



# INTELLECTUAL DISABLED PEDIATRIC CASE WITH UNILATERAL VOCAL FOLD PARALYSIS

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## Abstract

Unilateral vocal fold paralysis (UVFP) has effects on the acoustic and aerodynamic vocal parameters of the person and the voice related quality of life. It has been observed that cooperation increases with the design of the voice therapy program with concrete content specific to the individual who has a mild intellectual disability.

**Keywords:** unilateral vocal fold paralysis, intellectual disability, voice therapy

## Introduction

UVFP may be associated with a change in voice intensity, frequency range, fundamental frequency, and phonation time<sup>1</sup>.

“Intellectual disability (intellectual developmental disorder) is a disorder with onset during the developmental period that includes both intellectual and adaptive functioning deficits in conceptual, social, and practical domains.”<sup>2</sup>.

According to the International Classification of Diseases-11, the disorder of intellectual development (intellectual disability) categorized as mild, moderate, severe, and profound<sup>3</sup>.

The aim of this case report is to present the assessment and voice therapy program for right-sided vocal fold paralysis of a pediatric patient with mild intellectual disability.

## Case Description

Z.K., an 11 years old female patient has dextrocardia, history of surgical operation due to severe aortic coarctation (in 2009) and intubation (two times; in 2010). The first diagnosis was made by an otolaryngologist in 2013 as UVFP. The patient applied to Speech and Language Therapy Department of Hacettepe University in 2020 with the complaint of hoarseness.

## Assesment Protocol

Functional evaluation of the case was made by speech language pathologists (SPL) and videolaryngostroboscopy (VLS) records were performed by the ENT doctors. A multidimensional assessment protocol was preferred; it included the GRBAS score<sup>4</sup>, the pediatric voice-related quality of life survey<sup>5</sup>, the Turkish children’s voice handicap index-10<sup>6</sup>, videoendoscopy, the maximum phonation time (MPT), acoustic and aerodynamic analysis. The PENTAX Medical Phonatory Aerodynamic System (PAS) Model 6600 was used in the phonatory aerodynamic evaluations. The Multi Dimensional Voice Program (MDVP) was used in the voice analysis. Computerized Speech Laboratory (CSL) Analysis of Dysphonia in Speech and Voice (ADSV) is used for frequency based parameters. All the assessment protocols were repeated after VTP.

## Voice Therapy Program

VTP was applied once a week for 9 weeks and the exercises were requested to be applied regularly at home 3 times a day. Appropriate vocal hygiene behaviors, glottal closure & loudness control were targeted with the holistic VTP. Each session were 30-45 minutes.

Vocal hygiene training, semi-occluded vocal tract exercise (lip & tongue trills), sustaining vowels, gliding, push and pull excercises were included the VTP.

## Results

In VLS examination, improvement in glottal closure was observed after VTP. After VTP, a decrease in all parameters was observed in GRBAS scores compared to the first evaluation (Table 1). An increase in MPT was observed. The fundamental frequency increased from 248 Hz to 296 Hz after VPT. A decrease in noise to harmonics ratio (NHR), jitter, and shimmer value were observed (Table 2). The multidimensional voice profile (MDVP) graphics are shown below (Image 1 & 2). An improvement was observed in voice-related quality of life (from 38 to 19) and voice handicap index (from 74 to 35).

**Table 1: GRBAS scores**

	G	R	B	A	S
Before VTP	3	2	3	2	1
After VTP	1	1	2	1	0

**Table 2: Assesment results**

	Before VTP	After VTP
MPT /a/ (sec)	8,59	10,64
MPT /i/ (sec)	8,7	9,42
s/z ratio	1,17	1,29
F0 (Hz)	248	296,67
Jitter (%)	1,00	0,55
Shimmer (%)	6,02	3,36
NHR	0,14	0,11
Cepstral Peak Prominence	7,62 dB	9,07 dB

According to the findings of the running speech protocol for the "Pinokyo" reading passage, the reading time before VTP was 55 sec and it decreased to 30 sec after VTP. Before VTP the breath number was 29 and it decreased to 10 after VTP (Image 3 & 4).

Image 1: Before VTP in MDVP

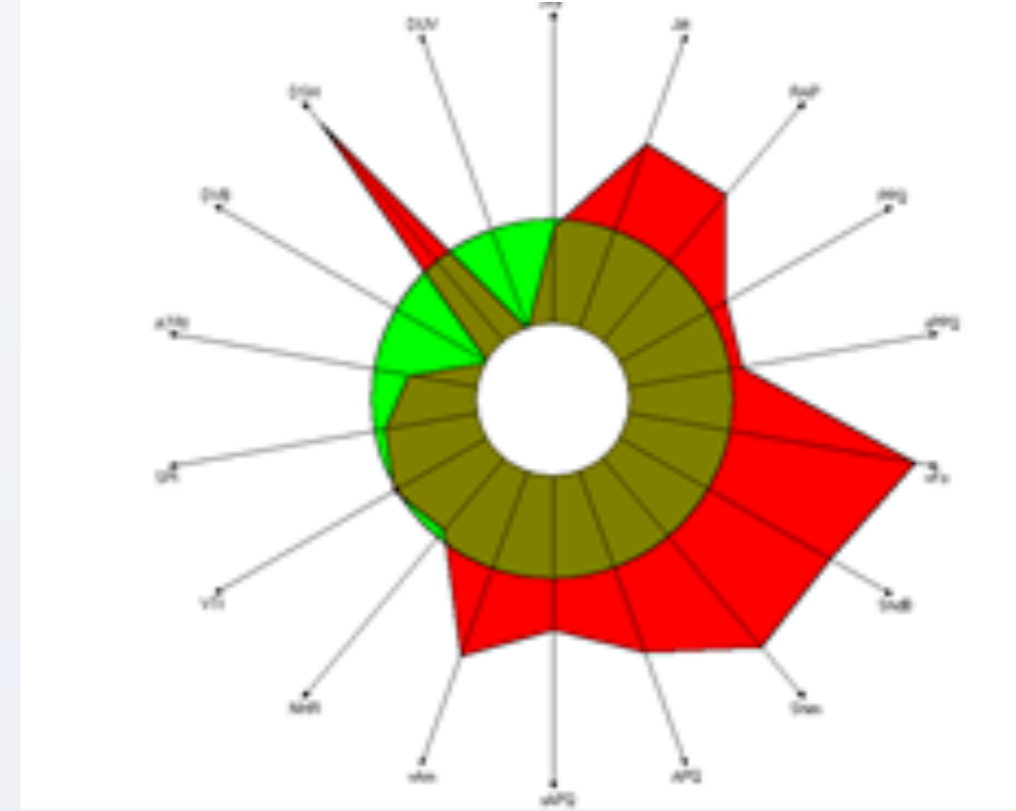


Image 2: After VTP in MDVP

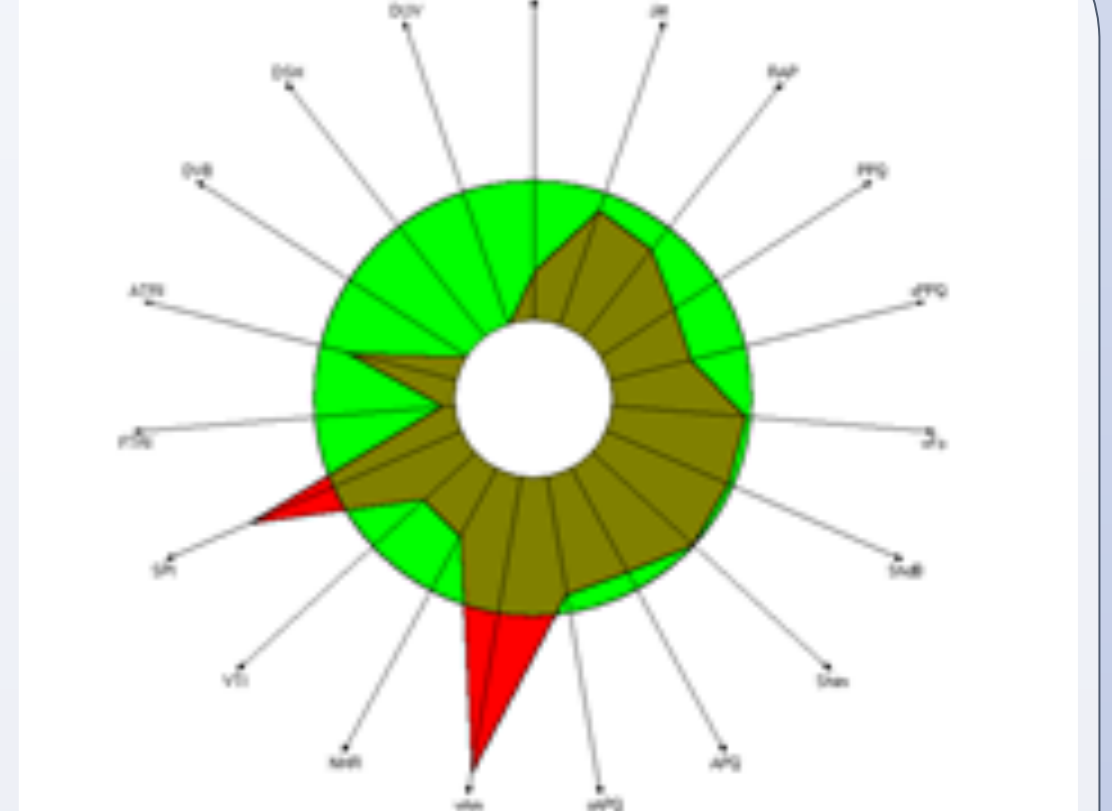


Image 3: Running Speech Protocol Before VTP

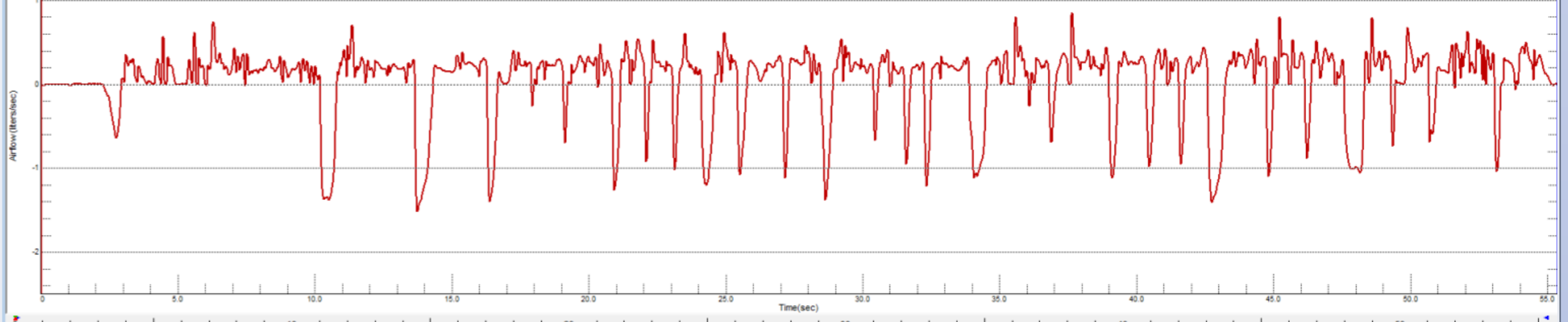
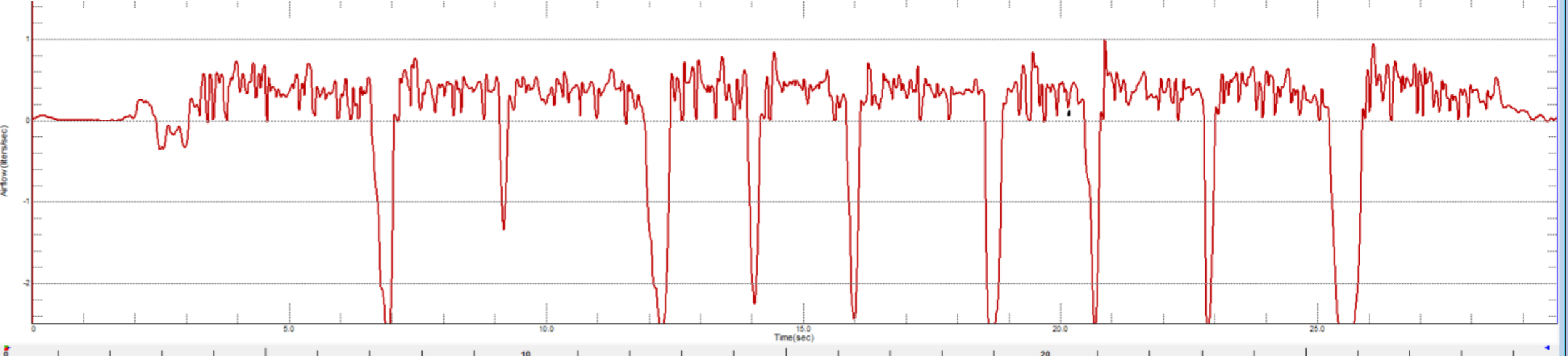


Image 4: Running Speech Protocol After VTP



## Discussion

Damage to the vagus nerve for various reasons causes vocal cord paralysis. These causes include head and neck injuries, tumors, infection, surgery, and stroke<sup>7</sup>. Dextrocardia is a cardiac positional anomaly and is observed as the position of the heart in the right hemithorax from the base to the apex axis to the right and caudad<sup>8</sup>. In this case; the history of dextrocardia, surgical operation due to severe aortic coarctation, and right-sided vocal fold paralysis should be considered for etiology.

The purpose of VTP for UVFP is to avoid supraglottic hyperfunction by maintaining proper pressure control with abdominal breathing and to improve the function of intrinsic muscles<sup>9</sup>. Preparing and implementing a program considering individual differences is very important for the success of the VTP. In this case study, to organize an efficient voice therapy program content, we considered the individual difference of the patient. Visuals and video feedbacks of therapist and the patient were preferred to supply concrete exercise samples. According to the evaluations made after VTP; clear improvement was observed in the objective and subjective measurement parameters. According to aerodynamic analysis for running speech, the breath number was observed in the normative value range after VTP<sup>10</sup>.

More studies with large populations on different disability groups such as intellectual disability are needed to get valid and reliable information about the effects of individual differences on voice therapy design.

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