IJPSR (2018), Volume 9, Issue 8 (Research Article)

INTERNATIONAL JOURNAL OF PHARMACEUTICAL SCIENCES AND RESEARCH

Received on 05 November, 2017; received in revised form, 21 February, 2018; accepted, 04 March, 2018; published 01 August, 2018

FIXED HEXA-HELIX: AN AMENDED QUAD HELIX FOR A COMPLIANCE DRIVEN PEDIATRIC PATIENT- A INNOVATIVE CASE APPROACH

Ranu Bhandari [*1], Seema Thakur [1], Parul Singhal [1], Deepak Chauhan [1], Cheranjeevi Jayam [1] and Teerthesh Jain [2]

Department of Pedodontics [1], H.P. Government Dental College, Shimla -171001, Himachal Pradesh, India. School of Dental Medicine [2], University of Colorado, Denver, USA.

Keywords:

Quad Helix, Space Regain, Maxillary arch Expansion, Mixed Dentition

Correspondence to Author:
Dr. Ranu Bhandari

Postgraduate Student, 'Jawal Bhawan' North Oak, Sanjauli, Shimla -171006, Himachal Pradesh, Indi.

Email: dr.teerthesh.jain@gmail.com

ABSTRACT: Introduction: Early treatment in growing patient is of value as the guidance of occlusion to normalcy can shorten the treatment time in mature patients. The removable appliance is commonly used by pediatric dentist to intercept malocclusion in such patients, but it brings a major drawback with it of being compliance dependent. Fixed appliance therapy is better accepted and has better wear compliance in young patients. One such fixed appliance proven to be successful when given in mixed dentition is a quad helix. Modified quad helix can prove to be a very versatile appliance. This case report discusses the advantage, mode of action and effects obtained by novel modification of quad helix. This appliance was chosen to achieve slow maxillary expansion and also to gain space for labially placed tooth simultaneously. **Clinical Significance:** Quad helix being a multifaceted appliance, this neoteric appliance design could be of help for pediatric dentists in treating such similar malocclusions.

INTRODUCTION: Patient's compliance is the key factor determining the result obtained from a removable orthodontic appliance. Treatment is usually done with the removable appliance for correcting malocclusion or as a retention plate at an early age [1, 2]. Howsoever, many studies have shown that fixed appliance therapy is more accepted by younger patient [3]. Early intervention in a child with developing malocclusion canbrings desired results such as acceptable arch form, good aesthetic result. One such malocclusion noted is dental bilateral or unilateral cross-bite. It is mandatory to treat any such malocclusion as early as possible by using any appliance, from many available options. One such option is banded appliance which can bring quick and desired results [4].

QUICK RESPONSE CODE

DOI: 10.13040/IJPSR.0975-8232.9(8).3535-37

Article can be accessed online on: www.ijpsr.com

DOI link: http://dx.doi.org/10.13040/IJPSR.0975-8232.9(8).3535-37

The fixed quad helix appliance is a banded appliance which is a modification of Coffin transpalatal spring. It has four helical loops providing extra 25 mm of wire in the appliance. This longer wire increases the range of action and also provides continuous lighter force [5, 6]. Successful results are observed with both quad helix appliance as described by Ricketts in1975 and "W" appliance [7]. Quad helix has two anterior arms, used for anterior expansion. Modification of thisanterior arm of quad helix can correct anterior crossbite simultaneously with posterior cross-bite owing to expansion provided by the appliance [4].

This case report discusses the novel approach of gaining space in the maxillary anterior region by modification of anterior arm of quad helix.

Case report: A 10 year old female child consulted in the department of pedodontics and preventive dentistry HPGDC College Shimla, with a chief complaint of the forwardly placed tooth. Her mother gave the history of the retained deciduous

tooth for a longer period and later eruption of the permanent tooth in a labial position **Fig. 1**, for which a removable appliance with jack screw for maxillary expansion and finger spring for distalizing left lateral incisor was delivered. Soon within 1 month, the patient reported with the misplaced appliance, again a new removable appliance was delivered, but the parents reported, again within one month with a complaint of noncompliance of the patient in wearing the appliance.

Consideration was made for a fixed appliance for maxillary expansion simultaneously to gain space for maxillary left central incisor. Hence a modification of quad helix was planned as hexahelix, and anteriorly the free ends looping around maxillary left lateral incisor and maxillary right central incisor. **Fig. 1**

FIG. 1: DEMONSTRATING BUCCALLY PLACED LEFT CENTRAL INCISOR, AMODIFIED QUAD HELIX WITH ANTERIOR ARMS LOOPING AROUND THE RIGHT CENTRAL AND LEFT LATERAL INCISOR

Within 3 months 4 mm of extra space was created for maxillary left central incisor and increase in inter canine, and intermolar width was obtained. **Fig. 2**

FIG. 2: DEMONSTRATING EFFECTS OF, MODIFIED QUAD HELIX (NOTE: SPACE GAIN OF 4 mm FOR LABIALLY PLACED LEFT CENTRAL INCISOR)

Central incisor was aligned in the arch with lip pressure itself,as there was enough space for same. **Fig. 3**

FIG. 3: DEMONSTRATING EFFECTS OF, MODIFIED QUAD HELIX. NOTE MAXILLARY EXPANSION OBTAINED AND CENTRAL INCISOR ALIGNMENT BY LIP PRESSURE

DISCUSSION: Developing dentition is a stage at which a pediatric dentist can bring about the desired change towards normal occlusion through guiding occlusion and interception of malocclusion [8]. Complication and increased treatment time was observed when failure to treat the malocclusion at this stage occurs and if it is delayed to maturity [9]. One of the ways pediatric dentist considers to treat malocclusion is a removable appliance, but removableappliance has a major disadvantage of patient co-operation difficulty in speech, difficulty in eating, demineralization of enamel leading to carries, hyperplasia of the palatal mucosa, fungal infection and increased treatment time.

In this case, poor compliance of patient made removable appliance a poor choice to treat the malocclusion, so fixed therapy was chosen. Fixed appliance therapy provides amajor advantage as no need of patient co-operation and decreased treatment time, as required in this case. Additionally, it provides tooth movement control and cost-effectiveness. Quad helix has significantly lower indirect and direct cost, fewer failures when compared to expansion plates [10].

Modified quad helix was chosen to achieve slow maxillary expansion and also to gain space for labially placed incisor. Slow maxillary expansion has some advantage on rapid maxillary expansion as it provides more stable results and fewer relapse *via* more physiological reorganization of bone in 3 planes of space of maxilla [11].

Skeletal changes on maxilla can be appreciated when quad helix is used in young patient owing to greater force the appliance applies. Quad helix is a versatile appliance; it provides expansion control over tipping, torque, and rotation of molars.

Nevertheless, it has also seen to provide sweeping action in the anterior region as it creates space in the anterior region through anterior expansion. Modification of these anterior arms can also be done to control the movement as when and where needed. It can be concluded that modified quad helix is a good choice for expansion in mixed dentition [7, 12].

CONCLUSION: Fixed quad helix is a versatile appliance, proven in time. Modification of quad helix can bring the desired results, giving many benefits as nonpatient compliance dependent, low cost, easy fabrication, and activation and early achievement of results. This novel appliance design could be a great help for pediatric dentists in treating such similar malocclusions.

ACKNOWLEDGEMENT: I am thankful to my mentor Dr. Seema Thakur for the guidance and teachings she has provided for the fulfillment of this work. Also, I am thankful for all the teaching staff of the department for their valuable support.

CONFLICT OF INTEREST: None to declare.

REFERENCES:

1. Casutt C, Pancherz H, Gawora M and Ruf S: Success rate and efficiency of activator treatment. European journal of orthodontics 2007; 29(6): 614-21.
2. Pratt MC, Kluemper GT, Hartsfield JK, Fardo D and Nash DA: Evaluation of retention protocols among members of the American Association of Orthodontists in the United States. American journal of orthodontics and dentofacial orthopedics: official publication of the American Association of Orthodontists, its constituent societies, and the American Board of Orthodontics. 2011; 140(4): 520-6.
3. Nagarajappa R, Ramesh G, Sandesh N, Lingesha RT and Hussain MA: Impact of fixed orthodontic appliances on quality of life among adolescents' in India. Journal of clinical and experimental dentistry 2014; 6(4): e389-94.
4. Kommineni NK, Varsha M, Rao AV and Reddy N: Early intervention of cross bite during mixed dentition with quad helix appliance – 2 case reports. Annals and Essences of Dentistry 2010; 56(2).
5. WHC: A generalized treatment of irregularities, Paper read to section XII of the International Medical Congress, Trans Int Cong Med. 1881; 3: 542 - 7.
6. Friel SMH: The design and construction of fixed orthodontic appliances in stainless steel, in European Orthodontic Society, report of the twenty-second annual congress. London, England, The Dental Manufacturing Company, 1038: 53-84.
7. Vizzotto MB, de Araujo FB, da Silveira HE, Boza AA and Closs LQ: The quad-helix appliance in the primary dentition orthodontic and orthopedic measurements. The Journal of clinical pediatric dentistry. 2008; 32(2):165-70.
8. Caprioglio A, Bergamini C, Franchi L, Vercellini N, Zecca PA and Nucera R: Prediction of Class II improvement after rapid maxillary expansion in early mixed dentition. Prog Orthod. 2017; 18(1): 9.
9. Mir CF: One-phase or two-phase orthodontic treatment? Evid Based Dent. 2016; 17(4): 107-8.
10. Al-Sehaibany F and White G: A three dimensional clinical approach for anterior crossbite treatment in early mixed dentition using an Ultrablock appliance: case report. The Journal of clinical pediatric dentistry. 1998; 23(1):1-7.
11. Petren S, Bjerklin K, Marke LA and Bondemark L: Early correction of posterior cross bite a cost-minimization analysis. European journal of orthodontics 2013; 35(1):14-21.
12. O'Neill J: Quad-helix appliances may be more successful than removable expansion plates at correcting posterior crossbites. Evid Based Dent. 2015; 16(1): 25-6.

How to cite this article:
Bhandari R, Thakur S, Singhal P, Chauhan D, Jayam C and Jain T: Fixed hexa-helix: an amended quad helix for a compliance driven pediatric patient- a innovative case approach. Int J Pharm Sci & Res 2018; 9(8): 3535-37. doi: 10.13040/IJPSR.0975-8232.9(8).3535-37.