

**RESEARCH ARTICLE**

## **Oral Motor Problems – What You May Recommend Your Little Patients**

**Author:**

Johannes Limbrock

kbo-Kinderzentrum Munich, Germany

**Email:** [info@oral-motorik.de](mailto:info@oral-motorik.de)

**Abstract:**

Babies and infants getting osteopathic therapies may show oral functional disorders, such as insufficient sucking, problems with mashed, semisolid or solid food, up to choking (dysphagia); open mouth, tongue protrusion, drooling. This article highlights medical contexts (muscle hypotonia, hypertonia/spasticity) and explains indications to a more specific therapy: such as the Castillo Morales®- Concept.

**Key words:** Drinking and eating disorder, Feeding disorder, Choking/dysphagia, hypersalivation/sialorrhea, hypotonicity, cerebral palsy, Castillo-Morales®-Concept, stimulating palatal plates

**Introduction:**

Babies and infants often are introduced and treated in osteopathic practices and benefit from early treatment, such as asymmetries or blockades after complications during birth etc. Frequent topics are problems of movement or posture, or of autoregulation<sup>1</sup> (sleep, restlessness, fidgety), but sometimes also feeding disorders in breastfeeding or bottle sucking, intake of mash-food, later on finger food and/or solid food appear. This can escalate up to choking (dysphagia<sup>2-7</sup>). Also open mouth posture, tongue protrusion or sialorrhea/drooling<sup>8</sup> are possibly presented to the therapist. In the case that such disorders don't improve short-dated (in time), further support should be considered.

The aim of this article is to reflect the symptoms and medical correlations of disorders, and to present possible options of therapy.

The above mentioned oral dysfunction symptoms might be early signs of neurologic developmental disorders. Depending on severity and progress a neuropaediatric examination might be necessary, if not yet done. In Germany centres for diagnostics and counseling are the SPZ (social-pediatric centres,

[www.dgspj.de/category/sozialpaediatrischezentren](http://www.dgspj.de/category/sozialpaediatrischezentren)). Also contact to neuropaediatricians can be asked at neuropaediatric societies, like [info@neuropaediatric.com](mailto:info@neuropaediatric.com).

To simplify, the orofacial or oralmotor dysfunctions can be subdivided in symptoms and secondary signs of muscle hypotonia on the one hand, and muscle hypertonia on the other hand.

**Muscle hypotonia**

Muscle hypotonia<sup>9-12</sup> results from a variety of causes, and often occurs in neuromuscular diseases, i.e. spinal muscular atrophy (SMA), hereditary ataxia diseases and other genetic syndromes: Trisomy 21 (Down-syndrome, Fig.4), Prader-Willi-syndrome, myotonic dystrophy and

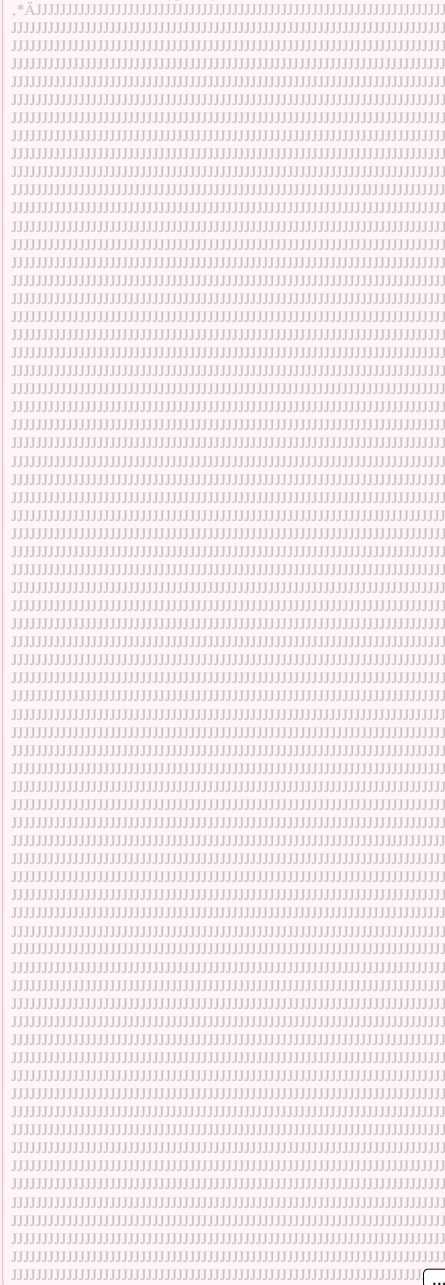
many other. The muscles of the face, the chewing system and the tongue are involved in these disorders.

Primary symptoms of hypotonia are delayed development of upright postures (uprighting) with insecure trunk and head posture, compressed chest, flat breathing, and many orofacial symptoms:

open mouth posture, reduced facial expression, inactive upper lip and/or everted lower lip. The tongue remains flat and broad on the oral bottom and often is protruded in front of the lower lip. It presses forward during swallowing and later during speaking – rather downwards, in contrary to spasticity. Its lateral and rotational mobility is frequently reduced, which impedes chewing and articulation. The tongue can be asymmetric, and can show atrophy signs, or possibly cleavages and fibrillations. The back of the tongue tends to remain flat. Thus, over the years, it insufficiently forms the palate, which remains narrow and peaked<sup>13</sup>.

On the contrary the lower jaw grows into protrusion, due to tongue pressure and to lack of muscle tension of lips and cheeks (buccinator-mechanism). This leads to cross bite, progeria and Angle class III. An open bite will develop, in frontal and sagittal planes, with protruded lower incisors. Gingiva hypertrophy often occurs, due to lack of saliva-bathing of teeth and gums, and due to open mouth breathing. This also promotes dental caries and paradontitis<sup>13</sup>. The soft palate muscles are weak: hypernasal voice, faint blowing and eventually nasal food discharge can arise. The oral sensitivity, and thus differentiation of food consistency, is often reduced – nevertheless at the same time a hypersensitivity with augmented gag reaction can develop. This leads to rejection of unknown, „overcharging“ consistencies and tastes.

Commented [C1]: Hypotony??? –



### Muscle hypertonia

The muscle hypertonia mostly corresponds to spasticity (also persistent muscle tension and rigor are forms of hypertony). The definition of spastic muscle tone is the augmented elongation resistance of skeletal muscles, dependent on elongation speed, as long as the muscle is not activated arbitrarily<sup>14</sup>. In children this mostly occurs in cerebral palsies (due to brain lesions before, during or up to 4 weeks after birth)<sup>15,16</sup>. More rarely, spasticity can result from later diseases, such as brain inflammation, accidents etc.

Symptoms of hypertonia are retarded motor development, impeded and asymmetric posture control, especially of the head (overextension, augmented inflexion etc, Fig.1).



**Fig.1:** Six years old girl with spastic cerebral palsy (bilateral)

Orofacial functions are often affected: the facial expression is tense, as are the muscles of chin and the lateral parts of upper lip (marginal fibres, i.e. deep nasiolabial folds). The mouth stands open,

the upper lip is inactive. As the tongue presses forward/upwards, and the marginal fibres of the upper lip press on the root of the teeth, the upper incisors will protrude over the years. The pressure of the chin muscle and lower lip, affiliated with lack of downward tongue pressure, leads to reduced growth of the lower jaw (mandibular retrognathism), and retruded lower incisors (deep overbite, Angle class II)<sup>13,17</sup>. The tongue presses into the open bite, as if „closing it“ during swallowing – and thus reinforces the open bite. The form of the tongue tends to be chunky and convex, not flat. Children with spastic cerebral palsy swallow more rarely than normal, and with little quantity of each swallow. The transporting tongue movement backwards is less effective, and lacks the negative compression wave because of the open mouth. This leads to sialorrhea (drooling)<sup>18 - 20</sup>. Often the initiation of swallowing is hard, so that the head is abruptly reclined (like a „bird swallowing“). Choking can easily occur. The oral sensitivity tends to be rather augmented than reduced, in contrary to sensation: the differentiation of food consistency is reduced. That's why the transition to mashed food and even more to fragmented mixtures is difficult. Solid food is hard to be sufficiently chewed (manducated) for a long time<sup>21</sup>. The gag reaction is increased and advanced in the mouth-cave. Often children with spasticity, dystonia or hypotonia cannot bring their hands to the mouth – this impedes oral exploration. Speech development is often retarded, especially with problems of pronunciation: intermittent, pressed, backshored articulation<sup>22,23</sup>. Often the initiation of the voice is hard.

### Therapy options<sup>24</sup> – a selection

#### The Castillo Morales® – Concept<sup>25</sup>

is a holistic, neurophysiology-based treatment concept for sensorimotor and orofacial dysfunctions in children and adults<sup>25</sup>. A main focus is the treatment of the orofacial area.

In order to induce and improve physiologic movement patterns in the orofacial complex, an

uprighted posture of the trunk and head is required and needed. In babies, infants and severely disabled persons this is achievable by the „motor calm posture“ according to Castillo Morales. The child will be held in a secure corporal contact, with the therapist’s palm of the hand at the occiput, the other hand exerting a slight pressure and manual vibration at the sternum. Thus the neck is uprighted – in elongation of the vertebral column: Breathing will calm, the child seeks eye contact, its hands meet in the centre line.

Important treatment techniques in the Castillo Morales® – Concept are manual contact, stroking, pulling and manual vibration. By intermittent vibration the muscle tone is in first line augmented, which stabilizes the posture of a hypotonic child. The long-hold vibration lowers the muscle tone of a hypertonic child.

Furthermore the concept includes many exercises (such as basic exercise and its variations, lateral uprighting mechanism etc.), which achieve an active neck erection. This is essentially important (clue) for the coordination of the orofacial complex, and swallow<sup>26</sup>.

In order to activate the facial muscles, the concept uses the „motor zones of the face“. They are stimulated separately or in combination. A thorough preparation is always required, beginning at trunk and shoulder girdle.

Intraoral stimulations are rarely needed, and only beneficial in a situation of mutual trust and complete acceptance. It’s a basic principle in the Castillo Morales® – Concept, that therapists must not slur over the signals of the child, and never exert pressure or constraint. Otherwise severe behaviour problems can evolve. Fundamentally it’s not reasonable to begin treatment at the mouth primarily.



**Fig.2:** Basic exercise of the Castillo Morales® – Concept. Aim: physiological swallowing, also activation of tongue, velum and pharynx, and their lateral movements<sup>26</sup>

#### **Palatal plates according to Castillo Morales®**

Palatal plates originate from orthodontics<sup>13</sup> for jaw- and dental corrections. They have been processed by Dr. Castillo Morales for stimulating tongue and lips: for example to reorientate the protruded tongue of children with Trisomy 21 (Down-syndrome) into the mouth cavity<sup>27-32</sup>. Real macroglossia is very rare in Trisomy 21. Only long persistent hypotonic tongue protrusion can over the years lead to „secondary macroglossia“: thickening/fibrosing of tongue tissue, and relatively small oral cavity, consequence of not being formed/widened by inside tongue activity. But real macroglossia occurs for example in Beckwith-Wiedemann-syndrome, and responds well to Castillo Morales® treatment. In such case the palatal plate and the stimulation must be constructed thin enough, to give place in mouth for the intruding tongue. The palatal plate aims to stimulate movements, and therefore is only inserted several short times daily, e.g. 3 x 1 up to 4x ½ hours in daytime, not during eating or drinking.



**Fig. 3a+b:** Palatal plates according to Castillo Morales® for a suckling babe and a 5-year-old child



**Fig. 4a+b:** Suckling babe with Trisomy 21 before and after inserting the plate according to Castillo Morales®

Palatal plates can also stimulate lateral tongue movements (chewing etc): this primarily is necessary in spastic cerebral palsy (Fig 5a+b), and also in some syndromes with possible hypoglossus palsy: Moebius, Myotonic

dystrophy, DiGeorge, myopathies, bilateral perisylvian syndrome etc. <sup>14, 32</sup>. In Scandinavia Castillo Morales®-plates also are used for active tongue training (in only slightly handicapped patients), for example in speech-articulation problems <sup>33, 34</sup>



**Fig. 5a+b:** Girl of Fig.1 (4 years old) with spastic cerebral palsy (bilateral) and her lateral stimulating plate

Over the decades variations of the plates arose by experiences in many countries (Scandinavia, South America, Germany, Switzerland, Austria etc.). Most important and frequently used is the tongue stimulator: mostly performed as hollow cylinder at the A-line (back line of hard palate). It brings the back of the tongue upwards, to press and unclasp – like playing with the vacuum, and thus initiating back-movement of the tongue and swallowing.

In sampling such experiences, Dr. Castillo Morales advised, which was dear to his heart:

The palatal plate is – like other enoral stimulation – a rarely needed supplement during manual orofacial therapy. This manual therapy must precede, indicate and accompany the plate stimulation<sup>25, 26, 30, 31</sup>. Indication and controls of effect should be done by an interdisciplinary team of pediatrician, therapist (speech/physio/ergo-with special apprenticeship) and orthodontist/dentist.

#### Further treatment possibilities<sup>35 - 37</sup>:

**NEPA-therapy** (Pörnbacher<sup>35</sup>) activates motricity of neck-stretch and orofacial muscles by prone position on a special cotter (spline, of 30 °), with elbow supporting blocks.

**Padovan-Method** (<sup>36</sup>) uses creeping and toys for oral stimulation (chewing tube, suction device etc) to train suction, mastication and swallowing.

**FOTT** = Facio-Oral-Trakt-Therapy (<sup>37</sup>) is based on Bobath-concept, and trains functions of eating, drinking, tooth brush and nonverbal communication.

#### Conclusions:

Early diagnostic and treatment in babies and infants can prevent long-lasting problems of eating and drinking, choking, open mouth posture, sialorrhea (drooling), dysgnathia, bite anomalies, dental diseases, speech problems etc. Neurophysiology-based therapies are presented, especially the Castillo Morales®-Concept, including stimulating palatal plates; with short discription of NEPA, Padovan and FOTT.

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