

Speech And Malocclusion-A Review

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ABSTRACT:

Speech is the process to address and interact with one another to deliver one's point of view. It is an important part of human development and an effective way to let people know what we think. As an orthodontist, our role is not only to bring about esthetic corrections in patients but also to bring form and function to the stomatognathic system. Lack of proper alignment is a possible cause for speech disorders. However, there are various known causes of speech impediments, such as " hearing loss, neurological disorders, brain injury, intellectual disability, drug abuse, physical impairments such as cleft lip and palate, and drug abuse or misuse. This article throws light upon speech distortion related to malocclusion.

INTRODUCTION:

Speech pathology deals with speech defects of articulation, rhythm, voice, and language. Defects of articulation are shown in the distortion, omission, substitution, or inappropriate addition of consonant and vowel sounds in speech. Symptoms of rhythm disturbances occur by blocking, repetitions, prolongations, and avoidances of stuttering, and in the slurred and irregular syllabifications of cluttered speech. The disciplines of orthodontics and speech pathology do not parallel each other, however, but proceed from different frames of reference. Thus, we may say that, the orthodontist seeks to alter certain structures of the mouth in order to improve their function, whereas the speech pathologist tries to alter function, where necessary, to adapt to the oral anatomy. In conjunction with the lips, tongue, and oropharynx, the teeth play an important role in the articulation of consonants via airflow obstruction and modification. Therefore, along with speech therapy, any orthodontic therapy that changes the position of teeth plays an important role in speech disorder correction.

Production Of Speech:

It is not fully understood how speech is produced, but it is known to be a complicated process in several stages.

The first stage is generally lumped together in what is called the premotor processes

1. There's the idea, the thoughts that the individual wants to convey.

2. Then comes the word finding, which are the words the individual wants to use to convey those thoughts.
3. Then the brain assembles the sounds that are necessary to make each of those words.

Then in the second stage, in what we will call the mechanical process, the brain sends the signals to make those sounds in that particular order at that particular speed (in which you thought of) to the muscles that control the vocal chords, lips, tongue, and breathing apparatus. To top it off, are about 40,000 neuromuscular events per second of speech. And in order to make a sound, the coordination of over 100 muscles needs to happen. These coordinated movements have to perform without a single flaw for fluent speech to occur. The movements required for speech are performed naturally without conscious control and they are monitored by hearing and touch. The movement involves-(a)Respiration (b)Phonation (c)Articulation.

Causes Of Speech Defect:

- The various causes of speech defects include (i)valve defects, (ii)structural changes in lips (iii)tongue tie,(iv)high palatal vault, (v)cleft lip and palate, (vi)nervous and muscular disorder ,(v) mental problems and(vi) damages in speech and hearing centres in brain.

SPEECH DEFECTS IN SPECIFIC MALOCCLUSION:

(A) Incisor Positions:

Irregular incisors especially lingual position of maxillary incisors leads to irregular production of lingoalveolar stops” t”,d”.

Production of “s” sound becomes most difficult to pronounce and it is the most misarticulated consonant.

Difficulty in production of sound is mainly due to increased overjet⁴

(B) Alveolar Arches And Shape Of Palate:

Simple frontal segment of the dental arches have an important role in sibilants pronunciation and sibilant speech disorder.

Narrow arches are a common clinical finding of patients with speech defects⁴

(C) Class Ii Malocclusion:

These patients experience difficulty in producing bilabial consonants such as “p”,”b” and “m”. because these sounds require the upper and lower lip to contact each other which becomes difficult due to irregular placement of upper anterior teeth⁴

(D) Class Iii Malocclusion:

Class III patients have a tongue position and posture that is habitually low and loose. Constriction of the linguloalveolar valve necessary for sibilants is not produced effectively. Difficulty in producing labiodental and linguloalveolar consonants such as”f” and “v”.⁵

(E) Open Bite

The most common speech disorders are met in the anterior open bite cases. These patients have problem of LISPING and have difficulty in pronunciations of sibilants like “s” and “z” Difficulty in producing lingoalveolar consonants “t”,”d”,”n””l”. Individuals with open bite produce the sounds “s” and “z” with the tip of the tongue contacting the maxillary anterior producing LISP.⁴

(F) Diastema:

Diastema is also related to LISPING.

(G) Cleft Lip And Palate:

Cleft lip and cleft palate is the most common congenital craniofacial anomaly, that reflects a failure of fusion during the maxillary and palatal development. This results in a spectrum of

aesthetic and functional deformities; considered among the most crucial, is the potential disruption of speech development. Meeting appropriate speech milestones is dependent on the functional and structural integrity of the velopharynx. Velopharyngeal dysfunction can result in numerous speech abnormalities including compensatory articulation, hypernasality and nasal air emission which can impair intelligibility. Though treatable, it has a negative impact on the child and his/her family. Velopharyngeal dysfunction requires a multidisciplinary team approach in its management, which includes members from the fields of facial plastic surgery, otolaryngology, speech and language pathology, paediatrics, genetics, oral surgery, orthodontics and audiology. The role of orthodontist in cleft lip/cleft palate doesn't restrict to management of malocclusion with constricted maxillary arch alone but is well suited for management of velopharyngeal dysfunction due to the expertise knowledge in growth and development of oro-facial and dentofacial structures. Management of VPD might be amendable to non surgical or surgical or a combination of both⁴

DISCUSSION

Bloomer et al, suggested speech problems and dental malocclusions may have a common cause as products of abnormal orofacial movements due to neurologic or myopathic conditions, are either from genetic factors or maladaptive habits. Therefore patient who has abnormal or immature patterns of orofacial muscle function during mastication and deglutition may also have defective speech and malocclusion.²

According to Dr. Sayam Patil et al, in order to diagnose speech difficulties these information's is needed about relationships among all of the following: • Tongue morphology, position and movement; • Lip morphology, position and movement; • Oral-facial skeleton, including occlusion; • Variables obligating tongue fronting; • Biologic activity at the attachment apparatus of the teeth; • Speech motor control; • Oral adaptation and compensation; and • Speech production. Tellervo et al, from Finland from his studies concluded that individuals with mesial molar occlusion, mandibular overjet, incisal open bite and/or lateral cross-bite have a higher risk for articulatory speech disorders, especially consonants produced too far anteriorly. Incisal open bite alone is rarely associated with articulatory speech disorders, but if present they tend to be mild. Incisal open bite combined with other occlusal anomalies, especially with mesial occlusion, is related more often to more severe misarticulations.¹

Danial subtly and Joanned Subtely in their extensive research on malocclusion, speech and deglutition suggested that muscle function during speech and swallowing can be a primary factor in causing and perpetuating a malocclusion and such scenarios can only be diagnosed by orthodontist. They suggest that if muscle dysfunction alone stands as a causative factor that treatment will be difficult, and in such cases muscle training under the direction of a speech therapist is necessary

Common Speech Problems Associated With Malocclusion:

An overjet or openbite, or crossbite are the most common causes of speech impediments. Teeth must come together properly to create an air tight seal for the tongue to swallow properly in the roof of the mouth. If there is an opening which is often found in overjets, and openbites, the tongue creates the seal instead and results in a speech issue when communicating. If there is not enough room for the tongue which is often found with Crossbites or underbites, speech is affected.

LISPING

A primary cause of the development of a lisp or whistle is overbite—when upper teeth overlap the bottom teeth too much. Another cause could be gaps in teeth, which impede correct placement of the tongue and allow air to escape while talking, creating a whistling sound. Different types of lisp includes

- (A) **Interdental lisp:** A person with an interdental lisp will pronounce the sound 's' and 'z' incorrectly as 'th'. Hence, the word 'lisp' itself will be pronounced as 'lithp'. This is normal

for children up until the age of 4-4.5. This happens because the tongue pushes forward between the front teeth, causing air to flow forward. Hence, this is also called a frontal lisp.

- (B) **Dental lisp:** Here, too, air gets pushed forwards when speaking. In this case, the tongue rests against the front teeth when articulating sibilants. As a result, the sound is somewhat muted as compared to an interdental lisp.
- (C) **Lateral lisp:** This is called so because air is pushed out through the sides of the mouth. The resultant sound is often described as ‘wet’, making it seem as if the person’s mouth is full of saliva when speaking.
- (D) **Palatal lisp:** Here, the speaker attempts to articulate a sibilant but it becomes distorted because the middle of the tongue is in contact with the soft palate

A speech and language therapist is assigned to an individual that helps him/her in treating the specific type of lisp (frontal, dental etc). The therapy includes helping the individual correctly align the teeth and the tongue in order to produce correct sounds. The speech exercises should be practiced regularly to achieve thorough treatment.

An important way to prevent lisp is by giving habit breaking appliances to stop habits such as thumb sucking.

Sluttering

Stuttering affects nearly 1% of the population worldwide and often has life-altering negative consequences, including poorer mental health and emotional well-being, and reduced educational and employment achievements. Over two decades of neuroimaging research reveals clear anatomical and physiological differences in the speech neural networks of adults who stutter. However, there have been few neurophysiological investigations of speech production in children who stutter.

Mispronunciation

Certain sounds are very difficult (if not impossible) to pronounce when teeth aren’t where they’re supposed to be. For example, fricative consonant sounds like “t” “s” or “ch” which require tongue-to-tooth contact. Orthodontic treatment places teeth where they need to be for better pronunciation.

CONCLUSION:

Orthodontic treatment isn’t a magical cure for all speech challenges. However, for people working to correct speech disorders, orthodontics can offer life-changing solutions. And the advantages of orthodontic treatment are not limited to speech therapy alone.

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