

Craniofacial morphology as a clinical implication for intelligibility-based speech therapy in adults with Down Syndrome

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Figure 1: (Center for Leadership in Disability, n.d.)

Reason for Research

This review seeks to identify literature pertaining to poor speech intelligibility as a component of communication deficits in adults with Down Syndrome. The purpose of the review is to identify craniofacial morphology as a clinical implication for intelligibility-based speech therapy, and to identify literature pertaining to the positive outcomes of this therapeutic aspect.

Introduction

Down Syndrome (DS) is the most frequent genetic cause of mild to moderate intellectual and developmental disabilities (Coppens-Hofman, Maassen, van Schrojenstein Lantman-de Valk, & Snik, 2012). It is associated with anatomical and physiological differences that may affect speech intelligibility by disrupting speech movements (Bunton & Leddy, 2011). Many individuals with Down Syndrome experience communication breakdown due to poor speech intelligibility as it is crucial for effective communication (Terband, Coppens-Hofman, Reffeltrath, & Maassen, 2018).

Methods

Nine peer-reviewed articles were identified and located using SUNY Plattsburgh's Feinberg Library Database and Google Scholar. The keywords used included Down Syndrome, intellectual disabilities, adults, speech intelligibility, and speech therapy.

Down Syndrome and Communication

- The development of communication skills has not been investigated in-depth in adults with Down Syndrome due to the notion that they reach a plateau in language-learning by adolescence (Terband et al., 2018).
- The communicative interventions that exist until adolescence mainly focus on the improvement of expressive and receptive language skills rather than speech intelligibility (Terband et al., 2018).
- Motoric deficits are viewed as characteristics of the disability itself rather than the result of distinct underlying factors that may be sensitive to therapy (Coppens-Hofman et al., 2012; Terband et al., 2018).
- It is also believed that speech and language difficulties in this population will persist throughout adulthood if unresolved through early intervention (Terband et al., 2018).
- Adults with DS may benefit from therapeutic interventions that focus on speech production (Coppens-Hofman et al., 2018).
- The development of assessments and interventions to improve speech intelligibility is imperative for these adults and effective speech therapy may improve their quality of life (Coppens-Hofman et al., 2016; Terband et al., 2018).

Results				
Relevant Study	Participants	Poor speech intelligibility related to craniofacial morphology (Figure 2)	Therapy Focus	Outcomes
(Bunton & Leddy, 2011)	2 adult males with DS aged 26 and 29	X	Articulation (to document articulatory working space area in vowel production)	<ul style="list-style-type: none"> • Reduced acoustic vowel space area • Reduced articulatory working space area • Reduced speed of articulatory movements
(Bunton, Leddy, & Miller, 2007)	5 adult males with DS	X	Phonetic feature analysis	<ul style="list-style-type: none"> • Participants with similar single-word intelligibility scores exhibited different speech errors
(Coppens-Hofman et al., 2016)	Heterogenous group of 36 adults with mild to moderate intellectual disabilities aged 18-40 (11 with DS)	X	Spontaneous speech and picture-naming tasks analyzed by phonological error analysis	<ul style="list-style-type: none"> • The phonemic and syllabic inventories of participants were complete
(Terband et al., 2018)	Heterogenous group of 36 adults with mild to moderate intellectual disabilities aged 18-40 (11 with DS)	X	Training in articulation and listening skills	<ul style="list-style-type: none"> • Increased number of consonant and syllable structures correct • Significantly increased receptive vocabulary • Significantly increased intelligibility

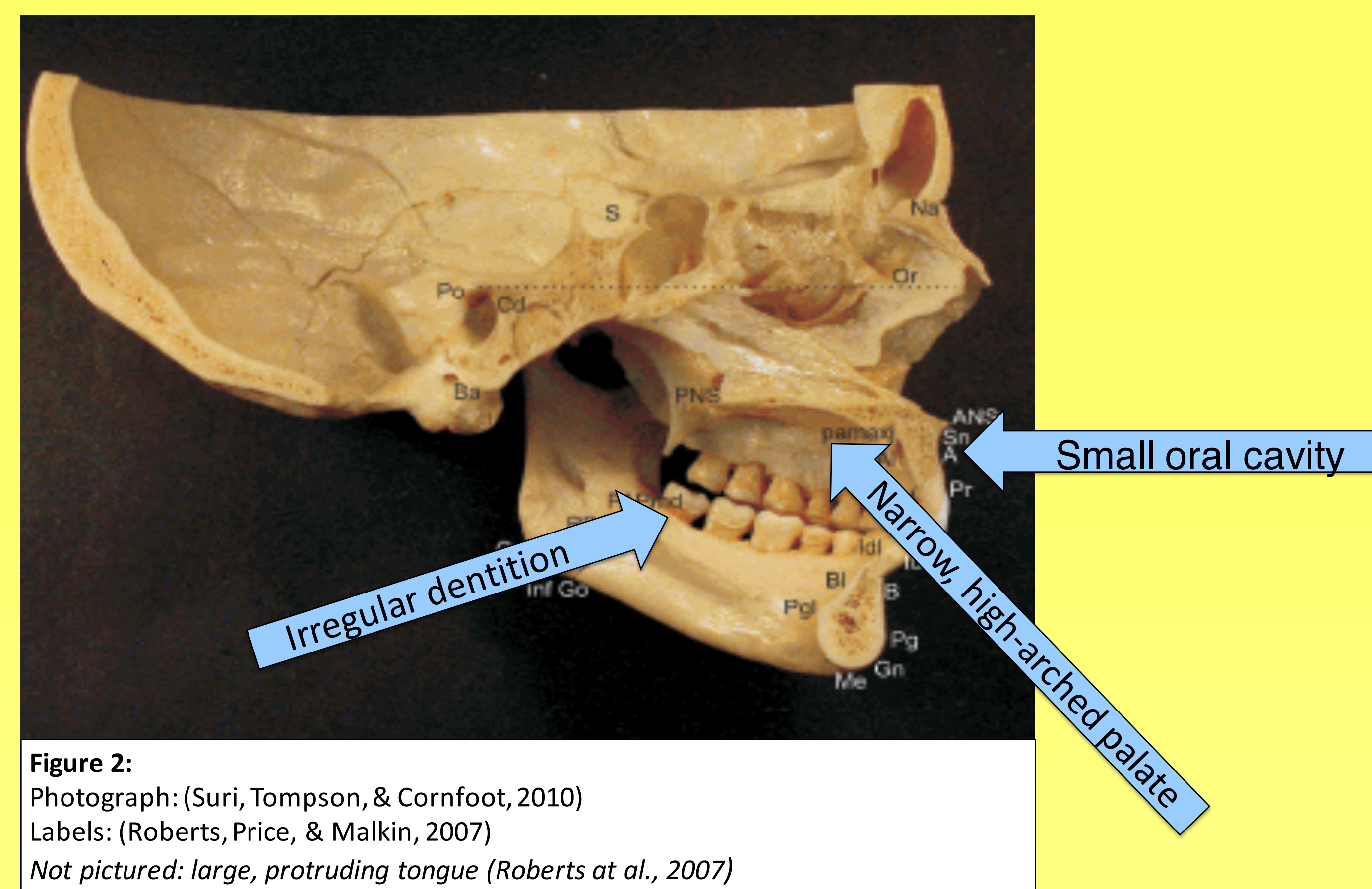


Figure 2: Photograph: (Suri, Tompson, & Cornfoot, 2010) Labels: (Roberts, Price, & Malkin, 2007) Not pictured: large, protruding tongue (Roberts et al., 2007)

Discussion

These data support the significance of focusing on speech intelligibility-based intervention in adults with Down Syndrome as well as the need for further research regarding this treatment method.

Although it is believed that speech intervention is not beneficial for adults with DS, it is important to consider that language development in both comprehension and production continues throughout early adulthood (Chapman & Hesketh, 2000; Terband et al., 2018).

It is also determined that speech intelligibility increases with age in individuals with DS (Bunton et al., 2007).

Speech intervention should focus on structural and motoric aspects related to speech production rather than expressive and receptive language skills (Terband et al., 2018; Wild, Vorperian, Kent, Bolt, & Austin, 2018).

The lack of motoric-based therapy limits language learning and is responsible for the presence of expressive language deficits in adults with DS (Bunton et al., 2007).

There is a positive effect of intelligibility-based speech therapy on receptive vocabulary in adults with intellectual disabilities such as DS (Coppens-Hofman et al., 2016).

Clinical Implications

- It is determined that speech therapy treatments that improve speech intelligibility facilitate clinically meaningful improvements in communication effectiveness and spoken language (Bunton et al., 2007).
- Examination of the individual differences in structure and speech characteristics in individuals with Down Syndrome is needed in order to provide individualized clinical intervention programs (Bunton et al., 2007).
- Intelligibility in individuals with Down Syndrome facilitates their participation in society; moreover, the denial of speech therapy services due to low cognition is a violation of their fundamental human rights as stated in Article 19 under the Universal Declaration of Human Rights (Rvachew & Folden, 2018).

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