

## Headaches in Children: A New Neurological Interpretation

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### ABSTRACT

**Introduction:** This paper aims to shed light on an increasingly common condition, namely headaches in children. Until now, the problem has been studied to rule out the presence of underlying diseases, but without a thorough understanding of the causal mechanisms, we are groping in the dark and end up resorting to symptomatic remedies that have little to do with the phenomenon. The explanation may instead come from studying the swallowing process. Through rhythmic stimulation of the nasopalatine trigeminal receptors, this process is increasingly demonstrating its function as a regulator of the brain. **Objectives:** To demonstrate that headaches in children are often caused by poor swallowing function with reduced serotonin production in the brain and that re-education can solve the problem. **Methods:** Two groups of ten children each, all suffering from headaches for at least 10 days a month, were randomly selected. One group performed exercises to restore the ability to stimulate the palatal receptors, while the second group continued the therapies prescribed by other specialists. **Results:** In all participants in the working group, the headaches disappeared permanently after 45-60 days of tongue function re-education. In the control group, two people reported a reduction in the intensity of the attacks and two people reported a reduction in the number of attacks. **Discussion:** Myofunctional re-education proved to be a targeted therapy for headaches, as it increases the production of serotonin, which is responsible for both reducing pain perception and, to an even greater extent, reducing hypertonicity, which is the cause of tension headaches and promotes vascular headaches.

**Keywords:** Headaches, Trigeminal, Nose-palatine nerve, Serotonine, Myofunctional Therapy.

Headaches in children are an increasingly pressing issue, given the growing number of individuals affected and the anxiety this causes in parents.(1,2,3,4,5) However, there is very little in-depth knowledge about headaches, and there is often a tendency to repeat what has been said in the past without checking the accuracy of the statements being repeated and without adequate neurophysiological knowledge.

If you do a bibliographic search in major internet libraries such as Pub Med, you are immediately struck by the fact that, when you type in "childhood headache", you find yourself faced with a very large number of searches and publications made using the "copy and paste" method, which is actually quite unexpected. In fact, finding sentences or entire paragraphs copied verbatim in multiple publications only denotes a desire to publish at any cost, even without having anything new to say on the subject.

In my work as an oro-facial muscle rehabilitator, I deal daily with children who come to me for observation because they need to wear orthodontic appliances or braces, or simply because

they have difficulty swallowing properly or speaking adequately. I have realised that many, too many, suffer from some form of headache for which they have consulted various specialists without success.(6,7) They go from neurologists to ophthalmologists, nutritionists and psychologists, without anyone being able to permanently eradicate this problem.

All publications confirm that there are two types of headache: primary and secondary. Fortunately, the vast majority of headaches are not the result of serious brain problems, and many studies recommend, after a neurological examination and in more serious cases, CT scans, MRIs, electroencephalograms, dietary changes, psychosocial therapies and medication. (8)

In what sometimes seems like a miracle, after about two months of rehabilitation for the above problems, the young patient no longer feels the headache and even forgets about it altogether.

Until 2002, when I came across the existence of trigeminal nose-palatal receptors, there was no explanation. During rehabilitation, the patient was taught to position the tip of the tongue in the area of the palate corresponding to the position assumed by the tongue when squeezing the nipple during breastfeeding. It was a tongue position considered correct without any real basis of knowledge. The discovery by two anatomists (Halata and Baumann)(9) that all higher animals have an enormous number of the five major exteroceptors in the body at the emergence of the nose-palatine nerve, the same ones that inform the brain about the correct posture to assume in the feet, completely changed the interpretation of the problem, allowing me to direct my studies towards the ability of these informants to largely govern brain function. Teaching in various university master's programmes in posturology, and coordinating the Master's degree course in "Myofunctional Therapy in Posture", organised in 2009 by the Department of Neurology at Sapienza University of Rome, has allowed me to assign theses on the subject and to explain many problems that were often previously unexplained or poorly explained due to a lack of knowledge in the field of neurophysiology.(10,11) The greatest satisfaction was to interest Prof. Marcello Brunelli, director of neurophysiology at the University of Pisa, in these new topics. He became passionate about the subject and invited me to teach in the Master's in "Neurophysiology of static and dynamic postures", becoming a fundamental point of reference for following correct study paths. This initially allowed me to publish a neurological explanation of bruxism (12) (not surprisingly, one of the most constant elements in headaches in children and adults). This was followed by research on stimulating the recovery of pregnancy capacity (13), on the explanation that Juvenile Idiopathic Scoliosis, which since the 1990s had been linked to a decrease in serotonin and melatonin, was often recoverable in a few months of stimulation of the palatal receptors (14,15,16 ). Research has been carried out on why children suck their thumbs (and often trigger headaches when they stop sucking) (17), on fibromyalgia (18) and on muscle hypertonicity caused by a lack of stimulation of the naso-palatal receptors. (19)

Electromyography has allowed us to observe that most headaches in children are muscle tension headaches, caused by hypertonicity of the masseter and temporal muscles. We have also been able to appreciate how positioning the tongue on the Spot, i.e. in contact with the palatal receptors, causes a decrease and regularisation of the tone of the occlusal muscles within the time of one screen, i.e. 14 seconds.

However, in addition to muscle tension headaches, it is also possible to diagnose vascular headaches. The explanation is simple. Hypertonicity of the temporal and masseter muscles forces the skull into a vice-like grip that reduces the rhythmic movements of expansion and contraction of the skull (in osteopathy, these are referred to as flexion-extension and internal-external rotation). These rhythmic movements are necessary for emptying the cranial venous sinuses. The decrease in mobility causes blood to stagnate in the sinuses and stretching of the dural membranes, which, remember, are innervated by the trigeminal nerve. It is therefore easy for both muscle tension headaches and vascular headaches to occur. Migraine can also originate from this dysfunction, especially when there is a muscle area innervated by the trigeminal nerve on one side that is more hypertonic than the other.

Functional magnetic resonance imaging has also helped us. Visualising the areas activated by a subject while swallowing incorrectly, habitually, and comparing them with those activated when swallowing physiologically, with the tongue at the Spot, has allowed us to understand why there is also psychological involvement in subjects with altered swallowing and headaches. The lack of stimulation of the naso-palatal receptors produces a significant decrease in the activation of the limbic area, which is recovered in correct swallowing.

This leads us to introduce a further element that explains the improvements brought about by the recovery of physiological swallowing: the increase in the production of, among other things, serotonin. Serotonin is related to at least nine neurological functions, some of which are still unknown. It is the basis of muscle tone control, which, as we have seen, is lacking in muscle tension headaches. It is such an important natural painkiller that, if a painful procedure has to be performed on a newborn baby, it is done while the baby is breastfeeding (20,21) because, without being aware of it, by pressing the nasopalatine receptors while squeezing the nipple, the baby is stimulating the production of serotonin.

In research carried out for two theses in Posturology, we measured the presence of 5-hydroxyindoleacetic acid, a catabolite of serotonin, in subjects affected by juvenile idiopathic scoliosis, which, as has been demonstrated for years, is very often due to a deficiency of serotonin and melatonin. Seeing in many cases an improvement in scoliosis during treatment carried out as a prerequisite to orthodontic treatment in order to remove the causes of dental damage, we realised that within a few months, apparently without explanation, the orthopaedic problem improved significantly. This prompted us to measure serotonin levels before the start of myofunctional treatment and after three months. In 70% of subjects, serotonin increased significantly to physiological levels. This was the explanation we were looking for. This substance reduced both pain perception and, above all, muscle hypertonicity, which is the basis of muscle tension headaches and often, indirectly, vascular headaches as well.

### **OBJECTIVE OF THE STUDY**

To demonstrate how myofunctional re-education, through the recovery of stimulation of the nasopalatine nerve receptors, is able to reduce and even eliminate the cause of headaches. The presence of headaches emerged from the medical history taken before starting orthodontic treatment. In some cases, however, the subjects came to us as a “last resort”, having already followed the most common and correct diagnostic procedures without finding a solution other than the medications prescribed by the various specialists consulted. Some of them were

advised to visit us by other subjects who had received unexpected benefits from the recovery of physiological swallowing function.

## METHODS

Children of both sexes, aged between 7 and 12 years, suffering from headaches for more than 10 days per month were selected for our research. Subjects already undergoing orthodontic treatment (which in many cases can cause tension headaches due to continuous changes in dental contact during orthodontic treatment) were excluded.

All subjects had already been examined by a neurologist and had undergone tests to rule out severe brain disorders. Many had undergone psychological examinations, nutritional consultations and visits to pain specialists. All without results.

We formed two groups of 10 subjects each. The first, the working group, consisted of six females and four males, the second of five females and five males. The first group underwent the first three months of myofunctional therapy. The first phase of re-education is dedicated to the functional recovery of the tongue elevator muscles, which are used to press the palatal receptors (in functional subjects, these receptors are stimulated at least 1,200 times in 24 hours).

The second group, on the other hand, practised the therapies prescribed by other specialists without re-educating their swallowing.

All subjects in both groups were assessed with a specific device for measuring masseter tone (Myometer). During muscle contraction by clenching their teeth, all subjects showed values between 1.9 pounds and 3.1 pounds. (Normal values for the age group analysed should be between 0.5 and 0.8 pounds).

The subjects in the working group practised exercises involving the progressive lifting of the tongue towards the palate, starting from the tip of the tongue and then lifting the center of the tongue and finally the back. In practice, the peristaltic movement of the tongue that pushes food into the pharynx was progressively reset. The active exercises were performed twice a day and never took more than 5 minutes per session. Only one exercise had an initial duration of 5 minutes, increasing by 5 minutes per week. It is an exercise involving passive positioning of the tip of the tongue in contact with the palatal spot. It is an exercise that does not require particular muscular strength but progressively increases the contact of the tongue with the nasopalatine receptors.

## RESULTS

Within a period ranging from forty-five to sixty days, all members of the active group saw their headaches disappear permanently. The most severely affected child (30 days per month of headaches with vomiting and photophobia) suffered only four episodes in the first month, which she described as “not like before!”, and no headaches at all in the second month. Muscle measurements showed that the masseter values had fallen by about 60% or more compared to the initial values.

After three months, the control group showed values almost identical to the initial ones, with two subjects reporting a decrease in episodes and, in two cases, a decrease in the intensity of the attacks.

## DISCUSSION

Palatal stimulation showed unexpected effectiveness on headaches and, above all, proved to be a treatment aimed at the cause of the problem and not simply a treatment of the symptom. It is desirable that specialists, in addition to the examinations proposed so far, also request an assessment of swallowing function carried out by a myofunctional therapist.

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