

## Tutorial

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## Mastication in the Oral Myofunctional Disorders

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### ABSTRACT

The aim of this article is to show two ways of clinical work with mastication in Oral Myofunctional Disorders. Consideration is given to limitations that make direct treatment impossible: symptoms/signs of temporo-mandibular joint, occlusions alterations, types of ortodontics or orthopedics appliances and loosing teeth. The procedures suggested are named procedures WITH and WITHOUT LIMITATIONS.

**KEY WORDS:** Mastication, Myofunctional Disorders, Myofunctional therapy, Orofacial Myology

### INTRODUCTION

The purpose of this article is to present more information about our clinic work with oral myofunctional disorders. A part of it was published last year in IJOM (Bacha and Rispoli, 1999). In this article, we share ideas about mastication with consideration being given to some possible limitations of the patient, temporo-mandibular joint (TMJ), occlusion, orthodontic or orthopedical appliance, loosing teeth.

There are several important publications in Brazil about mastication, which relate mastication to the other stomatognathic functions. Some articles focus on theoretical ideas while other articles contribute information on the practical focus of evaluation and of oral myofunctional treatment (Altmann, 1990; Altmann & Vaz, 1992; Altmann, 1997; Bacha & Rispoli, 1999; Bianchini, 1993, 1998, 1998a; Camargo & Hernandez, 1987; Felício, 1999; Franco, 1998; Gomes, Proença & Limongi 1984; Jabur, 1994; Junqueira, 1994; Krakauer, 1995; Limongi, 1987; Marchesan, 1989, 1993, 1994, 1997, 1998; Meurer, Veiga & Capp, 1998; Noronha e Duro, 1995; Rispoli & Bacha, 1998; Tanigute, 1998).

In order to better understand mastication, it is necessary to also understand the anatomy and physiology of the stomatognathic system as a whole - its sensibility and its motor aspects. For information in this area we referred to publications by: Baptista (1996), Bradley (1981), Douglas (1994), Madeira (1997), Morales (1991), Moyers (1988), Planas (1988) and Petrelli (1992).

It may be said that mastication is an intermediary stomatognathic function between the

taking of food and swallowing, and with the aid of saliva, the food is reduced into smaller particles, forming the alimentary cake (bolus) that will be digested. In order to be chewed, it is necessary that food have a minimum consistency to permit chewing movements. Therefore, it is also necessary to understand the characteristics of food when working with the mastication. In this regard, we studied the work of Cravioto and Milan (1989), Douglas (1994), and Marchesan (1998). These authors comment about the relevance of the eating habits of a society, the considerations about the consistency, amount, and quality of food.

Mastication is initially a learned function and later an automated function. In order to be modified, systematized therapy on mastication is needed in regard to anatomical and functional conditions of the patient. However, in addition to these conditions, consciousness and motivation are needed. In this sense we highlighted the works of Marchesan (1989, 1993).

In this article, we will present two proposed therapies with mastication.

### PROPOSALS OF WORK WITH THE MASTICATION

Our research was published last year on Myofunctional Therapy: Brief Intervention (IFB). Information was presented on our practices in oral myofunctional therapy, and the purposes of our therapy on mastication for patients (children and adults) who may or may not have used orthodontic or orthopedic appliances (Bacha & Rispoli 1999).

We proposed that limiting factors for oral myofunctional therapy with mastication included:

- signs and/or symptoms of alterations in the temporo-mandibular joint - improper postural positions in the rest; deviations or cracks when opening the mouth; atypical movements of the jaw in the functions; pain when speaking, when chewing or during palpation;
- occlusion conditions that limited mastication movements - class I with agglomeration and/or accentuated overjet, deep overbite, cross bite, open bite; class II and class III;
- type of orthodontic appliance
- loosing teeth.

Beginning with IFB we proposed the following procedures for work with mastication in oral myofunctional therapy:

### **I) Procedures for cases Without Limitations**

When occlusal and TMJ situations (as well as the type of orthodontic appliance and teething) allow, we begin therapy for mastication directly with food. We start with foods that are less solid and progress to foods that are more solid, for example: apple, sandwich of hamburger bread, French bread sandwich, raw carrots, and lunch (with a variety of consistencies). Alternate bilateral mastication is guided. It should not happen in pain. If pain is present, the patient is instructed to use their old masticatory pattern until conditions for introducing alternate bilateral movements are improved. Often this desired pattern of bilateral mastication will never be possible.

If the patient is in orthodontic treatment, it is necessary to consider the phase of dental mobility, that limits the food consistency (TABLE Some preparatory myotherapeutic exercises may be necessary for the face, cheeks, lips and tongue (Altmann, 1996; Bacha, Camargo, Ennes, Ribeiro, & Volpe, 1998; Padovan, 1976).

Therapy with breathing, feeding, buccal hygiene, orofacial habits and corporal posture/physical activity may also be provided to establish the basic conditions for the coordinated functions of the stomatognathic functions system, especially for mastication. These aspects will be described in the item of procedures for the cases WITH LIMITATIONS.

### **II) Procedures for the cases With Limitations (TMJ, occlusion, appliance, loosing teeth)**

In these cases, direct therapy does not target mastication. We propose oral myofunctional therapy with limitation, focusing on aspects that are important to lay the proper foundation for mastication.

#### **Feeding:**

We focus on the consistency, quality, amount, and masticatory rhythm with closed mouth and size of the portions. We use a handout to help explain feeding aspects (TABLE I).

**Consistency of Food:** we recommended harder food, with specific considerations for patients with an orthodontic appliance (TABLE II). We are careful not to insist on food with a hard consistency due to limitations imposed by the patient's orthodontic appliance, current periodontal situation, and the TMJ considerations.

**Amount of Food:** we recommended the amount of the food (daily nutrition that is necessary and associated it with quality (TABLE I); small and more frequent meals, and avoiding "voracity" (one of the factors that interfere with mastication) which benefit the distribution of nutrients throughout the day.

**Quality of Food** (we have studied the age group of 8 to 15 years - Ríspoli, 1998): we recommended the consumption of food in order of importance for the oral motricity: 1-proteins; 2-calcium; 3-vitamins A and C; 4-carbohydrates (TABLE I). This item is guided and controlled with children. Associating the quality of food to the amount and consistency of food provides an effective therapeutic technique (Rispoli & Bacha, 1998; Bacha & Rispoli, 1999).

**TABLE I****FEEDING IN ORAL MYOFUNCTIONAL THERAPY**

Feeding is fundamental because it is through the blood circulation that its elements promote growth and development. The intention is to relate the quality, amount and consistency of the victuals, making a direct and fundamental relationship with the work in oral myofunctional therapy.

**QUALITY and AMOUNT**

Today meals are much poorer in nutrients than at the beginning of the century.

It is necessary to balance (quality and amount) the nutrients: vitamins, proteins, mineral salts, fibers, carbohydrates and fats, trying to distribute them between 4 and 6 daily meals.

For the oral motricity, the following is fundamental:

**1. Proteins:** The proteins stabilize the organism. They help the construction and renewal of the tissues of the body. To balance proteins half should be of animal origin and half of vegetable origin. The daily minimum amount is 1.2g/Kg/day (younger than 12 years old) and 1.0g/Kg/day (older than 12 years old). Example: a steak of 100grs, has 20grs of protein.

Sources of proteins of animal origin: milk and its derived; meats, fish and birds; eggs.

Sources of proteins of vegetable origin: bean, pea, lentil, beak grain, peanut, fava, soy, nuts, potato, sweet potato, beet, cereals (wheat, corn, rice) .

In the case of allergy to milk of animal origin: meat protein (mainly the white meat) and white of egg.

**2. Calcium:** It is a mineral salt. There are many mineral salts. They control many of the metabolic processes and they promote health of the bones, teeth, blood and certain tissues. Magnesium, potassium and sodium, are contained in almost all foods. 800 mg/day of calcium a day is necessary. Iron, zinc, copper, selenium and flouride are enough in small amounts.

Sources of calcium: milk and milk products (mainly cheeses, natural yogurt). A small amount of calcium is contained in the green vegetables, sardine and salmon. In the age group of 8-15 years, 800mg/day is necessary, that is to say, the equivalent of at least 1 liter of milk a day (in 1ml of milk has 1mg of calcium; 100 grs of cheese corresponds at 500 ml of milk) and this should be complemented with green vegetables to maintain a balanced diet.

**3. A and C vitamins:** These vitamins, generally, are responsible for the operation of cells and for reconstruction of the tissues. They also stimulate the production of energy. We emphasized A and C vitamins:

Carrot and most yellow fruits have both A and C vitamins (it is necessary to have 1 a day). When eating fruits is necessary to consider: One in juice (orange, lemon, peach...) and the other one should have starch (banana, papaya, sleeve). So, it is necessary to eat at least 2 fruits a day. The ideal is to eat 4 fruits a day.

Sources of A vitamin: milk, eggs; carrot, spinach, cabbage; liver; lettuce, pumpkin, tomato, bean, fish, cheeses, leaves of broccoli, pear, cashew, sleeve, watermelon, melon.

Sources of C vitamin: fruits (strawberry; orange, lemon; tomato and the remaining fruits) and less is available from vegetables (broccoli, cauliflower, bean sprout, grains).

**4. Carbohydrates:** The basis of energy for the human body is carbohydrates, but in the form of starch.

The daily consumption of carbohydrate should be about of 300grs according to age.

Sources of Carbohydrates (starches): flours (fundamentally wheat, corn and rice, oat), bean, pea, lentil, chickpea and potato, potato-sweet.

**5. Fats:** The fats supply energy and they participate of many chemical reactions in the organism. Therefore, they are necessary mainly during the growth, but they need to be the right kind of fats. The fat consumption should be:

Half as saturated fats (red meats, eggs, milk and milk products, and some vegetable oils, such as coconut).

Half as fats unsaturated fats (majority of the vegetable oils, fish, white parts of the chicken) which are better tolerated and easier for the body to handle, added to green vegetables (salads), without frying.

**6. Fibers:** Fibers are not nutritious and don't have energy value. However, they are control the intestinal absorption of fats and other substances of the organism.

Sources: hard and fibrous foods of vegetable origin: integral cereals (rice, corn, wheat, farena), roots (potato, carrot, turnip), vegetables, green vegetables, beans and lentils, dried fruits (plum, apricot), nuts, almonds, seeds and fresh fruits (apple).

**7. Water:** It is recommended to drink about of 1.5 liter of water daily.

**TABLE II****CONSISTENCY**

Mastication occupies an important place in the development of the musculature and of the bones of the face. Especially during the growth phase between 8 and 15 years.

To exercise our mastication, we needed more solid foods. It is important to avoid as basic feeding, diets that are primarily liquidified, pasty or with a lot of sauce.

**SUGGESTIONS:**

Use natural seasonings. Salt should be restricted to what is necessary to give flavor.

Foods should be roasted, grilled or broiled.

Vegetables should be mainly raw and well washed.

Avoids excess sugar.

Avoid going long periods without eating. Have small and more frequent meals.

Meals must be a pleasant time.

Try to eat what you like.

Try to eat slowly, chewing well and observe difficulties.

**TABLE III**

Specific suggestions for patients wearing orthodontic or orthopedical appliances:

1. Solid foods should be cut in small pieces so that the orthodontic appliance is not broken. Eat fruits without the peel.
2. Removable appliances should be removed during eating unless directed otherwise by explicit directions of the orthodontist. Always brush the teeth and the appliance before putting them back in the mouth.
3. The oral myologist's suggestions about eating cannot exclude the recommendations given by the orthodontist on cases with appliances. Combine the two directions if possible.
4. Food must not damage the orthodontic appliance.
5. Food should not cause pain when chewing. In case there is pain, stop and communicate this to the orthodontist and the myologist.
6. When teeth ache because of the fittings of the orthodontic appliance, eat just what it possible, giving preference to the softest foods.
7. Try to chew with a closed mouth and chew slowly.
8. Maintain good posture when eating. Avoid to eating lying down and do not lie down right away after meals (await at least 30 minutes).

Information is provided in writing and handouts regarding feeding. Charts are also given to patients for them to record their daily food intake. It is important to help the patient understand these concepts and accept the responsibility for implementation of the recommendations regarding: food (quality/amount/consistency); meals (breakfast, snack of the morning, lunch, snack of the afternoon, dinner and snack of the night); and, properties of food (proteins, calcium, vitamins A and C and carbohydrates). The information that the patient shares regarding their food intake is discussed at each session. Emphasis is placed on the patient eating balanced nutrients more and more frequently (quality and consistency)

for each of the six suggested meals. We noticed that when patients eat "forbidden" food which could damage the orthodontic appliance - nutritious or not -, such as bullets, chewing gums, soft drinks, fruits with peel etc., or, when they do not eat a balanced diet, they record such facts on their charts. This facilitates the course of the therapy program and promotes changes. It also directs our attention to the possible need for specific referrals to a physician and/or nutritionist.

Proper hydration is also emphasized. It is recommended that children aged 8 to 15 drink one and a half liters of water a day. The recommendation for adults is two liters.

**Breathing:**

Exercises for establishing nasal patency through the use of "nasal wash" and "nose wipe". Wiping the nose mainly at bath time and after the nasal wash. We followed the recommendations of the otorhinolaryngologist. When appropriate, it was suggested that the patient use a nasal wash with water and thick salt (half glass of lukewarm filtered water and a shallow spoon - "teaspoon"- of thick salt) once a day. Two or more times a day (respecting the medical contraindications) was recommended when they had a cold.

Exercises for nasal breathing: we used a Host ( a small thin wafer-like piece of bread) which initially was placed between the lips while the patient performed 3 to 5 diversified activities during the day with the duration of 5 minutes each. Next, the Host was removed while the same activities were completed. Later on, the patient was asked to record information regarding nasal breathing during the day with mouth closed in rest. This information was recorded by the patient on a chart by using positive and negative signs or through evaluating their own performance on a scale from 0 to 10. When the patient was a child, we emphasized the help and the responsible adult's accompaniment. Exercises of invigoration of the labial musculature were also recommended. We reinforced the medical and/or surgical treatment by emphasizing the importance of proper breathing.

**Buccal Hygiene:**

Information was provided about the need of maintaining good buccal hygiene (teeth and gums) and the effect of good buccal hygiene on mastication conditions. If there is decay or gingival pathology, the patient will experience pain which will interfere in the masticatory standard.

The amount of daily brushing is monitored by asking the patient to record this information on their chart. We based our recommendation of always brushing the teeth after each meal on the direction given by the orthodontists. We also accompanied the quality of the brushings by observation of the general state of buccal hygiene. With adult patients feedback provided is mainly verbal instead of being recorded on a chart.

The procedure of lingual brushing is discussed in physiology and in myofunctional therapy research. We did not find consensus in the opinions of experts to apply it in a widespread way, as we did for the recommendation of brushing teeth.

**Orofacial habits:**

When beginning treatment for habits, we asked patients, both adults and children, to record information on charts regarding the respective frequency, intensity and duration of the particular habit. In the cases of multiple habits, we worked on eliminating the habits one at a time. The patient chose the order in which the habits were addressed.

We used various resources to develop therapeutic techniques to address certain habits (Ríspoli & Bacha, 1998). However, in all the cases, we emphasized the patient's understanding and motivation through systematic recording of information on their charts (marks of positive and negative; zero to ten). In addition for children, it was recommended that a signal for each habit be established between the patient and the responsible adult as a reminder to cease the habit behavior.

When observing orofacial habits, mouth breathing deserves special attention because mouth breathing may be habitual. When mouth breathing is not accompanied by organic complications, we guided breathing exercises (use of the nose for breathing, wiping the nose) and exercises to invigorate the labial musculature. In the same way that in the cases WITHOUT LIMITATION, some preparatory myotherapeutic exercises, may be necessary for the face, cheeks, lips and speech (Altmann, 1996; Bacha, Camargo, Ennes, Ribeiro, & Volpe, 1998; Padovan, 1976).

**Corporal posture /Physical activity:**

We work to establish an awareness of postural conscience by relating it to the stomatognathic functions. Charts were used with children and adults for verification and monitoring posture and for daily control.

Neck and shoulders stretches are given in order to work on postural perception and knowledge.

Explanations were given to patients relating neck posture to lingual posture; neck posture and shoulder tensions with mandibular posture, and other relationships that are necessary for individual patients.

An understanding of physical activity was provided by giving the patients explanations relating the whole body to the stomatognathic system. We limited ourselves to recommending the frequent practice of physical exercises.

If there are larger discrepancies of corporal posture we recommended the patient to the physiotherapist and/or orthopedist. We also observed the existence of signs/symptoms of auditory and visual difficulties. We guided patients about the relationship between balance and corporal posture.

## CONCLUSION

These two proposals of myofunctional therapy try to enhance the possibilities for the patient's limitations with proper mastication.

In patients WITHOUT LIMITATIONS, we observed satisfactory results. Additional therapy directed toward other stomatognathic functions of swallowing and speaking are not described in this article. Therapy for patients WITHOUT LIMITATION on was provided once a week. With children we emphasized the need of a responsible adult's participation. The time of attendance varied patient by patient. However, the associated motivation, the understanding the work to be done, and a systematized therapeutic approach contributed to the effectiveness of the treatment. In the discharge process biweekly sessions were provided with return

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appointments for follow-up at 30 days, 3 months, 6 months and 1 year. If the patient used appliances (besides contention), we followed the patient until the end of orthodontic treatment.

In patients WITH LIMITATIONS, in addition to the same considerations above, we also observed satisfactory results in the targeted aspects. It is important that the initial explanation is given to the patient or his/her family about the limitations of therapy, the reason for doing it, and how it will be done. This treatment phase does not involve direct work with the masticatory function (swallowing and speech), and is shorter than for patients Without Limitations. Patients With Limitations have the potential to resolve the limitations (TMJ, occlusion, appliances, and teething) by the time the orthodontic or orthopedical treatment is completed. We make periodic appointments to determine the appropriate time to provide direct therapy for deficient functions (mastication, swallowing and speaking). When these types of patients have already received some myofunctional training, we observed that fewer sessions were necessary for this final treatment. In other cases we also observed self-correction.

When the patient is in ortodontic or orthopedic treatment, we send written reports to the physicians when we begin and when we conclude the myofunctional treatment. These report consists of basic information about the diagnostic evaluation, proposed intervention, and when treatment is completed information the conditions of discharge are provided. Contacts by telephone are maintained whenever necessary.

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