

ORIGINAL ARTICLE

Assessment of Effect of Malocclusion on Masticatory Sound: A Research Study

Nameeta Kaur¹, Abu Nedat²

Associate Professor¹, PG Student², Department of Orthodontics , DJ College of Dental Sciences , Ghaziabad, U.P., India

ABSTRACT:

Background: Malocclusion has impact of sound production. The present study was conducted to assess the effect of malocclusion on sound. **Materials & Methods:** The present study was conducted on 54 patients age ranged 14-22 years old with malocclusion such as open bite, deep bite, class II malocclusion etc. Patients were made to speak words including m, p, t, f, s,sh, ch, th, and l. **Results:** Out of 54 patients, males were 28 and females were 26. There were no error in 12, m sound error in 10, p in 8, t in 6, s in 7, sh in 3, ch in 2, th in 4 and l in 2 patients. The difference was significant (P< 0.05). **Conclusion:** Malocclusion has impact on sound production. There was significant difference in sound production in patients with malocclusion.

Key words: Malocclusion, Sound, Speech.

Corresponding Author: Dr. Nameeta Kaur, Associate Professor, Department of Orthodontics, DJ College of Dental Sciences , Ghaziabad, U.P., India

This article may be cited as: Kaur N, Nedat A. Assessment of Effect of Malocclusion on Masticatory Sound: A Research Study. Int J Res Health Allied Sci 2017;3(1):79-81.

INTRODUCTION

If speech sounds are not produced properly, speech disorders are occurred. Structural changes in lips and tongue, the lingual frenulum near the tip of the tongue, the hard palate is too high or flat, cleft lip and palate, nerve and muscle disorders, mental problems and damages in speech and hearing centers in the brain may cause speech disorders.¹

Teeth are articulator organs for formation of sound. The lack of teeth can cause that does not occur normal sound. Relation of maxilla and mandibular, tongue and oral cavity have important role for formation of the sounds. Relation of maxilla and mandibular varies in every patient. Class II patients have difficulties on p, b, m and s sounds. Class III patient have difficulties on s, z, f and v sounds. The way of speaking of patient should be carefully examined, the reasons should be identified which could cause problems in the sound formation.²

Nearly 90% of all consonants are made in the anterior portion of the oral cavity, suggesting that the dental arch relationship maybe one of the most important factors affecting articulation. A deviation in dental structure or alignment may interfere with the normal process of air flow and pressure, as well as proper lip and tongue placement

and contouring, thereby affecting the integrity of speech sound production.³

The speech pathology and dental literature historically has had an interest in the impact of the dentition on speech. Studies have demonstrated the use of different articulatory postures to functionally adapt to variations in structural anomalies of the dental skeletal framework and dentition, including occlusal plane, palatal shape, lingual shape and placement and dentition.⁴ The present study was conducted to assess the effect of malocclusion on sound.

MATERIALS & METHODS

The present study was conducted in the department of Orthodontics. It comprised of 54 patients age ranged 14-22 years old with malocclusion such as open bite, deep bite, class II malocclusion etc. Patients with mental retardation, neurologic disorders, thumb sucking, infantile swallowing, previously diagnosed speech disorder and hearing deficits etc. were excluded.

Patients were made to speak words including m, p, t, f, s,sh, ch, th, and l. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

RESULTS

Table I: Distribution of patients

	Total- 54	
Gender	Males	Females
Number	28	26

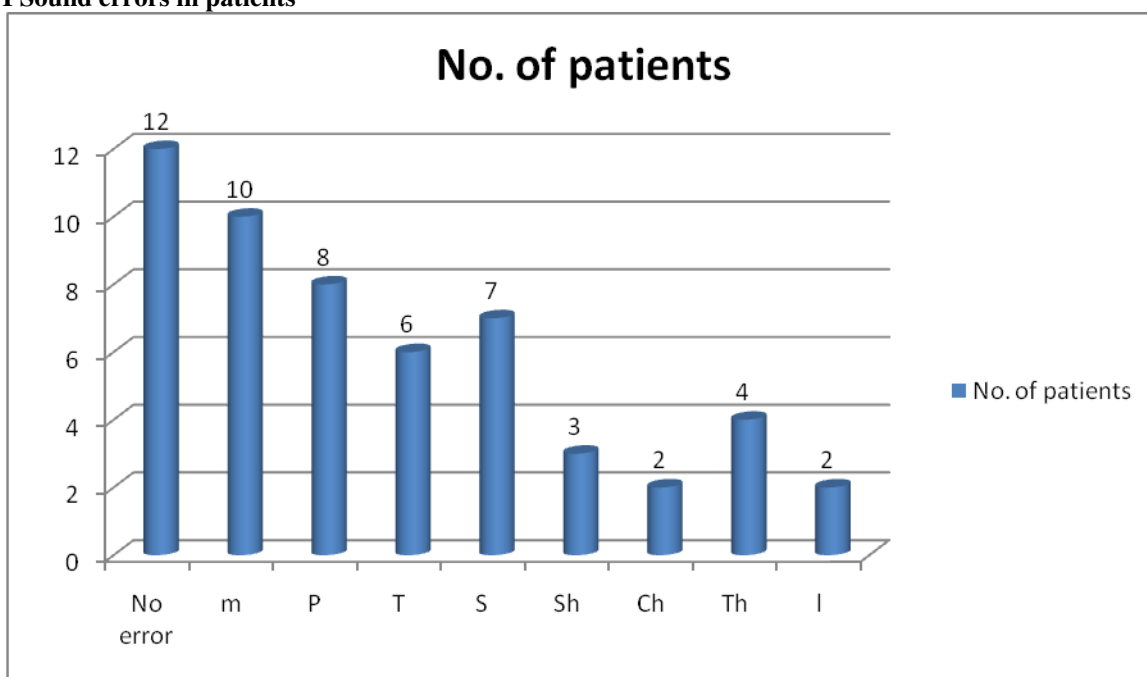
Table I shows that out of 54 patients, males were 28 and females were 26.

Table II Sound errors in patients

Sound	No. of patients	P value
No error	12	0.01
m	10	
P	8	
T	6	
S	7	
Sh	3	
Ch	2	
Th	4	
L	2	

Table II, graph I shows that there were no error in 12, m sound error in 10, p in 8, t in 6, s in 7, sh in 3, ch in 2, th in 4 and l in 2 patients. The difference was significant ($P < 0.05$).

Graph I Sound errors in patients



DISCUSSION

A complex relationship clearly exists between speech and tooth position. Three possible mechanisms by which malocclusion and speech may be interrelated: 1. There may be an occlusal and/or skeletal problem and coincidentally an articulatory problem. 2. There may be a genetic or metabolic disorder affecting the central nervous system, which will lead to poor motor control and possible distorted morphogenesis. 3. There may be a true cause and effect where occlusal or structural anomalies affect articulatory skills.⁵

There are many etiological factors that are common to both problems. If speech defect is present, it cannot be assumed to have a strict cause and effect relationship with malocclusion. Individuals with normal occlusion may have speech defects and individuals with

malocclusions may have normal speech. In most cases, tongue and lips adapt to the malfunctions and irregularities on dental arches so that no speech disorders occur. These people who have tongue-lip adaptation show greater lower lip activity. In defective speakers, tip of the tongue slightly overlay the lower incisors at rest and protrude beyond the lower incisors during “s” production. Therefore the adaptation capacity of oropharyngeal structures has an important role. This adaptation is related to one’s character, level of intelligence, muscle control, emotional state and social conditions.⁶The present study was conducted to assess the effect of malocclusion on sound.

We found that out of 54 patients, males were 28 and females were 26. There was no error in 12, m sound error in 10, p in 8, t in 6, s in 7, sh in 3, ch in 2, th in 4 and l in 2 patients. Johnson et al⁷ in their study one hundredfifteen

patients (8.2-36 years of age) seeking orthodontic evaluation were assessed for speech sound production abnormalities. An orthodontic clinical examination assessed Angle classification, overjet, overbite, crowding, spacing, and crossbites. A standard speech sample was elicited from each subject. Results: The results indicated that 71 (62%) of the subjects made a production error, particularly with the /s/ and /t/ sounds. However, auditory distortions occurred in 12 subjects (20%), and 56 (80%) subjects had visual distortions of the sound. An open bite (.2 mm) was the key malocclusal factor underlying speech sound errors. There was statistical significance between the Orthodontic Treatment Priority Index and the sound errors of /s/ and /t/ (mean score of 9.54 vs 6.29 for subjects without sound errors).

Vallino et al⁸ conducted a study which indicated that study indicated that the /s/ sound was more sensitive to deviations in the dentition than others. Another sound, /t/, was also misarticulated frequently in our study. /s/ and /t/ have a common placement (lingual alveolar) in that the lingual apex makes contact with the alveolar ridge for sound production, but they differ in acoustic properties and their manipulation of air flow and pressure mechanics. In most incidences, misarticulation of one of these sounds went hand in hand with misarticulation of the other. From a visual standpoint, lingual protrusion for the /s/ sound and dental edge contact for the /t/ sound were noted more often than other placement error types. These visual inaccuracies occurred more often than articulatory distortions, indicating that the target sound was often made in a different position than typically expected; yet it was able to retain enough of its acoustic properties to be perceived as adequate for acceptance.

CONCLUSION

Malocclusion has impact on sound production. There was significant difference in sound production in patients with malocclusion.

REFERENCES

1. LeBlanc EM, Cisneros GJ. The dynamics of speech and orthodontic management in cleft lip and palate. In: Shprintzen RJ, Bardach J, editors. Cleft palate speech management: a multidisciplinary approach. St Louis: Mosby; 1995;305-26.
2. Subtelny JD, Mestre JC, Subtelny JD. Comparative study of normal and defective articulation of /s/ as related to malocclusion and deglutition. J Speech Hearing Dis 1964;29:269-85.
3. Bloomer HH. Speech defects associated with dental malocclusions and related anomalies. In: Travis LE, editor. Handbook of speech pathology and audiology. New York: Appleton-Century-Crofts; 1971; 715-65.
4. Starr CD. Dental and occlusal hazards to normal speech production. In: Bzoch KR, editor. Communicative disorders related to cleft lip and palate. Boston: Little Brown; 1979; 313.
5. Jensen R. Anterior teeth relationship and speech. Acta Radiol 1968;276(Suppl):1-69.
6. Rathbone JS. Appraisal of speech defects in dental anomalies. Angle Orthod 1955;25:42-8.
7. Johnson CL, Sandy JR. Tooth position and speech—is there a relationship? Angle Orthod 1999;69:306-10.
8. Vallino LD, Tompson B. Perceptual characteristics of consonant errors associated with malocclusion. J Oral Maxillofac Surg 1993;51: 850-6.