

Editorial

Canada, August 2005

Dear Friends and Colleagues

There has been some time since the first issue of the MRC Newsletter appeared. Although the second issue was delayed, I have very good news for you. A library website is being produced by Aaron and Rafael (two hard workers in the MRC team), which is going to be soon in the MRC webpage. In this library website you may find interesting papers related with the *modus operandi* of functional appliances, as well as this MRC Newsletter with answers for questions sent by the members of the MRC team and from our customers. Additionally, in the MRC Newsletter I am including some topics of interest regarding the use of functional appliances, such as the Trainers™, and the advantages that may arise when dentists treat malocclusions with functional appliances rather than with fixed orthodontics.

Thus, I am further explaining in this issue the *modus operandi* of the Trainer™ and I also included a comment about the advantages of using functional appliance to avoid root resorption, a common problem when malocclusions are treated with fixed appliances. All the references cited in my comments below will be in the MRC library webpage, and so, you may be able to give your customers and institutions my comments, and furthermore, provide them with literature supporting it. In this way, all the members of the MRC team and our customers may find a lot of scientific support when any of us might be questioned about the scientific basis for the Trainers™. I hope this will facilitate your work.

I do not want to finish this editorial without mentioning some of the great people who I have met and are part of our MRC team. During the first semester this year, I was invited twice to Mexico where I have the opportunity of lecturing in two different cities (Puebla and Veracruz) in that wonderful country. I met Dr. Jorge Bolivar and his right hand Mr. Miguel Zubieta who have made an excellent job through his company AH-KIM PECH, showing to the dental community in Mexico the advantages of correcting soft tissue dysfunction with the Trainers™. I thank them for all the wonderful time they gave me there and for the opportunity they got for us, MRC and me, to explain in two serious forums the scientific basis and *modus operandi* of the Trainers™. Working as a team we will get our message through the dental community: "To treat malocclusions we need first to understand its aetiology, Soft Tissue Dysfunction".

I hope you may find this issue interesting and helpful for your business. My best wishes

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Question

Is there scientific evidence in the literature supporting and demonstrating the *modus operandi* and effect produced by the Trainers™? What about the Myobrace?

The effect of the Trainer™ is similar to that produced by other functional appliances designed to stimulate mandibular growth (Bionator, monoblock, twin-block, etc). These appliances force the mandible into an edge to edge bite. Thus, while the appliance is worn, it produces a stretching of the lateral pterigoid muscle. Once the appliance is taken out of the mouth, the lateral pterigoid enters in hyper-contractile movements, which makes the condyle moves forward and backward for a certain time. This was explained by Petrovic and Stutzman (1994, 1990). These little movements of the condyle are not noted by patients, who generally interpret this as a discomfort to achieve a proper occlusion immediately after he takes out the appliance. These movements of the condyle stretch the retrodiscal pad (known as Zenckel's zone), where the blood vessels release nutrients and growth factors into the condyle producing the mandibular growth that we know is produced by these appliances and have been extensively supported in the literature (see references below).

In the case of the Trainers™, mandibular relocation has been scientifically demonstrated by an increase in the SNB angle in those patients treated with this functional appliance (Usumez, 2004).

An advantage of the Trainers™ is that they relocate the mandible, and also, they stimulate transversal development. We have just finished a research where we

evaluated the effect of the Trainer™ for Kids (T4K) on the dimensions of the dental arches. For this, 60 kids treated only with the T4K for one year were involved in the study. Our results showed that there was a significant increase in inter-canine, inter-premolar and inter-molar distances. Furthermore, overjet and overbite were improved in all patients treated with this functional appliance. This effect is produced by the relocation of the tongue produced by the flag incorporated into the T4K, as well as, by the effect of the external flange on the muscles of the cheeks and lips, which produces an effect like that observed in patients treated with the Functional Regulator (Frankel). This study has been submitted to be published in an ortho journal and soon will be available in the MRC library webpage.

In addition, the efficiency of the T4K was also evaluated on those patients treated with the T4K. We are able now to say that Trainers™ produce a significant increase, up to 4 mm in a year, in the transversal dimensions of the dental arches. In addition, the Trainers™ correct sagittal and vertical problems (deep and open bites) in 80% of the cases.

This data support the success achieved with this functional appliance and published previously (Quadrelli, 2002).

All I mentioned here is applicable to the Myobrace. The *modus operandi* of the Myobrace is the same as the Trainers™.



However, it has an extra advantage. It guides the teeth to achieve a correct position, and so, producing that effect of the brackets. With the Trainers™ dentists may achieve success treating sagittal and vertical problems, and at the same time, to stimulate transversal development, and thus, to avoid extractions. However, if you need to stimulate higher transversal development (4 mm or more) you should combine the Trainers™ with the Bent Wire System (BWS).

Summarizing, the Trainers™ produce a relocation of the mandible, demonstrated

by Usume (2003), in a similar way as the Bionator and other functional appliances do. In addition, the Trainers™ stimulate transversal development of the dental arches, demonstrated by Ramirez-Yañez (2005), in a similar way as the Frankel. Therefore, the Usume paper published in the Angle Orthodontist (2004) and my study (2005), as well as all the literature published about other functional appliances (see below) extensively explain the *modus operandi* of the Trainers™ and may support and show our customers and the institutions that there is enough scientific basis to use this functional appliances.



Comment

Is there any advantage in regards to root resorption when malocclusions are treated with functional appliances rather than with fixed appliances?

There is consensus in the orthodontic literature that the average patient receiving orthodontic treatment with brackets experiences mild to moderate external apical root resorption. Dental trauma, developmental abnormalities in root morphology, duration of treatment and stage of root development at the start of treatment have all been suggested as possible risk factors. However, there is no predictability when root resorption may appear when treating malocclusions with orthodontic fixed appliances (Smale, 2005). In other words, all human teeth develop resorption lacunae on the pressure side of the root surfaces shortly after application of orthodontic forces (Weiland, 2003) and root resorption is an unavoidable pathologic consequence of orthodontic movement (Brezniak, 2002).

Thus, dentists may expect some degree of root resorption when treating malocclusions with fixed appliances. Nevertheless, this statement appears not applicable when malocclusions are treated with functional appliances. Although there are no particular study showing that there is or there is not root resorption when malocclusions are treated with functional

appliances, Brin (2003) demonstrated that two-phase treatment, where the first-phase is performed with a functional appliance, reduces external apical root resorption.

Children who have early treatment with the functional appliance had significantly less root resorption at the end of the second-phase treatment. Therefore, it may be inferred that early treatment with functional appliances decreases the amount of discrepancy between the maxilla and the mandible, and so, reduces the amount of tooth movement that have to be done when a later treatment is intended with fixed orthodontics. Even though, there are no studies supporting the fact that functional appliances do not produce root resorption, the current knowledge permits to state that root resorption is unavoidable when treating malocclusions with fixed appliances, but the involvement of functional appliances in the plan of treatment permits to reduce the risk of root resorption. Thus, it may be suggested that functional appliances are more recommended for treating malocclusions rather than fixed appliances, and even more when root resorption is a concern for the dentist or the patient.



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Note: All this references will be available in the MRC library website, where you may download the full article and my comments about how the results and conclusions of the paper are applicable to the Trainers™.

