Y	N	Y
	13	Y	N	U	Y	N	N	Y
	14	U	N	Y	Y	U	N	Y
	15	Y	N	N	N	N	N	N
	16	Y	N	N	Y	N	N	N
	17	Y	N	Y	N	N	N	N

	18	Y	N	Y	N	Y	N	N
	19	Y	N	N	Y	N	N	Y
	20	Y	Y	Y	Y	Y	Y	Y
	21	Y	Y	Y	Y	Y	U	Y
Confounding	22	Y	N	Y	Y	N	N	N
	23	N	N	Y	Y	Y	N	N
	24	Y	N	N	Y	N	N	N
	25	Y	N	N	Y	N	N	N
	26	Y	Y	N	Y	Y	N	Y
	27	Y	N	Y	Y	Y	N	Y
Total		22	8	17	24	18	5	18

This indicates a high level of methodological quality. The strongest aspects of the study were reporting quality and internal validity.

The second-highest-rated study was the publication by Raith et al. (2016), which received 22 points, also indicating high methodological quality. In this case, as in the study by Accorsi et al. (2014), the strongest aspects were reporting quality and internal validity.

The studies classified as being of moderate quality included the publication by Filisetti et al. (2020), which received 17 points, and the studies by Pizzolorusso et al. (2013) and Davis et al. (2007), which each received 18 points. Their strongest aspect was reporting quality.

The lowest scores were obtained by the two case reports: Heineman (2018), which received 5 points, and Feely and Kapraun (2017), which received 8 points. In neither study was an area identified that could be considered an unequivocal methodological strength.

Summary and final conclusions

The analysed studies indicate the potential application of osteopathic medicine in various areas of paediatric care, including both diagnostic assessment and therapeutic management. The studies involved, among others, preterm infants, children with plagiocephaly, ADHD, scoliosis, and headaches.

Raith et al. (2016) investigated the short-term effects of craniosacral therapy on neurological function in preterm infants. No significant differences in General Movements Assessment (GMA) scores were found between the intervention and control groups. At the same time, no deterioration in GMOS scores was observed in the intervention group, which may indicate that the intervention was not associated with adverse changes in the assessed

parameters in the study population. The authors nevertheless indicated the need for further research addressing the efficacy and safety of this type of intervention.

Based on case reports concerning infantile idiopathic scoliosis, Feely and Kapraun (2017) highlighted the need for randomised controlled trials to evaluate the effectiveness of osteopathic treatment methods, particularly osteopathic cranial manipulative medicine (OCMM), in comparison with standard orthopaedic management.

In the case of plagiocephaly, Filisetti et al. (2020) emphasised that this condition may have not only aesthetic but also functional implications. The authors highlighted the importance of early diagnosis and intervention, as well as the need for further research enabling quantitative assessment of the effects of the proposed osteopathic management.

The study by Accorsi et al. (2014) involving children with ADHD suggested a possible beneficial effect of OMTh on selected aspects of attention, including selective and sustained attention. However, given the lack of replication of these findings in other populations, further research is required to confirm these observations and determine the role of OMTh in the management of children with ADHD.

Pizzolorusso et al. (2013), in turn, indicated the potential usefulness of osteopathic assessment in the evaluation of newborns and preterm infants. The authors emphasised the need for studies involving larger populations to develop a more comprehensive database of somatic dysfunctions and cranial strain patterns in newborns.

The case report presented by Heineman (2018) suggests a possible role for OMT in the management of children with secondary headache. However, given the nature of the study, this finding should be regarded as a preliminary observation requiring confirmation in studies involving larger patient populations.

In summary, the available studies indicate the potential application of osteopathic methods in both the assessment and management of selected paediatric conditions. At the same time, substantial heterogeneity should be noted among the analysed studies in terms of methodology, sample size, and assessed outcomes. Some publications were case reports, which limits the generalizability of their findings. Therefore, the available evidence does not allow definitive conclusions regarding the effectiveness of osteopathic methods across all of the conditions examined and highlights the need for further research, particularly randomised controlled trials involving adequately sized study populations and clearly defined outcome measures. Osteopathic medicine may represent a potentially useful area of supportive care in paediatrics; however, its effectiveness and scope of application require further evaluation in studies with high methodological quality.

Conflict of interest

The author declare no conflict of interest related to this article.

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Tab. 2. Basic information regarding the type of research, project details, results, and researcher expertise

Study	Patient population	Follow up	Assigned groups	n	Number of sessions / length of session	Practitioner profile	Type of intervention
Filisetti et. al., 2020	Newborns and infants.	Yes (up to 12 months)	Homogeneous group.	530	Three-week rehabilitation programs: 6 sessions, 6 assessments.	Osteopathic physician	Comparison of pre- and post-treatment results (2, 3, 6, 9, and 12 months).
Heineman, 2018	A 10-year-old girl.	-	A single case.	1	6 sessions.	Osteopathic physician	Comparison of pre-treatment and post-treatment results.
Feely, Kapraun, 2017	14-month-old child.	-	A single case.	1	11 visits in 14 months; then 6 to 10 times a year until the age of 5.	Osteopathic physician	Comparison of pre-treatment and post-treatment results.
Raith et. al., 2016	Preterm infants born between 25 and 33 weeks of gestation.	-	Intervention group and control group.	12 13	A 20-minute session twice a week for 3 weeks.	Two specialised physiotherapists trained at the Upledger Institut Österreich, with 10 years of experience and certified as Upledger Cranio-Sacral therapists.	Comparison of results between groups following the intervention.
Accorsi et. al., 2014	Children between the ages of 5 and 15.	-	Intervention group and control group.	14 14	6 sessions of 40 minutes each over 10 weeks.	Osteopathy specialist	Comparison of groups.
Pizzolorusso et. al., 2013	Newborns or premature infants.	-	Homogeneous group.	155	Session twice a week.	Osteopathic physician	Comparison of the occurrence of symptoms.
Davis et. al., 2007	Children under the age of 14.	-	Homogeneous group.	57	Not specified.	Osteopathic physician	Comparison of results before and after treatment.

Wykorzystanie wybranych terapii osteopatycznych w leczeniu pediatrycznym

Streszczenie

Celem pracy była analiza dostępnego piśmiennictwa dotyczącego zastosowania medycyny osteopatycznej w pediatrii oraz ocena jakości metodologicznej wybranych badań. Przeanalizowano publikacje dotyczące zastosowania osteopatycznego leczenia manipulacyjnego (OMT) oraz wybranych technik osteopatycznych u noworodków, wcześniaków i dzieci z różnymi problemami zdrowotnymi, m.in. plagiocefalią, ADHD, skoliozą oraz bólami głowy. W analizowanych pracach oceniano zarówno możliwości diagnostyczne medycyny osteopatycznej, jak i potencjalne efekty terapeutyczne. Jakość metodologiczną badań oceniono z wykorzystaniem kryteriów Downa i Blacka. Wyniki analizy wskazują na potencjalne zastosowanie metod osteopatycznych w wybranych obszarach pediatrii, jednak uzyskane wyniki były zróżnicowane, a część analizowanych publikacji charakteryzowała się ograniczeniami metodologicznymi, w tym niewielką liczebnością badanych grup oraz formą opisów przypadków. Dostępne dane sugerują możliwość korzystnego wpływu wybranych interwencji osteopatycznych, jednak nie pozwalają na jednoznaczne potwierdzenie ich skuteczności we wszystkich analizowanych problemach klinicznych. Konieczne jest prowadzenie dalszych badań, szczególnie randomizowanych badań kontrolowanych na większych grupach pacjentów, w celu dokładniejszej oceny skuteczności i bezpieczeństwa medycyny osteopatycznej w pediatrii.

Słowa kluczowe: medycyna osteopatyczna, osteopatyczne leczenie manipulacyjne (OMT), pediatria, wcześniaki, noworodki, terapia czaszkowo-krzyżowa

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