

The Impact of Orthodontic Appliances on Speech Production

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Background

Wearing orthodontic clear aligners may result in speech difficulties, including lisping, slurring words, and nasality.¹ Pronunciation of soundless fricatives, especially "s", may also be affected.²

Orthodontic vacuum-formed retainers may result in a reduced oral cavity space and changes in tongue position.⁴ This may affect frequencies of vowel pronunciation, especially "i".³

Wearing orthodontic Hawley appliances may lead to differences in speech including acoustic differences in "i"³ and articulation difficulties in pronouncing "f" and "s".⁴

Significance

Clear aligner therapy and removable orthodontic retainers rely on patient compliance to be effective.

Difficulties in speech may deter patients from wearing removable orthodontic appliances for the prescribed amount of time, reducing the effectiveness of orthodontic treatment and retention.

Purpose

The purpose of this experimental study is to investigate the specific effects that wearing removable orthodontic appliances can have on speech production and articulation using a variety of assessment tools.

The appliances being studied include clear aligners, Hawley retainers, and vacuum-formed retainers.

Methods

Sample Population: 30 ATSU students with clear aligners or orthodontic retainers with no prior history of speech deficits.

Methods: Assess speech production with and without wearing orthodontic appliances (clear aligners or removable retainers).

Variables: The independent variable is the wear of a removable orthodontic appliance. The dependent variable is the measured speech production.

Data

Data Collection:

- Oral Motor Mechanism Examination
- Assess the speech sound production of a standardized articulation assessment word list
- Real-time analysis of speech using the 'Motor Speech Profile' and 'Real-time Spectrogram' on the Computerized Speech Lab (CSL)

Motor Speech Profile:

- Diadochokinetic rates
- Second formant transitions
- Standard syllabic rates

Data Analysis: Compare participant scores on each measure with normative values. Compare differences between participant scores obtained with and without wearing their orthodontic appliance using an analysis of variance approach.

Discussion

As the specific effects of removable orthodontic appliances on speech are demonstrated, possible outcomes of this project may include:

- Developing a screening form to identify patients experiencing speech difficulties while using orthodontic appliances
- Creating & testing interventions to combat speech alterations, such as creating a reading passage for patients to practice, highlighting the specific sounds most affected



References

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