

Combining functional appliances in the straightwire system

Derek Mahony

The Trainer for Braces (T4B) helps speed up fixed appliance therapy, by derotating teeth and pushing them into the line of the arch. It also aids treatment stability by reducing the influence of undesirable myo-functional habits and retraining the oral musculature. I issue a T4B to all my patients on the day of bracket placement. I have noticed a 30% reduction in treatment times for those patients who wear the T4B as directed.
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INTRODUCTION

Many clinicians advocate the use of functional appliances for the early treatment of malocclusions. The advantage of functional appliances is that they allow orthopedic effects on the bone allowing for the correction of skeletal malocclusions, not possible with fixed appliance therapy. In Europe, the concept of functional appliances (for the redirection of growth), in combination with arch expansion, has been a popular choice for the treatment of Class II malocclusions. Correction of some severe Class II skeletal discrepancies would be difficult without the use of functional appliances. More wide spread use of these techniques, particularly in North America, has been limited by the inherited disadvantages and criticism of functional appliances.

The general disadvantages of the functional appliance are the lack of ability to align the teeth, and the complex and expensive construction. The more these appliances are developed to improve performance, the more prone they are to breakage and poor compliance. Furthermore, despite the name, few functional appliances have significant effects on the soft tissue. i.e. correction of tongue thrusting, reverse swallowing, oral habits and mouth breathing. These soft tissue problems have been shown to greatly influence growth, development and long term stability.

More recently there has been a trend to combine a two-phase system to obtain the best of functional and fixed appliance treatment modalities, recognizing the shortcomings of both systems used separately. This requires one to two years of functional appliance therapy and then (as functionals are poor at dental alignment) the use of fixed appliances for another one to two years, not including retention time.

Orthodontic treatment, therefore, can be prolonged to four years or longer. Children, parents and orthodontists prefer shorter treatment times and tend to skip the functional phase, just focusing on effective tooth alignment for practicality. This has led to a wide spread tendency, particularly in North America, to only use fixed appliance therapy. The clinician thus treats in the permanent dentition and ignores the advantages of a two-phase functional and fixed appliance treatment plan.

THE TRAINER FOR BRACES (T4B)

The "Trainer for Braces" was developed out of the need to assist in the treatment of soft tissue, tongue position and potential TMJ problems during fixed appliance therapy. As an added bonus the T4B covers the brackets and bands, preventing much of the irritation that is seen in the first few weeks of fixed appliance therapy. The T4B is not intended to replace the functional phase of treatment, but allows "functional type" treatment in combination with fixed appliances. The T4B also has specific design features for "myo-functional training".

The Trainer for Braces (T4B) can be viewed as a pre-fabricated single size functional appliance that has channels to fit over orthodontic brackets. The T4B helps speed treatment by reducing the influence of undesirable myo-functional habits. It improves post treatment stability by retraining the oral musculature. Bruxing is limited by the double mouth guard effect of the T4B.

BENEFITS OF T4B DESIGN

- No impressions or custom fitting needed.
- Single size for all patients.
- Distal end may be trimmed in younger patients.
- High-grade silicone material delivers good flexibility and comfort.
- Only needs to be worn for one (1) hour daily plus overnight wear.
- Appliance channels to accommodate brackets and archwires.
- Tooth channels to guide tooth movement.

* Derek Roy Mahony BDS (Syd) MScD (Lon) DOrth RCS (Edin)
MDOOrth RCPS (Glas) Orthodontic Practice 49 Botany Street
Randwick NSW 2031 Sydney Australia
Email: Braced@bracesforall.com.au

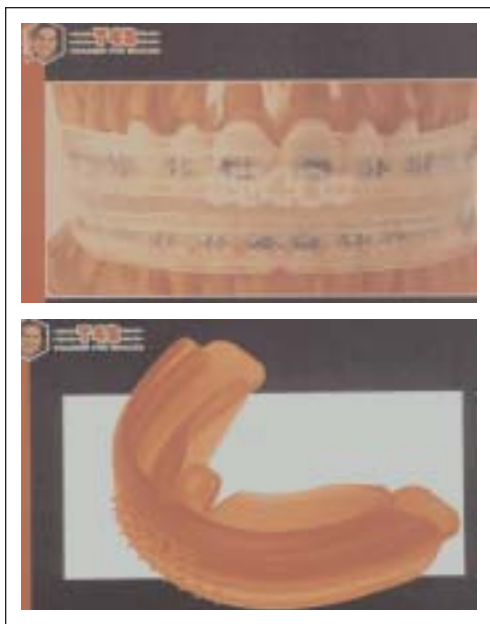


Figure 1. The T4B appliance is shown on the model.

- Tongue Tag for ideal positioning of the tongue tip, as per myo-functional and speech therapy.
- Tongue Guard stops tongue thrusting when appliance is in place, and encourages nasal respiration.
- Splint (patented aerofoil shape) achieves gentle decompression of the temporomandibular joints.
- Lip Bumpers discourage over active mentalis muscle activity.

TREATING MUSCLE FACTORS, TONGUE POSITION AND FUNCTION

The T4B has a tongue tag for the active retraining of tongue position. The tip of the tongue is “trained” into the correct position, behind the maxillary central incisors. The tongue guard prevents tongue thrusting while the appliance is worn. This eliminates detrimental forces on the dentition, which can slow orthodontic treatment.

The T4B has a lip bumper effect via the incorporation of raised nodules in the lower lip area. This stretches the mentalis muscle to break the reverse swallow pattern that is responsible for lower anterior crowding and mandibular “under development”.

THE T4B AS A FUNCTIONAL APPLIANCE

The T4B is constructed in an edge to edge Class I position, making it effective for Class II correction. In addition, the double mouth guard effect prevents mouth breathing in a similar fashion to an Oral Screen. The correction of mouth breathing is one of the most important factors in maintaining maxillary arch expansion. The development is sometimes lost when a clinician progresses from an arch development appliance to fixed appliance therapy.

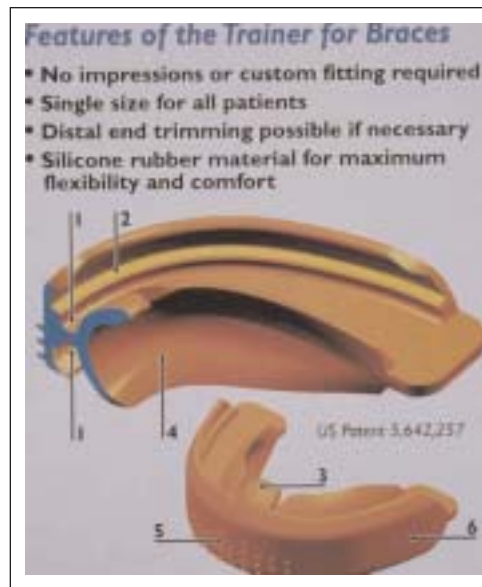


Figure 2. The features of the T4B appliance are noted and include: no impressions or custom fitting required, single size that can be adjusted, trimming on the distal ends if necessary, and silicone rubber material for maximum flexibility and comfort.

Maxillary expansion has often been criticized for lack of stability. As a result of such relapse many orthodontists never consider maxillary development. What the clinician must realize is that the tongue is capable of exerting forces of 300 to 500 grams against the palate. When the tongue is in the correct position, it is able to maintain maxillary arch width, while dental alignment is occurring. It is important that functional problems, such as enlarged adenoids and tonsils, deviated nasal septums or allergies that cause nasal obstruction are eliminated before the commencement of fixed appliance therapy. After maxillary expansion, any correction in the mode of breathing and the tongue resting position can be maintained by using the T4B.

Research has proven repeatedly that “muscle will always overpower the hard tissues, i.e. teeth and alveolar bone”. It is now possible to treat all three aspects of any malocclusion, i.e. tooth position, myo-functional bad habits and jaw position. The Trainer for Braces allows the clinician to treat these three aspects of the malocclusion in conjunction with the correction of dental and skeletal structures.

IMMEDIATE SOFT TISSUE PROTECTION ON NEWLY BANDED CASES

Patients often complain of irritation to the soft tissues in the first few weeks after fixed appliance placement. The T4B prevents this discomfort, particularly during sleep. Not only is this a good practice builder, but it reduces the number of unnecessary emergency appointments.

I fit the T4b on the day of banding. The patient is instructed not to take the appliance out of the mouth until they have dinner later that evening. As soon as the patient removes the T4B, to eat, they feel the irritation of the brackets for the first time and immediately



Figure 3. Frontal view of dental assistant before and after braces were placed without the benefit of wire.



Figure 4. T4B appliance on model with Viazis brackets and wire in place.

replace the T4B in the mouth! This encourages patient compliance, as the patient will replace the T4B to avoid any future discomfort. On average, the majority of patients will continue to wear the T4B, as close to full time as possible, for the next three months. It is only taken out of the mouth to eat and brush the teeth. After the first three months patients will wear the T4B for 1 hour at home and when sleeping

SPEEDING UP FIXED APPLIANCE THERAPY

The T4B discludes the dentition allowing the teeth to move more freely. This speeds up the rate of orthodontic tooth movement. I have also found that the majority of dental rotations are corrected by the action of the tooth channels against the bracket wings and tooth surfaces. This is particularly evident when using the new Viazis bracket, which has increased in and out dimensions (due to its vertical slot) thus making greater contact with the tooth channels.

A clinical experiment performed, within my practice, to see the effect of the T4B on severely rotated central incisors. My clinical assistant was treated with fixed appliances at no charge on the condition she would accept having no archwires placed for the first eight weeks of her fixed appliance therapy. She did, however, wear a T4B on a “full time” basis for the initial eight weeks of treatment. The results were amazing with the T4B correcting the majority of rotations and providing a more symmetrical archform. Pre and post treatment photographs of this case may be found at Figures 3 and 5.

ELIMINATION OF TMJ SYMPTOMS

TMJ symptoms may develop during the use of fixed

appliances. The T4B allows the clinician to continue fixed appliance therapy while simultaneously treating the TMJ symptoms. The T4B is an ideal nighttime splint as it has a thicker section at the back for joint decompression. This soft silicone material compensates for occlusal disharmony and a “splint affect” can be implemented without interruption to the fixed appliance treatment.

Orthodontic treatment creates a lot of tooth movement, which can create prematurities and subsequent TMJ symptoms. This can be disturbing for the patient and the orthodontist, as many times symptoms do not subside without instituting TMJ treatment.

CLASS II CORRECTION

The T4B is employed like a functional appliance to advance the mandible to a Class I position and stop the tongue thrusting and lip habits associated with a Class II problem. Removal of these aberrant forces allows our Class II mechanics to be more effective. Class II elastics can still be utilized, in conjunction with the T4B, by cutting a slot in the canine region. This permits the attachment of elastics between the arches.

CORRECTION OF DEEP OVERBITES

Bite opening can be achieved with the T4B when the distal ends of the appliance are cut to allow super eruption of the second molars.

ISSUING THE TRAINER FOR BRACES

- Show the patient the T4B and point out the tongue tag.
- Tell the patient to place the T4B in their mouth with the tongue tag uppermost.

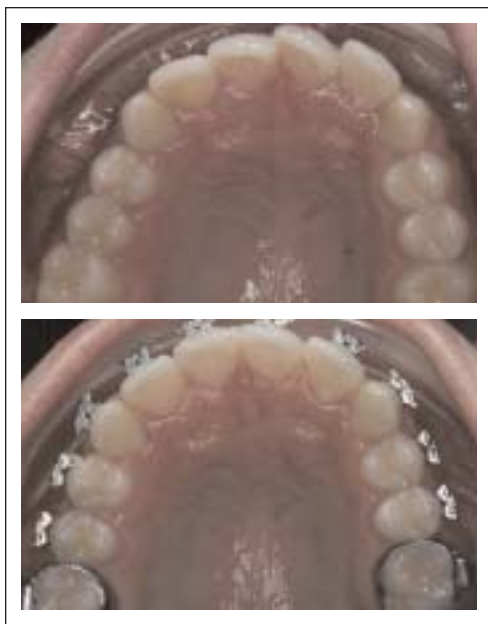


Figure 5. Correction of rotations and arch form by only wearing the T4B and with brackets in place without the benefit of any wires for 8 weeks.

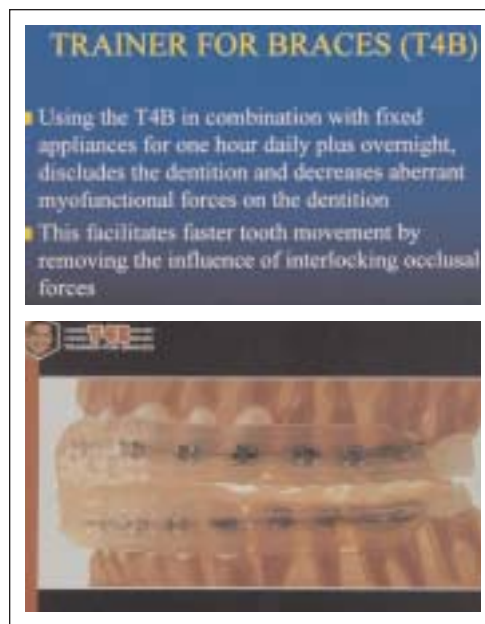


Figure 6. T4B can be used with fixed appliances one hour daily plus overnight. Since the appliance discludes the teeth and decreases aberrant myofunctional forces, it facilitates faster tooth movement.

- Feel the tongue tag with the tip of the tongue. Show the patient the raised section of the tongue tag; touch the tongue tip with a mirror handle and say, “This is where the tongue tip should be all the time, with the T4B in or out”.
- The patient now places the T4B into the mouth.
- Ask patient to keep lips lightly together and breathe through their nose.
- Remind patient not to chew on the T4B. Close the teeth into the T4B and keep lips together.
- “Use daily, while doing homework, reading, watching TV or playing”. Minimum daily use is 1 hour. Two half-hour sessions are as effective. One hour is considered minimum and of course if they want to use it more, that will increase effectiveness. Daily use is the conscious training of the tongue position.
- **Adequate soft tissue protection requires night use.** Using at night will stop the brackets irritating the soft tissue and causing trauma when the child is asleep and cannot feel the irritation. If the T4B falls out (which it mostly does in the early stages of treatment), just tell the patient to persevere as this is a training program and once the T4B stays in all night that is a major success! Mouth breathers and tongue thrusters, in particular, have this trouble. They must, however, be made to realize that orthodontics will fail unless these habits

are corrected, so the patient must persevere. Night use is the passive phase stopping the detrimental effect of tongue thrusting and mouth breathing.

FITTING AND ADJUSTING

The T4B usually requires no adjustments. Have the children place it into the mouth themselves.

Do not try to place it into the child’s mouth yourself.

Ask them to check that it does not hurt anywhere. Usually it will not. Narrow mouths may require 2 to 3 mm off the distal ends if they say it is too long or they cannot get the lips together.

Cut the distal ends with scissors to shorten the T4B or trim anywhere that discomfort occurs.

If there is too much bite opening, the anterior teeth do not come into the tooth guidance system. Trim 2 to 3 mm off the distal ends to close the bite down and correct this. Trim back the upper labial bow if the child has an extreme Class II or open bite. This will make it easier to seat the anterior teeth into the T4B. Children younger than ten (10) years without the second permanent molars can still use the T4B. Just cut 4 — 6 mm off the distal ends to compensate for the absence of permanent molars.

Cleaning: Rinse in warm water — brush with a toothbrush. The T4B can be boiled to sterilize.