

Acrylic versus Silicone in Interceptive Orthodontics

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The purpose of this study was to compare the clinical effectiveness and patient compliance regarding interceptive orthodontics, between a prefabricated functional appliance (PFA) and an Andersen Activator. The PFA appliance used was the TRAINER System™, a flexible appliance made of non-thermoplastic silicone (soft) or polyurethane (hard). The Andersen Activator is a functional acrylic appliance. The sample consisted in 20 subjects (10 girls, 10 boys), mean age 10.5 years with a class II division 1 malocclusion and an overjet > 6mm. The patients were randomly selected for treatment with either PFA or AA. Overjet, overbite and lip seal were recorded before and every 3 months after the start of the treatment. The treatment was considered finished when the overjet reduced < 3mm. No significant differences were found in overjet and overbite reduction or lip seal between the two groups. The Activator caused less discomfort than the Trainer, and seemed to be more acceptable.

Keywords: acrylic, Andersen activator, silicone, trainer, myofunctional

The influence of myofunctional habits like abnormal lip and tongue function on craniofacial development and orthodontic problems has been regularly reported in multiple publications. Various appliances were considered efficient for the correction of bad oral habits or muscle function. (Walpole Day et al., 1949; Massler, 1952; Tallgren et al., 1998; Schievano et al., 1999; Quadrelli et al., 2001, 2002; Usumez et al., 2004) [1].

Myofunctional therapy treatment aims to change muscle function and influence jaw growth, but also the position of the teeth.

The Activator (fig. 1) consists of a loose plastic device fitted on the lingual side of both upper and lower dentition, constructed to a bite which alters the mandible's old functioning position. Activators are passive appliances that can transfer muscle forces towards the bone and the teeth [2].

The activator is considered the universal type of functional appliance throughout the world. The upper and lower acrylic base plates of this type of appliance, are joined together to enhance the orthodontic effect on both arches. This is the reason why the activator is also known as the monobloc appliance.

The idea of prefabricated functional appliances was recently introduced in the orthodontic field. The trainer for kids (T4K™, Myofunctional Research Co, Australia) is a polyurethane prefabricated functional appliance (fig. 2), that corrects malocclusions at an early age by acting on muscular dysfunctions. The appliance can also reposition the mandible.

A randomized trial of the T4K vs. Andersen's Activator appliance concluded that the Activator caused less discomfort and was more acceptable than the T4K [9].

Experimental part

Material and method

The sample consisted in 20 subjects (10 girls, 10 boys). The mean age was 10.5 years. The subjects had a class II division 1 malocclusion and an overjet > 6mm. The patients were randomly selected for orthodontic treatment with either PFA or AA (fig. 1, 2). Overjet, overbite and lip seal were recorded before and every 3 months after the start of the treatment. The patients were instructed to wear both

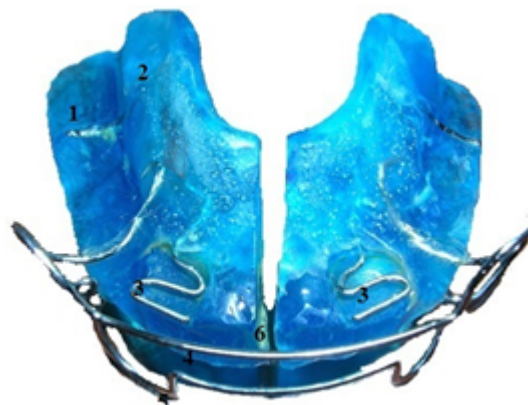


Fig. 1. Andersen's activator:
Inter-occlusal acrylic mass, palatal acrylic plate, S spring, upper labial bow, lower labial bow, transverse expansion screw

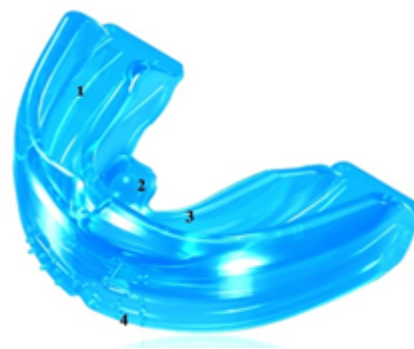


Fig. 2. T4K™, Myofunctional Research Co: 1. Tooth channels (aligns anterior dentition), 2. tongue tag (trains the correct tongue position), 3. tongue guard (prevents tongue thrusting), 4. lip bumper (discourages an overactive mentalis muscle)

appliances for 2 h during the day and all night, during sleep. The treatment stopped when the overjet was less than 3mm.

The clinical and laboratory steps in the fabrication and treatment of the Andersen activator consist in:

- proper diagnosis of the case;
- working Bite registration;
- recheck the bite on the plaster model;
- wire frame work;

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- articulation of the registered bite;
- fabrication of the appliance;
- trimming and polishing of the appliance;
- insertion of the appliance in the oral cavity;
- instruction for the appliance;
- selective trimming and adding of the resin as an adjustment of the appliance.

Results and discussions

No significant difference was found regarding overjet reduction, although the amount of overbite correction was better for the T4K group. The lip competence was improved in both groups (table 1).

Table 1

THE MEAN VALUES FOR THE TWO GROUPS: OB, OJ AND LIP SEAL CORRECTION

Appliance type	Overbite reduction	Overjet reduction	Lip seal
Activator	1.7 mm	3.1 mm	Labial competence was increased
T4K	1.8 mm	3.15 mm	Labial competence was increased

The Activator caused less discomfort and seemed to be more acceptable for the patients than the T4K appliance.

The trainer and similar appliances are said to encourage transverse bone growth by acting as a *shield* for the buccinators muscles. They provide muscular relaxation and protect the teeth and articulations from bruxism due to the *bite effect* feature of these appliances [3,4]. The trainer is capable of correcting a skeletal Class II due to the stimulation of the active mandibular force. By distancing the lower lips from the dental alveolar arch, the trainer prevents the malposition of the tongue and the lower lip during swallowing, solving the associated dental overbite problem. Studies also reported an improvement of the airway passage and a stimulation of nose breathing [5].

Being a functional device, the pre-orthodontic trainer appliance, was used in this study to quantify the reduction of bad oral habits. Quadrelli et al [6-8] indicated that the trainer appliance can be used in children with ages between four and 10 years. He recommended the trainer for the correction of the interposition of lips between the dental arches, atypical swallowing, and centripetal thrust of cheeks. This improves nasal breathing, protects teeth from bruxism and discourages bad oral habits. The external pterygoids are activated and the mandible is pushed forward.

For patients with a Class II malocclusion, the pre-orthodontic trainer appliance is constructed with the mandible in a slightly protruded position, similar to the therapeutic position used in the activator treatment.

Emina Cergic et al conducted a similar study in order to compare the clinical effectiveness in reducing a large overjet between a prefabricated functional appliance and a slightly modified Andersen activator [9-12]. They concluded that prefabricated functional appliances are just as effective as Andersen activators in correcting overjet, more effective in correcting overbite and less effective regarding the correction of the Class II molar relationship.

Conclusions

Both the PFA and the AA are effective for myofunctional and interceptive orthodontics. The AA appliance is more comfortable than the PFA. The PFA reduces the cost of the orthodontic treatment and the chairtime, allowing the initiation of the interceptive treatment, without the need of specialized dental laboratories.

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