

Applications of pediatric osteopathy: Clinical conditions and treatment strategies

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Abstract

Pediatric patients represent a vulnerable population in which untreated somatic dysfunction may contribute to persistent musculoskeletal, neurological, respiratory, and visceral conditions throughout development. Although osteopathic manipulative treatment (OMT) remains underutilized and understudied in pediatric care, available evidence suggests potential clinical benefits across a variety of conditions. This narrative literature review synthesizes current evidence regarding the principles, techniques, clinical applications, safety, and outcomes of pediatric OMT. Commonly utilized techniques include myofascial release, balanced ligamentous tension, cranial manipulation, soft tissue, and lymphatic drainage techniques. Reported findings demonstrate improvements in functional mobility and symptom management, while adverse effects are generally mild and transient. Although current evidence supports OMT as a safe, noninvasive adjunctive therapy, further studies are warranted to evaluate long-term outcomes and establish standardized treatment guidelines for pediatric care.

Keywords: Pediatric Osteopathic Manipulative Treatment; Somatic Dysfunction; Pediatrics; Osteopathic Manipulative Medicine; Nonpharmacologic Therapy; Conservative Management

1. Introduction

Pediatric patients represent a vulnerable population in which untreated somatic dysfunction may contribute to persistent musculoskeletal, neurological, respiratory, and visceral morbidity across critical periods of development. Somatic dysfunction is highly prevalent in the earliest stages of life, identified in nearly nine out of ten infants and frequently attributed to mechanical stresses of the birth process [1]. Beyond the neonatal period, common pediatric pathologies spanning multiple organ systems have been associated with identifiable patterns of somatic dysfunction amenable to osteopathic intervention, and osteopathic manipulative treatment (OMT) has demonstrated a generally favorable safety profile with minimal incidence of serious adverse events in pediatric populations [2].

Despite this, OMT remains underutilized and understudied in pediatric care, limited by small sample sizes, heterogeneous study designs, lack of standardized treatment protocols, and unfamiliarity with pediatric specific osteopathic examination [3,4]. This review synthesizes available evidence on clinical applications of pediatric OMT across key condition categories to support evidence-based practice and identify priorities for future investigation.

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2. Principles and Techniques of Pediatric OMT

2.1. Principles of Pediatric Osteopathic Care

Performance of a basic osteopathic structural examination can be seamlessly integrated into neonatal care with standard newborn evaluations [5]. By doing so, a comprehensive minimally invasive assessment can be obtained without additional procedural burden [5]. Establishing trust and rapport prior to initiation of a basic osteopathic structural examination is essential to ensure a positive experience.

2.2. Core Techniques in Osteopathic Manipulation for Children

Application of OMT techniques in pediatric populations is similar to adults, with minor adaptations. For instance, supine positioning reduces the need for active cooperation and allows better support for technique delivery [6]. Additionally, indirect techniques are often preferred given patient pliability and resultant hypersensitivity [6]. Core techniques utilized in OMT for children primarily include myofascial release (MFR), balanced ligamentous tension (BLT), soft tissue techniques, and lymphatic drainage techniques [6].

Soft tissue techniques in the lumbosacral regions have shown improvement in segmental mobility and support of functional movement in pediatric populations with musculoskeletal concerns [7]. In children with neurological conditions, BLT and gentle cranial manipulation techniques such as condylar decompression have been used to optimize neurologic function [8, 9, 10].

Commonly used myofascial release techniques target the respiratory diaphragm, thoracic inlet, and cervical regions [11, 12, 13, 14, 15]. These techniques have demonstrated enhancement in thoracic mobility and facilitate effective breathing in pediatric respiratory conditions [11, 12, 13, 14, 15]. Additionally, MFR techniques paired with sacrum oscillation have been applied in the treatment of visceral conditions such as constipation in pediatric patients [16, 17]. Certain lymphatic drainage treatments such as Gallbreath technique and auricular drainage have been used to aid in middle ear decongestion particularly in cases of otitis media and sinusitis [11, 12, 13, 14].

2.3. Developmental Considerations and Contraindications in Pediatric Care

Adequate newborn development includes spontaneous movements with a smooth flowing quality, blinking in response to light, and attentiveness to the environment [19]. Cranial nerve function can be assessed through these spontaneous activities [19]. Abnormalities identified in newborn development should prompt further investigation and initiation of OMT should be determined at the discretion of the treating physician [20]. Absolute contraindications to OMT are the absence of somatic dysfunction and the lack of patient or parental consent [20].

2.4. Clinical Applications in Children

2.4.1. Musculoskeletal Conditions

Common musculoskeletal complaints in childhood such as low back pain and postural asymmetry are often associated with somatic dysfunctions [21, 22]. In adolescents with low back pain, functional leg length inequality with resultant pelvic unleveling and sacropelvic dysfunction are commonly identified [6]. Dysfunctions of the upper thoracic vertebrae and sphenobasilar synchondrosis (SBS) are contributory to infantile postural asymmetry [6].

2.4.2. Neurological Conditions

Literature has suggested OMT as a beneficial adjunctive approach to certain neurological conditions in pediatric populations such as attention-deficit/hyperactivity disorder (ADHD), persistent post-viral headaches, feeding difficulties in neonates, and plagiocephaly [8, 9, 10, 23]. In children with ADHD, persistent post-viral headaches, and neonatal feeding difficulties, somatic dysfunctions frequently involve restriction of cranio-cervical structures [8, 9, 10]. Dysfunctional patterns between the occipitoatlantal joint, lateral strain of the SBS, and occipital flattening have been reported in correlation with plagiocephalies [6, 23].

2.4.3. Respiratory Conditions

Prevalent respiratory conditions in pediatric populations such as otitis media, asthma, sinusitis, and upper respiratory infections have been addressed with OMT in clinical practice [11, 12, 13, 14, 15]. In otitis media, somatic dysfunctions involve temporal-occipital and cervic-occipital regions [6, 11]. Asthma has been associated with viscerosomatic reflexes in the upper thoracic vertebrae, diaphragmatic restrictions, and reduced rib cage mobility [13]. Sinusitis and

upper respiratory infections are associated with sinus drainage dysfunctions and cervicothoracic fascial restrictions [14, 15]. Viscerosomatic reflex and Chapman reflex points have been primarily frequently identified in asthma and sinusitis [13, 14].

2.4.4. Visceral Conditions

Conditions such as colic and constipation associated with functional gastrointestinal disorders, have been addressed with OMT in pediatric populations [16, 17, 18]. In infantile colic, identified dysfunctions are primarily visceral such as dysregulated gastrointestinal mobility superimposed with craniosacral restrictions [18]. Constipation in children with neurodevelopmental disorders such as cerebral palsy or Pitt-Hopkins has been associated with abdominopelvic restrictions, fascial tension, and impaired gut motility [16, 17]. Lumbopelvic somatic dysfunctions have been identified in both colic and constipation in pediatric patients [6].

3. Outcomes and Benefits of Pediatric Osteopathic Care

3.1. Improvements in Functional Mobility

Osteopathic manipulative treatment (OMT) has been associated with enhanced functional mobility in pediatric populations. In preterm infants, OMT improved postural organization, motor tone, and movement patterns, supporting early motor development [24, 25]. In children with musculoskeletal conditions such as low back pain or postural asymmetry, spinal manipulation and targeted OMT techniques improved segmental motion, muscle tone, and limb mobility [21, 22]. Additionally, pediatric lymphedema patients experienced improved lymphatic flow and limb mobility, highlighting OMT's role in restoring functional movement in both neurologic and musculoskeletal contexts [26].

3.2. Symptom Management

OMT has demonstrated benefits across neurological, respiratory, and visceral conditions. Children with ADHD showed improved selective and sustained attention [8], while a 6-year-old with persistent post-viral Long-COVID headache achieved complete symptom resolution after targeted OMT techniques [9]. In neonates, OMT improved feeding outcomes by enhancing cranial nerve function and suck-swallow coordination [10], and infants with positional plagiocephaly showed significant improvements in cranial symmetry [23]. Respiratory conditions such as otitis media, asthma, and sinusitis were associated with reductions in effusions, improved peak expiratory flow, and decreased sinus congestion [11, 12, 13, 14, 15]. Visceral conditions including colic and constipation demonstrated decreased GI discomfort and improved motility following OMT [16, 17, 18].

3.3. Safety and Tolerability

Osteopathic manipulative treatment has been shown to be generally safe and well-tolerated in pediatric patients, with the most common post-treatment effects being mild and transient, such as soreness, headache, or irritability, and the overall incidence of serious iatrogenic events is minimal [2]. Across multiple studies, including preterm infants, neonates, and older children, no significant complications were reported in neurological, respiratory, or visceral conditions [8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 23]. These findings support OMT as a low-risk, noninvasive adjunctive therapy for a broad range of pediatric populations.

4. Conclusion

Although research on pediatrics OMT is limited, available studies indicate potential benefits in enhancing mobility and symptom management across various conditions. Further investigation is warranted to examine long-term outcomes and establish standardized treatment guidelines for the management of pediatric conditions. These efforts may optimize patient outcomes and support evidence-based applications of OMT in pediatric care.

Compliance with ethical standards

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