Voice Differences and Quality of Life in Individuals with Marfan Syndrome

Poster #

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OBJECTIVE

- Marfan syndrome (MFS) is a connective tissue disorder that impacts roughly 1 in 5,000 people[1]. It causes hypermobility, fatigue, pain, respiratory issues, and other quality of life concerns[1,2].
- Though the impact of MFS on vocalization has not been well explored, there are numerous reasons to expect the voice would be impacted. The larynx is comprised heavily of connective tissues and often affected by connective tissue diseases[3].
- Vocal function is also easily impacted by fatigue, a common symptom of MFS[4].
- Moreover, aortic dilation, a hallmark condition of MFS, may affect recurrent laryngeal nerve functioning[5].
- This study aimed to determine whether MFS affects vocal quality and what impact this has on quality of life (QoL).

PHASE 1: NATIONAL SURVEY

Methods

An online survey was distributed nationally by the Marfan Foundation. Survey items sampled from the Voice Handicap Index (VHI)[6] & Quality of Life Index[7].

Participants: 318 adults with MFS

Results

- Over 60% reported some level of voice difficulty.
- A multiple regression analysis revealed that as self-reported vocal difficulty increased, satisfaction with QoL decreased. Figure 1 depicts an item where this trend was clearest.
- The model examining QoL satisfaction as the outcome variable was statistically significant and accounted for 11.3% of the variance (R^2=0.113, F(10, 306) = 3.78, p<0.001).

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Over **60%** of people with **Marfan Syndrome** report voice symptoms that affect **quality of life**.

There may also be differences in vocal quality.

Figure 1. “My voice causes me to lose income.”

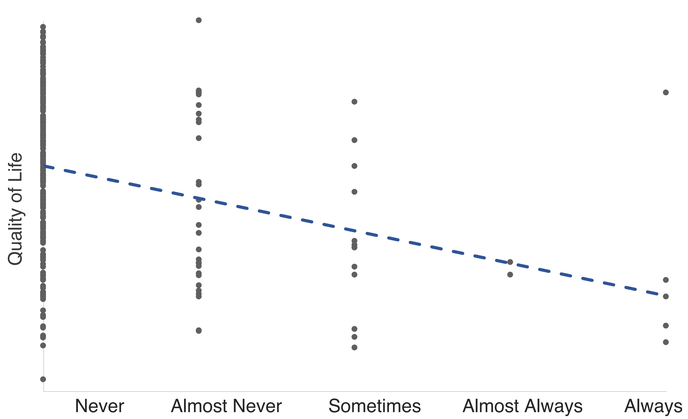
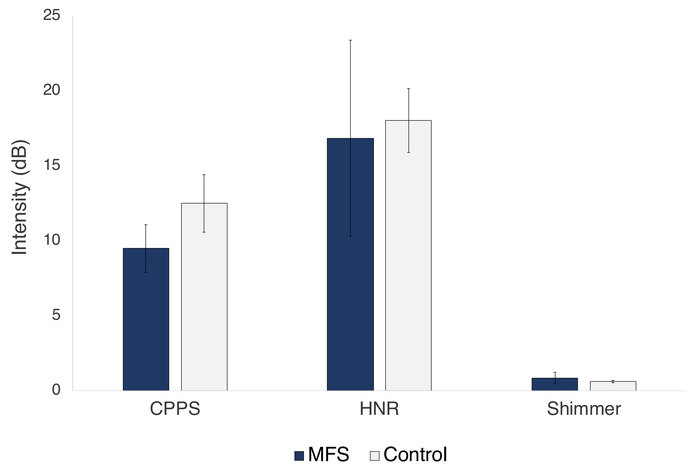


Figure 2. Measures of vocal clarity



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PHASE 2: VOICE QUALITY PILOT

The second phase of the study sought to determine whether individuals with MFS were likely to have voice quality differences in comparison with healthy controls (HC). It was used as a pilot to direct a larger future study.

Methods

Subjects: 3 MFS, 3 age & sex-matched HC

Equipment: Head-mounted condenser microphone and Focusrite Scarlet audio interface situated 5cm and 45-degrees from the mouth

Procedure: Voice range profile and production of CAPE-V[8] (Consensus Auditory-Perceptual Evaluation of Voice) sentences captured at a consistent gain. The Quality of Life Index[7] was also administered.

Acoustic Measures: Smoothed cepstral peak prominence (CPPS), harmonics-to-noise ratio (HNR), shimmer, fundamental frequency (F0) and intensity range

Results

Acoustic Differences: In comparison with HC, MFS demonstrated lower CPPS (large effect; Cohen’s d=1.71), lower HNR (small effect; Cohen’s d=0.24), and increased shimmer (large effect; Cohen’s d=0.90), although at least HNR varied widely in the MFS population (Fig. 2). Maximum F0 and F0 range were reduced for MFS (large effects, Cohen’s d=2.59 and d=2.48, respectively). MFS also had reduced maximum loudness and loudness range (large effects, Cohen’s d=1.08 and d=1.16, respectively).

Quality of Life: While controls were moderately satisfied with their QoL, individuals with MFS reported only slight satisfaction (large effect, Cohen’s d=2.69).

DISCUSSION

- People with MFS appear to be at risk of voice issues that negatively impact quality of life.
- These voice differences may lead to acoustic changes to voice quality. However, the very small sample size to phase 2 limits the generalizability of these results.
- A study assessing vocal stability and endurance and quality of life in MFS across a large sample size would likely be a worthwhile future endeavor.