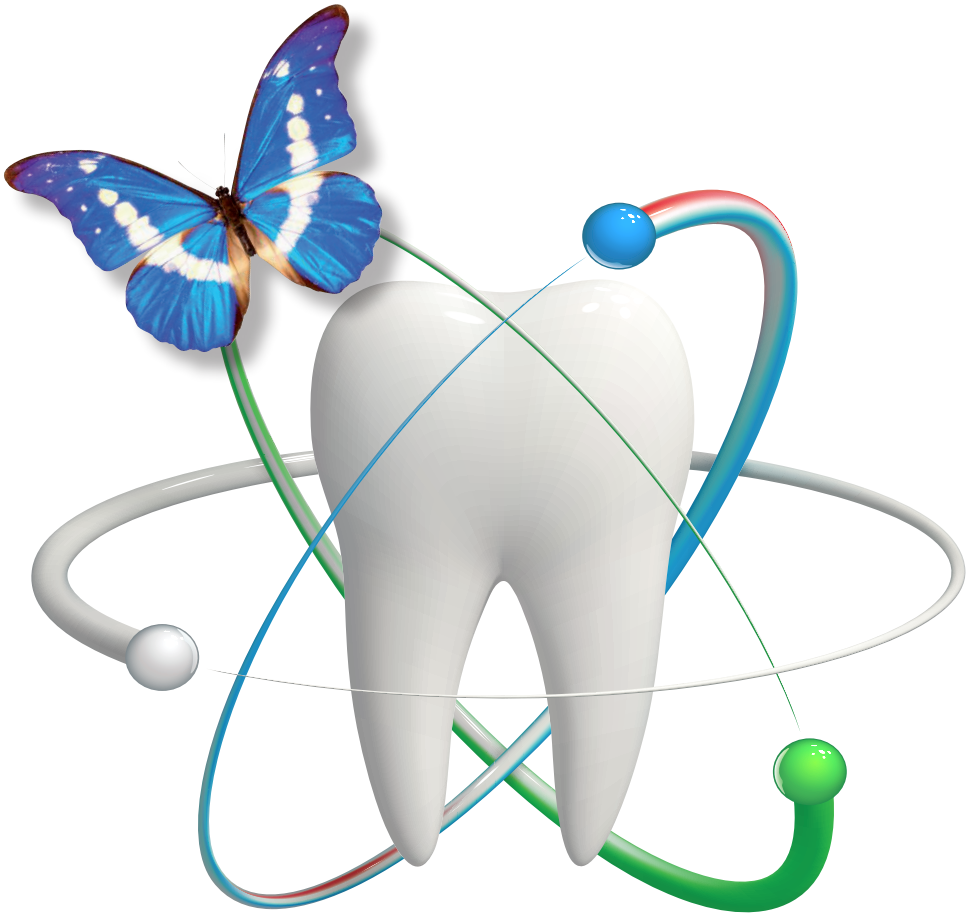
Australian Society of Orthodontists

University of Sydney



Myofunctional Therapies & Appliances

PART 2

Creating Brighter Futures

Myofunctional Therapies & Appliances PART 2

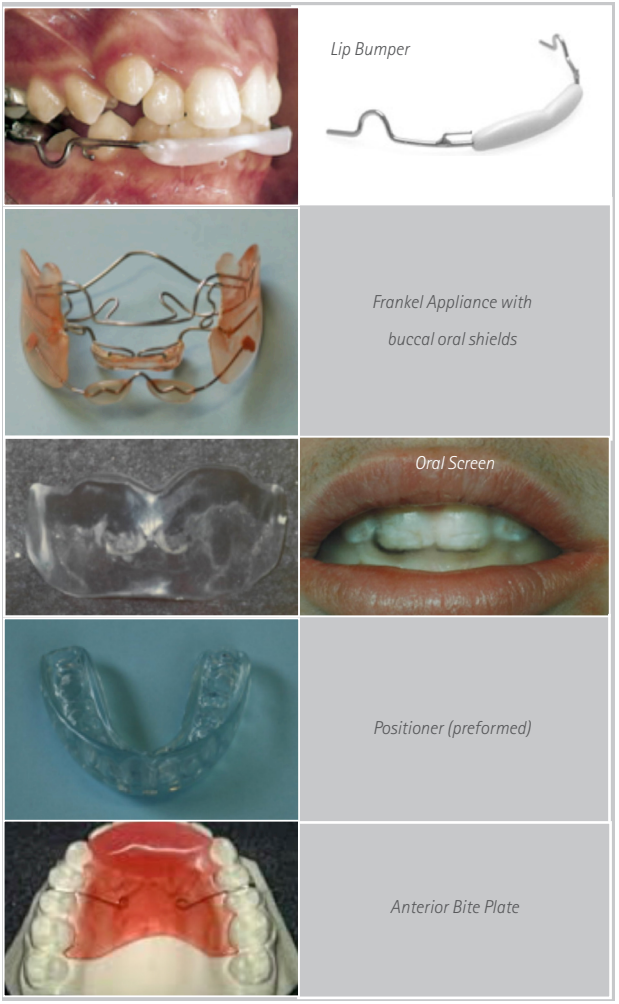
Types of Myofunctional Appliances

Myofunctional appliances can be divided into four groups based on their mode of action

1. Appliances that transmit muscle force to or away from teeth
2. Appliances that reposition the mandible
3. Appliances acting on the vestibule
4. Appliances that guide eruption of teeth

The first group of appliances work by utilising or altering forces from the lips, cheeks and tongue. This includes lip bumpers, oral shields and bite planes. Lip bumpers utilise a small acrylic pad and wire to a molar band to transmit forces from the lips to move molars distally and also shields the premolars, canines and incisors from the forces of the lips and cheek. It is mainly used in the mixed dentition when the permanent teeth are erupting. The lip bumper mainly uprights molars, expands the arch and allows for incisor proclination.[76-79] Oral shields, such as contained in the Frankel Appliance are designed to reduce or remove the forces on the teeth from the cheeks and lips. This allows for an alteration in the equilibrium so that teeth crowns can tip buccally, increasing arch width. Frankel shields that lie deep in the vestibule are also designed to pull on the periosteum to encourage buccal bone modelling. However this effect has not been scientifically proven. An Oral Screen is designed to use the muscles of the lips to apply pressure to the upper anterior teeth to retract them. It supposedly can also influence tongue and lip function.

Positioners, preformed or custom made, are flexible mouthguard like appliances that use the jaw closing muscles of the mandible to apply pressure to the teeth to improve tooth positions. They are sometimes used as finishing appliances after more comprehensive courses of orthodontic treatment, but are limited in what they can achieve.



Colgate CARE COLUMN

Alliance for a Cavity Free Future Community Grants

Alliance for a Cavity-Free Future ACFF
Stop Caries NOW for a Cavity-Free Future

The Alliance for a Cavity-Free Future (ACFF) is a worldwide group of experts who have joined together to promote integrated clinical and public health action in order to stop caries initiation and progression for all age groups.

As part of this global collaborative action Colgate Palmolive is proudly supporting ACFF Community Grants in Australia and New Zealand. A total of $50,000 has been granted to the 2015 recipients to undertake projects that aim to stop caries now and into the future.

The ACFF grant recipients and projects for 2015 are:

1) Dr Haiping Tan from Adelaide University with "Building a caries free community for the elderly"

2) Prof Helen Skouteris and Dr Merrilyn Hooley from Deakin University with "Dental caries prevention and treatment for children in out of home care"

3) Ms Susanne Sofronoff and Dr Andrea de Silva from Dental Health Services Victoria with "Developing a toolkit to integrate tooth- brushing into school breakfast programs"

4) Dr Melanie Hayes from Melbourne University with "Dietary analysis and nutritional counselling for caries prevention in community dental practice"

Congratulations to these winners. We wish them all the best with their projects.

Applications for the 2016 ACFF Community Grants will open in October. If you would like more information about these please visit ACFF.org/Australian Chapter or send an email to Susan_Cartwright@colpal.com

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You may wish to share this issue of Brighter Futures with your hygienists and other staff members.

Bite planes work by directing forces from jaw closing muscles to anterior teeth in deep bites and to posterior teeth in open bites. During periods of active growth this allows for relative intrusion (holding vertical dentoalveolar growth) of the segment contacting the bite plane, eruption of teeth not in contact with the bite plane, and can also influence skeletal growth (mandibular growth rotations). [80-82]

Myofunctional appliances that reposition the mandible forward are also known as functional or dentofacial orthopaedic appliances. These appliances posture the mandible forward on jaw closure, distracting the condyle out of the fossa. This has both skeletal and dental effects. The skeletal effects are the encouragement of condylar growth, glenoid fossa remodelling and also restraint of maxillary forward and vertical growth. The dental effects are a reduction of mesial and vertical maxillary dentoalveolar growth, mesial and vertical mandibular dentoalveolar growth, palatal crown tip of maxillary incisors and labial crown tipping of lower incisors.[1, 83] It is controversial whether or not the mandibular skeletal changes would have occurred without treatment.[84-91] The role of genetic susceptibility and epigenetics could explain why there are good responders and poor responders to functional appliance treatment. Randomised controlled trials can determine the likelihood of an outcome in a group of people, however at an individual level it may not necessarily apply.

Eruption guidance devices are prefabricated removable devices used during the mixed dentition. They are designed to shield the teeth from the tongue, cheeks and lips so that they can erupt into good alignment. Conclusions cannot be made about the efficacy of these devices due to lack of studies with robust study designs.[92, 93]

Myofunctional Exercises

Myofunctional exercises are designed to strengthen the oral musculature or re-educate the tongue. Orofacial muscle strengthening exercises are used to treat patients with anterior open bites and or vertical growth.[94] There have been studies that have shown a benefit in treatment outcome and stability when myofunctional exercises have been used in conjunction with traditional orthodontic treatment, however these studies were either retrospective in nature, had small sample sizes, had no follow up results or were case reports and therefore the results must be interpreted with caution. [94-97] These beneficial results were in contrast to another retrospective study that found that short-term clenching exercises are insufficient as an adjunct to traditional orthodontic treatment for correcting or controlling the vertical dimension.[98] Myofunctional exercises alone have not been found to improve or prevent any malocclusion.[29, 99]

In a review of evidence for myofunctional therapy for tongue-thrusting, Proffit and Mason found that there was no evidence that a tongue thrust swallow could cause a malocclusion, instead it was an adaptation to certain anatomic conditions found in pre-pubertal children, such as transitional open bite.[29] It was concluded that myofunctional therapy should not be prescribed to treat malocclusions in pre-pubertal children as they could grow out of it. During the transition from the mixed dentition to the permanent dentition most anterior open bites will resolve, as most children will transition from tongue-thrust swallow to a normal adult swallow. In post pubertal patients with an anterior open bite and anteriorly positioned tongue posture, myofunctional therapy in conjunction with orthodontic treatment may be useful, especially if they are accompanied by speech problems.

Myofunctional exercises in the treatment of sleep apnoea syndrome

Obstructive sleep apnoea syndrome (OSAS) has a multifactorial aetiology, which includes anatomical and physiological factors. Upper airway dilator muscles are important in maintaining pharyngeal patency and could be a contributing factor in the aetiology of OSAS. "Oropharyngeal exercises" consist of isometric and isotonic exercises involving the tongue, soft palate, and lateral pharyngeal wall. It includes functions of suction, swallowing, chewing, breathing and speech, developed from myofunctional therapy. The aim of the exercises is to strengthen the tongue and orofacial muscles and to re-educate the tongue, placing it in the palate at sleep. The exercises are repeated several times a day.

There have been four studies that have looked into this treatment modality, one in children, and the rest on adults. [100-103] These studies had conflicting findings and all had problems with their methodology. More research is still required to conclude whether myofunctional exercises can improve sleep apnoea.

BRIGHTER FUTURES

is published by the Australian Society of Orthodontists (NSW Branch) Inc. in conjunction with the Orthodontic Discipline at the University of Sydney.

The newsletter is intended to help keep the dental profession updated about contemporary orthodontics, and also to help foster co-operation within the dental team.

Without the generous support of Henry Schein Halas and Colgate, who are an integral part of the dental team, this publication would not be possible.

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Conclusion

Craniofacial growth and development results from an interaction between our genes and the environment. The treatments we provide to alter growth and development will depend on the patient's genetic susceptibility to the environment and epigenetic modifications. There is evidence that our facial musculature plays an important role in growth and development however it is not the only factor in growth and development. More research is required to be able to determine what contributions mouth breathing, head posture, tongue posture and jaw closing muscle strength play in the development of a malocclusion. The evidence shows that the craniofacial abnormalities are a potential risk factor to the development of paediatric Sleep-Disordered Breathing (SDB), highlighting the importance in screening, diagnosing and managing these patients as part of a multidisciplinary team.[104]

Contemporary myofunctional appliances that are preformed and act as oral shields, mandibular repositioning devices, tongue re-education devices and eruption guidance appliances have not been proven to be efficacious preventing or treating malocclusions. Early orthodontic interventions in the mixed dentition are very malocclusion specific and require a thorough diagnosis and long-term treatment plan in the ethical management of the patient.

There is evidence that oral muscle strengthening and tongue re-education exercises may help as an adjunct to orthodontic treatment of malocclusion and OSAS. The question we have to ask ourselves is does myofunctional therapy allow for enhanced adaptation of the tongue after skeletal and dental structural enhancement has taken place with orthodontic treatment or does myofunctional therapy lead to direct skeletal and dental structural change? When it is used alone, the evidence shows it has very little to no effect. There is no long-term evidence that re-educating the oral musculature behaviour is possible. Exercises to strengthen muscles in the treatment of paediatric SDB and adult OSA offer a new avenue of research where better designed, and long-term studies are required.

References available on request