Revista Mexicana de Ortodoncia

Vol. 4, No. 4 • October-December 2016
pp e217–e224

ORIGINAL RESEARCH

Pronunciation of phonemes in relation to the degree of malocclusion and position of the incisal edges-lip vermilion border

Pronunciación de fonemas en relación con el grado de maloclusión y posición de bordes incisales-borde bermellón del labio

Samantha López Nájera,* Francisco Javier Marichi Rodríguez,§ Abigailt Flores Ledesma,‖ Diana Ibarra Grajeda,¶ Joaquín Canseco Jiménez,** Vicente Cuairán Ruidíaz§§

ABSTRACT

Introduction: Phonetics helps to establish an ideal incisal edge position in relation to the vermilion border during phoneme articulation. **Objective:** To evaluate the relationship between the incisal edge of the anterior teeth and the vermilion border with the severity of the malocclusion and phonemes articulation of patients attending from January to February 2015 at the Orthodontics Service of Mexico Children's Hospital «Dr. Federico Gomez». **Material and methods:** A prospective, observational and cross-sectional study was performed on 40 patients of both genders between the ages of 14 to 25 years old. A digital video sequence was recorded (2 minutes) while the patients pronounced different words. **Results:** 22.5% of the patients presented phoneme articulation problems (D, K, L, R, S); the phoneme S was found to have the most statistically significant error (8%). **Conclusion:** It was not observed if a relationship exists between malocclusion severity, incisal edges- vermilion border and phonemes articulation.

RESUMEN

Introducción: La fonética ayuda a establecer la posición ideal de los bordes incisales con relación al borde bermellón del labio durante la articulación de los fonemas. **Objetivo:** Evaluar la relación entre la posición de los bordes incisales-borde bermellón del labio y el grado de maloclusión con la articulación de fonemas en pacientes del Servicio de Ortodoncia del Hospital Infantil de México «Federico Gómez», de enero a febrero de 2015. **Material y métodos:** Se realizó un estudio prospectivo, observacional y transversal en 40 pacientes ambos sexos, de 14 a 25 años de edad en los cuales se grabó una secuencia de video digital (dos minutos), mientras el paciente realiza la pronunciación de diversas palabras. **Resultados:** El 22.5% de los pacientes presentó problemas en la articulación de fonemas (D, K, L, R, S); de los cuales la S se encontró con mayor error del 8%. **Conclusión:** No se logró observar si existe asociación entre el grado de maloclusión, bordes incisales-borde bermellón del labio con la articulación de fonemas.

Key words: Phoneme, pronunciation, malocclusion, incisal edges, vermilion border.
Palabras clave: Fonema, pronunciación, maloclusión, bordes incisales, borde bermellón del labio.

INTRODUCTION

It has been mentioned in the literature that beauty is related to the function of the lips and teeth during orthodontic treatment. However, none of these studies have been performed with a frontal assessment of lip-tooth relations from a phonetic and functional point of view.[1]

The relationship between lips and incisal edges is important for three reasons:

1. The strength of the lips influences dental alignment and stability.
2. The lower lip is related to the upper incisors by placing the incisal edges in their position for a proper function of both.
3. Lip closure should be easy and delicate.

When the lips are in a proper functional relationship with the incisal edges of the anterior teeth a good arch position and shape is revealed.[1,2]

* Student of the Orthodontics Service, Mexico Children´s Hospital «Dr. Federico Gómez».
§ Professor of the Orthodontics Department, Faculty of Dentistry, UNAM.
‖ Attending Professor, Faculty of Dentistry, UNAM.
¶ Attending Doctor of Pediatrics Phonetics, Mexico Children´s Hospital «Dr. Federico Gómez».
** Professor of the Orthodontics Department, Mexico Children´s Hospital «Dr. Federico Gómez».
§§ Head of the Stomatology Department, Mexico Children's Hospital «Dr. Federico Gómez».

See related content at doi: http://dx.doi.org/10.1016/j.rmo.2017.03.003

In 410 university students with malocclusion it has been found that 87% presented speech problems, 62% an average speech function and 35% had no speech problems. It was concluded that speech problems were directly related to the severity of the dental malocclusion.[3]

Speech pathology involves defects in the articulation of phonemes or sounds, pace of voice and language; which involve both the orthodontist and the phoniatrist. Speech problems and dental malocclusions have a common cause: as a product of abnormal orofacial movements, as a product of neurological and myopathic conditions, of genetic origin or habits. Patients who have abnormal or immature muscular orofacial function patterns during mastication and deglutition also present malocclusion and speech disorders.[4]

The difficulty for the correct articulation of phonemes (sounds) is called «dyslalia», which can be classified into distortion, omission and inappropriate replacement of the consonants and vowels sounds during speech. The phoniatrist works more closely with the orthodontist in the management of combined problems of consonant sounds, when planning the amount of dynamic anterior tooth crown exposure during orthodontic treatment.[4]

Patients with problems for phoneme articulation tend to have a higher incidence of malocclusions, but such difficulties may also be found in normal occlusions. However, when a speech problem is present, it cannot be assumed that it is strictly related to the malocclusion; in some cases, the tongue and lips are capable of adapting to severe dental malocclusions, in other cases, where the malocclusion is mild to moderate, defects in phonemes articulation may prevail.[5]

Phonology is the study of the phonemes or sounds of language. The learning process of the phonological system usually begins in the first years of life and is completed at the age of 8, when the child will have the sound production and articulation of an adult.[6]

The anatomical components of the various systems used in the production of the voice are as follows:[7]

- The respiratory apparatus: Voice production depends on the balanced relationship between the forces exerted by the intrinsic muscles of the larynx and the force exerted by the air (air pressure) when exhaled from the lungs. The slightest deviation of this balance produces a significant alteration in the tone, power or quality of the voice.[7]
- Phonal system: The system that produces the sound that we call voice consists of a cartilaginous structure called larynx. The movement that results from the contraction of the intrinsic laryngeal muscles produces the characteristics of mass, length and tension that alter the vocal folds *(Figure 1)*.[7]
- The resonance system: Resonance is a non-acoustic phenomenon that occurs when a vibrating structure (sound source) excites air in a chamber filled with air that in turn produces a similar vibration in the walls of the chamber. The human voice would sound as a weak whispering if it was not for resonance.
  - Anomalies in the vocal tube configuration that result from different tongue positions or when coupling the nasal resonance (nasal cavity) to the rest of the vocal system, produce notable acoustic changes.[7]

Mainly, the oral and laryngeal system is a speech mechanism. The orthodontist's job is related primarily to the sound articulation and resonance processes, which are intimately connected.[8]

The tongue makes contact with different areas of the oral cavity in order to produce different articulation points for phonemes. These points are classified as follows:

- Linguovelar: the posterior portion of the tongue contacts the soft palate.
- Linguopalatal: the lingual dorsum contacts the hard palate.
- Linguoalveolar: the tip of the tongue rises to contact the alveolar ridge.
- Linguodental: The tip of the tongue protrudes and contacts the teeth.[8]

Lip function participates in two articulation points:

1. Labiodental: upper incisors and lower lip.
2. Labial: both lips work together.[8]

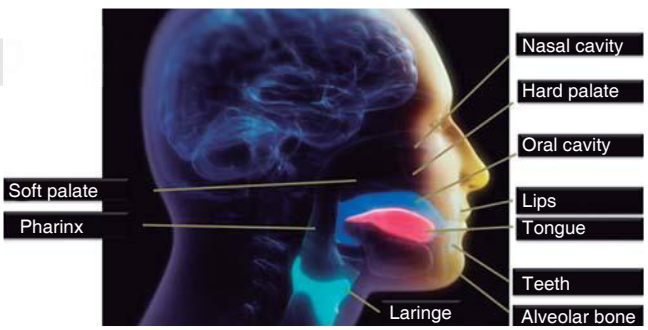

Figure 1. Phonal system (Direct source).