

# Pre and Post Comparison after Myofunctional Therapy in 7 Years Old Sleep Apnea Dysarthria Child - A Single - Longitudinal Case Study

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**Abstracts:** *Sleep Apnea is a condition mostly seen in individuals with Down Syndrome, ankyloglossia, Hypoglossal nerve paralysis or paresis, including those with dysarthria and cerebral palsy. In this single longitudinal case study, researchers are trying to find the pre and post - treatment comparison in a 7 - year - old boy with Down Syndrome and dysarthria and are finding that a long - term treatment plan (Myofunctional Therapy) and adequate posture can improve speech problems.*

**Keyword:** Sleep Apnea, Dysarthria, Down Syndrome, Myofunctional Therapy, Speech Therapy

## 1. Introduction

Sleep apnea is a common sleep disorder characterized by repeated pauses in breathing during sleep. These pauses can last from a few seconds to several minutes and can occur multiple times throughout the night, disrupting the sleep cycle and leading to daytime fatigue and other health problems. According to the American Sleep Apnea Association, "Sleep apnea is a serious, potentially life - threatening condition that affects an estimated 22 million Americans, with up to 80% of cases going undiagnosed (1.)

One potential sign of speech disorder due to sleep apnea is dysarthria, which is characterized by slurred or slow speech, difficulty controlling the pitch or volume of the voice, and problems with articulation and pronunciation. This can occur because sleep apnea can cause damage to the nerves that control the muscles used for speech (2). The more severity of Sleep Apnea the severity of breathing issues also can be noticed.

Myofunctional Therapy is a type of therapy that focuses on the oral and facial muscles and their role in breathing, swallowing, and speaking. The therapy aims to correct any dysfunction or imbalance in these muscles, which can cause various health issues, including sleep apnea, snoring, speech disorders, and dental malocclusions (3).

## 2. Methodology

A 7 - year - old boy with Down syndrome who has a component of Pediatric Dysarthria with Down Syndrome is currently diagnosed by a pulmonologist as having obstructive sleep apnea (OSA). He has been enrolled in the study since November 2022.

The study involves myofunctional therapy after analyzing Pediatric Sleep Apnea (PSQ). The authors and co - authors initially fill out the Pediatric Sleep Questionnaire (PSQ), where responses are "yes" = 1, "no" = 0, and "don't know" = missing. The questionnaire was developed by Dr. Jodi Mindell (4) and is administered while interacting with parents. After the first PSQ assessment, the clinician uses

myofunctional therapy three times a week for three months and recommends maintaining a lateral sleeping position (mostly on the left side) and head elevation of up to 30 - 40 degrees.

The Clinician used following exercises for 3 months:

- 1) Breathing
- 2) Sucking
- 3) Chewing
- 4) Speech (Isotonic and Isometric therapy).
- 5) Using Oral Appliances made by dentist to keep jaw open.

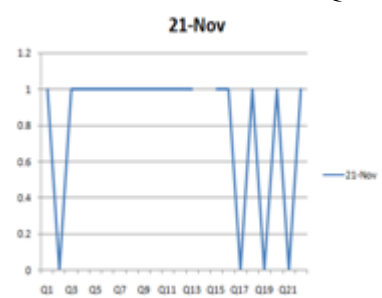
Over the course of three months of treatment, the Clinician and Co - Clinician fill the PSQ three times (initially on November 21st, then on January 5th, and finally at the end on February 20th, 2023) and compare the data.

**Analysis:** In the study, the clinician uses autoregressive integrated moving average (ARIMA), which is a time series analysis test. All the data is being plotted in line graphs.

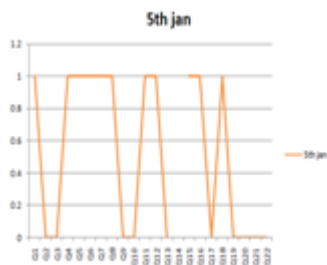
## 3. Results

In the initial PSQ assessment, the score is 0.72%, indicating severe sleep apnea (Figure 1). In the second assessment, it shows a score of 0.54%, indicating a moderate problem (Figure 2). Finally, the latest PSQ score after the intervention shows 0.36%, indicating a mild problem (Figure 3).

**Table 1:** Result of 1<sup>st</sup> PSQ



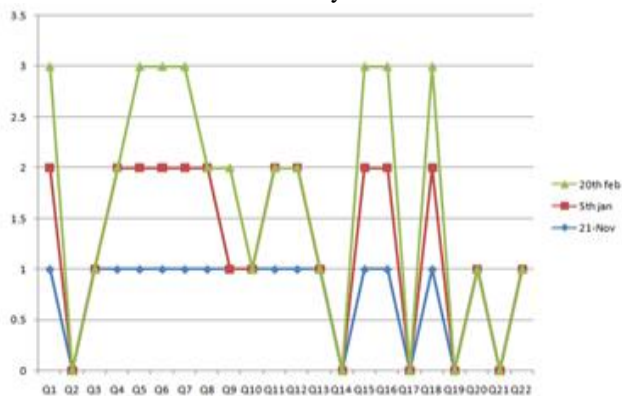
**Table 2:** Result of 2<sup>nd</sup> PSQ



**Table 3:** Result of final PSQ



**Table 4:** Comparison of all the three data collected in the study



#### 4. Discussion

Sleep Apnea is the condition that can be seen mostly with Down Syndrome, Motor Speech Disorder (MSD), Hypoglossal nerve paralysis or paresis and mostly in an Ankyloglossia in which the tongue rests posterior part of Oral cavity and while sleeping gravity pulls the tongue inferiorly. With proper Speech therapy (Myofunctional Therapy) and adequate body posture breathing can be improved. It's all based on the daily practice and life style.

#### 5. Future Direction

In future the clinician could take large number of candidates with sleep apnea with MSD, Down syndrome, Dysarthria and Hypoglossal Nerve paralysis and paresis.

#### References

- [1] Author Name: American Sleep Apnea Association.
- [2] A study published in the Journal of Sleep Research in 2012 by authors A. R. Schwartz, N. Karatinos, and D. M. Geddes found that patients with sleep apnea were more likely to have dysarthria compared to those

without sleep apnea. The study also found that the severity of dysarthria was correlated with the severity of sleep apnea, suggesting a link between the two conditions.

- [3] The American Speech - Language - Hearing Association (ASHA)
- [4] Dr. Jodi Mindell a clinical psychologist and sleep expert, in collaboration with Dr. Avi Sadeh, a sleep researcher, and Dr. Richard G. R. Ferber, a pediatrician and sleep expert.