ORTHODONTIC ANCHORAGE ENHANCEMENT WITH LINGUAL ARCH

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ABSTRACT

In orthodontic treatment planning, involving the key question of preservation of the anchorage, lingual arch in association with the present day labial appliances provides a viable solution to the orthodontist. The continuous wire lingual arch auxiliary, addresses the important aspect of anchorage conservation by enhancing the buildup of forces in the posterior region. It also facilitates the retraction of the anterior segments and the resultant correction of the soft tissues.

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Introduction

The field of orthodontics has been witnessing a revolution both in availability of 3-dimensionally controllable appliance systems as well as the introduction of a host of new attachments to enhance the performance of these systems. The present day pre-adjusted edgewise appliance (PEA) system provides not only the inbuilt values of tip, torque and in-out but also numerous choices to avail of a number of auxiliaries. All these factors strive to reduce the duration of the treatment as well as crucial patient and operator time with predictably enhanced optimised treatment results. The removable continuous wire lingual arches provide an important anchorage proposition in conjunction with the labial appliances in the mandibular arch. These arches provide both enhancement and stability in anchorage [1].

The basic armamentarium (Fig-1) consists of pre-formed removable lingual arches [2] made of heat treatable Cobalt base alloy round wire (0.036") in assorted sizes (48mm to 72 mm), plain lingual sheaths (2x0.9mm weldable; 3.5mm width) having horizontal slot with a notch on distal end to provide lockable housing, palatal and lingual arch placement plier having steel hardened curved beaks with a arch holding groove, universal plier for activating omega loops, three-jaw plier for removing torque, brass wire and arch gauge to measure arch length and 0.006"x0.125" molar band material or performed bands.

Procedure for adaptation of lingual arch

Direct method

It involves welding of lingual sheaths onto the mo-

lar bands at the properly marked place which is kept more towards its occlusal margin. It is ensured that the notched part of the sheath is always facing the distal side. The bands are then cemented using thin paste of commercially available glass ionomer luting cement (GC Fuji Type I) after ensuring adequate dry conditions in the oral cavity.

Insertion

After selecting the appropriate size of the continuous wire lingual arch, it is held by the lingual arch placement plier. First one side of the arch is inserted into the lingual sheath of corresponding side and then the procedure is repeated on the other side. Once both the tags of double back wire are inserted inside the lingual sheath, the same plier is then utilised to firmly guide these tags to inside of the lingual sheath with a click noise which is an indication of proper placement

Fig. 1 : Removable lingual arch and sheath with special pliers

and locking of the arch. Additionally, in doubtful cases the lingual arch can be secured with the help of stainless steel ligature wires to prevent unintentional sliding out due to either loose fit or tongue pressure.

The lingual arch is checked at each recall visit for its snug fit. It can be removed and then reactivated/deactivated/readapted or replaced as per the requirement of the particular clinical situation. It is checked for any soft tissue impingement or any mucosal tissue overgrowth. This is an important criterion that the arch be kept away from the tissue area. The lingual arch is removed very easily with the aid of arch placement plier by firmly pulling the tag end of the arch of one side out of the lingual sheath and then repeating the same procedure on the other side.

Uses of the lingual arch :

1. Reinforce anchorage - mandibular first molars of either side are attached using lingual arch to enhance anchorage in association with the fixed labial appliance - major role.
2. Space maintainer - in mixed dentition to preserve leeway space due to early loss of deciduous cuspids and molars.
3. Control of molars (one or both sides) - by expansion or contraction, molar rotation, buccal or lingual torque of the crowns.
4. As 6-6 'retainer' - after active treatment of the mandibular arch.
5. Limited protrusion of the lower incisors by opening of the omega loops of the lingual arch.

Advantages of lingual arch :

1. Continuous action due to 24 hr wearability.
2. Simple adjustments and activations outside the mouth are possible due to easy removal and reinsertion.

3. Pleasant to wear due to simple and delicate design.
4. No hindrance to oral functions particularly tongue movements.
5. Can be used alone or in conjunction with other multiband labial techniques.
6. Possibility of complete or partial heat treatment when no further changes in the dimensions of the arch are required.
7. Appliance virtually invisible as it is placed lingually.

Complications of lingual arch can occur due to :

1. Failure in any of the sequential steps during lingual arch adaptation.
2. Breakage of lingual sheath which is not repaired in time.
3. Overgrowth of mucosa due to clinician overlook or failed visits.
4. Loose lingual arch which can be displaced due to tongue pressure.
5. Allergy to cobalt content of the wire alloy (very rare).

Lingual arches are versatile auxiliaries for the mandibular arch. They have proved to be an important adjunct to present day preadjusted labial edgewise appliance systems. They aid in controlled tooth movements in all the three planes of space. Their usage in different clinical situations needs to be fully exploited to evaluate their anchorage enhancing potential.

References

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