IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 18, Issue 4 Ser. 9 (April. 2019), PP 29-31
www.iosrjournals.org

Evaluating the Effects of Posterior Bite Plane, Essix Retainer and Hawley's Appliance on Speech.

LijinJames, [1] UB Rajasekaran, [2]Aniruddh V Yashwant[3]
[1](Post Graduate Student, Department Of Orthodontics and Dentofacial Orthopaedics, Indira Gandhi Institute of Dental Sciences, Sri BalajiVidyapeeth Deemed University, Puducherry, India)
[2](Professor and Head, Department Of Orthodontics and Dentofacial Orthopaedics, Indira Gandhi Institute of Dental Sciences, Sri BalajiVidyapeeth Deemed University, Puducherry, India)
[3](Senior Lecturer, Department Of Orthodontics and Dentofacial Orthopaedics, Indira Gandhi Institute of Dental Sciences, Sri BalajiVidyapeethDeemed University, Puducherry, India)
Corresponding Author: LijinJames

Abstract: *Function such as speech has to be maintained during the orthodontic treatment. As speech is crucial for communication, to perform day to day activities and social acceptance, precautions should be taken to prevent any disturbance of speech during active and retentive phase of orthodontic treatment. Appliances such as posterior bite plane, Essix retainer and Hawley's appliance have an effect on speech. Many patients advised for these appliances, often complaint about the hindrance in speech. Hence, we would like to evaluate the effects of appliances on speech.*

Keywords:*Posterior bite plane, Essix retainer, Hawley's Appliance*

Date of Submission: 25-03-2019 Date of acceptance: 12-04-2019

I. Introduction

Retainers are routinely used by patients for 6 to 12 months after orthodontic treatments have been completed in light of the fact that remodelling occurs in soft and hard tissue during this retention period. Though, in the long term, it might be essential to tolerate the retention procedure until the growth is complete. Hawley and Essix are the two most commonly used removable retainers in orthodontic treatment, [1] whereas, the effect of Posterior bite plane incorrection of skeletal open bite, cross bite and also used as retainer for the management of vertical problems.[2] The aim of this studyis to compare the effects of Posterior Bite Plane, Essix Retainer Hawley's Appliance on speech and to evaluate which appliance gives least effects on speech.

II. Materials& Methods

Inclusion criteria for this study involve male and female patients with a mean age18-30 years in ethnic Pondicherry &Tamil Nadu population. Patients who had undergone previous orthodontic treatment, patient with missing teeth, prosthesis,gross asymmetry, history of trauma, cleft lip and palate were excluded from the study.

The Posterior bite plane was prepared by extending the base plate to cover the occlusal surface of the teeth, Essix retainers were developed from plastic, polyester .030″, Essix sheet materials as indicated by the producer's guidelines and Hawley retainers were fabricated with labial wire with vertical loops, adams clasps and lingual acrylic.(Figure 1)

The speech articulation of 30 patients was evaluated prospectively. The patients were randomly selected into retention by treatment allocation cards such as Posterior bite plane, Essix retainer and Hawley's appliance. The all groups included 10 participants with a mean age of 18-32years. Speech sound assessments were performed using vowels (a) with different consonants in first day,[3]second week and one month. The sound analyses were obtained using spectral and temporal parameters with a computerized speech lab model 4300B. Statistical analysis was done using IBMSPSS for Windows, version 20.

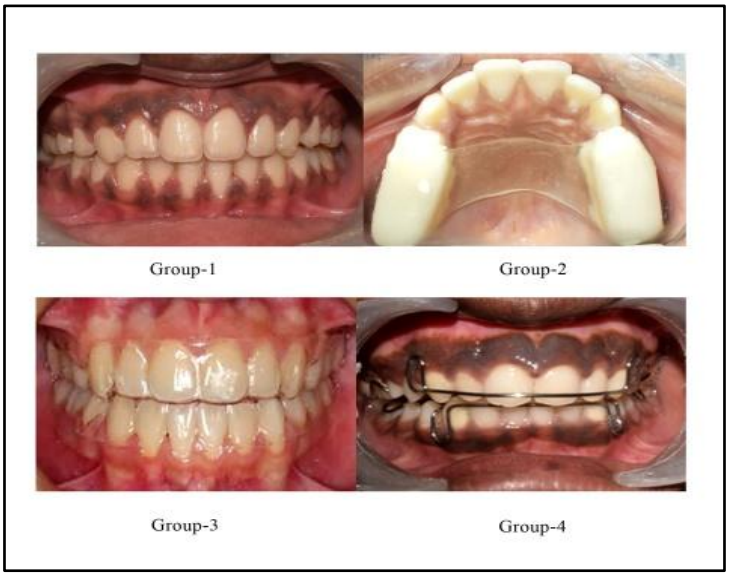

Figure 1: Intraoral Photograph showing Group 1-control group, Group 2-Posterior Bite Plane, Group 3-Essix Retainer and Group 4-Hawley's Appliance.

III. Results

p value less than 0.05 was considered statistically significant. Patients wearing the Essix retainer exhibited the least difficulty during speech followed by Hawley's retainer. Patients using bite plane exhibited the maximum difficulty in speech among all the groups.(Table- 1)

Table 1: Statistical evaluation of **F1, F2**, and **F3** frequencies of the **[a]** vowel with different consonants **(t, d, n, l, s, and z)**in different observation periods.

Format in frequency (Hz)		Control group			Posterior bite plane			Essix retainer			Hawley's appliance		
		1st day	2nd week	1 month	1st day	2nd week	1 month	1st day	2nd week	1 month	1st day	2nd week	1 month
ta	**FI**	.008	.009	.004	.335	.312	.301	.069	.038	.017	.268	.235	.190
ta	**F2**	.005	.006	.007	.339	.327	.321	.056	.031	.024	.298	.239	.187
ta	**F3**	.008	.001	.004	.351	.313	.302	.047	.037	.027	.279	.251	.197
da	**F1**	.003	.005	.002	.339	.336	.325	.087	.026	.014	.265	.239	.201
da	**F2**	.005	.003	.006	.325	.328	.316	.065	.043	.029	.256	.225	.183
da	**F3**	.006	.007	.004	.329	.305	.296	.035	.028	.012	.283	.229	.177
na	**F1**	.009	.001	.003	.343	.333	.315	.054	.039	.013	.249	.243	.183
na	**F2**	.002	.001	.007	.336	.317	.303	.076	.036	.024	.254	.236	.195
na	**F3**	.007	.008	.002	.330	.326	.316	.054	.029	.016	.267	.230	.187
la	**F1**	.005	.003	.005	.325	.308	.300	.049	.040	.034	.268	.225	.191
la	**F2**	.005	.002	.004	.319	.311	.304	.076	.032	.024	.288	.219	.201
la	**F3**	.008	.003	.008	.351	.345	.334	.037	.028	.018	.269	.251	.160
sa	**F1**	.004	.003	.005	.343	.334	.327	.043	.025	.012	.269	.243	.187
sa	**F2**	.002	.004	.005	.356	.343	.336	.077	.050	.043	.274	.256	.198
sa	**F3**	.004	.005	.007	.347	.341	.329	.051	.032	.014	.254	.234	.189
za	**F1**	.001	.002	.004	.321	.315	.304	.054	.032	.004	.251	.235	.203

za	**F2**	.005	.007	.002	.312	.310	.301	.065	.021	.016	.245	.228	.196
za	**F3**	.003	.001	.005	.330	.316	.303	.053	.025	.013	.263	.247	.211

IV. Discussion

Posterior bite plane can be incorporated in to upper or lower arch for correction of anterior open bites to unlock the occlusion by discluding all the anterior teeth to permit further eruption and intrusion of the posterior teeth.[2] Essix retainers are used to maintain the newly positioned tooth in correct position in all three dimensions after the end of orthodontic treatment. A Hawley's appliance may be used actively to achieve minor orthodontic tooth movements and passively for retain the teeth in the corrected position at the end of the orthodontic treatment.[1]

Formats were typically utilized for the assessment of vowels. Phoneticians focus around the initial three formants for etymological data[3]. The first format frequency (F1) connects to the articulatory height of the voweland rises when the tongue is brought down. The second format frequency (F2) reflects generally the vowels and rises when the tongue placed towardthe front. The nearer they are together, the more ''back' 'a vowel sounds. The third format frequency (F3) addsto quality distinctions, which is more dependent on thearea of lip cavity and could rise when accompanied by the reduction of the lip cavity.[4]

A past study demonstrated that pitch and format frequencies may change significantly during puberty,whereas this change ends at the age of 18 years.[5] Toensure that the sound phonatingapproaches for eachpatient at variousexamination times were almost the equivalent, the age criteria (older than 18 years) was chose in our investigation to avoid intentional distance from change in sound from puberty. Furthermore, all patients had the experience of learning English for over 10 years. Englishpronunciationspecialists were likewise used to ensure the accurate pronunciation of those designed words before enrolment.[6] Thus, in our study, we expected that allsubjects could pronounce their selected wordsprecisely.

To lessen the impact of impairment in speech asmuch as possible, two measures ought to be taken. Thefirst is to inspire retainer-wearing patients topractice distortion sounds and the second is to alter the structure of the bite plane, retainer&appliance with the goal that it will be less likelyto impact on speech.[7]More grounded materials might be utilized to lessen the thickness of bite plane, retainer &appliance.[8]

V. Conclusion

To conclude this study,essix retainer can be used as a retainer after fixed appliance therapy,since it has the least effect on speech, avoids and reduces the time frame.Posterior bite plane shown maximum influence on speech as per this study results.

Acknowledgement

Dr.Ezhumalai, statistician, MGMCRI for compiling the data and statistical analysis.

Raam, speech therapist,Department of **otorhinolaryngology,**MGMCRI for aiding in performing this study in their institute.

References

[1]. EzgiAtik, FatmaEsenAydinli, Mavis EmelKayikci, SemraCiger et al Comparing The Effects Of Essix And Hawleys Retainers On The Acoustics Of Speech. EJO 2016:1-6

[2]. Meibodi S E, FatahiMeybodi S, Samadi A H. The effect of posterior bite-plane on dentoskeletal changes in skeletal open bite malocclusion.

[3]. Kulak Kayikci, M.E. Akan, S. Ciger S. Ozkan, S. (2012) Effects of Hawley retainers on consonants and formant frequencies of vowels. The Angle Orthodontist, 82, 14–21

[4]. Jia Wan, Tong Wang, Xibo Pei, Qianbing Wan, WenkunFeng,Junyu Chen et al Speech Effects Of Hawley And Vaccum-formed Retainers By Acoustic Analysis.ANGLE 2016:286-292

[5]. Kent, R.D. and Kim, Y. (2008) Acoustic analysis of speech. In: Ball, M.J Perkins, M.R., Müller, N., Howard, S. Eds. The Handbook of Clinical Linguistics. Blackwell Publishing Ltd, Oxford, UK, pp. 360–381.

[6]. Honda, K. (2008) Physiological processes of speech production. In: Benestry, J. Huang, Y.A., eds. Springer Handbook of Speech Processing. Springer, Berlin, Germany, pp. 7–26.

[7]. Haydar, B. Karabulut, G. Ozkan, S. Aksoy, A.U. and Ciger, S. (1996) Effects of retainers on the articulation of speech. American Journal of Orthodontics and Dentofacial Orthopaedics, 110, 535–540

[8]. Rowland, H., Hichens, L., Williams, A., Hills, D., Killingback, N., Ewings, P., Clark, S., Ireland, A.J. and Sandy, J.R. (2007) The effectiveness of Hawley and vacuum-formed retainers: a single-centre randomized controlled trial. American Journal of Orthodontics and Dentofacial Orthopaedics, 132, 730–737.

LijinJames. "Evaluating the Effects of Posterior Bite Plane, Essix Retainer and Hawley's Appliance on Speech." IOSR Journal of Dental and Medical Sciences (IOSR-JDMS), vol. 18, no. 4, 2019, pp 29-31.