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Orthodontic Bite Turbos

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Abstract

Orthodontic bite turbos are small glass ionomer cement or acrylic ramps that are bonded to the inside of the upper anterior teeth or on the occlusal surfaces of the posterior teeth. They are used in patients with overbite, deepbite and improper alignment of teeth. These are made up of different types, namely glass ionomer, resin, metal and composites. They are also called as build-ups, which are given by bonding composite material to the palatal or occlusal surfaces of teeth. The primary purpose is to prevent heavy contact of the upper teeth with lower fixed appliances in patients with deep overbite, but they can also be beneficial in cases involving crossbites or hyperfunctional masticatory muscles. This article also discusses about the advantages, disadvantages, duration of wear and precautions to be taken with bite turbos, and it also gives us an insight about various materials which can be used for making turbos. They are mainly used for overbite corrections and various types of turbos like functional turbos, invisalign functional turbos and button bite turbos are also given pertaining to the type of treatments involved.

Keywords: Metal turbos, Resin, Overbite, Ramps.

Introduction

Although the application of resin turbos is a well-known technique, there are differences of opinion about where to place them and what materials to be used. This review is intended to improve clinicians understanding of rationale for such conditions. This article also discusses about the utilization of functional turbos. Orthodontic bite turbos are small glass ionomer cement or acrylic ramps that are bonded to palatal surface of upper anterior teeth or on occlusal surfaces of posterior teeth. They are also termed as bite ramps or bite blocks. They are tooth supporting platforms, which impact the upper anterior teeth.

Figure 1: Resin Turbos Metal Turbos

These ramps are given using either glass ionomer cement or acrylic material or composite. These turbos prevent appliance breakage also. They prevent the distortion, caused by upper brackets hitting lowers in case of deep bites thereby, preventing frequent debonding of the brackets.

Development of bite turbos

Orthodontists have historically corrected deep overbites with removable and fixed upper anterior acrylic bite plates. These appliances disarticulate the posterior teeth[1], deprogram the masticatory muscles and allow for eruption, extrusion and up righting of the posterior teeth. Removable bite plates require patient compliance , however as well as frequent adjustments to account for orthodontic tooth movements . Banded bite plates provide a fixed alternative, but they are less accommodating of tooth movements and can cause soft tissue irritation.

In 1994, Joe Mayes of Ormco Corporation created a metal bite turbo as an alternative to the acrylic bite plate[2].Mayes's design was a simple modification of a lingual upper incisor bracket. After one to four turbos were bonded to the palatal surfaces of the upper incisors, the lower incisors occluded on the turbos' 44^{o} occlusal ledges to prop open the bite. Mayes believed metal was a better material for deprogramming the muscles than the softer acrylic used in conventional bite plates.

Metal turbos largely replaced bite plates because of their durability, ease of hygiene, and simplicity, but they were not without problems. Most notably, metal turbos were sometimes difficult to place because of the variability of the upper incisors lingual anatomy. Posterior metal turbos consisted of stainless steel crowns placed over otherwise normal molars common side effects of metal turbos included lisping and intolerable tooth vibrations. These issues prompted the creation of a resin alternative for use in overbite correction.

How effective are bite turbos ?

There is a widespread debate on how efficient these bite turbos are. Initially these are composed of a softer acrylic material. However in time, this material turned out to be more fragile and not effective, hence metal bite turbos were introduced and they showed greater effect than the traditional bite plates. In fact using metal bite ramps has gained valuable points in patients for several reasons, as they are more durable and not delicate to wear. They also offer a greater hygiene and simpler to maintain and didn't require much adjustments.

Advantages

- Accelerates orthodontic treatment

Disadvantages

- Speech impairments may be encountered like lisping.
- Some patients reported irritation when wearing them.
- Problems during mastication.

But all these disadvantages and side effects of using bite ramps are only temporary for shorter duration and they last hardly for about a week.

Duration of wear of bite turbos

They are worn from 6-12 months depending on the problem.

Precautions to be taken

Patient wearing these turbos are advised to be on soft foods in order to keep away them from discomfort. If metal is used in making these ramps, then breakage

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percentage is less. As these are fixed to the teeth, they accelerate the treatment. Maintenance of bite turbos don't recommend any special procedures, regular brushing especially after taking food is necessary. These bite turbos will open up the bite as they are fixed to the teeth surfaces and accelerate the treatment.

Overbite correction

A patient with retrognathia or a reduced lower arch perimeter is prone to the development of a deep overbite and a steep curve of spee. The lower incisors erupt until they contact the opposing teeth or palatal soft tissue, forming the anterior component of the curve of spee. The lower second molars then erupt distal to the upper first molars and are unopposed until they contact the upper second molars, making up the posterior component.

Overbite correction requires reversal of this process to level the curve of spee. Specifically, the premolars and first molars are extruded, while the incisors, canines, and second molars are intruded. Complete levelling of the curve of spee is difficult without bonding the lower second molars, because their inclusion provides a lever arm for extrusion of the lower posterior teeth, because posterior extrusion and overbite correction can be particularly challenging in low-angle patients, the lower second molars should be bonded as early as possible.

Light, vertical posterior elastics can be prescribed to assist in premolar extrusion. In a patient with hyperfunctional masticatory muscle, as is commonly seen in low angle cases, Botox can be used in conjunction with bite turbos to facilitate posterior extrusion[3]. the posterior teeth are discluded by the resin turbos on the upper central incisors.

Positions of turbos in low angle, average angle and high angle patients

The mandibular plane angle is always an important factor in choosing turbo locations. Anterior resin turbos are indicated in low-angle patients, while posterior resin turbos are better suited for average-angle cases. Anterior turbos should be used with caution in high-angle cases because of the risk of undesirable posterior extrusion; instead only the upper teeth should be bracketed until the overbite has been reduced enough for the lower teeth to be bonded.

The most common locations for anterior resin turbos are on the lingual aspect of the upper central incisors. Both central incisors are customarily bonded to broadly distribute the occlusal forces. Upper lateral incisors are rarely used because of their shorter roots, although this could be an alternative location if the patient develops a lisp.

Posterior resin turbos are usually placed on the supporting cusps of lower first molars. In a preadolescent patient, the lower second deciduous molars are another possibility. Some practitioners prefer placing turbos on the upper premolars and first molars for easier isolation during bonding. On the whole, however, posterior turbos are les effective in providing clearance for lower anterior brackets and may require excessive thickness in low-angle patients.

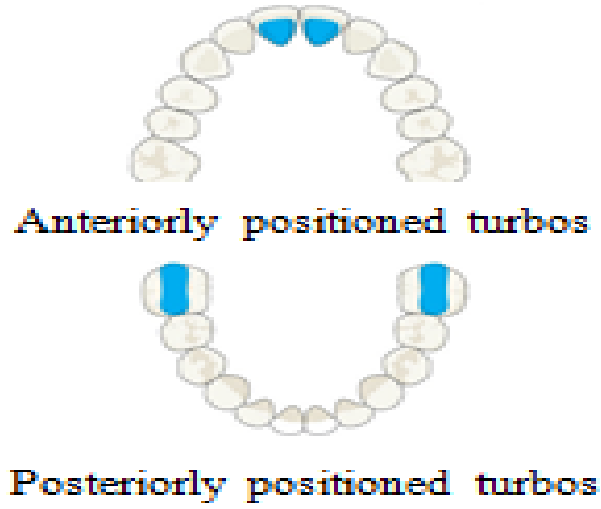

Figure 2

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Choices of materials

Many materials have been proposed for resin turbos, including acrylic gels, band cements, bracket adhesives, and lingual retainer adhesives.

Each has advantages and disadvantages related to its color, placement and removal techniques, and glass filler content. As described in Table.

Glass fillers such as quartz and silica are included in dental resins primarily to add hardness; they also help minimize polymerization shrinkage and improve handling characteristics. In orthodontic resins, fillers reduce the incident of bracket debonding due to cohesive failure and of material washout under bands , and they add body to control bracket flotation. On the other hand , the use of a turbo material with high filler content increases the risk of abrasion on opposing teeth. Quartz is of particular concern because it is harder and more abrasive than silica. Acrylic gel and band cements, which have lower quartz contents, are therefore most commonly used to make resin turbos.

Trial gel is an acrylic resin liquid designed for fabricating bite plates and modifying dental casts. Its composition is primarily methacrylate mixed with silica glass(1-10% by weight), because its formula is similar to that of an acrylic bite plate, it carries little risk of tooth abrasion. The small tubes of resin are available in four colors: clear colorless, clear pink, clear blue, and clear red. These light colors are acceptable to patients but visible enough to aid placement and removal by the orthodontist. After the teeth are etched and primed, Trial gel can be applied with a microbrush or a repurposed adhesive syringe. One disadvantage is that the exothermic reaction created by light curing can cause hyperemia and discomfort. This is often observed when turbos are placed on the upper incisors. The resin also undergoes substantial polymerization shrinkage, so the clinician should verify the marginal seal to avoid decalcification under the turbos.

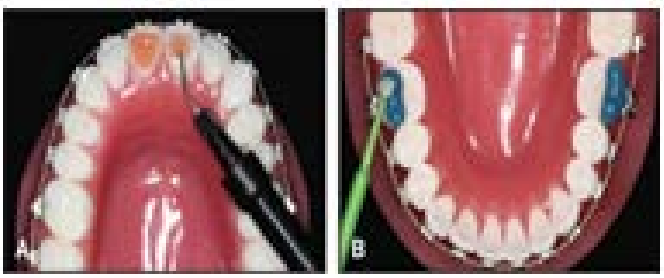

Figure 3: Turbos using Trial gel

Ultra Band-Lok is a compomer paste, a hybrid of dental resin and glass ionomer which is used for securing orthodontic bands and large acrylic appliances. Its composition includes a glass filler (50-75% by weight), methacrylate, and acid monomer. The product is packaged in a push syringe; after the teeth are etched and primed, it can be applied with a microbrush or directly from the syringe tip. Ultra Band-Lok has the handling properties of dental resin and the bonding advantages of glass ionomer. Its acid monomer allows it to bond chemically to metal alloys, which is particularly beneficial for turbos placed on lower first molars with buccal or occlusal amalgam restorations. Ultra Band-Lok's bright blue color facilitates placement and removal, but can also cast a dark shade through thin upper incisors. Most important, because the glass filler contains some quartz, the opposing teeth should be checked periodically for abrasion, particularly if the material is used to construct functional turbos.

Different materials used for making turbos

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Product	Original purposes	Types	Advantages	Disadvantages
Trial gel[a]	Bite plates, cast modification	Acrylic gel	Soft, light color	Polymerization shrinkage, hyperemia
Ultra Band-Lok[b]	Band cement	Compomer paste	Bonds to metal, distinct color	Casts a blue shade
TruLock Light Cure Band Adhesiv-e[c]	Band cement	Compomer paste	Bonds to metal, distinct color, fluoride releasing	Casts a blue shade
Ketac [d]	Band cement, Permanent restorations	Glass ionomer cement	Moisture insensitive, fluoride releasing	Difficult to remove
Blugloo, Grengloo[e]	Bracket adhesive	Resin paste	Color change	Potential for wear
Transbond[f]	Lingual retainer adhesive	Resin paste	Bond strength	Potential for wear
Flow tain[g]	Lingual retainer adhesive	Flowable resin	Easy application	Potential for wear
Twinky Star[h]	Pediatric restorations	Compomer paste	Easy application, distinct color	Potential for wear

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g. VOCO America, Inc., Indian Land, SC; www.voco.com/us.

Functional turbos

Bevelled resin turbos, also referred to as functional turbos, are constructed with bevelled occluding surfaces that guide the opposing teeth toward the desired positions. Their most common application is in the correction of a mild anterior crossbite[4]. Resin turbo material is bonded to the incisal edges of two or more lower incisors and then bevelled lingually. Upon contacting the bevelled surface, the upper incisors are nudged forward and the lower is directed posteriorly[5]. The dental crossbite will usually be corrected in about three months.

Functional turbos[6] can also be placed on premolars to improve disarticulation in class II patients. These turbos essentially operate like a bonded twin block appliance: the mandible is disarticulated and repositioned as the occluding premolars slide along the bevelled surfaces.

The most common use of functional turbos is for the correction of an anterior dental crossbite. In this application, resin material is bonded to the incisal edges of two or more lower incisors and then bevelled lingually with a handpiece. Upon contact with the bevelled surface, the upper incisors are nudged forward and the lower jaw is directed posteriorly. The dental crossbite is corrected in approximately 3 months, oftentimes in the absence of orthodontic brackets and wires.

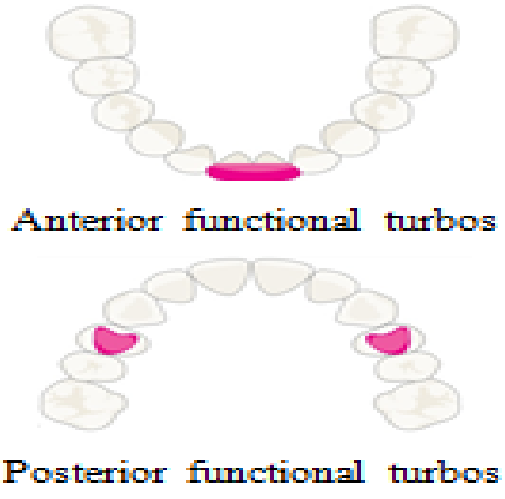

Figure 4

Invisalign functional turbos

The same technique can be applied in invisalign patients

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by adding unfilled rectangular attachments to the occlusal surfaces of the aligners.

To avoid the posterior bite block effect of full time aligner wear, anterior bite turbos can be placed on the lingual of upper anteriors. These bite turbo attachment need not be attached to the teeth as the purpose of these aligners are served by the removable aligners, and not by actual resins attached to the actual teeth. These ledges in the aligners can help in providing a ledge of aligner material that will act as an anterior bite plane during treatment and avoid heavy posterior contacts of upper and lower aligners. If the patients overjet is very much increased, then the clinician can choose to bond other commercially available bite turbos on the palatal surface of maxillary anterior teeth prior to invisalign impressions, when bite turbos by clincheck software cannot be used. Then in these cases, aligners must be built with this type of lingual anatomy and one can delay the start of maxillary invisalign alignment and fabricate local Essex retainers or other removable maxillary anterior bite planes with considerable horizontal length, and the lower arch can be started first for initial levelling and alignment.

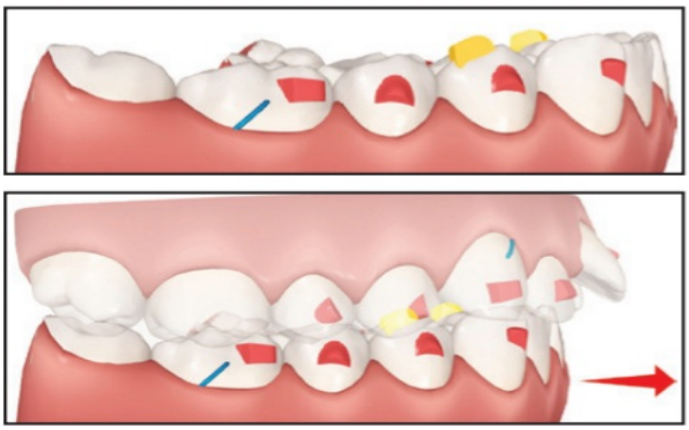

Figure 5: Invisalign functional turbos

Button bite turbos[7],a variation of bite turbo, is an easy to fabricate and can be fixed during the bonding procedure itself. It displays good stability and efficiency in bite opening.Another variant of bite turbos is Tempoblocks[8]. It is also used in Treating deep bites and also can be used in correcting crossbites. These are given in growing[9] patients for correcting open bite, by intrusion of molars.

Conclusion

Resin bite turbos are usually placed on the upper central incisors or the lower first molars, depending on the mandibular plane angle. Initially an acrylic gel or and cements were used, later now replaced by other materials where quartz filler content is low enough or the duration is minimum to avoid occlusal wear on the opposing teeth.

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