

# Characterization of Functional Dysphonia: Pre-Treatment and Post-Treatment Findings

Claudio F. Milstein, PhD, William S. Tierney MS, Dattanand, Sudarshana, Roy Xiao, Abraham R. Joseph, Jason Ya, Allen C. Xu  
Cleveland Clinic Head and Neck Institute

## Introduction

- Chronic dysphonia has a 4.3% lifetime incidence in the USA<sup>1</sup>
- Functional Dysphonia (FD) is one of the most difficult chronic dysphonias to diagnose and treat<sup>2,3</sup>
  - Defined as a change in voice quality without structural or neurologic abnormalities of the larynx
  - Highly variable presentation<sup>4,5,6,7,8,9</sup>
  - Conventional speech therapy ineffective
  - Specialized FD therapy has been shown to be effective<sup>11-13</sup>
- Poorly understood physiologic basis<sup>5,6</sup>
- The current study aims to characterize the clinical features of FD before and after treatment in a large single-center sample

## Methods

- 114 patient records reviewed from the Cleveland Clinic Voice Center
  - Electronic records surveyed for demographic, morphometric, and medical data
    - Comorbidities previously associated with FD specifically addressed
  - Video recordings of patient speech used to assess quality of voice
  - Videostroboscopic examination used to characterize laryngeal posture and movement
- Pre-treatment and post-treatment time-points assessed
- Video review conducted by two independent reviewers
  - Disagreement resolved via collaborative discussion
- Statistical analysis completed using JMP 10.1 and SAS 9.4

## Results

- Median time to diagnosis 166 days (Q1: 74d, Q3: 519d)
  - 38% greater than 1 year to diagnosis
  - Maximum time to diagnosis 30.6 years
  - 41.9% treated previously failed voice therapy elsewhere
- Pretreatment Vocal Handicap Index (VHI) 71.0 0 ± 19.3
  - Physical 24.9 ± 6.2
  - Functional 25.2 ± 8.52
  - Emotional 20.0 ± 8.2
- 98% of patient voices improved after voice therapy
  - 94% improved after one therapy session
  - 2% improved after 2 sessions, 2% improved after 3

## Results

Baseline Characteristics		n=114
<b>Demographics</b>		
Age in Years		48.5 ± 15.6
Female		97 (85.1%)
BMI		31 ± 7.3
<b>Treatment Characteristics</b>		
Time to Diagnosis (in days)		166 (74;519)
Time from Diagnosis to Treatment (in days)		0 (0;1)
Prior Treatment Elsewhere		47 (41.9%)
<b>Comorbidities (% of Subjects with Comorbidity)</b>		
Allergies / Sinus Problems		30 (26.3%)
Arthritis		6 (5.3%)
Asthma or Lung Disease		30 (26.3%)
Chronic Fatigue Syndrome		1 (0.9%)
Depression / Anxiety		26 (22.8%)
Fibromyalgia		8 (7.0%)
Hearing Loss		1 (0.9%)
History of VF Trauma		1 (0.9%)
Irritable Bowel Syndrome		9 (7.9%)
Laryngeal Hypersensitivity		8 (7.0%)
Migraine Headaches		18 (15.8%)
Neck Pain		5 (4.4%)
Other VF Movement Abnormalities		13 (11.4%)
Reflux Disease		60 (52.6%)
Stroke / Neurologic Disease		5 (4.4%)
Thyroid Disease		18 (15.8%)
<b>Disease Trigger (% of Patients Reporting this Trigger)</b>		
Environmental Trigger (scent / allergen)		19 (16.7%)
Intubation / Surgery		14 (12.7%)
URI		54 (47.4%)
Other Respiratory Infection		3 (2.6%)
No Trigger Listed		24 (21.1%)

Table 1: Baseline Characteristics of Sample

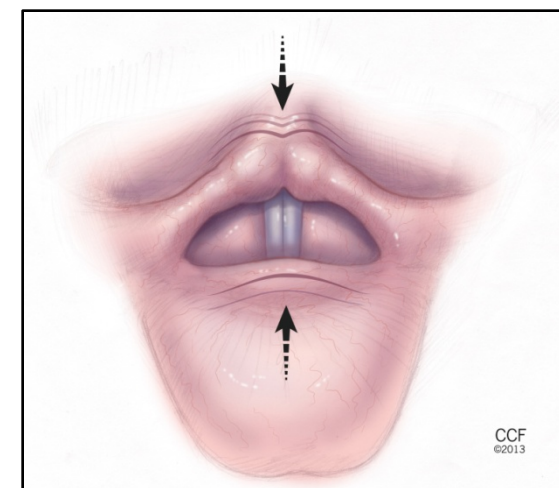


Figure 2: supraglottic anteroposterior compression

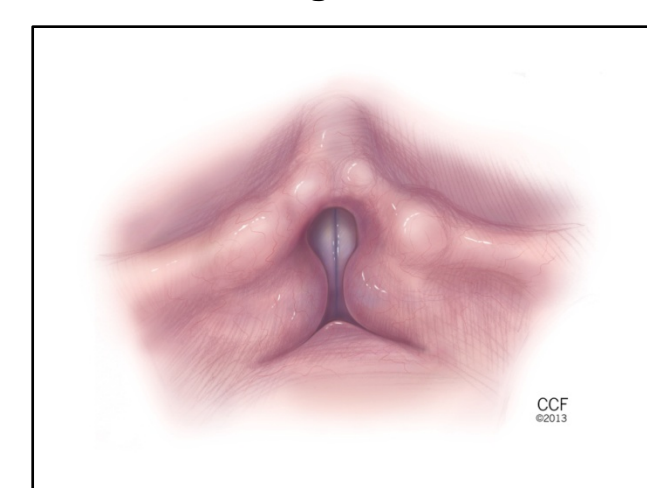


Figure 3: supraglottic lateral compression

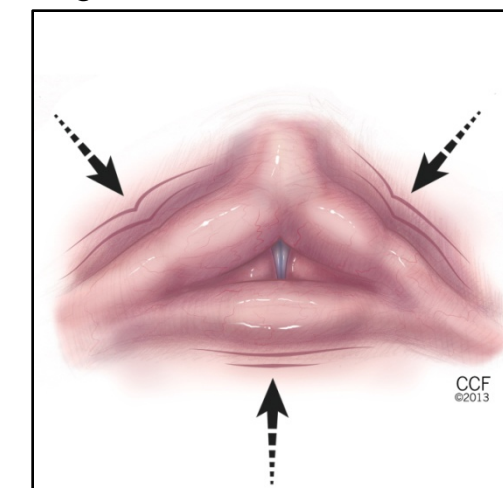


Figure 4: Supraglottic compression with both anteroposterior and lateral components

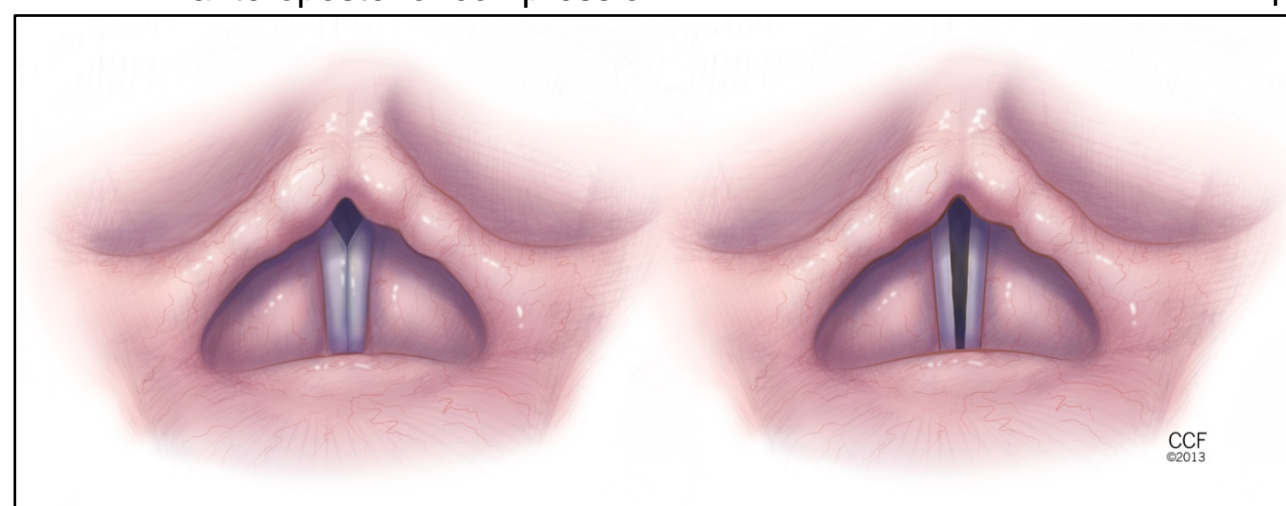


Figure 5: glottic hypoadduction; posterior (L) and longitudinal (R)

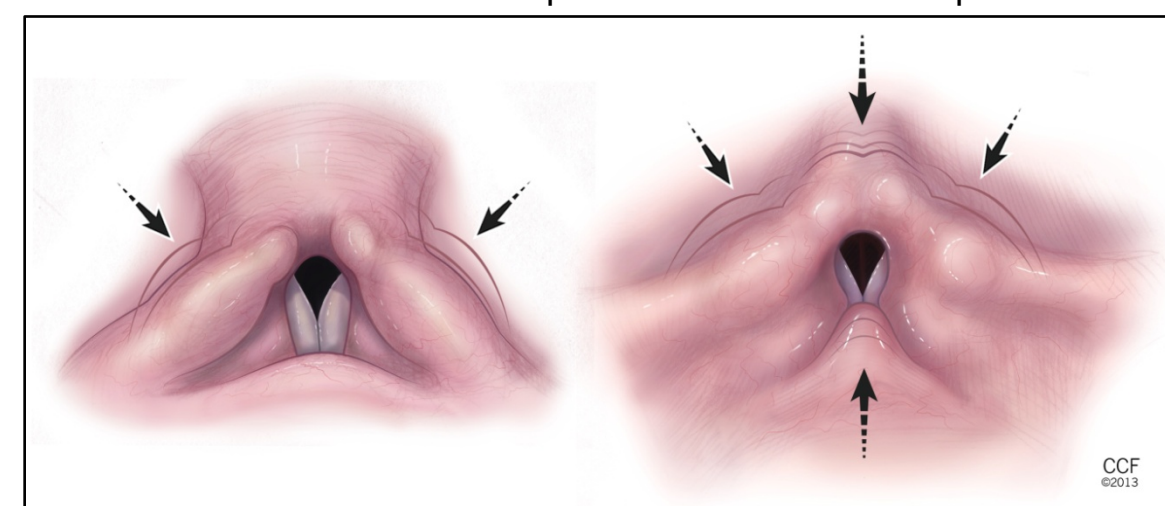


Figure 6: combined glottic hypoadduction with supraglottic hyperadduction

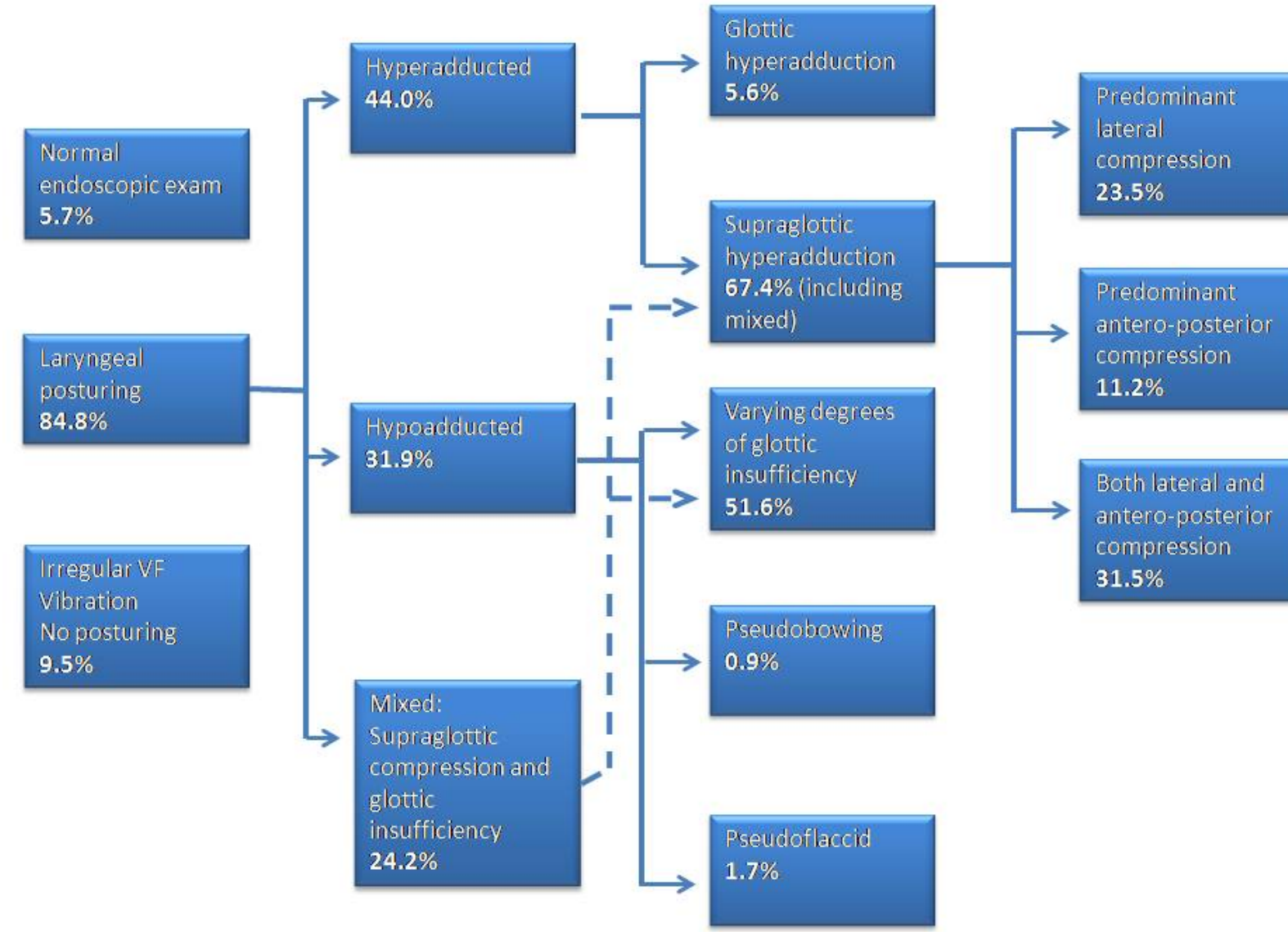


Figure 1: Videostroboscopic classification algorithm and data

Degree of Dysphonia	Perceptual-Auditory Rating of Voice				
	None	Mild	Moderate	Severe	Unable to Assess
<b>Pre-Treatment (n = 108)</b>					
Overall Quality	0 (0.0%)	2 (1.9%)	20 (18.5%)	86 (79.6%)	1 (0.9%)
Roughness	14 (13.0%)	5 (4.6%)	22 (20.4%)	29 (26.9%)	38 (35.2%)
Breathiness	13 (12.0%)	3 (2.8%)	17 (15.7%)	63 (58.3%)	12 (11.1%)
Strain	10 (9.3%)	5 (4.6%)	16 (14.8%)	57 (52.8%)	20 (18.5%)
Pitch Instability	4 (3.7%)	5 (4.6%)	20 (18.5%)	48 (44.4%)	31 (28.7%)
Loudness	9 (8.3%)	12 (11.1%)	22 (20.4%)	52 (48.1%)	13 (12.0%)
<b>Post-Treatment (n = 100)</b>					
Overall Quality	85 (85.0%)	10 (10.0%)	2 (2.0%)	2 (2.0%)	1 (1.0%)
Roughness	87 (87.0%)	9 (9.0%)	2 (2.0%)	0 (0.0%)	2 (2.0%)
Breathiness	94 (94.0%)	2 (2.0%)	1 (1.0%)	2 (2.0%)	1 (1.0%)
Strain	95 (95.0%)	0 (0.0%)	2 (2.0%)	1 (1.0%)	2 (2.0%)
Pitch Instability	88 (88.0%)	7 (7.0%)	2 (2.0%)	1 (1.0%)	3 (3.0%)
Loudness	95 (95.0%)	1 (1.0%)	0 (0.0%)	2 (2.0%)	2 (2.0%)

Table 2: perceptual auditory assessment of voice

## Conclusions

- Large descriptive sample of FD patients with characterization of dysphonia, laryngeal posture, and comorbidities
- Method for categorizing laryngeal posture in FD
- Time to diagnosis and previously failed treatment reinforce the need for good diagnosis and treatment of FD
- 98% successful treatment demonstrates high efficacy of specialized laryngeal manipulation/repositioning therapy

## Discussion

- Follow up limited to repeat visits - 6% had relapse of FD
  - Relapse without follow up would bias this result
  - Prospective survey planned to address this issue
- Debate continues over psychogenic vs. muscle tension etiology – our data do not support psychogenic causality
  - Average emotional VHI subscore significantly less than physical or functional values (p<0.001)
  - Concurrent diagnosis of depression/anxiety (22.8%) comparable to national incidence (19.7%)<sup>14</sup>

## References

- Cohen SM. Self-reported impact of dysphonia in a primary care population: an epidemiological study. *The Laryngoscope*. 2010;120(10):2022-2032.
- Schwartz SR, Cohen SM, Dailey SH, et al. Clinical practice guideline: hoarseness (dysphonia). *Otolaryngol-Head Neck Surg Off J Am Acad Otolaryngol-Head Neck Surg*. 2009;141(3 Suppl 2):S1-S31. doi:10.1016/j.otohns.2009.06.744.
- Gerritsma EJ. An investigation into some personality characteristics of patients with psychogenic aphonia and dysphonia. *Folia Phoniatr (Basel)*. 1991;43(1):13-20.
- Morrison MD, Rammage LA. Muscle misuse voice disorders: description and classification. *Acta Otolaryngol (Stockh)*. 1993;113(3):428-434.
- Aronson AE. *Clinical Voice Disorders*. Thieme; 2009.
- Mathieson L, Greene MCL, Greene and Mathieson's the Voice and Its Disorders. London; Philadelphia: Whurr; 2001.
- Altman KW, Atkinson C, Lazarus C. Current and emerging concepts in muscle tension dysphonia: a 30-month review. *J Voice Off J Voice Found*. 2005;19(2):261-267.
- Koufman JA, Ballock PD. Functional voice disorders. *Otolaryngol Clin North Am*. 1991;24(5):1059-1073.
- Sama A, Carding PN, Price S, Kelly P, Wilson JA. The Clinical Features of Functional Dysphonia. *The Laryngoscope*. 2001;111(3):458-463.
- Roy N. Functional dysphonia. *Curr Opin Otolaryngol Head Neck Surg*. 2003;11(3):144-148.
- Mathieson L. The evidence for laryngeal manual therapies in the treatment of muscle tension dysphonia. *Curr Opin Otolaryngol Head Neck Surg*. 2011;19(3):171-176. doi:10.1097/MOO.0b013e328344816c.
- Roy N, Bless DM, Heisey D, Ford CN. Manual circumlaryngeal therapy for functional dysphonia: an evaluation of short- and long-term treatment outcomes. *J Voice Off J Voice Found*. 1997;11(3):321-331.
- Roy N, Leeper HA. Effects of the manual laryngeal musculoeskeletal tension reduction technique as a treatment for functional voice disorders: perceptual and acoustic measures. *J Voice Off J Voice Found*. 1993;7(3):242-249.
- Strine TW, Mokdad AH, Balluz LS, et al. Depression and Anxiety in the United States: Findings From the 2006 Behavioral Risk Factor Surveillance System. *Psychiatr Serv*. 2008;59(12):1383-1390. doi:10.1176/appi.ps.59.12.1383.