

Compliance The Major Problem In Orthopedic Therapy



Dr. J.W. "Skip" Truitt, Jr.

Compliance

The Major Problem In Orthopedic Therapy

The most common statement that I hear all over the world, made by doctors using functional orthopedic appliances is "if the patient wears the appliances they really work well". And in fact there is not one among us who has not experienced the abject frustration of knowing that you could successfully treat the patient, if only they would wear their appliances.

When speaking with specialist Orthodontists ten years ago regarding functional orthopedic appliances, their immediate comment was that they "simply do not work". Today the same specialists agree that the orthopedic appliances do work, but that the success or failure of the treatment is totally at the mercy of the patient. And, in point of fact they are correct!!!

I have been privileged to observe the work of some of the finest doctors all over the world. And, I must admit that ninety percent of their success usually lies in their ability to motivate the patient and the parents as opposed to having an exceptionally high mechanical skill level.

What is the solution to this difficult problem of compliance? The first obvious step is for the doctor and the staff to do everything possible to properly motivate both the patient and the parents prior to beginning treatment. This first step frequently requires a great deal of time and effort and probably accounts for the fact that doctors who are accustomed to using only fixed appliance therapy experience more compliance problems than those doctors who are accustomed to depending upon patient cooperation.

However, no matter how hard one may try there will always be those patients who will not cooperate and will require some form of fixed orthopedic appliance. Before we examine the different options that are available for using fixed orthopedic appliances one critical point must be made and thoroughly understood. When using a removable orthopedic appliance the clinician is constantly protected by the natural function of the occlusion that occurs when the appliances are not being worn. When the appliances are made fixed this inherent protection is eliminated. As a result any mechanical error that is made by the clinician is greatly magnified as the appliances are never removed and natural function allowed to occur.

In order to better understand the different mechanical options that are available to us we shall organize our treatment procedures into three basic categories; these are arch development, correcting the vertical dimension, and mandibular translation.

Arch Development

When discussing arch development we must segregate the mixed dentition from the permanent dentition; and the maxillary arch from the mandibular arch. **The Maxillary Arch**

The maxillary arch is usually best developed in both the mixed and the permanent dentition by using some form of a Schwarz appliance. This allows the size of the maxilla to be corrected in either the transverse and/or occlusal coverage of acrylic can be placed posteriorly on the appliance for an open-bite case, or an anterior bite ramp placed for a closed-bite case.

These maxillary Schwarz appliances are termed fixed-removable. Bands are cemented on various teeth using glass ionomer cement. These bands have buccal attachments that allow only the clinician to place and to remove the appliances. An

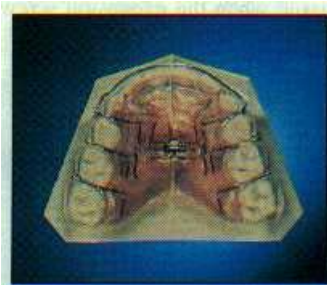


Fig. 1: Fixed-Removable Schwarz



Fig. 2: Expansion Screw Key



Fig 3: NAOL Fixed Expander



Fig. 4: McGill Appliance



Fig. 5: Lower Jackson Ligated

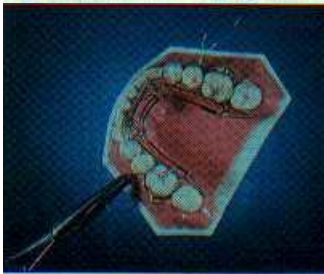


Fig. 6: Lower Crozat Ligated

example of this type of fixed-removable maxillary Schwarz appliance can be seen in figure number one.

The expansion screws in this appliance are adjusted either by the doctor, or by the parent using a special key. This key is designed with a large handle and a bayonet bend to prevent damage to the soft tissue when the expansion screw is being adjusted. (See fig. #2)

Oral hygiene is the major disadvantage of using the fixed-removable Schwarz appliance. The patient must use some type of oral irrigation and plaque control system. In addition, the clinician must see the patient every two weeks as opposed to every four weeks. The appliance should be removed, cleaned, and adjusted. The patient's teeth should be cleaned and the progress of the treatment monitored before the appliance is replaced.

Other options to the fixed-removable Schwarz appliance are the N.A.O.L. Fixed Expander (See fig. #3) and the McGill appliance (See fig. #4). These appliances can be modified for the mixed or the permanent dentition, and can also incorporate a Sagittal component as well. Neither of these appliances work well in open-bite cases due to the lack of posterior occlusal coverage of acrylic. Their major advantage over the fixed-removable Schwarz appliance is oral hygiene.

The Mandibular Arch

The mandibular arch is usually best developed with an appliance that incorporates a lingual body wire as the active mechanical force. This allows the clinician not only to increase the size of the lower arch, but to also increase its length, create symmetry, and to key-stone the mandibular cuspid position. The optimal appliance in the mixed dentition is the mandibular cuspid position. The optimal appliance in the mixed dentition is the mandibular Jackson, and in the permanent dentition the mandibular Crozat.

Fortunately, these two usually removable appliances can be easily made fixed-removable by ligating them into place using .010 steel ligature wire. The lower Jackson appliance can be ligated around the deciduous second molars (See fig. #5), the lower Crozat appliance can be ligated around the permanent second bicuspid (See fig. #6).

Oral hygiene is usually not a problem with the fixed-removable Jackson and Crozat appliances. The doctor can see the patient every four weeks and remove, clean, adjust, and religate the appliances with minimal time and effort.

Other alternatives to the fixed-removable Jackson and Crozat appliances are the N.A.O.L. Fixed Expander which can be modified for either the mixed or the permanent dentition (See figs. #7 and #8). Or the Williams Appliance™ which is used only in the mixed dentition (See fig. #9).

Vertical Dimension

When discussing changing the vertical dimension we must first fully appreciate the difference in opening and closing the bite. Deciduous teeth do not passively erupt to a new vertical height. And, if they are not ankylosed, are easy to mechanically intrude. The reverse is true of the permanent teeth. Therefore it is best to close an anterior open-bite case as early as possible in the child's development, and best to open the closed-bite case only after the first permanent molars have erupted in order to obtain a posterior vertical stop within the occlusion.

Thus opening a closed bite is a relatively simple procedure using a variety of fixed-removable appliances. All one must do is establish some type of an anterior bite plane that separates the posterior permanent molars and allows them to erupt to a higher occlusal plane. This type of appliance has the added benefit of intruding the lower incisors which in turn aids in leveling the Curve of Spee.

It is my experience that the Rick-A-Nator is the best fixed-removable appliance to simply open a closed bite (See fig. #10). The Rick-A-Nator can be used in either the mixed or



Fig. 7: NAOL Fixed-Expander Mixed Dentition



Fig. 8: NAOL Fixed-Expander Permanent Dentition



Fig. 9: Williams Appliance™



Fig. 10: Rick-A-Nator Appliance



Fig. 11: Modified-Fixed Removable Schwarz

permanent dentition. It can also be used in conjunction with fixed appliance therapy. In addition, the clinician can use vertical elastics to speed the eruption of the lower posterior teeth. And, in patients with temporomandibular joint dysfunction, one can easily add temporary posterior composite build up to support the condyles correctly upon the meniscus while the bite is being opened.

The Rick-A-Nator appliance is easily cleaned and is well tolerated by most patients. The major disadvantage to the Rick-A-Nator appliance is that many closed bite patients are also skeletal Class II. The more severe the skeletal Class II the more the need to correct the skeletal Class II relationship prior to using the Rick-A-Nator appliance to open the vertical dimension. If this sequence of treatment is not followed one can easily excessively procline the mandibular incisors, and/or create an anterior open bite.

Closing an anterior open bite requires two separate mechanical procedures. First, the appliance system must incorporate posterior occlusal coverage of acrylic. The appliance can be augmented with high-pull extra oral traction to add additional intrusive force to the maxillary posterior segments. Second, the anterior tongue thrust and/or object habit must be corrected in order to maintain the proper vertical dimension.

It is my experience that the modified fixed-removable Schwarz appliance is the only satisfactory solution to this very difficult compliance problem (See fig #11). This fixed removable Schwarz appliance can be used with or without high pull extra oral traction.

Mandibular Translation

The term mandibular translation carries with it various connotations to different treatment philosophies. It is not the intent of the article to discuss the changes that occur when a patient is treated from a skeletal Class II into a skeletal Class I relationship. So, in order to standardize our concepts let us assume that mandibular translation is defined as “changing the size, shape, and position of the mandible as it relates to the anterior cranial base”.

The universal appliance to best accomplish mandibular translation is the Bionator (See fig. #12).

The Bionator provides the operator with the ability to control the vertical dimension, increase the maxillary arch length, keystone the lower inter-canine width, and translate the mandible. Unfortunately, the Bionator appliance is the most difficult of all of the functional orthopedic appliances for the patient to tolerate. And, this lack of tolerance increases with the patient's age. Since one can not make the Bionator appliance fixed, or even fixed-removable, mandibular translation presents some unique clinical problems for the patient who will not cooperate.

First of all the reciprocal forces created by translating the mandible forward must be controlled. If these forces are not properly anchored the lower incisors can be pushed forward into excess proclination which will in turn cause mandibular arch length loss. The same forces must be controlled on the maxillary arch in order to maintain correct upper arch length. All of these mechanical problems are easily controlled when using the Bionator appliance. But what can the clinician do when the patient simply refuses to wear the correct appliance?~

There are a number of fixed-removable appliances that can be used to translate the mandible such as the Rick-A-Nator and the Clark Twin-Block™ (See fig. #13). Unfortunately neither of these appliances work well if the patient is a skeletal Class II with an open bite.

My approach to the skeletal Class II open bite patient that is non-compliant is relatively simple. First close the open bite by using the properly modified fixed-removable Schwarz appliance. Second, if the skeletal Fig. 13: Clark Twin-Block™ Class II is very mild translate the mandible with a Rick-A-Nator. If the skeletal Class II is severe use a fixed removable Clark Twin-Block™ to



Fig. 12: Bionator Appliance



Fig. 13: Clark Twin-Block™

translate the mandible. Once the skeletal Class II has been treated, the Rick-A-Nator can be used to correct any skeletal mid-line deviation and finalize the vertical dimension.

In conclusion let us review the problems that are created by non-compliance patients who have skeletal components to their malocclusion. First, and most important, attempt to motivate both the patient and the parents to properly wear the appliances. This is without question the best solution to the problem.

Second, divide the patient's skeletal problems into three basic categories. These are the size of the maxillary and mandibular arches, the vertical dimension, and the severity of the skeletal Class II. If the clinician will follow this sequence of therapy there is usually a solution for even the most difficult compliance problem.

Should you have any questions or comments regarding the treatment of non-compliance patient's please contact the Clinical Foundation of Orthopedics and Orthodontics, P. O. Box 130, Gainesville, Texas 76241-0130, or call 1800-843-3558.