

PROCEDURES MANUAL

T4K™ (THE TRAINER FOR KIDS) PRE-ORTHODONTIC TRAINER

developed by Dr. Chris Farrell (BDS Sydney University)

Treatment for developing malocclusion in children during mixed dentition

INCORPORATING:

**TOOTH GUIDANCE
MYOFUNCTIONAL TRAINING
JAW POSITIONING**

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CONTENTS:

Introduction
2 - 5

How to start
6

Indications for use
7 - 9

Contra-indications
10

Use during and post orthodontic treatment
11 - 12

Treatment plans
13

Patient selection
14

Follow-up visits
15

Fee structure
16

Research
17 - 20

The Pre-Orthodontic TRAINER™ A Combined Functional and Tooth Guidance Appliance

The concept of early treatment of orthodontic problems in the growing child has been in practice for the majority of the century, particularly in Europe. The “functional appliance” is used for redirection of growth and, combined with arch expansion, has been a popular choice for many common malocclusions. More widespread adoption of these techniques, particularly in North America has been limited by the inherent disadvantages and criticism of these “functional” appliances.

The advantages of functional appliances are the early treatment of malocclusion, orthopaedic effects on the bone allowing for the correction of skeletal malocclusions not possible with dentally fixed appliances.

General disadvantages are lack of ability to align the teeth, plus complex and expensive construction. The more the appliances are developed to improve their performance, the more prone they are to breakage and poor compliance. Furthermore, despite their name, few functional appliances do not have significant effects on the soft tissue. ie; correction of tongue thrusting, reverse swallowing, oral habits and mouth breathing, all of which have been shown to greatly influence growth and dental alignment^{1,3,7,9}. Furthermore, many functional appliances discourage correct tongue position and function tending to produce the adverse effects demonstrated by the Harvold experiments of the 1960's on primates.

More recently there has been a trend to combine a 2 phase system to obtain the best of functional and fixed appliance treatments, recognising the shortcomings of both systems used separately.

From this need the Pre-Orthodontic TRAINER™ was developed as a definitive early treatment for the child in the mixed dentition years - the ages when functional appliances work best. The intention was to produce an easy to use prefabricated device with the orthopaedic effects of a functional appliance, combined with a tooth guidance system, plus an unique myofunctional training feature. The product does not require manufacture in the laboratory and is made in a universal size for all children 6-11 years (mixed dentition stage), allowing orthodontic treatment to be implemented earlier and at lower cost. The application of a tooth guidance into a functional appliance overcomes one of the major disadvantages of other functional appliances.

Tooth Guidance

The TRAINER™ is made from a non-thermoplastic silicone or polyurethane. The material has both flexibility and inherent memory. The premoulded upper and lower labial bows have a similar effect to that of orthodontic archwire. That is, they are premoulded to the parabolic shape of the natural arches and adapt to any arch size, large or small.

As with archwire, the TRAINER™ does not require to be different sizes, only

The Pre-Orthodontic TRAINER™
A combined functional and tooth guidance appliance

The advantages of early treatment

The Pre-Orthodontic TRAINER™ was developed from the need for a more comprehensive early treatment

Tooth Guidance

distal length varies, which can be trimmed accordingly to the distal position of the first permanent molars. The labial bows combined with anterior tooth channels afford a constant force on misaligned anterior teeth to assist in the correction of their position. There is a starting **TRAINER™** made of a soft and a flexible silicone material for maximum compliance. This also allows it to adapt to the most severely misaligned teeth. The starting (blue/green) **TRAINER™** imparts only light force on the teeth, then after 6-8 months the firmer (pink) **TRAINER™**, which imparts a much higher force on the misaligned anterior teeth, is implemented. This is the principle behind the straight wire technique, starting with a light wire then progressing to firmer wire as the teeth come into better alignment. (only 1.7gm of force is required to move an anterior tooth⁵) Computer design technology has allowed this principal to be incorporated into the **TRAINER™**.

Myofunctional Training

Incorrect tongue position and function, tongue thrusting and oral habits are the cause of many malocclusions^{1,3,7,9}. More attention has been given to these factors recently as factors in relapse. Correction of these aberrant forces imposed on the dentition can assist dental and skeletal alignment^{4,8}. The **TRAINER™** has an unique myofunctional training system to assist correction of these habits.

The design incorporates a **tongue tag** for proprioceptive location of the tongue tip. The raised section on the tag trains the child to place the tongue tip in the correct **“position”** with the **TRAINER™** in place. This also acts as a **“reminder”** to place the tongue tip correctly without the **TRAINER™**. Myofunctional therapists use this tongue positioning as a basis of their re-training of the oral musculature. **The Tongue guard** prevents a tongue thrust swallow when in place, which is a position “training” process for the tongue. **Lip bumpers** or Mentalis stretchers are incorporated to stretch and deactivate overactive mentalis contraction, associated with a tongue thrust swallow. Lip bumpers have been shown to gain arch length in mild to moderately crowded cases.⁴

The **TRAINER™ stops mouth breathing** when in place. The double mouthguard design of the **TRAINER™** trains the child to breathe through the nose. Most children with open mouth posture can nose breathe. They are habitual mouth breathers and can be trained to breathe correctly. Particularly when worn overnight, the **TRAINER™** helps to prevent maxillary arch loss and slowed growth so common in mouth breathers.^{7,9} Woodside and Linder-Aronsen showed **“a change from mouth-open to mouth-closed breathing was associated with greater mandibular growth expressed in the chin and greater facial growth expressed in the midface.”**⁸ **Passive arch expansion and mandibular growth is achieved by changing mode of breathing.**

A Functional Appliance

The **TRAINER™** acts like a functional appliance, (Activator and derivatives) being premoulded into a class I (edge to edge position). The difference is that it does not need to be specially fitted, and the flexible material used prevents breakage, which is one of the biggest disadvantages of other functional appliances.

Myo-functional training

“Lip bumpers have been used to gain arch length for the alignment of mild to moderately crowded dental arches. The dental changes produced can be attributed to removal of lip pressure on the lower anterior dentition....”⁴

Stops mouth breathing when in place

“It was observed that children with open-mouth posture displayed a significantly slower pattern of maxillary growth compared with children who display anterior lip seal posture.”⁹

A combination of important features

The **TRAINER™** has been shown to be effecting malocclusion in mixed dentition of children, when worn a minimum of one hour daily plus overnight. As only very light forces are required to move anterior teeth (about 1.7gm5), the use of the combination of light aligning forces, removal of aberrant myofunctional forces from the tongue, the lower lip and correcting mode of breathing, plus the features of a functional appliance is the mechanism that makes the **TRAINER™** so effective. It is particularly good for class II malocclusions, as it “trains” a class I relationship, as well as retracting upper anteriors and advancing the mandible. It also assists maxillary development and mandibular restriction in class III cases. (Unsuitable for severe class III cases)

The use of the Pre-Orthodontic **TRAINER™** can be a replacement for existing treatment

The **TRAINER™** allows treatment of dental alignment as well as the traditional functional appliance role. In addition the myofunctional training of tongue position, swallowing and mode of breathing encompass the most recent findings of research in this subject. The problems of compliance, although still present, are minimised by the use of more flexible and thinner materials.

The lower cost and easy implementation makes routine treatment of the child with a developing malocclusion possible in the majority of cases. Although, like other orthodontic appliances, it does not always produce the most ideal result, it works at three therapeutic levels not just one, as do functional appliances and fixed appliances combined. Tooth guidance, Jaw positioning (as functional appliances do) plus Myofunctional Training. This assists normalisation of growth and development and greatly improves the stability of the final orthodontic treatment result. Further treatment becomes easier and more stable.

A practical early treatment procedure

The **Pre-Orthodontic TRAINER™** is a practical early treatment of choice for the practitioner who is now using functional appliances as early orthodontic treatment, or, for the practitioner who has not previously used early treatment because of the inherent disadvantages of other available appliances. Lower cost, easier implementation, better compliance, tooth guidance and myofunctional training make this appliance an ideal choice for the child in the mixed dentition stage with a developing malocclusion. Future orthodontic treatment will be enhanced by the addition of the **TRAINER™** program.

Jaw Positioning similar to a functional appliance

The Pre-Orthodontic **TRAINER™** is a practical early treatment of choice for the Dental practitioner and the Orthodontist

Lower cost, easier implementation, better compliance, tooth guidance and myofunctional training make this appliance an ideal choice for the child in the mixed dentition with a developing malocclusion

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*"The influence of the lips in modifying the form of the dental arches is an interesting study, and almost every case of malocclusion offers some noticeable and varying manifestation of it." In speaking of the upper and lower lips - "This force is exerted automatically in response to almost every emotion, and results in maintaining the teeth in harmony with the graceful and beautiful curve of the normal individual arch.....In cases of malocclusion, strikingly, characteristic abnormalities in lip function are often noticeable, leading to the suspicion that **more often than is recognised, the peculiarities of lip function may have been the cause of forcing the teeth into the malpositions they occupy.**"*

Dr. E.H. Angle - The Treatment of Malocclusion of the Teeth Edition 7. Chapter 2. Philadelphia: 1907.

References

Angle observed the significance of myofunctional forces in malocclusions

How to use this manual

First: Read this procedure manual quickly to obtain an overview of the different applications of the **TRAINER™** in both starting (blue/green) and finishing (pink/red) versions for pre and post orthodontic procedures. **Use right column as a subject guide.**

Next: Spend 13 minutes to watch the instructional video. It is important to find a time when you can give 100% attention to the subject, as there is a large amount of information condensed into a short period of time. This will tell you why the **TRAINER™** was developed to fill a need in your practice. In addition, it covers all the practical aspects of how to use the **TRAINER™** as well as studies and research behind the appliance. Allow your staff to watch the video, as they can then explain the concept to your patients. (Note the former name was the TMJ TRAINER and POSITION - TRAINER)

Finally read this procedure manual in more detail with 3-4 priority cases in mind. Now you are ready to start.

The **Pre-Orthodontic TRAINER™** is suitable for the majority of malocclusions in the **mixed dentition** stage. Optimal timing is as the permanent anteriors are still erupting. Ensure you start with motivated parents/children (of which there are many) to maximise compliance. Reinforce the **DAILY** use instructions on the inside of the container box. Your own children tend not to be the best cases for you to judge the effectiveness of the **TRAINER™**.

TIP: Do not try to fit the **TRAINER™** into the child's mouth. Review how, on the video, all the children are given the **TRAINER™** and the child places it into their mouth themselves. You will find it fits virtually all children with no adjustment. Distal end trimming of 2-4mm for very narrow mouths or large anterior open bites only. Usually no adjustment is required. Follow up the patients every month initially, then every 2 months.

Gain more patients by placing the patient information brochures in your waiting room and place the poster in a prominent position. This will introduce the concept to many grateful parents. Use the 8 page colour brochure (have a few laminated and bound) to explain this result you are trying to achieve. Remember to tell the parents the treatment goal is **NOT** to eliminate the malocclusion (although this is possible in some cases), but to decrease its severity, improve facial growth, decrease the need for extractions, and to improve the stability of any future orthodontic treatment. If used as directed you will obtain routine success.

The most economical way to re-order the TRAINER™ is in packs of 10 or 12. Higher volumes will also attract a further discount. Progress to the harder finishing **TRAINER™** after 6-months of treatment. Specify the mix you require (blue/green/pink/red) on the order form.

WHEN YOU RECEIVE YOUR FIRST PRE-ORTHODONTIC TRAINERS

Read the manual

Watch the video

Optimal timing is as the permanent anteriors are still erupting

Ensure you start with motivated parents/children

Do not try to fit the TRAINER™ into the child's mouth. Allow them to place it themselves

The treatment goal is NOT to eliminate the malocclusion, but to decrease its severity, improve facial growth, decrease the need for extractions, and to improve the stability of any future orthodontic treatment

Indications for Pre-orthodontic use

The **TRAINER™** is designed to be used in the mixed dentition stage, from the time the permanent anterior teeth are erupting. This is the optimum time to implement treatment, as the anterior dentition is most dynamic. It can be used prior to this stage* or after (up to permanent dentition stage).

Two versions with identical design and size

The soft (blue/green) **TRAINER™** is the starting appliance and the hard (pink or red) version is the follow-up finishing appliance. While the soft version has greater flexibility for maximum compliance, but with less tooth aligning force, the hard version has optimum tooth aligning properties. The soft version comes with 2 breathing holes in the front, to allow for some mouth breathing for treatment of children with chronic nasal obstruction. This improves compliance while attempting to stop mouth breathing and associated tongue thrusting in these children.

The treatment starts with the soft (blue) **TRAINER™**. This gives maximum compliance, while primarily treating the myofunctional problems with some light tooth guidance. Then is followed after 6-8 months, with the hard version, as myofunctional problems improve and continued dental alignment becomes the priority.

When to start Trainer treatment

All children in the mixed dentition stage presenting in the practice with signs of a developing malocclusion can be started on the **TRAINER™** program. All common malocclusions can all be helped by the **TRAINER™**. From the children whose parents see the anterior dentition erupting incorrectly and want something done immediately, to the severe cases that you wish to treat to decrease the complexity of treatment, onto those you would normally start treatment with a functional appliance. The treatment is pre-orthodontic, so any improvement will be better than the old “just wait and watch it get worse” approach. Facial growth continues to get worse without treatment. The typical malocclusions to start the **TRAINER™** program are detailed below. Correction of the myofunctional habits combined with Tooth and Jaw alignment is the goal. Correction of myofunctional problems like mouth breathing and tongue thrusting are most important for correct facial development and for future orthodontic success. Elimination of these habits, plus the dental correction can eliminate the need for further treatment in some cases.

Observe the face for signs of reverse swallowing, overactive mentalis and a mouth open posture. (Soft Tissue Dysfunction Analysis) Show the parents the significance of these habits for dental alignment and facial growth.

The optimal age to start treatment

It is preferable to commence **TRAINER™** treatment at the stage that 4-6 permanent anterior incisors have erupted, to obtain the maximum effect from the tooth guidance and myofunctional training. A younger child can start before the first permanent molars come in by using a soft **TRAINER™** and shortening

FROM 6 to 10 YEARS OF AGE*

*Can be used on younger patients before the anterior teeth have erupted. Trim 8-10mm from distal ends to accommodate lack of first molars. Disadvantage is that tooth guidance system is ineffective until permanent anteriors commence eruption.

The soft (blue or green) TRAINER™ is the starting appliance and the hard (pink or red) version is the follow-up finishing appliance

INDICATIONS FOR THE PRE-ORTHODONTIC TRAINER™

- Lower anterior crowding
- Class II both Div I & II
 - Anterior open bite
 - Deep bite
 - Class I crowding
 - Mild Class III
 - Tongue thrusters
 - Thumb suckers
 - Incorrect swallow
 - Oral bad habits

CONTRA-INDICATIONS

- Posterior crossbite
 - Correct crossbite with lateral expansion and then use **TRAINER™** to correct the causes.
 - Severe Class III
 - Complete nasal obstruction
- Reluctant Child/Parent

The optimal age to start treatment with the TRAINER™ is 6-8 years

of the distal ends to compensate for the lack of first permanent molars. The **TRAINER™** can be used up to the permanent dentition stage.

For which cases is the **TRAINER™** most effective?

At ages 6-10, the **TRAINER™** is particularly helpful with class II malocclusions⁴ and “crowding cases”.³ Minimum treatment time is 6-12 months, up to 18 months or more. In the early mixed dentition it is used as sole treatment for developing malocclusions, and for mouth breathing tongue thrusting and thumb sucking as a pre-orthodontic treatment. The majority of developing malocclusions will have myofunctional and/or jaw positioning components that can be helped with **pre-orthodontic treatment with the TRAINER™**.

The most common cases to treat.

Lower Anterior Crowding (Case study book page 6)

Lower anterior crowding cases are the most common reason for orthodontic consultation from 6 years of age. Parents see the lower lateral incisors do not have sufficient space. Serial extractions were done in the past for these cases resulting in greater space loss, bite deepening and the need to extract permanent teeth later. The crowding is a result of the underdevelopment of the anterior alveolar arch NOT due to tooth size discrepancies. Many have a “flattened” arch producing a pseudo-crowding due to overactive mentalis/reverse swallow. The **TRAINER™** is designed to stretch and de-activate the mentalis (lip bumper) and also retrain the swallowing habit. The tooth guidance feature improves arch form and anterior dental alignment. Note some passive arch expansion is achieved from the repositioning of the tongue into the palate. This is reflected in improved facial development.

Anterior Open Bite (Case study book page 4)

Early treatment of anterior open bite is essential to prevent untreatable malocclusion and aberrant facial growth. The causative factor is a tongue thrust swallow with or without thumb sucking. The tongue guard stops the tongue going between the anterior teeth when in place and the tongue tag actively 'trains' the correct tongue position. Removing the influence of the tongue habit allows the anterior teeth to erupt into the correct position. Parents can be told that it is essential to eliminate this habit for the success of any future orthodontic treatment. Tip: For severe open bites, shorten the distal end to allow the anterior teeth to close into tooth guides.

Class II Div. 1 and 2 (Case study book page 5 & 7)

Myofunctional bad habits such as tongue thrusting, incorrect swallow and mouth breathing all contribute to the severity of class II cases. Facial growth is also compromised. Parents often notice the underdeveloped lower face as the first sign of this malocclusion. The **TRAINER™** program should be implemented in these cases for the purpose of removing the oral habits and mode of breathing, plus bringing the anterior teeth into the correct alignment. The **TRAINER™** acts like a functional appliance in that it “trains” a class position with some “headgear” effect on the uppers similar to class II elastics used in fixed appliances. Research has shown improved maxillary and

The most common cases to treat

Lower Anterior Crowding

Note some passive arch expansion is achieved from the repositioning of the tongue into the palate.

Anterior Open Bite

Class II both Div 1 & II

mandibular growth is achieved with changed mode of breathing.⁸ (i.e: CII correction).

Deep Bite (Case study book page 5)

Correction of a deep bite is essential to prevent long term soft tissue damage. The **TRAINER™** opens the bite with the mechanics of the aerofoil base and the elimination of habits such as mouth breathing. Bite opening without facial lengthening. Observe facial improvement.

Class I Crowding from Chronic Mouth Breathing

Research shows how important the mode of breathing is for influencing craniofacial growth. Chronic mouth breathers cannot position the tongue correctly in the maxilla, which consequently develops narrow with a shortened arch length causing crowding. Tooth size is not the cause of class I crowding, mouth breathing very commonly is. The **TRAINER™** should be used on a mouth breather in the mixed dentition stage to maximise arch development and minimise the need for extraction of permanent teeth. Passive arch development can be seen in the majority of **TRAINER™** cases after 12 months of continuous use. (see all case studies)

Mild Class III and Pseudo Class III

Class III malocclusion can be primarily hereditary but many mild class III's are the result of chronic ENT problems causing mouth breathing and associated lowered tongue posture. This can be the primary cause of the Class III and can be improved with early **TRAINER™** treatment. The retraining of the tongue position alone can bring these cases into at least an edge to edge situation (or better), making future orthodontic correction possible without surgery.

Thumb Suckers

These children develop a malocclusion routinely. Treatment to stop the habit should be implemented as soon as the diagnosis is made, to prevent further deterioration of the occlusion and craniofacial growth. Parents must be told of the damaging effects of this habit which are usually permanent. Get the child to use the **TRAINER™** at the time the thumb sucking is most frequent. Use the **TRAINER™** like an orthopaedic pacifier. Obviously the **TRAINER™** prevents the thumb going into the mouth, but it also stops the associated tongue thrust which will perpetuate an anterior open bite if not corrected. No future orthodontic treatment can be successful without the elimination of this habit.

Oral Habits, Incorrect Swallow, Speech Problems

Use the **TRAINER™** as a primary therapy for myofunctional training to correct oral habits. Speech and myofunctional therapists use exercises based on the principles incorporated into the **TRAINER™**. It can be used as a secondary "home care" to reinforce the myofunctional exercises the child uses to correct these habits.

Posture - Mandibular and Spinal

Incorrect mandibular posture and poor spinal (body) posture have common

Deep bite

**Class I
Crowding**

Mild Class II

Thumb Suckers

**No future
orthodontic
treatment can
be successful
without
correction of
these habits**

**Oral Habits
Incorrect
Swallow
Speech
Problems**

**Posture -
Mandibular and
Spinal**

causes. Mouth breathers and tongue thrusters have forward head posture as well as the craniofacial problems. As an added bonus, children with poor posture will be improve amazingly in facial appearance and posture immediately the **TRAINER™** is placed into the child's mouth. Demonstrate this to parents and they will see they are getting more than just orthodontics. It appears, over time from observation of these growing children, that their posture does improve.

The Reluctant Child/Parent

The **TRAINER™** is suitable for most malocclusions but will not be of benefit if the child decides not to use it on a daily basis. The child and parent must be motivated to get a result, otherwise result will be minimal. Conversely, the motivated child will produce amazing results.

Severe Class III

Skeletal Class III has a hereditary factor and mostly the child will not be able to wear the **TRAINER™**. (because it will usually not fit) Restrict cases to mild or pseudo - Class II malocclusion.

Posterior Cross Bite

The **TRAINER™** does not have sufficient passive expansion capabilities to correct a posterior crossbite. However, many of these cases are caused by oral habits and will not be stable unless these habits (tongue, sucking and breathing) are corrected. First correct the crossbite with transverse expansion, then apply the **TRAINER™** program to correct the myofunctional habit and the mandibular alignment (rotation). Or use Farrell Bent Wire System (BWS) with the **TRAINER™** See BWS manual for more information.

Complete Nasal Obstruction

Always check a child for a patent airway. The child should be able to breathe through the nose. ie. a patent airway must be present. If there is complete or semi complete nasal obstruction refer to otolaryngologist (ENT) for assessment.

Rule of Thumb: Test child in chair with **TRAINER™** in place and lip over hole. If they can keep it in place with lips together for 5 minutes or more - they are not obstructed. Suggest ENT consultation (?Surgery) then the **TRAINER™** program - if complete obstruction.

Contra-Indications

The Reluctant Child/Parent

Severe Class III

Posterior Cross Bite

Use the Bent Wire System with the to correct arch form while using the **TRAINER™**

Complete Nasal Obstruction

Uses during orthodontic treatment

Children in late mixed dentition stage (8-12 years) have most of the growth already complete in the dental arches. The **TRAINER™** is often not able to offset major jaw discrepancies such as maxillary underdevelopment and/or major class II or III malocclusions at this stage. The tooth alignment system, although still effective, is less so as the child gets older. However, the maxillary expansion can be performed first with various appliances (Schwarz or Biobloc Stage I) and then the patient can use the **TRAINER™** (soft or hard) for the remainder of treatment for mandibular advancement, dental alignment and myofunctional therapy. This can substantially reduce the cost (to the Dentist) of treatment of these cases. After maxillary expansion, the patient wears the removable appliance by day and then the **TRAINER™** 1 hour per day and overnight. Treatment time 9-12 months depending on outcome. Alternately the new BWS can be used. The BWS has been designed to be used with the **TRAINER™** system to assist arch development and dental alignment in the late mixed dentition. It is not affected by loss of deciduous teeth.

During functional appliance therapy

The **TRAINER™** can be used 1 hour per day, to help to correct mouth breathing to speed up treatment by treating the myofunctional component that is driving the malocclusion. So called 'ifunctional' appliances generally do not treat the myofunctional and mouth breathing habits. These appliances can sometimes make the habits worse. Use of the **TRAINER™** daily for one hour during this treatment can substantially improve the result by decreasing treatment time, enhancing arch development and improving stability. If progressing to the fixed phase this myofunctional treatment can be continued using the **TRAINER FOR BRACES™**. If progressing to fixed (SWA) braces within 12 month, start with the **T4B™**.

Clark Twin Block/Biobloc Treatment

Mandibular advancement appliances like the Clark Twin Block are now commonly used for class II correction. Although the correction can appear successful, much of the gain can be lost when the appliances are removed for fixed appliance or retention phases as they lower tongue position. Mouth breathing and tongue habits need to be corrected in conjunction with these appliances. The **TRAINER™** is used one hour daily in conjunction with these appliances for myofunctional correction. Better still substitute their use with the BWA and the **TRAINER FOR FINISHING™**.

Biobloc treatment which heavily emphasises correction of mandibular posture. The **TRAINER™** is an essential part of this treatment for active soft tissue correction. This corrects mandibular posture. These appliances also lower tongue position and can make the myofunctional problem worse. After the first stage of treatment, the **TRAINER™** (Blue) is used 1 hour daily, with appliances removed, to correct myofunctional habits and improve mandibular posture. Better still substitute their use with the BWA and the **TRAINER T4K™** or **T4F™**.

Use the TRAINER™ program in conjunction with Crozat, ALF and BWS appliances.

8-12 YEARS

The BWS has been designed for use with the TRAINER™ system to assist arch development

Children have myofunctional habits which are contributing to the malocclusion being treated. These factors slow treatment and compromise stability. The **TRAINER™** is used 1 hour daily during the functional Phase I treatment and in the retention Phase to eliminate these habits. Failure to treat these habits causes the instability common to many dentally well treated cases.

Use the TRAINER for Braces™ with fixed appliances

Myofunctional Training in conjunction with Functional Appliances

These appliances also lower tongue position and can make the myofunctional problem worse

Post Orthodontic Treatment

In the retention phase a most important use to assist stability

Many well treated case that appear well treated and stable relapse to unsatisfactory levels. (see research) A large number of these would be from untreated oral musculature as observed by Angle. (see page 2 of case brochure). In the retention phase, use the **TRAINER™** 1 hour per day (with retainers removed if removable). Better to use the **TRAINER FOR FINISHING™**. With fixed retainers in place, the **TRAINER FOR FINISHING™** can also be used 1 hour daily plus at night as well.

Minor Relapse

When the patient returns after their retention phase and some minor dental relapse has occurred, this can be expensive to correct. First, show the patient they are causing the relapse because of the uncorrected myofunctional problems. Point out those detrimental factors of mouth breathing and incorrect swallowing. Now, the **TRAINER FOR FINISHING™** is used to help correct the myofunctional problems causing the relapse and to perform the dental correction. You must emphasise that the **TRAINER™** will not work unless it is used everyday. Minor dental relapses can be corrected in this way saving much time and added expense.

Bruxers

The soft **TRAINER™** is ideal for the child who is a bruxer being easy to implement with specific design characteristics. i.e. the double mouthguard effect limits lateral function, while the aerofoil shaped base functions as a pivotal splint. More children than is recognised are bruxers and will tend to develop TMJ disorders if untreated. Conventional splint therapy can impair the development of the dentition, so the soft **TRAINER™** is ideal for this purpose.

TMJ treatment

TMJ disorder in children is prevalent. Riolo, Brandt and Tenhave American Journal of Orthodontics, 1987 quote incidences of 36-72% of TMJ Disorder in their study of 6-17 year olds. The **TRAINER™** has therapeutic characteristics to help with this disorder. There is an aerofoil shaped base thickest over the first molar area. This aids decompression of the inflamed joint and the double mouthguard design of the **TRAINER™** limits bruxing. Both helpful if the patient may have or may be developing a TMJ Disorder. Or use the NEW TMJ Appliance if no tooth guidance is needed.

The soft **TRAINER™** now comes with 2 breathing holes to assist compliance for the chronic mouth breather, who usually cannot wear the **TRAINER™** during periods of complete nasal obstruction. Tell the child to keep their lips together, as in the instructions, so they still cannot mouth breathe. However, by dropping the lip and uncovering the holes, they can mouth breathe. This allows these chronic cases to continue to wear the **TRAINER™** daily. Do not use the the hard **TRAINER™** until nose breathing is achieved.

Post-Orthodontic Treatment

Use the TRAINER for FINISHING™

Minor Relapse

The TRAINER for FINISHING™

is used to help correct the myofunctional problems causing the relapse and also to perform the dental correction.

Bruxers

TMJ/D Treatment

Use the NEW TMJ Appliance if no tooth guidance is needed

Starting Pre-Orthodontic TRAINER™ (Blue/Green)

Eliminating Myofunctional habits that cause malocclusion together with light tooth guidance

The starting **TRAINER™** (blue/green) is soft for maximum compliance and to adapt to the most severe dental mis-alignment.

First explain to the parent and child what you are trying to achieve. That is: elimination of the habits causing malocclusion and also move the erupting teeth into their correct position. For this purpose there are two design features. The tongue tag and the tooth guidance system. Point both of these features out to the parent and child.

Show the child the raised section on the tongue tag: “This is the position where their tongue should be with the **TRAINER™** in place.” Then instruct the child to place the **TRAINER™** into their own mouth unassisted. Do not try to fit it yourself. Once the **TRAINER™** is in place it will normally be comfortable, only narrow mouths need distal trimming. (See section on trimming for more information.) Ask the child to close down and show the parent the tooth guidance system at work. (Deflection around misaligned anterior teeth). Emphasise the instructions inside container box.

Use must be for 1 hour per day plus overnight every day. Use the starting **TRAINER™** for 6-8 months average. You are looking for an improvement in myofunctional habits, particularly mouth open posture and overactive mentalis activity associated with an incorrect swallowing pattern. Improvement in dental alignment should occur after 3-6 months.

Review the patient after one month and then every 1-2 months thereafter. See follow up visits.

Finishing treatment with the Pre-Orthodontic TRAINER™ Program (Pink/Red)

Correcting Tooth Alignment

Once myofunctional habits and dental alignment improve (6-8 months) the child progresses to the (pink/red) **TRAINER™**. This is much firmer and more elastic (same principle as orthodontic archwire). The child will initially experience tooth sensitivity with the harder **TRAINER™**, as more force is placed on them. The Myofunctional characteristics are the same, but combined with a stiffer material. A phasing in period of alternating the blue **TRAINER™** by night and the Pink/Red **TRAINER™** for the daytime use for a few weeks is sometimes necessary.

Use the pink **TRAINER™** for a further 6-12 months. Use beyond this period is recommended depending on the outcome and the next phase of orthodontic treatment.

The final outcome of the treatment is not to eliminate the need for orthodontic treatment, although this does occur in some cases. The role of the pre-orthodontic treatment is to attempt to eliminate the myofunctional habits that cause malocclusion and interrupt normal craniofacial growth patterns. See following research.

The added bonus of treatment is a noticeable facial improvement, a decrease in need for extractions, shorter orthodontic treatment time and improved stability.

Starting
treatment with
the
Pre-Orthodontic
Program

**Do not try to fit
the TRAINER™
into the child's
mouth.
Allow them to
place it
themselves**

**MINIMUM
USE IS ONE
HOUR DAILY
PLUS
OVERNIGHT**

Finishing
treatment with
the
Pre-Orthodontic
Program

**The added
bonus of
treatment is a
noticeable facial
improvement, a
decrease in
need for
extractions,
shorter
orthodontic
treatment time
and improved
stability**

Patient Selection

The **TRAINER™** program is easy to implement, requiring minimal chair-side time. Every child with a developing malocclusion should have the opportunity to use one. Parents are usually motivated to do something for their child to lessen the effects of a developing malocclusion. The key to success is daily use. Therefore, the parent and child must be motivated to get results. This is not for the child who does not want treatment. A minimum of one hour per day (more if possible) plus overnight, over a minimum period of 12 months, is the essential commitment to achieve consistent results.

Review progress each month. If wearing time is less than minimum, advise the patient and parent that the treatment “will not work.” Take photos at the start of treatment. Show the patient and parent facial and dental changes to assist motivation. Tell the parent that this is pre-orthodontic treatment primarily directed at the myofunctional causes of the malocclusion, which **MUST** be corrected to get a stable orthodontic result.

- Show the patient the **TRAINER™** and point out the tongue tag.
- Tell the child to “**place the TRAINER™ into the mouth with the tongue tag uppermost. Feel the tongue tag with the tip of the tongue.**” Show the child the raised section on the tongue tag, touch the tongue tip with a mirror handle. “This is where the tongue tip should be all the time, with the **TRAINER™** in or out.” The patient now places it into the mouth.
- “**Keep lips lightly together and breathe through your nose.**”
- “Do not chew on the **TRAINER™**. **Close the teeth into the TRAINER™ and keep lips together.** Feel it trying to straighten your teeth.” Show the parent how “closing into the guidance channels assists tooth alignment in the same way as braces do.” Closing into the **TRAINER™**, **not chewing**, is all that is necessary as long as the lips are kept 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.
- **Night use is absolutely essential**, and should be commenced only when the child is used to daytime use, usually after 1-2 weeks. If it falls out (which mostly it does in the early stages of treatment), just tell them to persevere as this is a training program and once it stays in all night that is a major success! Mouth breathers and tongue thrusters in particular have this trouble, this is why they need the **TRAINER™**. Emphasise that any orthodontics will fail unless these habits are corrected and they must persevere. Night use is the passive phase stopping the detrimental effect of tongue thrusting and mouth breathing.

Review the patient every 4-6 weeks.

Check progress. Ask “how are you going with your **TRAINER™**?” Confirm that it is being used every day as the instructions say. Then have the patient place the **TRAINER™** into the mouth to show it is being used regularly and correctly. Observe the facial and dental changes against the original photographs. (Apparent after 2-3 months of use, sometimes sooner) Motivate by showing

Patient Selection

This is not for the patient or child who does not want treatment

What to tell the parent:

“This is the best treatment for your child now, no future orthodontic treatment will be stable without the **TRAINER™** program”

What to tell the patient:

“Feel the tongue tag with the tip of the tongue”

“Keep lips lightly together and breathe through your nose”

“Do not chew on the **TRAINER™**”

“Must be used **EVERY** day to be effective”

“Night use is absolutely essential”

“It is normal for it to fall out at night, as soon as it stays in, that is the first success”

Review the patient every 4-6 weeks

progress from these photographs. You will see facial changes first, particularly in the lower third of the face, then jaw position improvement and finally dental changes. These facial changes are usually more dramatic to the patient (and Dentist) than the slower dental changes. Progress to the hard (pink) **TRAINER™** after 6-8 months when facial changes indicate myofunctional problems are improving, the **TRAINER™** is staying in most nights and dental alignment has started to improve.

Remind the parent that this is an essential part of the child's orthodontic treatment. The **TRAINER™** is a myofunctional appliance that is used at the stage the child is still growing to eliminate habits that cause incorrect growth and malocclusion. If these habits are not corrected, any future Orthodontic treatment will be prolonged and the result will be less stable.

Fitting and Adjustments

The **TRAINER™** usually requires no adjustment. Have the child place it into the mouth themselves. **Do not try to place it into the child's mouth yourself.** Tell them to squeeze in the distal ends then place it into their mouth.

Check that it does not hurt anywhere. Usually it will not. Only very narrow mouths may require 2-3 mm off distal ends if they say it is too long or they cannot get their lips together.

Trimming... Cut with scissors (soft) or trim with acrylic bur (hard) with straight handpiece anywhere that discomfort occurs.

If the tongue tag area hurts after night wear, deepen the v cuts either side of the tongue tag.

If there is too much bite opening, the anterior teeth do not come into the tooth guidance system. Trim 2-3mm 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 III or open bite. This will make it easier to the anterior teeth into the **TRAINER™**

Children younger than 6 years without the first permanent molars can still use the **TRAINER™**. Just cut 4-6 mm off the distal ends to compensate for the lack of the permanent molars.

Adjusting the upper labial bow

The upper labial bow can be removed to adjust the upper anterior incisor position. This is appropriate for class III correction where you want to get more anterior advancement past the lower anterior dentition. Hard **TRAINER™** only.

Adjusting the lower labial bow

Removing the lower labial bow produces more of a lip bumper effect which allows for more arch length increase (if desired) and increased lower anterior advancement. This is more efficient in the harder **TRAINER™**.

Edge to edge bite

As with all functional appliances the **TRAINER™** is made in an edge to edge position to ultimately achieve an ideal class I in incisor relationship. Occasionally the very compliant patient will achieve an edge to edge bite. This can be adjusted to allow a slight overjet by removing the upper labial bow as in above. A acrylic bur is the most suitable. The settling in period after the **TRAINER™** is removed tends to slightly increase the overjet and overbite. Therefore, it is ideal to have a minimal amount of both.

Follow up Visits

Remind the parent that this is an essential part of the child's orthodontic treatment

“If these habits are not corrected, facial appearance will be compromised and any future Orthodontic treatment will be prolonged with a less stable result”

Fitting and Adjustments

Cleaning

Rinse in warm water and brush with a toothbrush. The **TRAINER™** can be boiled to sterilise if required. Warm water and a toothbrush are

Billing the Patient

Treatment fees will be very different depending on the area and clinical situation. As the **TRAINER™** requires little time to fit and maintain, plus it cannot break, the fees can be low and still be profitable. Much can be delegated to auxiliaries. Compliance seems to be better as the fee increases. So do not make the fee too low. However, the parent is usually willing to pay any fee that will assist in the child to lessen orthodontic problems. Some doctors bill as a part of the overall orthodontic treatment. Below is an example treatment plan as a guide only. The example is an indication of the cost effectiveness of the program. You can fill in the numbers and currency variations for your area and it will always be an extra profit for your practice.

Fees charges can be claimed under the code 811 or 812 for the **TRAINER™**. Also bill for the photos, models etc the same as a regular treatment plan.

Notes on billing.

FEE STRUCTURE GUIDE

**The advantage
of the
TRAINER™
program is that
it generates
immediate
income as soon
as it is
implemented
into the
practice**

The “THREE Ms” MUSCLES, MALFORMATION and MALOCCLUSION

From the AJO-DO 1963 Jun (418-450): The “Three M's”: Muscle, Malformation and Malocclusion - Graber.

“An analysis has been made of muscles and their relationship to structural configuration in Class I, Class II, and Class III malocclusions. The effect of muscle forces is three-dimensional, although most orthodontists have considered it only in one vector - that of expansion. Whenever there is a struggle between muscle and bone, bone yields. Muscle function can be adaptive to morphogenetic pattern. A change in muscle function can initiate morphologic variation in the normal configuration of the teeth and supporting bone, or it can enhance an already existing malocclusion. In the latter instance, the inherent structural malrelationship calls for compensatory or adaptive muscle activity to perform the daily functions. The structural abnormality is increased by compensatory muscle activity to the extent that a balance is reached between pattern, environment, and physiology. At times it is impossible to assign a specific cause-and-effect role to any one factor. **It is imperative that the orthodontist appraise muscle activity and that he conduct his orthodontic therapy in such a manner that the finished result reflects a balance between the structural changes obtained and the functional forces acting on the teeth and investing tissues at that time.**”

Dante Bresolin, DDS, MSD, Peter A. Shapiro, DDS, MSD, Gail G. Shapiro, MD et al. AM J ORTHOD DENTOFAC ORTHOP 1983.

“While there are many claims that abnormal breathing patterns alter facial growth, there are limited controlled data to confirm this. We evaluated forty-five North American Caucasians of both sexes, ranging in age from 6-12 years. Thirty chronically allergic mouth-breathers were selected from pediatric allergy practice, and fifteen nonallergic nose breathers were selected from a general pediatric practice. Each subject underwent an intraoral clinical examination and a cephalometric radiograph analysis. Various skeletal and dental relationships were evaluated for statistic differences related to mode of breathing and age. The upper anterior facial height and the total anterior facial height were significantly larger in the mouth breathers. Angular relationships of the sella-nasion, palatal, and occlusal planes to the mandibular plane were greater in the mouth breathers and their gonial angles were larger. The mouth breathers' maxilla and mandibles were more retrognathic. Palatal height was higher and overjet was greater in the mouth breathers. Maxillary intermolar width was narrower in the mouth breathers and was associated with a higher prevalence of posterior cross-bite. Over all, mouth breathers had longer faces with narrower maxillae and retrognathic jaws. This supports previous claims that nasal airway obstruction is associated with aberrant facial growth. Longitudinal studies are needed to evaluate the effectiveness of early intervention in preventing these

THE RESEARCH

“There are 3
components to a
malocclusion

1. TOOTH

2. MYO-
FUNCTIONAL
as described by Angle

and

3. JAW POSITION

Most orthodontic techniques treat only the dental component. Some treat Tooth and Jaw. The Myofunctional component is most commonly ignored. This can slow treatment and be the cause of relapse. The Pre-Orthodontic TRAINER™ allows treatment of the 3 components of a malocclusion.”

“Mouth
Breathing in
Allergic
Children: Its
relationship to
Dentofacial
Development”

growth alterations.”

Alan M. Gross, PhD, Gloria D. Kellum, PhD, et al. AM J ORTHOD DENTOFAC ORTHOP 1994; 106:635-40.

“It was observed that children with open-mouth posture displayed a significantly slower pattern of maxillary growth compared with children who display anterior lip seal posture.”

C.T. Nevant, P.H. Buschang, R.G. Alexander and J.M. Steffen (AM J Orthod Dentofac Orthop 1991;100:330-6)

“Lip bumpers have been used to gain arch length for the alignment of mild to moderately crowded dental arches. The dental changes produced can be attributed to removal of lip pressure on the lower anterior dentition...”

Donald G. Woodside, Sten Linder-Aronson, Anders Lundstrom and John McWilliam. AM J ORTHOD DENTOFAC ORTHOP 1991;100:1-18.

“The amount of maxillary and mandibular growth and the direction of maxillary growth were studied in 38 children during the first 5 years after adenoidectomy for correction of severe nasopharyngeal obstruction. The amount of mandibular growth measured between successive gnathion points on superimposed radiographs was significantly greater in the group who had an adenoidectomy than the matched controls.

In the boys the difference was 3.8mm ($p < 0.01$), and in the girls the difference was 2.5mm ($p < 0.01$). The boys also showed a tendency towards greater growth in the maxilla as measured between subnasal points. (1.2mm, $P < 0.05$).

Linder - Aronson demonstrated varying degrees of recovery from steep mandibular plane angle, narrow maxillary arches and retroclined maxillary and mandibular incisors during the 5 years after adenoidectomy and change from mouth to nose breathing.”

Ram S. Nanda, DDS, MS, PhD, and Surender K. Nanda, DDS, MS. American Journal of Orthodontics and Dentofacial Orthopedics April 1992.

“The question of long term retention and stability of occlusions after orthodontic treatment has always engaged the attention of the specialty. The improvements achieved from long and painstaking treatment may be lost to varying degrees after the appliances are removed. Sometimes relapse in tooth positions is noted even during the period when a patient is using the retention appliances. The question often asked by patients is how long should active retention with appliances be maintained?

Recent studies on assessment of long term observations of post-treatment results have indicated that relapse occurs in **most** cases. Orthodontic treatment rendered in conjunction with extraction or nonextraction procedures met the same fate. No variable was found to be predictive of either stability or relapse. Does contemporary orthodontics have no satisfactory solution to the problem of achieving long-term stability?

The debate on extraction versus nonextraction orthodontic treatment approaches has waxed and waned thought this century. **The matter of long term stability of the corrected result has never been satisfactorily resolved. Perhaps several additional factors may have an important bearing on orthodontic stability.”**

“Open mouth posture and maxillary arch width in young children: A three-year evaluation”

“Lip bumper therapy for gaining arch length”

“Mandibular and maxillary growth after changed mode of breathing”

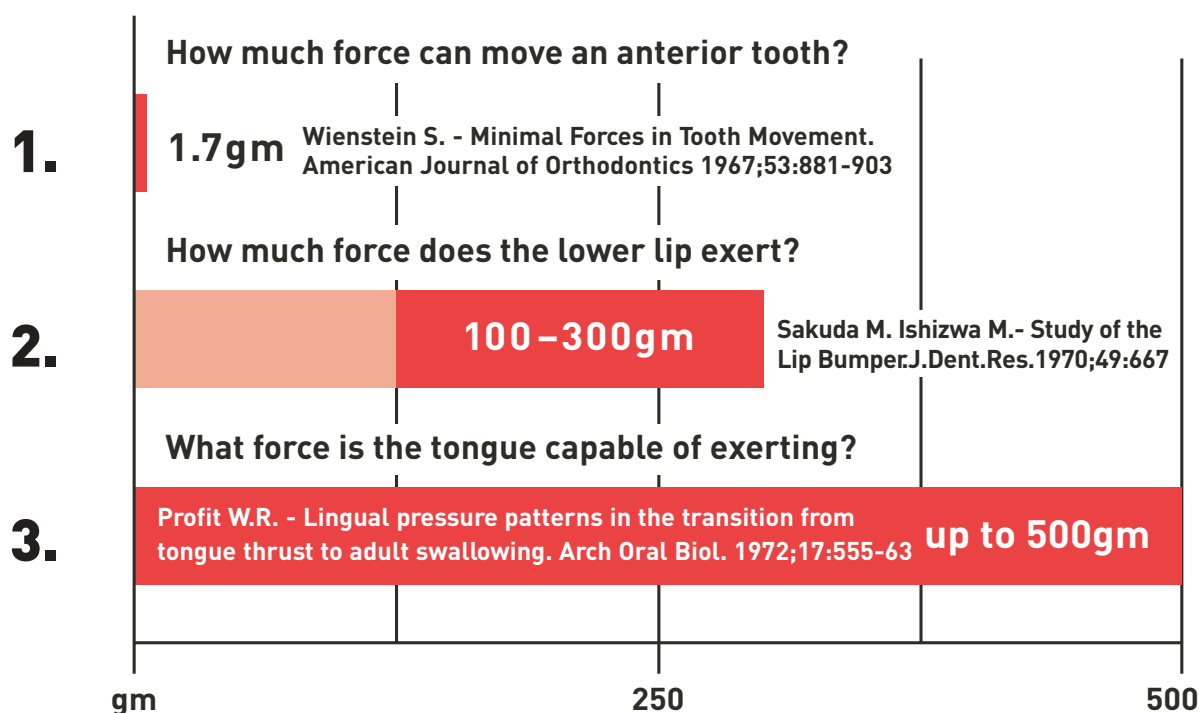
“Considerations of dentofacial growth in long-term retention and stability: Is active retention needed?”

T4K™ The PRE-ORTHODONTIC TRAINER

Treatment for developing malocclusion in children during mixed dentition



MYOFUNCTIONAL FORCES COMPARISON CHART:



1. “Only 1.7gm of lip pressure above the resting values is necessary for moving teeth”
2. “Labial pressure exerted against the lip bumper has been estimated to range between 100gm and 300gm”
3. “Most persons adopt a swallowing patter in which the tip of the tongue is placed in the roughae area and a pressure of roughly 100gm per cm² is exerted upward and backwards. In aberrant swallow a force of up to 500gm can be exerted against the anterior teeth”

Gibbs found forces during swallowing averaged 66.5 pounds which was substantially higher than 58.7 pounds during the occlusal phase of chewing.