


Laryngeal Framework Surgery: Optimizing Results and Avoiding Complications


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- Plural Publishing
 - Royalties for The Performer’s Voice and Laryngeal Dissection Atlas
- MedBridge, Inc.
 - Royalties for Laryngeal Videostroboscopy instructional course

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Isshiki's Thyroplasty Classification


 Type I (Medialization)	 Type II (Lateralization)
 Type III (Relaxation)	 Type IV (Tensing)

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Framework Surgery for Glottal Insufficiency


- Indications:
 - Immobile Vocal Fold → Paralysis
 - Mobile Vocal Fold: paresis, scarring, atrophy
- Procedures:
 - Approximation Laryngoplasty (Type I Thyroplasty)
 - Arytenoid Adduction
 - Adduction Arytenopexy
 - Cricothyroid Subluxation
- Considerations for optimizing results and avoiding complications:
 - Pre-op
 - Intra-op
 - Post-op


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Unilateral Vocal Fold Paralysis

- Preoperative Considerations
 - Procedure timing
 - Patient selection
 - Patient preparation
 - Procedure planning




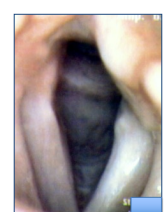
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Preoperative Considerations

- Patient Selection

Voice Change α Glottal Gap in 3D

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Preoperative Considerations

- Procedure timing
 - Remember: Sunderland Grade 1 and 2 usually resolve to normal spontaneously
 - Problem in knowing what grade of injury is present
 - Contralateral compensation may take time to develop
 - Denervation/reinnervation
 - Thus 6 to 9 month waiting period prior to **permanent** intervention is usually observed
 - ?Role EMG
- Special considerations: Children/Adolescents

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Preoperative Considerations

- Patient preparation
 - Explain limits of surgery: singing and shouting
 - *Static geometric solution for a dynamic problem*
 - Give realistic vocal goals:
 - Improve endurance
 - Reduce fatigue
 - Improve quality
 - Improve projection

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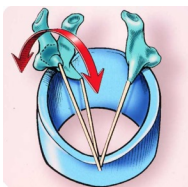
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Preoperative Considerations

- Procedure planning
 - Type I thyroplasty
 - Adjusts medial/horizontal position
 - Awake with local anesthesia
 - Flexible endoscopic visualization of larynx
 - Arytenoid Adduction
 - Adjusts vertical position
 - If voice results and laryngeal configuration are not adequate from medialization alone
- “Preoperative assessment cannot predict need for AA.”
 - REF: *Personal communication with myself*



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Image c/o Mark Courcy, MD



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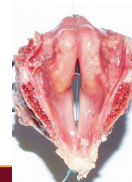
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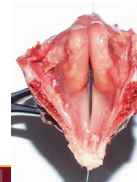
Vocal fold motion in thyroplasty

- Vocal fold motion occurs in three dimensions
- ML can adjust the horizontal position of the vocal fold but does not appear to have control over the vertical position

Normal



Right ML



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Slide c/o Mark Courcy, MD



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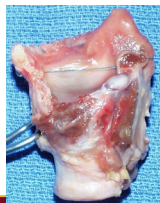
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Vocal fold motion in AA

- Arytenoid adduction controls the vertical height of the vocal process and improves free edge approximation

ML



AA



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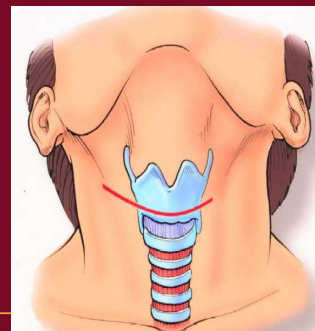


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Medialization Laryngoplasty

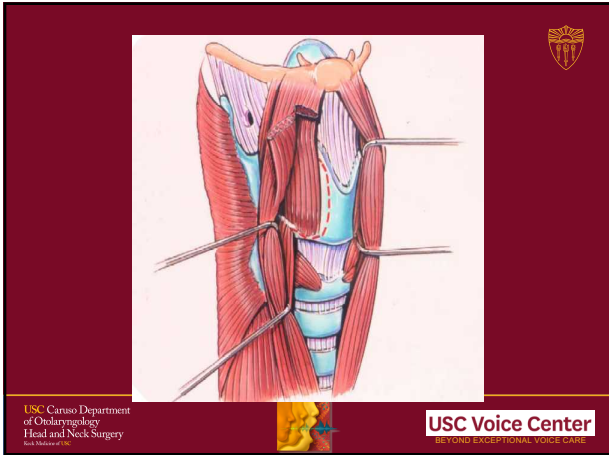


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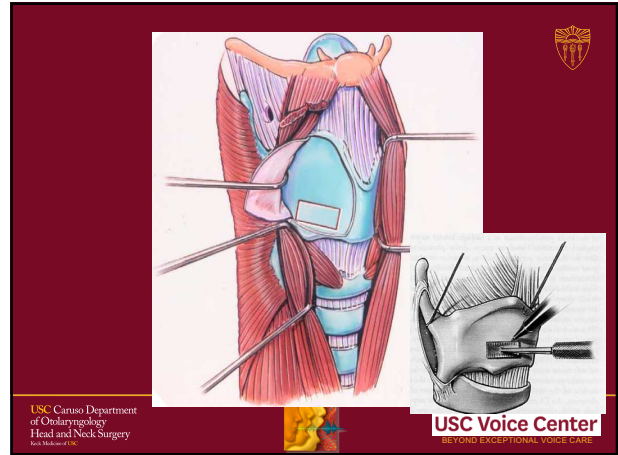
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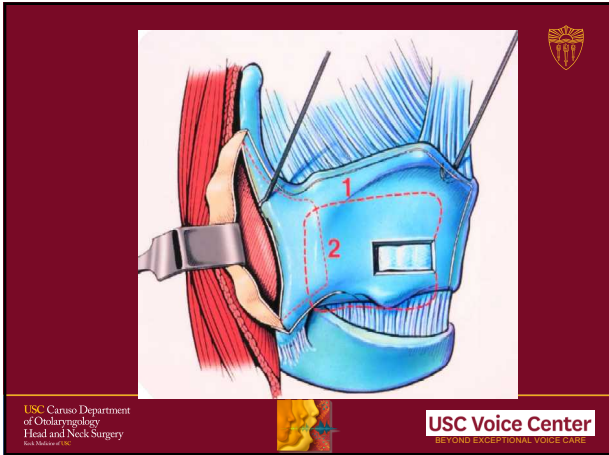
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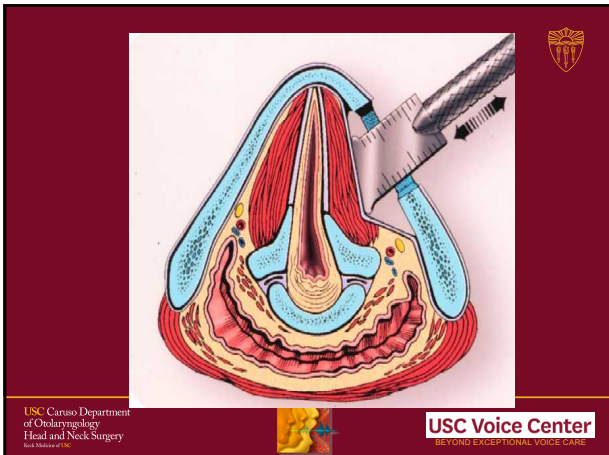
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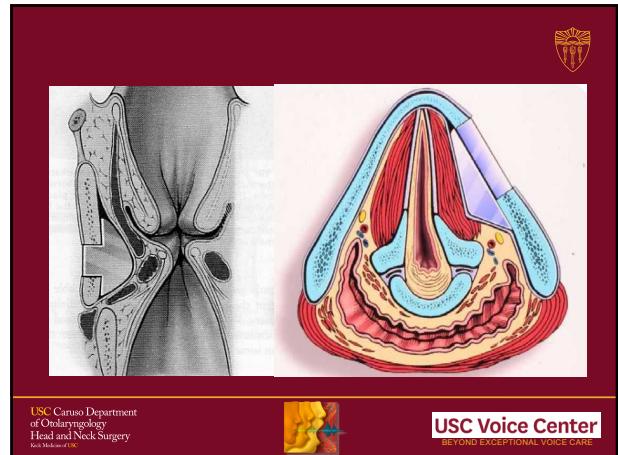
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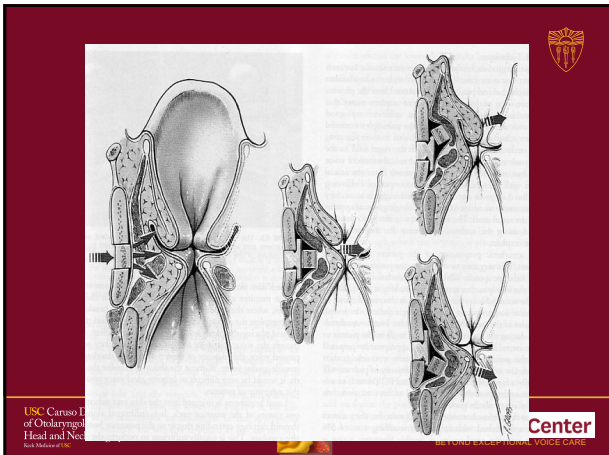
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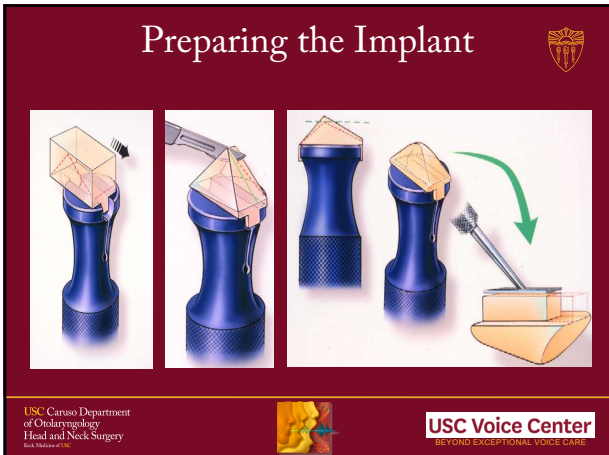
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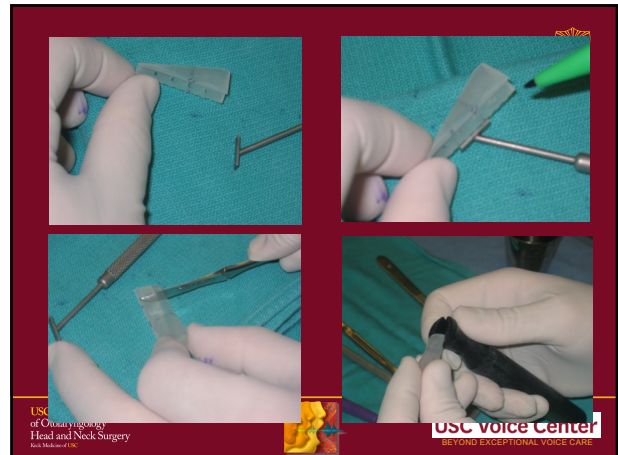
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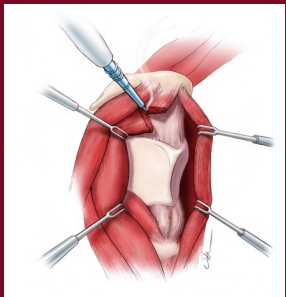
Gore-tex Thyroplasty Video



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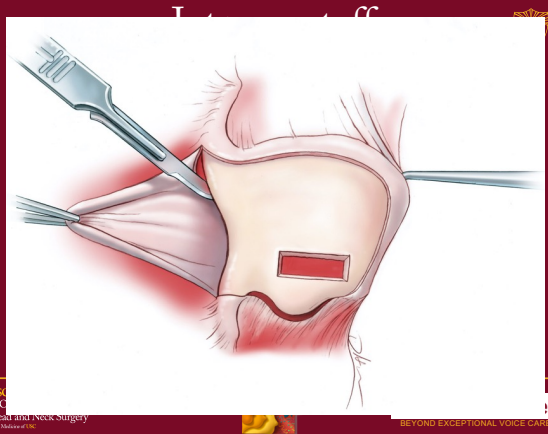
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Arytenoid Adduction



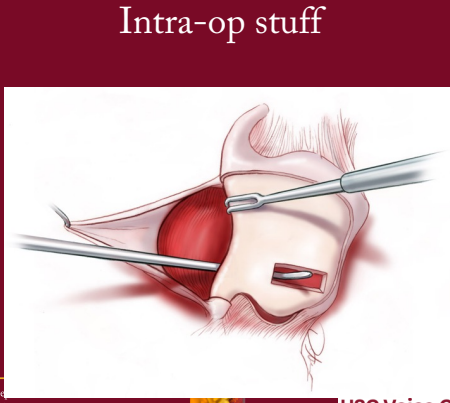
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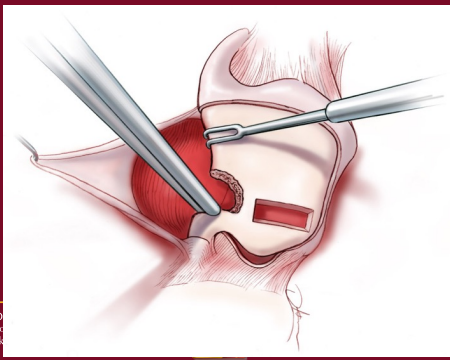
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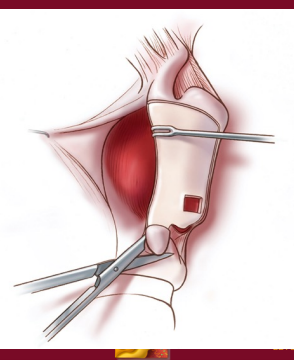
Intra-op stuff



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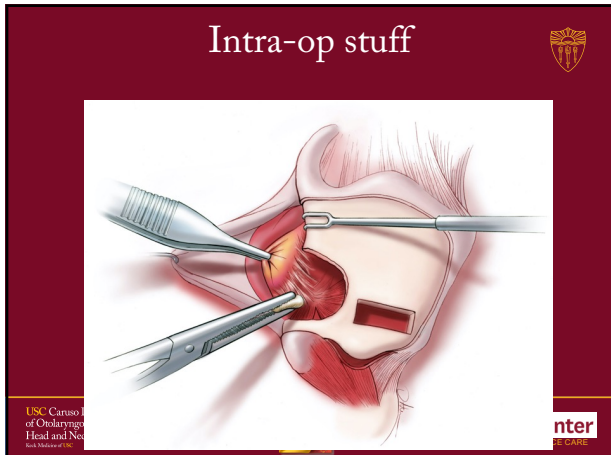
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Intra-op stuff

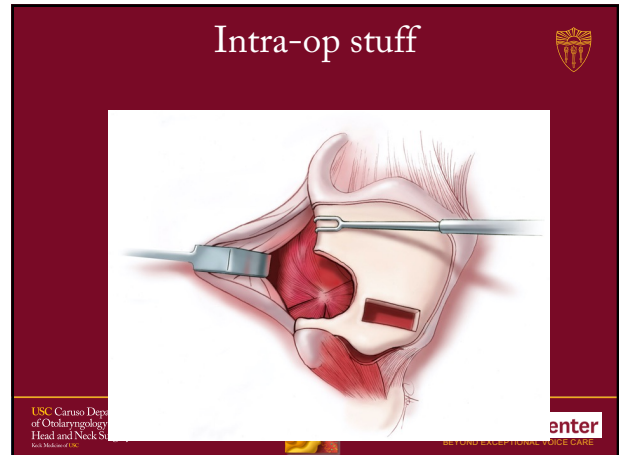


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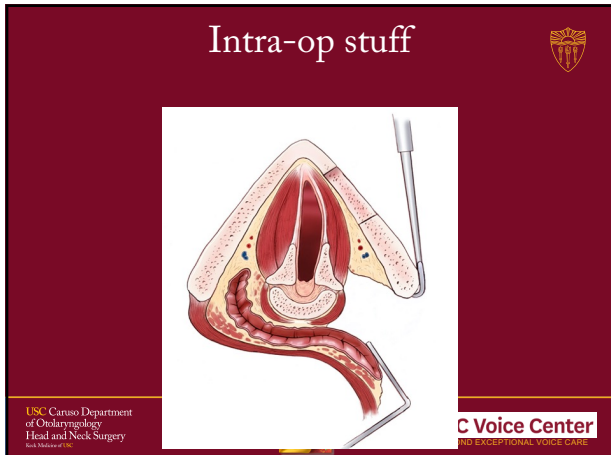
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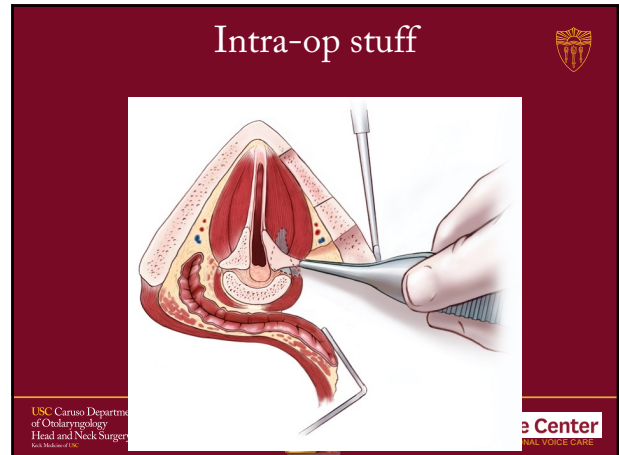
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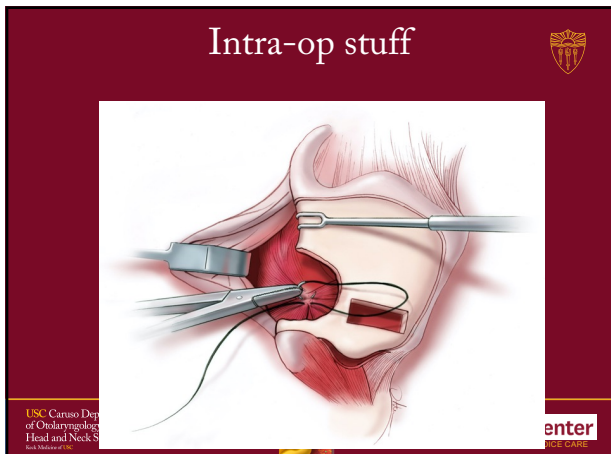
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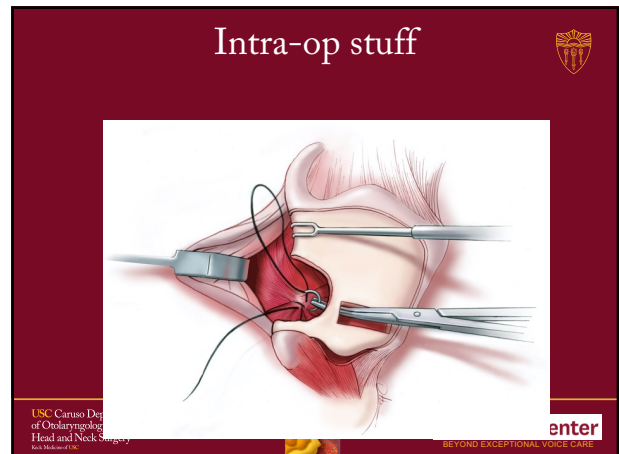
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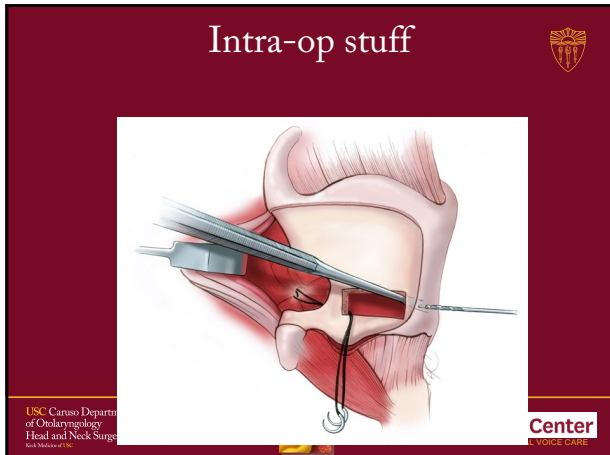
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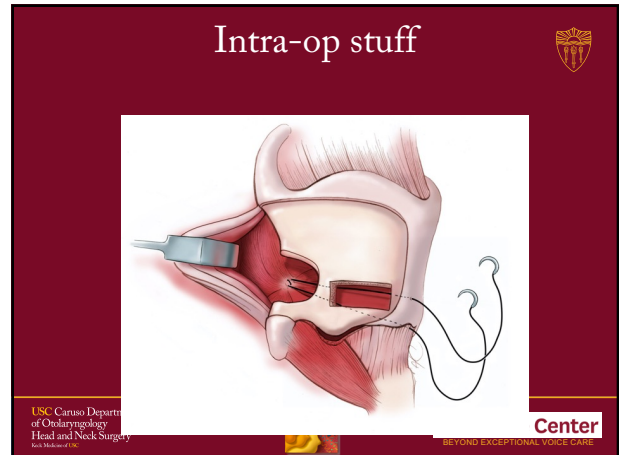
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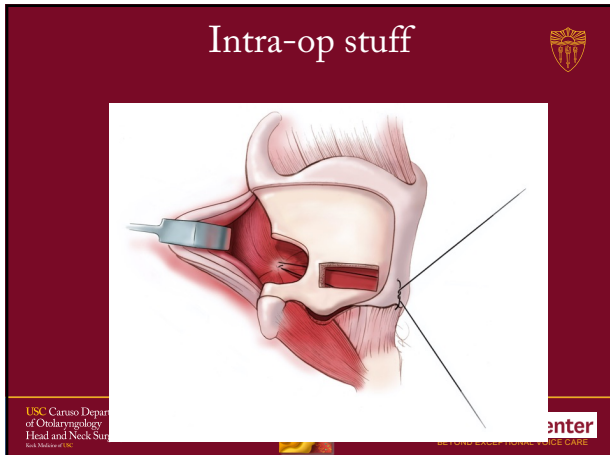
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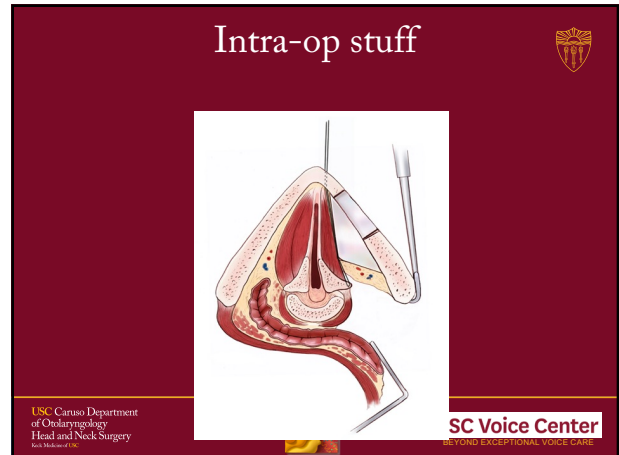
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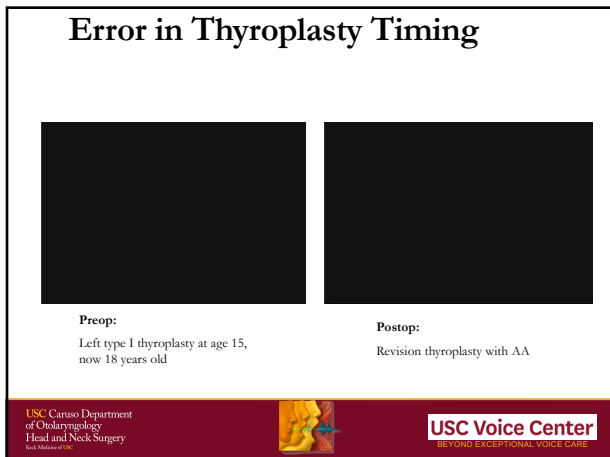
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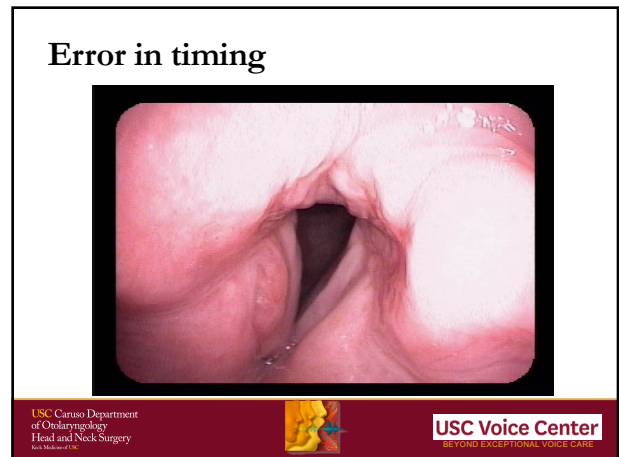
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Intraoperative Considerations

- Preoperative steroid use:
 - Minimize edema and thus under-medialization
 - Dexamethazone 10-12mg IV 30 min. prior to starting
- Local anesthesia:
 - Too much sedation impairs patient cooperation
 - Minimize sedation, use local anesthesia generously
- Window placement:
 - The key to thyroplasty success
- Implant design:
 - Avoid over medialization anteriorly
- Endoscopy:
 - Judge procedure based on voice
 - Visually monitor: airway, blood in larynx, implant malposition
 - Helps with troubleshooting / arytenoid adduction decision making

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Medialization Laryngoplasty: OR set up

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Intraoperative Considerations: Steroid Use

Preop:
68yo with left paralysis post aortic surgery
Steroids omitted intraoperatively

Postop:
Under correction

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Operative Considerations: Window Placement

- Common errors:
 - Too high = medialization of superior surface of TVF/ventricle → rough voice
 - Too posterior = interference from rising cricoid ring
 - Tilted window = implant does not parallel true vocal fold
 - Anterior overcorrection = pressed voice

- Goals:
 - 2-3mm above inferior border
 - Start window 5-7mm from midline
 - Parallel to true inferior line
 - Adjust horizontal plane of implant to match true horizontal of glottis
 - Endoscopy

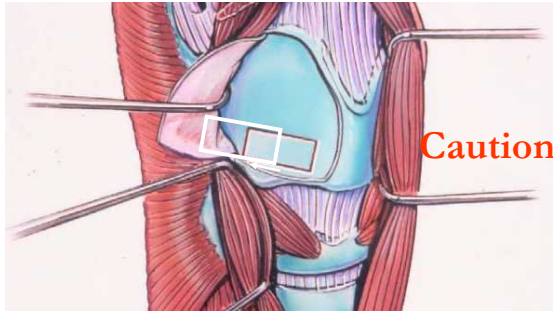
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Error: Too far back



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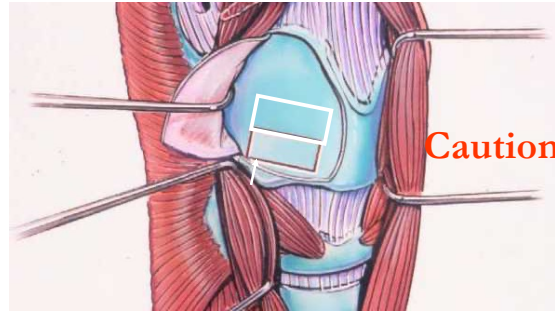


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Error: Too High



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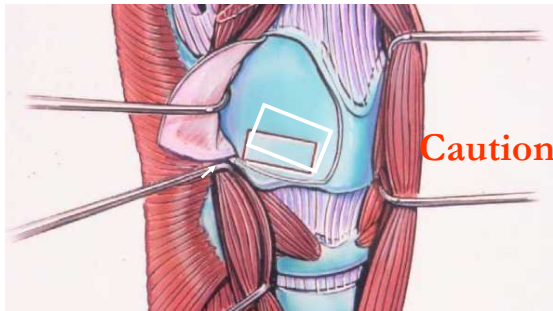


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Error: Tilted Window



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Window/Implant too high



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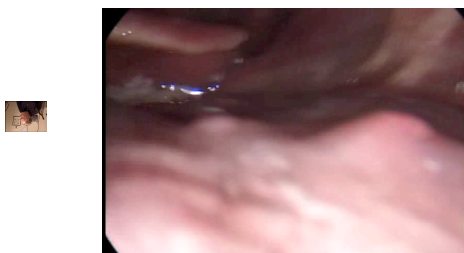


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Window/Implant too high



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Window/Implant too high



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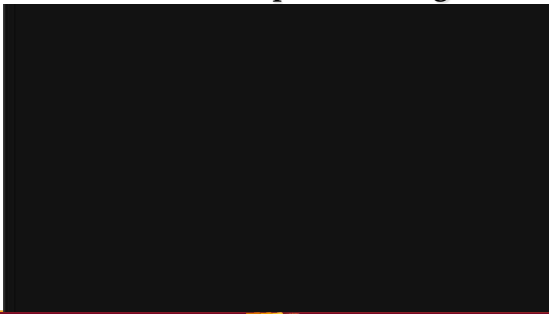
Preop

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Window/Implant too high



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Postop

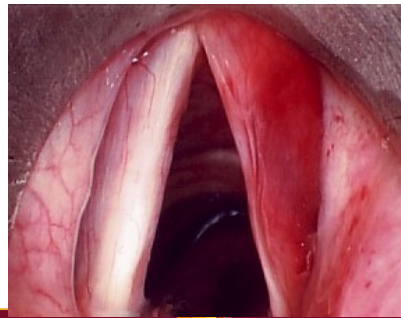


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Window/Implant too high



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Window too posterior



Preop: 5 years post type I thyroplasty with moderate improvement, persistent rough voice, fatigue

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Window too posterior



Postop: 3 months s/p revision thyroplasty, prior window nearly 20mm post midline, 5mm above inferior—placed window in standard location

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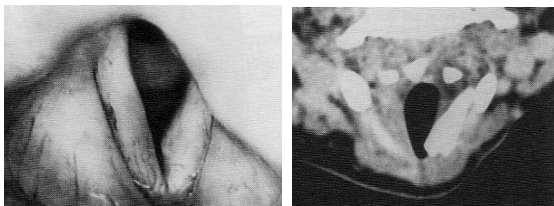


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Avoid anterior overcorrection



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Increased risk of extrusion?

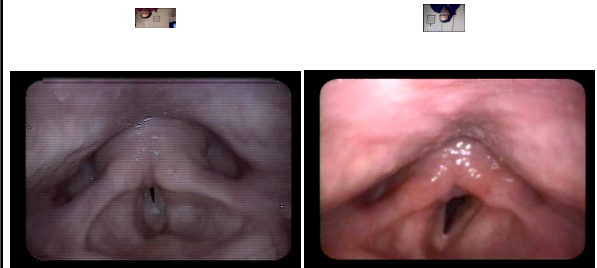


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Anterior Overcorrection



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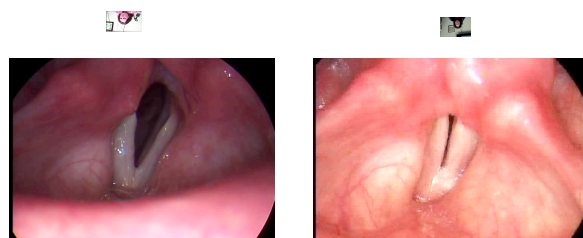


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Anterior Overcorrection



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Missed Vertical Height Mismatch



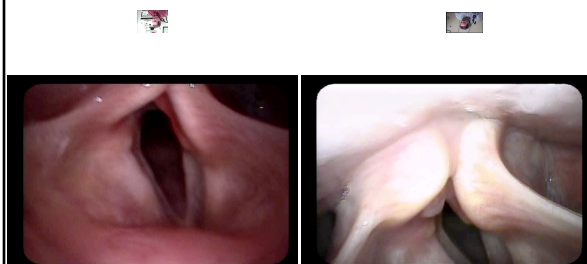
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Missed Vertical Height Mismatch



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Missed Vertical Height Mismatch



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Postoperative considerations

- Surgical drain?
 - Airway issues → communication from neck to paraglottic space
- Post-operative steroids?
 - Thyroplasty alone?
 - AA?
- Post-operative antibiotics?
- Observation vs. Outpatient?

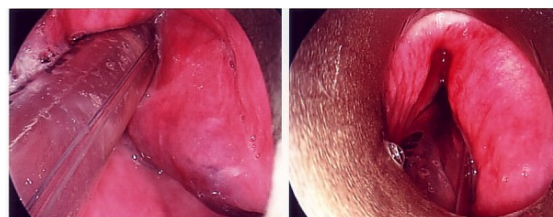
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Postoperative Hematoma




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Postoperative Edema



- 1 week post thyroplasty
- Stridor
- Sleeping in chair
- No steroids postop


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Postoperative Edema



Completed 1 week methylprednisolone
No airway symptoms

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Take Home Points

- Careful preop selection and patient preparation
 - Start with the chip shots
- Intraop steroids crucial to avoid undercorrection
- Meticulous window design – LOW – 2-3mm about inferior edge of thyroid ala
- Judge results on voice
 - Use flexible endoscopy to confirm medialization and troubleshoot
- **High medialization:** Rough voice
- **Anterior overcorrection:** Pressed voice
- Learn to reposition the arytenoid: Vertical height mismatch
 - Arytenoid adduction
- Revision thyroplasty challenging, but worth it in most cases

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Redondo Beach, California
October 22-24, 2020

THE FALL VOICE CONFERENCE

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