

Vocal tremors: Current concepts and Treatments

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Conflicts of interest : workshop animation on botulinum toxin (Merz)

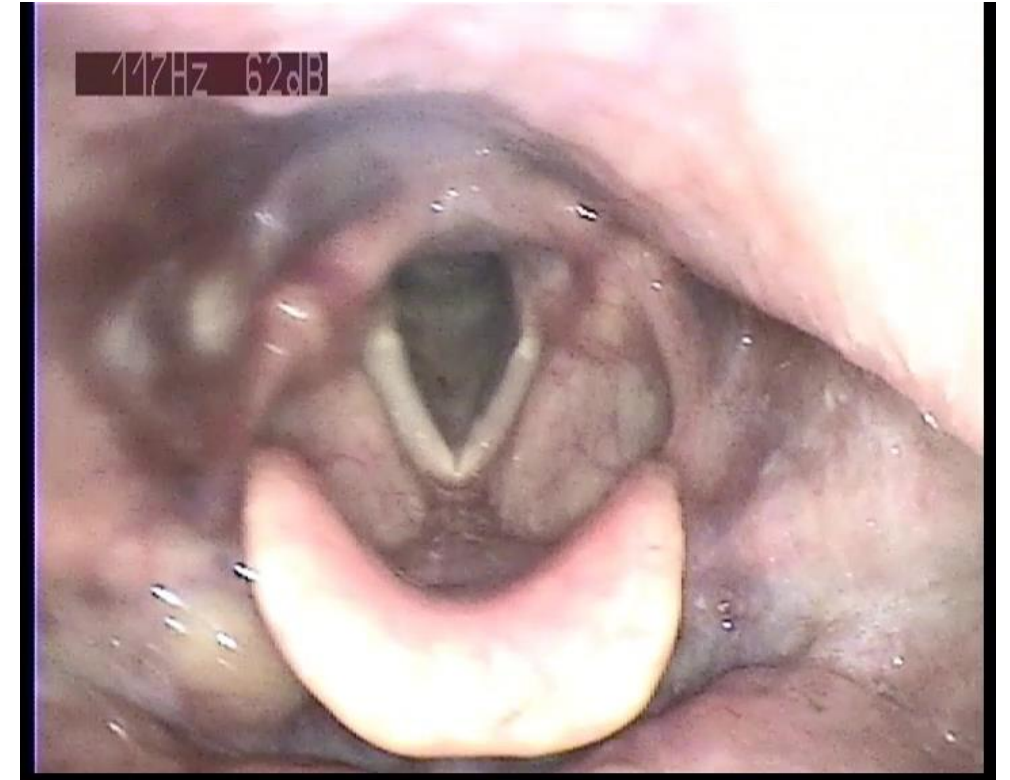
Neurological definitions

- Dystonia:
 - Sustained, involuntary contraction of the muscles, resulting in variable postures or –eventually shaking-movements
- Tremor:
 - Abnormal, rhythmic oscillatory movement
 - around a fixed point, axis or plane
 - with symmetrical velocity in both directions of movement.
- Myoclonus:
 - Sequence of repeated, often non-rhythmic, brief jerks
 - associated with the sudden, involuntary contraction or relaxation of one or more muscles.
 - Most of so-called cerebellar/rubric tremors



Vocal tremors

- Parkinson disease
 - Peripheral tremor at rest([3Hz – 7Hz])
 - Postural tremor ([8Hz – 12Hz])
- Vocal tremor:
 - Frequency: [4Hz-6Hz], same as the frequency of hands tremor at rest of the same patient
 - Clinical significance of the re-emerging tremor



Vocal tremors

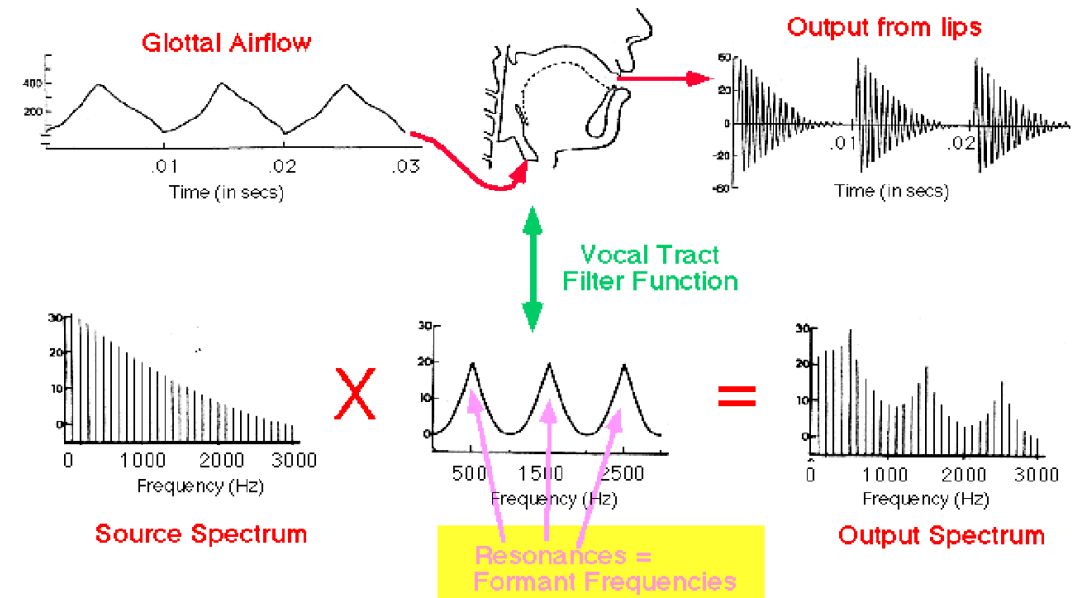


- Tremor in laryngeal dystonia
 - Tremulous laryngeal dystonia
 - Dystonic tremor
- Essential tremor involving the voice:
 - Most frequent tremor in adults,
 - Involves upper limbs bilaterally
 - For at least 3 years
 - No other neurological signs (dystonia, ataxia, extra-pyramidal syndrome)
 - Exclusion criteria:
 - Focal tremor (e.g. voice, head)
 - Orthostatic tremor frequency $>12\text{Hz}$
 - task- and position-specific tremor
 - Tremor with abrupt onset or rapid deterioration
- Focal vocal tremor



What's shaking?

- Source
 - Intrinsic laryngeal muscles
- Filter
 - Extrinsic laryngeal muscles
 - Pharynx
 - Velum
 - Mandible
 - Tongue
 - Oral floor



Vocal Tremor Scoring System.

Anatomic Site	Tremor Severity (0-3)*			
Palate†	0	1	2	3
Base of tongue‡	0	1	2	3
Pharyngeal walls†	0	1	2	3
Larynx (global)†	0	1	2	3
Supraglottis†	0	1	2	3
True vocal folds†	0	1	2	3

*0 = absent; 1 = mild/intermittent; 2 = moderate tremor; 3 = severe tremor.

†Activation task for assessment of tremor is sustained /i/ phonation.

‡Activation task for assessment of tremor activity is sustained tongue protrusion.

Bové M, Daamen N, Rosen C, Wang CC, Sulica L, Gartner-Schmidt J.
Development and validation of the vocal tremor scoring system. Laryngoscope
2006



Treatments of Essential or Focal vocal tremors

- Difficulties in highlighting results
 - Lack of high-quality studies
 - Small cohorts
 - No control groups
 - Patient satisfaction? Quality of life and VHI questionnaires?
 - Varying
 - Instrumental voice analysis
 - Mostly non-significant

Drugs

- 1- Propranolol (beta-blocker)
 - 50% responders
- 2- Primidone (barbiturate)
- 3-Topiramate (anti-epileptic)
- 4-Gabapentin (anti-epileptic)

- In the future?
- If ethanol-sensitive, octanoic acid
- Not available in Europe

-MDS evidence-based review of treatments for essential tremor. Ferreira JJ, Mestre TA, Lyons KE, Benito-León J, Tan EK, Abbruzzese G, Hallett M, Haubenberger D, Elble R, Deuschl G; MDS Task Force on Tremor and the MDS Evidence Based Medicine Committee. *Mov Disord.* 2019

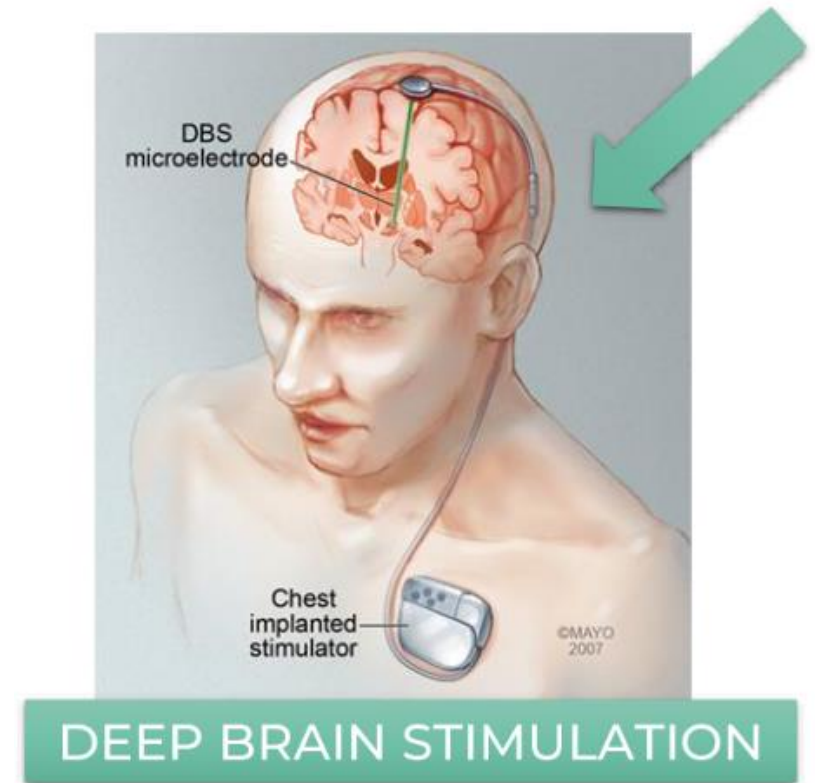
-Treatment of Essential Vocal Tremor: A Scoping Review of Evidence-Based Therapeutic Modalities. Khoury S, Randall DR. *J Voice.* 2022

Speech therapy

- Relaxation
- Low voice phonation
- Gentle attack exercises
- Breathing exercises
- Loud voice exercises
- Emphasizing the consonants despite of the vowels in speech
- Often combined with other treatments

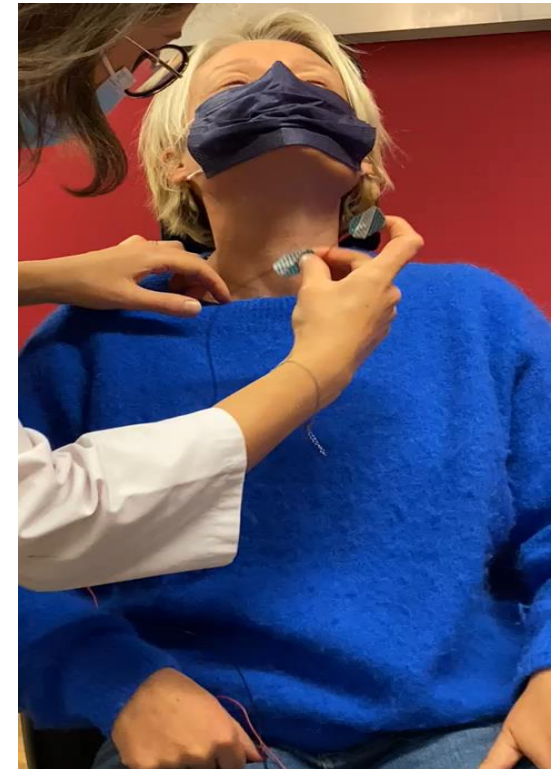
Deep Brain Stimulation

- DBS of the VIM for essential tremor
 - and not STN as in Parkinson's disease
 - Proven efficacy in vocal tremor
 - Especially if implanted bilaterally
 - But alters verbal fluency,
 - Exacerbates dysarthria or creates clamped dysphonia
- Hence:
 - not first-line treatment
 - Never if focal vocal tremor



Botulinum toxin

- No significantly greater effect than propranolol
- In vocal muscles
 - if ad/ab-duction component of tremor
 - Unilateral vs. bilateral
 - More side effects, but longer-lasting results with bilateral
 - Around 33% good responders,
- In pre-laryngeal muscles
 - If vertical component of tremor, described as providing better outcomes



-A new paradigm for the management of essential vocal tremor with botulinum toxin. Gurey LE, Sinclair CF, Blitzer A. Laryngoscope. 2013

-Treatment of Essential Vocal Tremor: A Scoping Review of Evidence-Based Therapeutic Modalities. Khoury S, Randall DR. J Voice. 2022

VF augmentation (injection)

- Complementary treatment
 - to limit side effects
 - Simultaneous injection of toxin and hyaluronic acid
 - under EMG
 - To offset undesirable effects of toxin:
 - when associated with presbyphonia or vocal demands
 - Prospective, small-scale study
 - Encouraging results

Simultaneous Botox and Augmentation Injection Laryngoplasty in Patients With Adductor Spasmodic Dysphonia (ASD) and Tremor. Woo P. J Voice, 2022

- Alternative to botulinum toxin
 - Small prospective study
 - No superiority to toxin

A Prospective Crossover Trial of Botulinum Toxin Chemodenervation Versus Injection Augmentation for Essential Voice Tremor. Estes C, Sadoughi B, Coleman R, Sarva H, Mauer E, Sulica L. The laryngoscope 2017.

Conclusion

- Comprehensive neurological assessment
 - Identification of any underlying neurodegenerative pathology
 - Search for organic lesions
 - Different drug treatments depending on the etiology
 - Genetic diagnosis of dystonic tremor
- Place of toxin in essential or focal vocal tremor
 - Second line after propranolol or if contraindicated
 - Even if outcomes are mixed
 - Persistent lack of literature

Thanks for your attention!

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