

# Voice Restoration in Presbyphonia

Strobe Rounds

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JOHNS HOPKINS  
M E D I C I N E

# Disclaimers & Disclosures

- None

# Agenda

## ▶ Background

- Etiology
- Management Options

# Background

- Structural changes of the larynx caused by aging
- US 2010 Census, age 65 and over population was 40.3M (13%)
- Incidence of vocal disorders in aging population: 12-35%
- Lifetime prevalence of 47% for age  $\geq 65$ <sup>1</sup>
  - 25% of pts  $>65$ y.o. w/ vocal complaint had presbyphonia<sup>2</sup>

1. Roy, et al. (2007)

2. Davids, et al. (2012)

# Background

- Quality of life affected
  - 13% noted QOL to be moderately to profoundly reduced related to dysphonia.<sup>3</sup>
    - Avoiding social events
    - Frustration and need to repeat oneself
    - Change in identity

3. Golub et al.(2006)

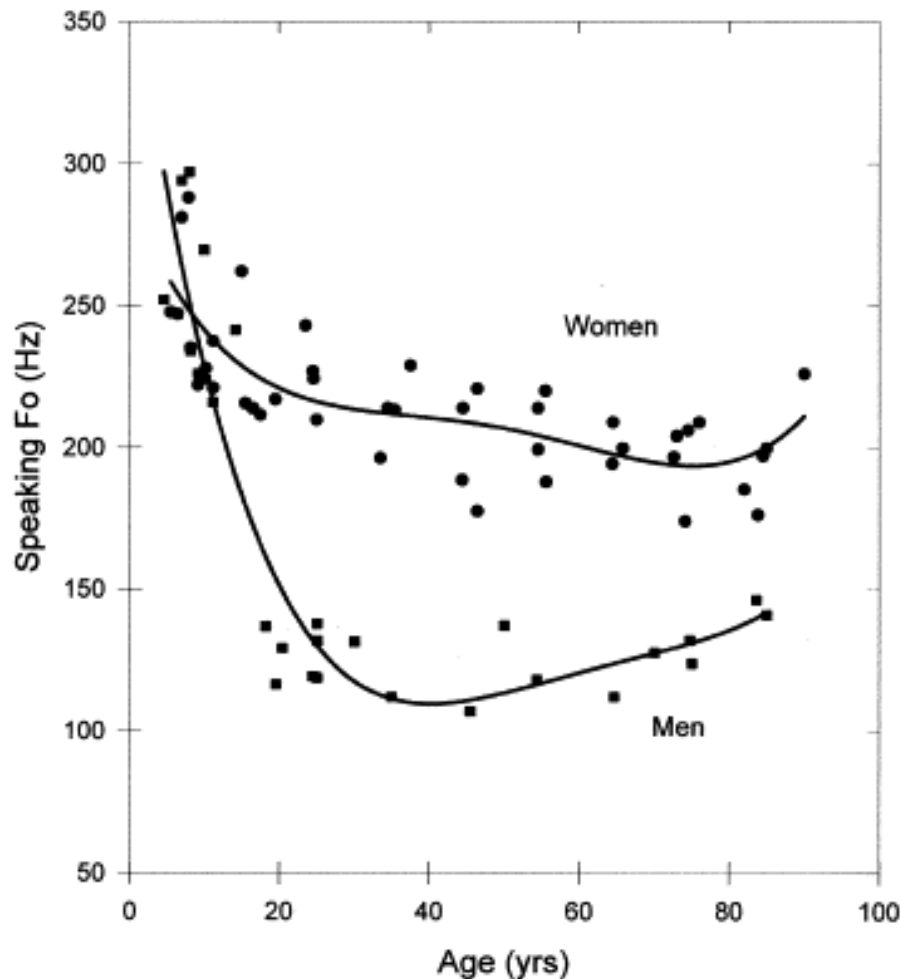
# Background

- Can guess age on basis of speech alone<sup>4,5</sup>
- Character
  - Weak
  - Thin
  - Breathy
  - Reduced projection
  - Decreased range
  - Unsteadiness
  - Pitch change

4. Ryan et al.(1974)

5. Linville et al. (1985)

# Background



- Speaking Fundamental Frequency decreases with maturity then rises
- VF vibrate more rapidly as age advances

6. Fig from Baken, et al. (2005)

# Agenda

- Background
- ▶ **Etiology**
- Management Options



# Molecular Etiology

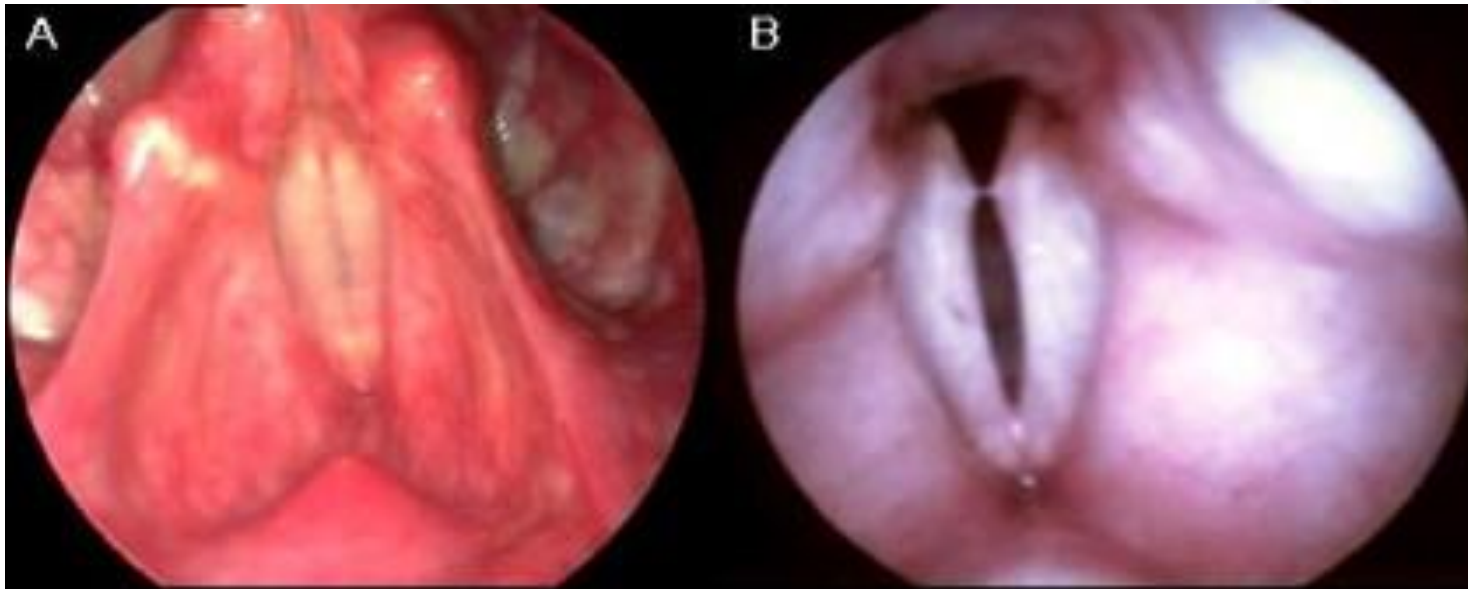
- Loss of vocal fold viscoelasticity
  - Collagen disorganisation
  - Less Hyaluronic acid and elastic fibers decrease
  - Decreased pliability and vibration
- Muscle atrophy
  - NMJ similar to denervated muscles
  - Reduction in axon terminal area and unoccupied postsynaptic Ach receptors
- Calcification of laryngeal cartilage
  - Limit ROM, altered resonance

7. Johns III, et al. (2011)

# Gross Etiology: laryngoscopy/stroboscopy

- Vocal fold atrophy and bowing
- Midline glottic gap and air escape
- Aperiodic / irregular vibration, increased amplitude, asymmetric wave
- Prominence of vocal processes
- Edema

# Gross etiology: laryngoscopy



A. Normal laryngeal closure.

B. Glottal insufficiency secondary to presbylaryngis.  
Note the 3mm glottal gap at the point of vocal-process to vocal process contact.

# Etiology

- Also multifactorial, outside larynx
  - Lungs
  - Kyphosis
  - CNS
  - Dental/mandibular
  - Dry mouth

Dauids, et al.

# Agenda

- Background
- Etiology

## ▶ **Management Options**

# Management Options

- Reassurance
- Voice therapy
- Medical optimization
- Surgical management

# Management options: voice therapy

- 1<sup>st</sup> line treatment
- Strengthening exercises for respiratory and phonatory control (Lee Silverman Voice Therapy)
  - Practice producing resonant tone
  - Emphasis on sustained high pitch and loud voice production
  - Vocal postures
  - Vocal function exercises
- Shown to lead to subjective improvement in QOL and perceived voice<sup>8</sup>
- Less beneficial in severe cases (higher VF atrophy, larger glottic gaps, glottic closure pattern, burden of medical problems)<sup>9</sup>

8. Berg, et al. (2008)

9. Mau, et al (2010)

# Management options: injection laryngoplasty

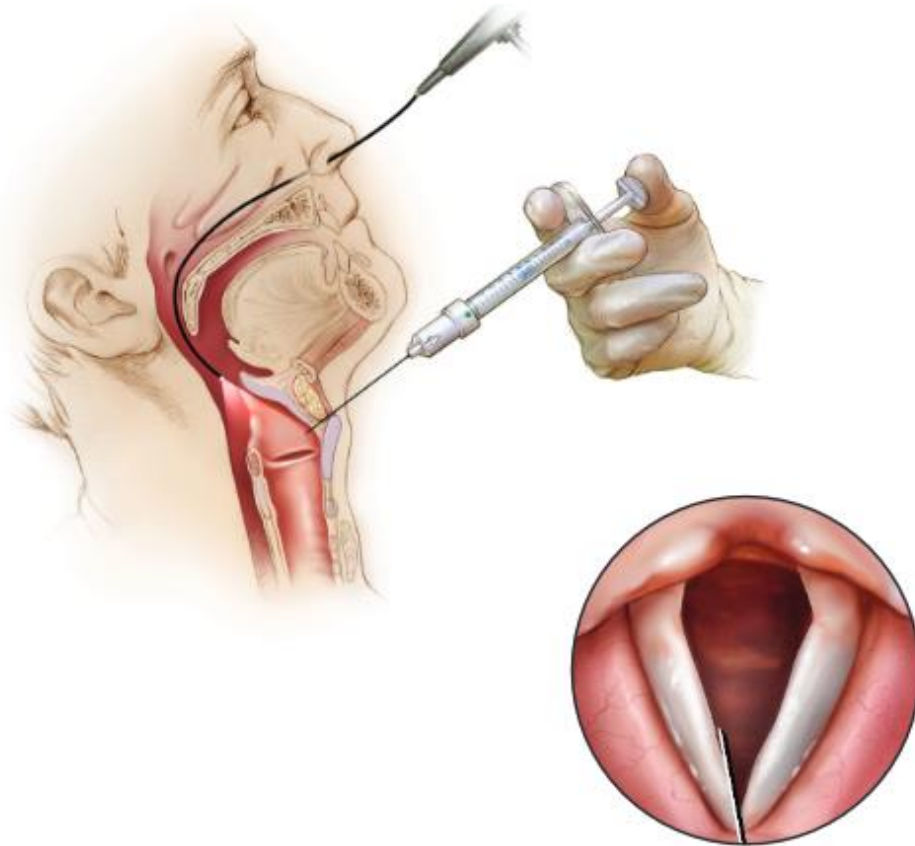
- Goal to improve glottic closure
- Temporary effect
- Serve as a trial for a more permanent procedure
- May avoid general anesthesia
- Risk of Superficial injection, over-injection



# Injection laryngoplasty

- Can be performed in-office as an awake procedure
  - Allow vocal titration, technically challenging
  - Anticoagulation is relative contraindication to office-based procedures
- Or in the OR, under general anaesthesia
  - More control
  - Does not allow for titration

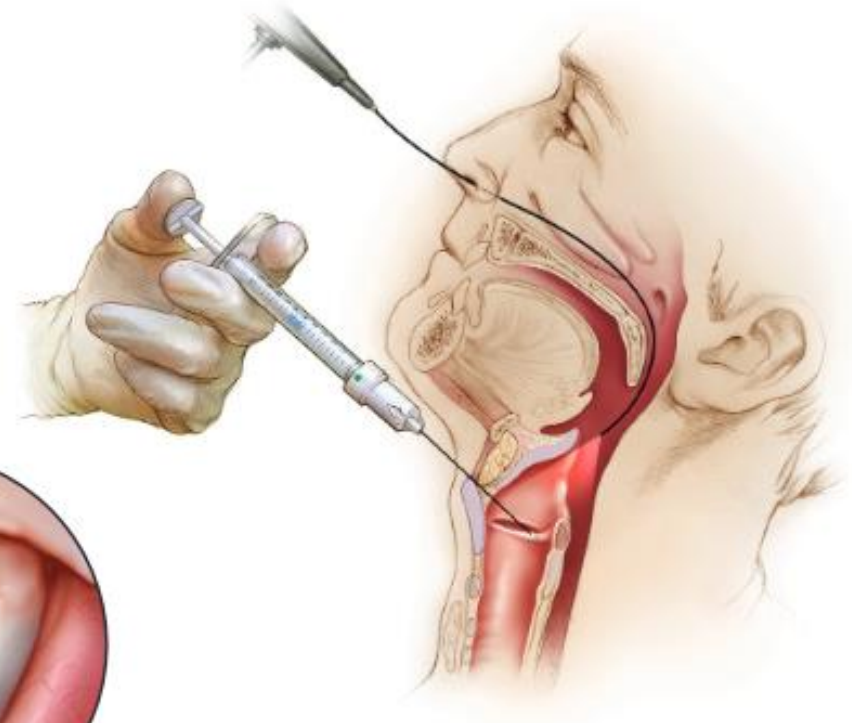
# In office injection laryngoplasty



Needle visible in airway via transnasal endo-scope

Radiesse website

# In office injection laryngoplasty

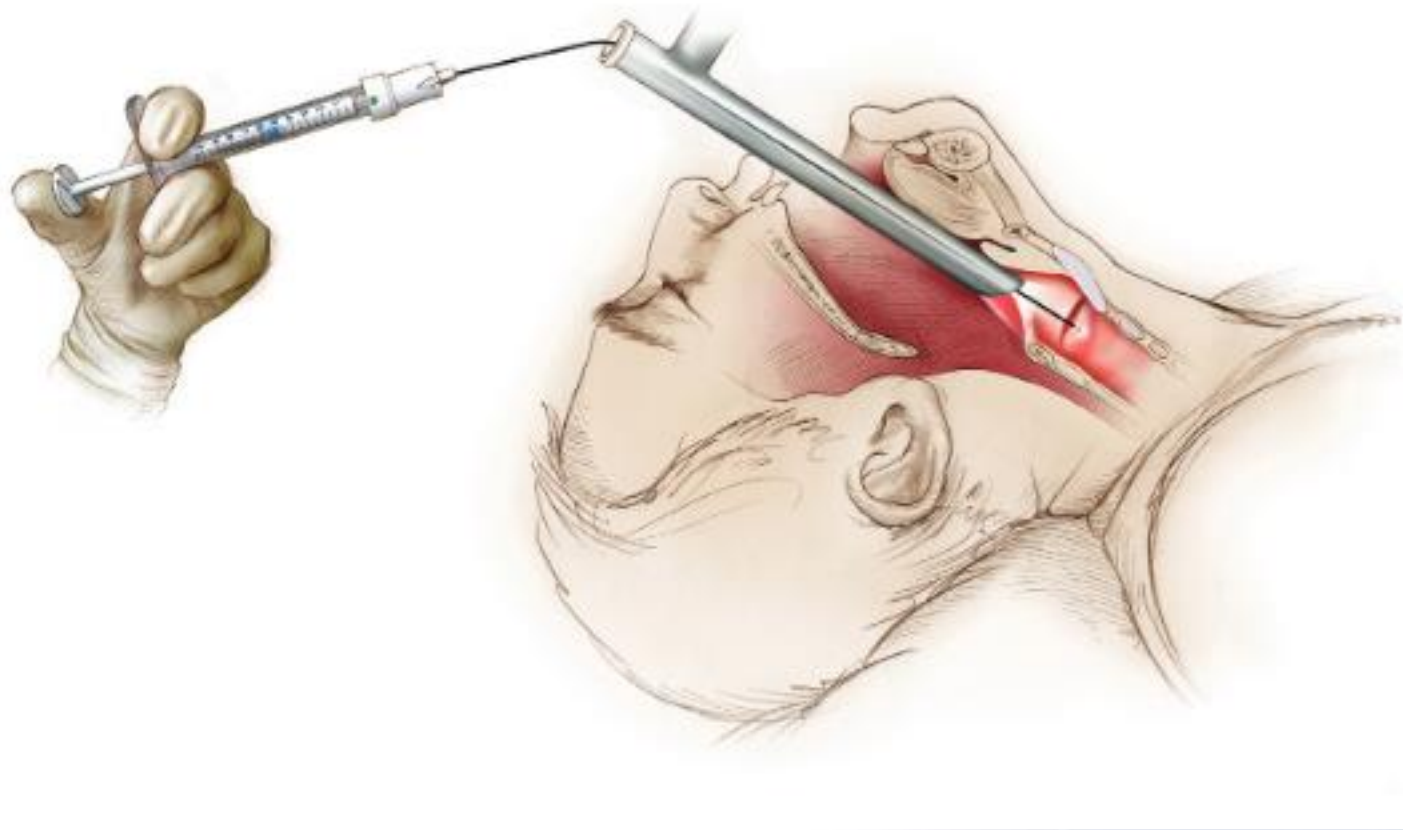


Needle inserted at injection site



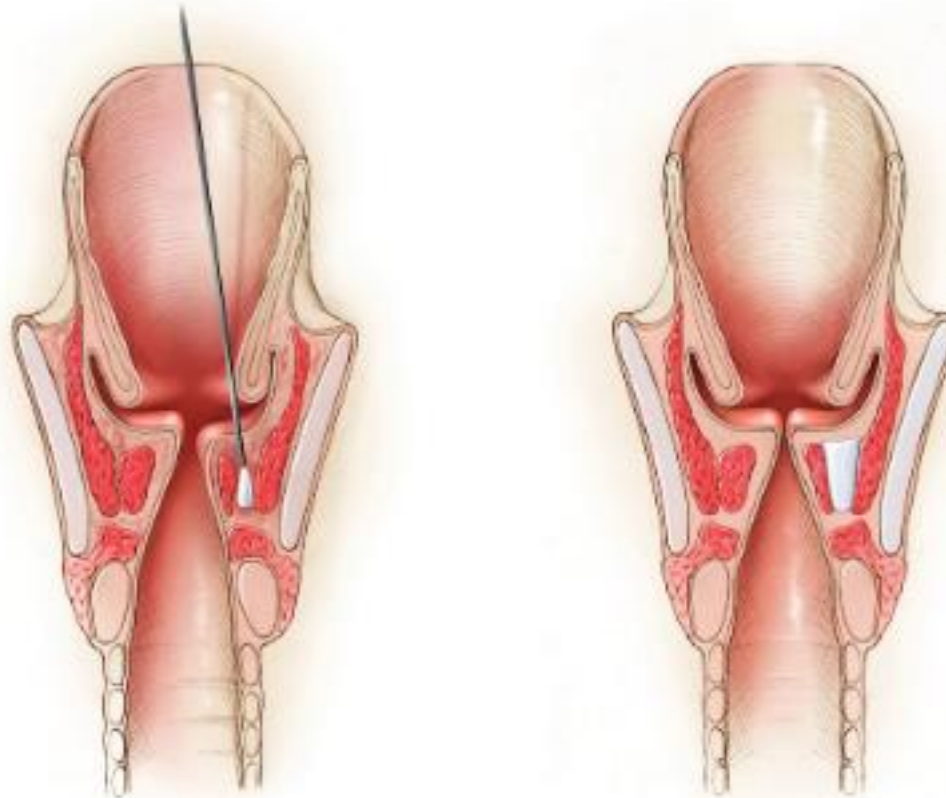
Radiesse website

# OR injection laryngoplasty



Radiesse website

# OR injection laryngoplasty



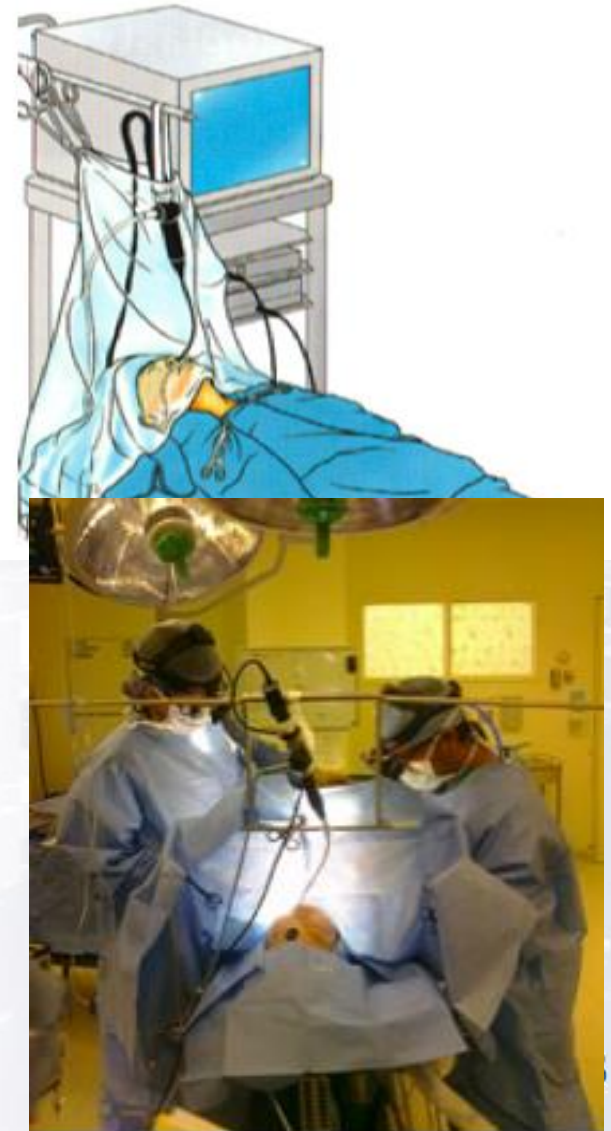
Radiesse website

# Injection laryngoplasty

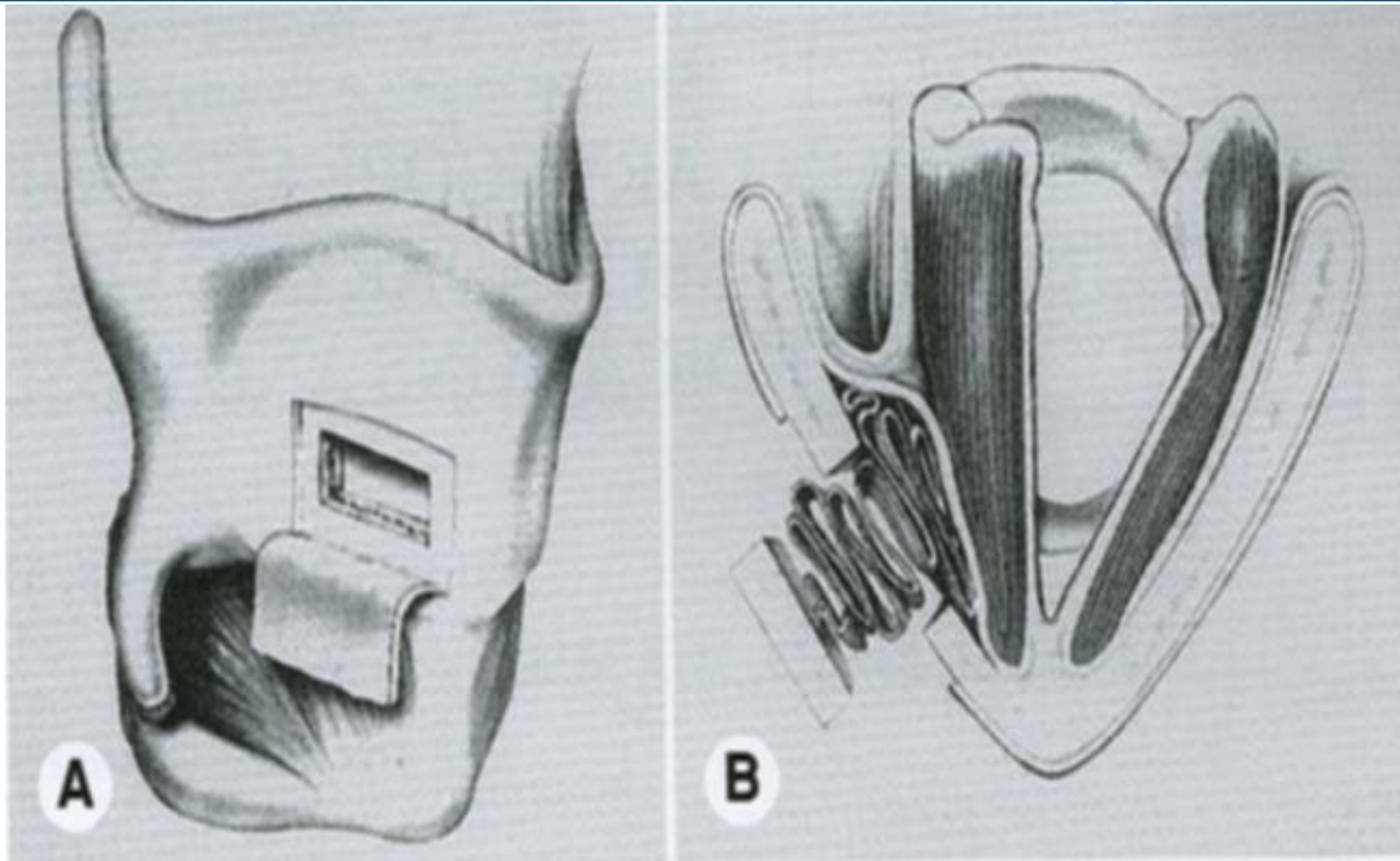
- **Materials/Fillers**
  - **Permanent/Long lasting**
    - Autologous fat – 1 to several years
    - Radiesse™ (calcium hydroxyapatite) – 12 months
    - Polydimethylsiloxane (PDMS or particulate silicone) – likely permanent, >10yrs
  - **Temporary**
    - Gelfoam™ (bovine gelatin) – 4-6 weeks
    - Collagen based products (Cymetra™, Zyplast™, Cosmoplast™) – 2-4 months
    - Hyaluronic acid (Restylane™, Hyalaform™) – 4-6, up to 12 months
    - Carboxymethylcellulose (Radiesse voice gel™) – 1-3 months

# Bilateral Medialization thyroplasty

- Provides static medialization of the vocal folds
- Permanent but reversible
- OR – local anesthetic & conscious sedation
- Implant placed in paraglottic space while patient phonates



# Bilateral Medialization thyroplasty





# Medialization thyroplasty: risks

- Risk of implant extrusion, FB reaction
- Risk of airway obstruction
- Risk of hematoma

# “cosmetic” voice surgery



U.S. International Politics Lifestyle ...

## The Latest in Plastic Surgery: the 'Voice-Lift'

**theguardian**

Voice lifts: something to shout about

Not so long ago surgery was the only way to repair a weak, quavery voice caused by age or illness. Now interest is growing in far less invasive 'voice lift' treatments