

Techniques in Clinical Practice

TRAP Intrusion Arch-Modification of Transpalatal Arch for an effective Intrusion of Molars and Premolars

Tarulatha Shyagali¹, Priyank Sen², Rana Tiwari²

From ¹ Professor & HOD, ² PG Student, Department of Orthodontics and Dentofacial Orthopedics, Hitkarini Dental College and Hospital, Jabalpur, MP, India.

Correspondence to: Dr. Tarulatha R Shyagali, Department of Orthodontics and Dentofacial Orthopedics, Hitkarini Dental College and Hospital, Jabalpur, MP, India. Email: drtarulatha@gmail.com

Received - 25 February 2019

Initial Review – 2 March 2019

Accepted – 28 March 2019

ABSTRACT

The aim of the present clinic paper is to demonstrate an innovative design for the effective molar intrusion using TRAP appliance. Since its inception, Transpalatal Arch (TPA) has been modified to meet the various needs of orthodontic tooth movement and modification continues still now. The applications of the transpalatal arch involve the three-dimensional control of the molar to active tooth movement of the molar as well. The design involves the usage of the properties of Niti open coil spring along with acrylic pad in TPA to bring about the effective molar intrusion.

Keywords:-TRAP, Transpalatal arch, molar intrusion, maxillary arch

The Goshgarian arch is a heavy stainless steel wire embracing the molars bilaterally in the palatal surface of the maxillary arch and thus named as Trans Palatal Arch (TPA). Originally, the TPA was fabricated for the purpose of conserving the anchorage burnout. Later, the appliance became so much popular amongst the orthodontic community that multidimensional applications of the appliance started coming forth. There were a variety of modifications proposed by different authors for different purposes. Most prominent of these were; TPA for the space maintaining, [1] for the molar derotation, [2] for the molar intrusion, [3,4] for the molar distalization, [5] TPA modified as a vertical holding appliance[6], for the correction of scissor bite [7], etc. Yet another invention for the effective molar intrusion using TPA is proposed in this article.

IDEA BEHIND THE APPLIANCE DESIGN

Molar intrusion is considered to be the most difficult of the tooth movements and for effective usage, in recent times,

the use of the mini screw is quite popular. However, the mini screw can be expensive in the developing countries and can involve an invasive procedure too. It is reported in the literature that one of the strongest muscle seen in the oral cavity is tongue and tongue can exert a pressure of 4.69 ± 1.44 Kpa on the hard palate [8]. The tongue is in contact with the palate for about 2400 times a day [9]. This pressure can be effectively utilized for the molar intrusion and the appliance was constructed using the same biological phenomenon.

APPLIANCE DESIGN

It is different than the earlier proposed vertical holding appliance which was proposed for the vertical control of molar in case of hyperdivergent growth pattern patients. This particular appliance is named as TRAP (it is an Acronym for the first name of authors; T-Tarulatha, RA-Rana, P-Priyank). TRAP (Figure 1) has a wire component running from the right to left molar following the contour of the palate. There are two acrylic buttons, one covering

the 'u loop' of the TPA which will harness one end of the closed coil spring and the other acrylic pad is over the free end or the other end of the closed coil spring (Figure 2). The second acrylic pad will be in constant contact with the tongue and the force exerted by the tongue will compress the open coil spring and the pressure thus existed will be transferred to the molars through the other acrylic pad.



Figure 1: TRAP Appliance Design



Figure 2: Acrylic pad and the closed coil spring

CONSTRUCTION

The construction of TRAP is similar to that of the normal TPA. The impression of the maxillary arch with the molar band in place was made. The band was transferred into the impression on the molars and the working model was poured. The working model will be procured along with the molars bands and the TPA was constructed using 036'' stainless steel. The "U" loop of the TPA was covered with the acrylic and four pieces of NiTi open coil spring of 0.010x0.035 inch dimension of 1centimeter (cm) size were embedded in the acrylic. The free ends of the coil spring

were covered by the acrylic forming a pad of around 2.5cm in diameter (Figure 3). Once the acrylic pads were set, they were trimmed and polished. In addition to this, for the effective intrusion of the molars, one can incorporate the posterior acrylic blocks in the TRAP (Figure 4).



Figure 3: Acrylic pad closer view



Figure 4: TRAP Appliance with the posterior bite plane

ADVANTAGES & DISADVANTAGES

Advantages	Disadvantages
Ease of fabrication	Can be irritating to the tongue
Non-invasive	The problem of cleaning or maintaining the appliance
Economical	Ulceration on the tongue can occur
Can be prepared chairside	Speech problems

DISCUSSION & CONCLUSION

The TRAP appliance was introduced with the hypothesis that the constant force of the tongue produced during the swallowing and the constant resting forces of the tongue on the palate can be effectively utilized using the modified TPA with acrylic pad and the Niti open coil springs. Niti open coil springs are known to produce a force of 25 gms

to 132 gms of force when compressed by 25%. When compressed by 50%, they produce a force of around 65gms to 295gms [10]. In the literature, it is reported that greater the distance of TPA acrylic pad from the hard palate, greater will be the forces generated. There is no universal force magnitude guide for the effective maxillary molar intrusion. In the literature, the forces ranging from 30gms to 500gms [11-14] have been used for the molar intrusion. Keeping this in mind, the forces produced by the combination of the acrylic pad and coil spring will be effective enough to produce the desired molar or the posterior intrusion.

This novel method can be the treatment of choice for the effective maxillary molar or the posterior intrusion. The current paper has just provided the prototype of the appliance; further clinical trials are required to evidence the effectiveness of this appliance.

REFERENCES

1. Kupietzky A, Tal E. The Transpalatal Arch: An Alternative to the Nance Appliance for Space Maintenance. *Pediatr Dent* 2007; 29:235-238.
2. Dahlquist A, Gebauer U, Ingervall B. The effect of a transpalatal arch for the correction of first molar rotation. *Euro J Orthod* 1996; 18: 257-267.
3. Durgekar S, Nagaraj K. Modified transpalatal arch for molar intrusion. *Int J Orthod Milwaukee* 2012; 23(3):59-61.
4. Kumar DN, Krishna GBR, Shamnur N, Mithun K. Modified Transpalatal Arch for Molar Intrusion. *J Int Oral Health* 2014; 6(6): 88-89.
5. Mauderino M, Balducci L. Asymmetric distalization with a TMA transpalatal arch. *J Clin Orthod* 2001; 35:174-178.
6. Deberardinis M, Stretesky T, Sinha P, Nanda RS. Evaluation of the vertical holding appliance in treatment of high-angle patients. *Am J Orthod Dentofacial Orthop* 2000; 117(6):700-705.
7. Reddy V, Reddy R, Parmar R. A Modified Transpalatal Arch for Correction of Scissor Bite. *J Clin Orthod* 2012; 46(5):308-309.
8. Xu K, Zeng J, Xuand T. Effect of an intraoral appliance on tongue pressure measured by force exerted during swallowing. *Am J Orthod Dentofacial Orthop* 2016; 149:55-61.
9. Staub WJ. Malfunction of the tongue. Part II. The abnormal swallowing habit: its causes, effects, and results in relation to orthodontic treatment and speech therapy. *Am J Orthod* 1961; 47:596-617.
10. Brauchli LM., Senn C, Ball J, Wichelhaus A. Force levels of 23 nickel-titanium open-coil springs in compression testing. *Am J Orthod Dentofacial Orthop* 2011; 139(5): 601-605.
11. Heravi F, Bayani S, Madani AS, Radvar M, Anbiaee N. Intrusion of supra-erupted molars using miniscrews: clinical success and root resorption. *Am J Orthod Dentofacial Orthop* 2011; 139(4) Suppl: S170-S175.
12. Melo AC, Jawonski ME, Largura LZ, Thomé G, Souza JR, Silva MA. Upper molar intrusion in rehabilitation patients with the aid of microscrews. *Aust Orthod J* 2008;24(1):50-53.
13. Umemori M, Sugawara J, Mitani H, Nagasaka H, Kawamura H. Skeletal anchorage system for open-bite correction. *Am J Orthod Dentofacial Orthop* 1999; 115 (2):166-174.
14. Park YC, Lee SY, Kim DH, Jee SH. Intrusion of posterior teeth using mini-screw implants. *Am J Orthod Dentofacial Orthop* 2003; 123(6):690-694.

How to cite this article: Shyagali T, Sen P, Tiwari R. TRAP Intrusion Arch-Modification of Transpalatal Arch for an effective Intrusion of Molars and Premolars. *J Orofac Res.* 2019;8(1):5-7.

Funding: None; Conflict of Interest: None Stated.