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AN ORTHOPEDIC APPROACH TO THE TREATMENT OF CLASS III MALOCCLUSION IN YOUNG PATIENTS

One of the most perplexing types of malocclusions (bad bites) that require early orthodontic treatment is termed "Class III Malocclusion." This type of problem generally is recognized by a reverse position of the upper and lower anterior teeth. In this type of bite, it is common that the lower front teeth bite ahead of the upper front teeth. This condition commonly is called an "underbite."

This type of problem can be caused by a number of conditions. In some patients, there is an under-development of the upper jaw. In other patients, there is an overdevelopment of the lower jaw, and in an additional group of patients both problems exist together.

The treatment of an underbite raises the clinical dilemma: Is it better to intervene at an early age, or to wait for the growth of the face to be expressed fully? When left unattended, this type of bite often is corrected through the use of corrective jaw surgery in combination with orthodontics. Surgical treatment typically occurs after the majority of growth of the patient is completed, usually during the late teenage years. The need for surgery often can be diminished or eliminated with early orthopedic intervention.

The early treatment of Class III malocclusion has been attempted for over 100 years. In the early 1980s, we modified a traditional treatment approach to incorporate some of the latest bonding technology. We currently recommend the use of an expansion appliance bonded temporarily to the upper teeth and a growth guidance appliance called a facial mask, which contacts the chin and forehead regions of the patient's face. The facial mask is connected to the hooks on the expander with small orthodontic rubber bands. These components are described in detail below.

SEQUENCE OF TREATMENT

To initiate treatment, orthodontic diagnostic records are needed. These consist of x-rays, models of the teeth, and diagnostic photographs. After diagnostic records are taken and the records have been reviewed by our doctors, a treatment plan is established that will include the bonded expander and the orthopedic facial mask. The treatment plan then will be discussed with the patient and his or her parents (or other responsible party) in either a formal consultation, or more typically during what we term a "treatment talk," which is handled chairside at the time of the delivery of the expander.

1. The Bonded Expander

The cornerstone of early Class III treatment is the bonded rapid maxillary expander. This device, made from acrylic and stainless steel wire, covers the back teeth of the upper jaw (maxilla) and is fixed to the teeth with a standard bonding procedure. On this appliance are attached small hooks, which are used to connect the expander to the facial mask with small orthodontic rubber bands.

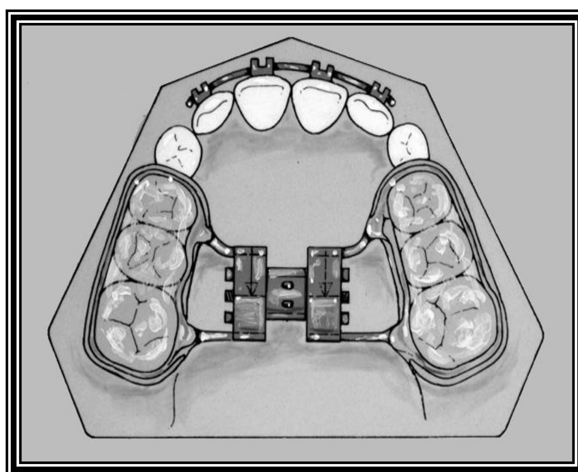
The upper jaw is connected to the rest of the skull through a complicated set of sutures (places where one bone connects with other bones). The expander is bonded to the upper teeth. There is a jack-screw in the

middle of the appliance that is "activated" or turned by the parent, one turn (90º) on a daily basis until the desired expansion of the upper arch is achieved.

The first major appointment involves the delivery of the expander. Please plan approximately **75 minutes** for this appointment. While the delivery of the expander takes approximately 15 minutes, we use the remaining time to prepare the patient, and then finally to show the parent or guardian how to activate the expander. In addition, the proper diet, techniques of brushing and care of the appliance will be discussed.

The patient will be seen in the office at four to eight week intervals following the delivery of the appliance. Usually the patient will be asked to expand the appliance one time per day (usually before bedtime) for 28 days. The need for further expansion will be determined at each visit.

In many cases of mild Class III malocclusion, the placement of the bonded expander alone is sufficient to help correct the crossbite and give the patient a normal bite. The spontaneous correction of the underbite usually is checked at four week intervals following the placement of the expander. If the correction has not occurred spontaneously, or if the malocclusion is severe, then the facial mask will be needed.



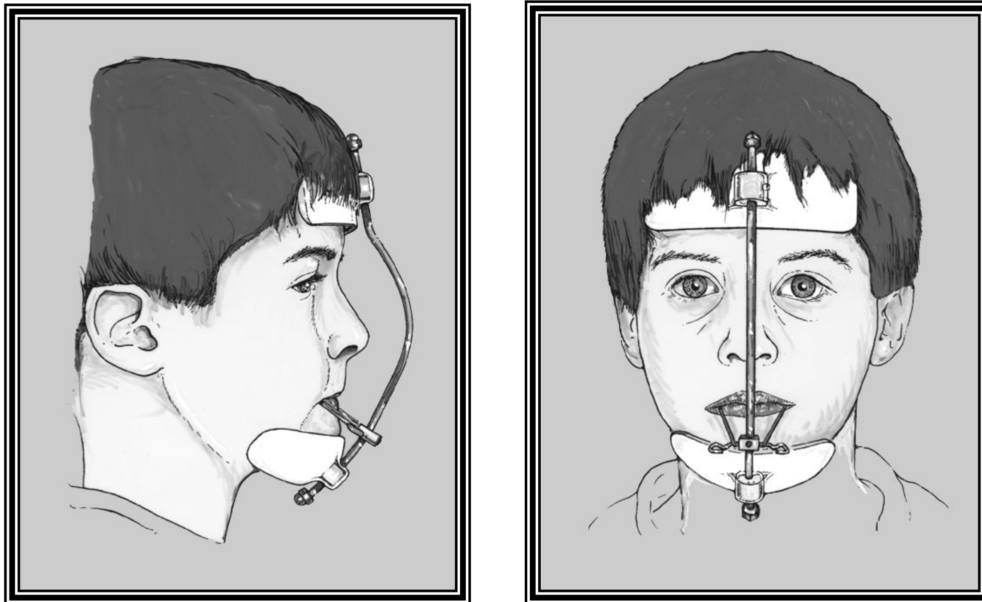
Bonded Rapid Maxillary Expander

2. The Facial Mask

The facial mask was described first more than 100 years ago, with similar devices appearing in the dental literature early last century. The current version of the mask used in this office consists of two pads that contact the soft tissue on the forehead and the chin regions. The pads are made from acrylic and are lined with soft closed cell foam that is non-absorbent, easily cleanable and replaceable. The pads are connected by a midline framework to which is attached a crossbow wire. From this wire, elastics (rubber bands) extend to the hooks on the expander.

A potential problem can exist concerning the fit of the facial mask as sore spots can appear on the forehead or chin when the appliance is worn. In these cases, supplemental padding (for example, Kleenex, pieces of old sweat pants, non-allergic pillow filler, lambs wool, moleskin) can be used to cushion the contact of the pad against the skin. In certain instances, the use of *Cortaid* or other mild cortisone products can be recommended.

If there has not been a spontaneous correction of the underlying bad bite, the facial mask will be delivered. In most instances **we ask the patient to wear the appliance at least 12-14 hours a day, including nighttime wear.** The patient should not wear the appliance during active sports such as swimming or soccer, or other times when wearing the mask could be dangerous to the patient or to his or her friends. **Usually the facial mask is worn for six to nine months, the duration of wear based on the number of hours the patient wears the appliance each day and the severity of the underbite. If the appliance is not worn as instructed, treatment takes much longer and the likelihood of needing surgical treatment increases.**



Orthopedic Facial Mask Therapy

3. Elastics

The facial mask is connected to the expander through the use of elastics. These rubber bands come in varying sizes and produce greater and greater forces as the strength of the rubber band is increased. Generally the following sequence of rubber bands is followed:

Tiger elastic	**3/8”**	**8 oz.**
Whale elastic	**1/2”**	**14 oz.**
Walrus elastic	**5/16”**	**14oz.**

Usually the Tiger elastic is used at the beginning of treatment to help the patient to become used to the appliance. The patient is then instructed to increase the strength of the elastic by changing from Tiger to Whale and ultimately to Walrus. **In situations where there are problems with tissue irritation, a decrease in the force of the elastics is recommended.**

RISKS OF TREATMENT

The use of this type of early orthopedic treatment is very effective in correcting most underlying Class III malocclusions. The older the patient or the more severe the problem, the less likely will the outcome be ideal. There are several possible complications associated with the use of the bonded expander and the facial mask. They are outlined as follows:

1. Decalcification of the Teeth.

As with any type of bonded appliance, there is a risk that the bonded seal of the appliance will break, and saliva will leak into the gap between the appliance and the teeth. If this leakage is left unattended for several months, significant demineralization (white spots) can occur on the teeth. In severe cases, decalcification can lead to decay.

If the patient notices a bad taste in the mouth or reports that the appliance is loose, this should be reported to the office immediately. Occasionally, the appliance will have to be removed and rebonded.

2. Problems with the Jaw Joint

The facial mask puts pressure on the forehead and on the chin. In most instances, this pressure does not cause a problem, especially in growing children. There have been rare instances, however, in which patients have reported problems opening and closing their jaws during treatment. If pain or locking occurs in the jaw joint, or if there are any other symptoms such as clicking, noise or limited movement, **wearing the facial mask should be discontinued immediately and a call should be made to the office.**

3. Skin Irritation

A common problem associated with those patients who wear the appliance on a full time basis is soft tissue irritation, particularly in the area of the chin. As mentioned earlier, the elastic force can be reduced, or the mask can be discontinued for a day or so to allow for healing to occur. If there are any major problems, please notify the office immediately.

FINAL REMARKS

Of the many types of orthodontic problems, the young patient with the developing Class III malocclusion proves to be one of the major challenges. The treatment outlined in this handout illustrates one approach to the early correction of Class III malocclusion, the use of the expansion of the upper jaw combined with orthopedic facial mask therapy. With proper patient cooperation, the changes in the bite can be dramatic.

One of the problems associated with this type of treatment is the nature of the problem itself. In most instances, there is some abnormal growth process occurring, which allows the upper and lower jaws to grow out of balance with one another. **In at least 50% of the patients that we treat, a second phase of expansion and/or facial mask wear is necessary before the eruption of the permanent teeth.** In almost all instances, full braces will be needed when the permanent teeth are in to align these teeth.

In some cases, even those cases undergoing early orthopedic treatment, surgery is still necessary. This growth problem may be due to genetic tendencies, hormone imbalances, underlying airway obstruction or other problems that can influence the growth of the head and face. These factors are beyond the control of the orthodontist and the patient, and must be recognized by the patient and parent before the onset of orthopedic treatment.

If you have any questions about the material contained in this handout, please do not hesitate to contact our office.