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Recurrent Laryngeal Nerve Injury at Thyroid and Parathyroid Surgery

Gerard M. Doherty, M.D.

NW Thompson Professor of Surgery
Chief of Endocrine and General Surgery
University of Michigan

Management of RLN Injury

- Prevention
 - Decision to operate
 - Operative planning
 - Operative technique
- Management of nerve injuries
 - Temporary
 - Permanent



Prevention of Nerve Injury

General Principles

- Deliberate consideration and documentation of the indication for operation, and especially, for re-operation
- For re-operations, careful preoperative imaging and planning to limit the amount of “exploration” necessary
- Identify recurrent laryngeal nerve early and low – keep in view
- Dissect from un-operated to operated areas in re-operations
- Intraoperative nerve monitoring for re-operations (?)

Completion Thyroidectomy for Cancer

- Careful consideration of the rationale for completion thyroidectomy; may not be necessary in everyone
- Timing of secondary operation controversial
- Careful management of RLNs and especially parathyroid glands critical

Timing of Completion Thyroidectomy for Cancer

- Operations between 10 and 90 days after initial resection is no different from early or delayed operation

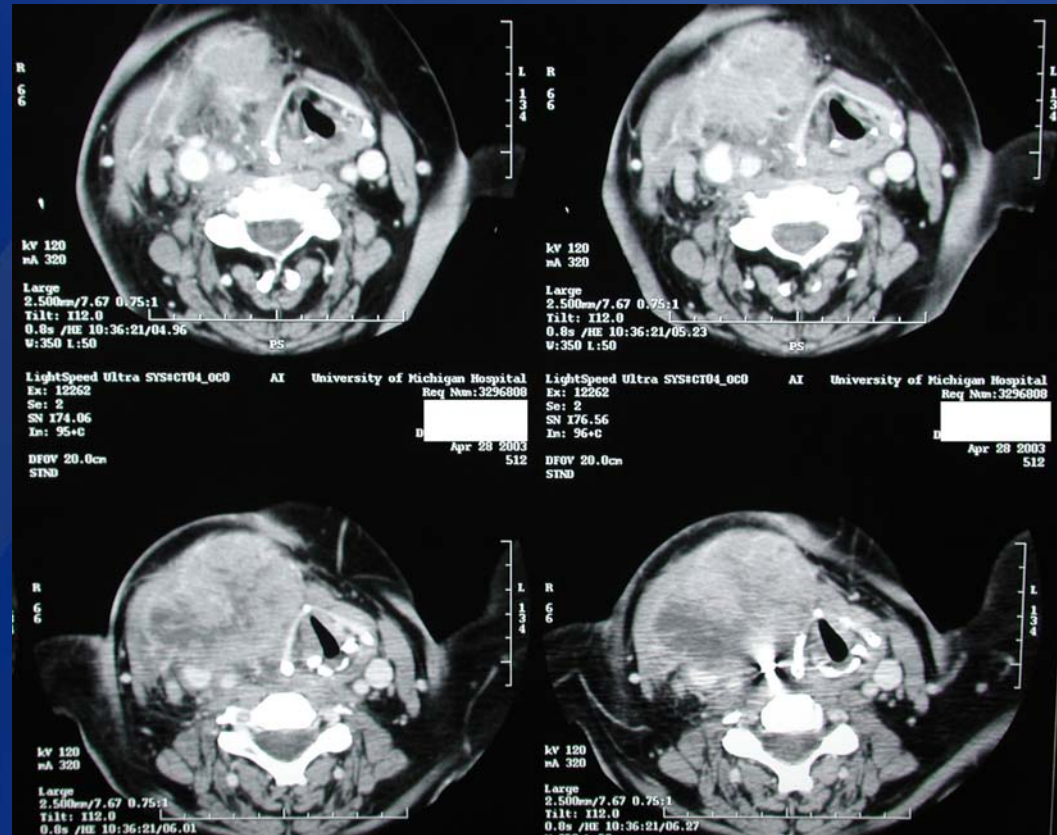
| | Total thyroidectomy | Completion thyroidectomy | |
|----------------------------------|---------------------|--------------------------------|-------------------------|
| | | Group 1 (< 10 or > 90 days) | Group 2 (10–90 days) |
| Nil | 172 (84) | 60 (95) | 30 (81) |
| Temporary hypocalcaemia | 20 (10) | 2 (3) | 4 (11) |
| Vocal cord dysfunction | 2 (1) | 0 (0) | 2 (5) |
| Recurrent laryngeal nerve injury | 2 (1) | 1 (2) | 1 (3) |
| Haematoma | 1 (0) | 0 (0) | 0 (0) |
| Reoperation for bleeding | 3 (1) | 0 (0) | 0 (0) |
| Tracheostomy | 2 (1) | 0 (0) | 0 (0) |
| Other | 2 (1) | 0 (0) | 0 (0) |
| Death | 1 (0) | 0 (0) | 0 (0) |
| Total | 205 (100) | 63 (100) | 37 (100) |



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Re-operative central neck procedure for cancer

- 102 re-operative central neck procedure for malignancy
- 6 patients with pre-existing vocal cord palsy
- 5 patients had RLN sacrificed deliberately
- Remainder: 12 had transient vocal cord dysfunction



Moley JF et al., Surgery 1999.

Recurrent or persistent hyperparathyroidism

- Confirm the diagnosis
- Review indications for operation
- Review previous procedures and operative reports
- Localize parathyroid abnormality
- Re-operate with intraoperative parathyroid hormone measurements

Results of operation

- Operation generally safe and successful with complication rates below 10% and success rates above 90%

| Source, y | No. of Patients | Cure Rate, % | Vocal Cord Paralysis, % | | Hypocalcemia, % | |
|---|-----------------|--------------|-------------------------|-----------|-----------------|-----------|
| | | | Transient | Permanent | Transient | Permanent |
| Martin et al, ² 1980 | 25 | 88 | ... | ... | ... | ... |
| McGarity and Goldman, ³ 1981 | 28 | 82 | 0 | ... | 54 | 21 |
| Brennan et al, ⁴ 1981 | 106 | 96 | 6 | 1 | 41 | ... |
| Brennan and Norton, ⁵ 1984 | 175 | >90 | ... | 6 | 35 | 13 |
| Grant et al, ⁶ 1986 | 157 | 89 | 8 | 4 | 17 | 13 |
| Cheung et al, ⁷ 1989 | 83 | 86 | 2.4 | 1.2 | 12 | 9.6 |
| Levin and Clark, ⁸ 1989 | 81 | 91 | ... | ... | ... | ... |
| Carty and Norton, ⁹ 1991 | 206 | 95 | 6.6 | 0.7 | ... | 8.3 |
| Jarhult et al, ¹⁰ 1993 | 93 | 82 | ... | 10 | ... | 16 |
| Weber et al, ¹² 1994 | 51 | 92 | 2 | 0 | 22 | 2 |
| Rodriguez et al, ¹³ 1994 | 152 | 93 | 1 | 0 | 4 | 1 |
| Present study, 1996 | 102 | 95 | 1 | 1 | 6 | 1 |

Total **1259** **91%** **4.3%** **2.7%** **8.8%**



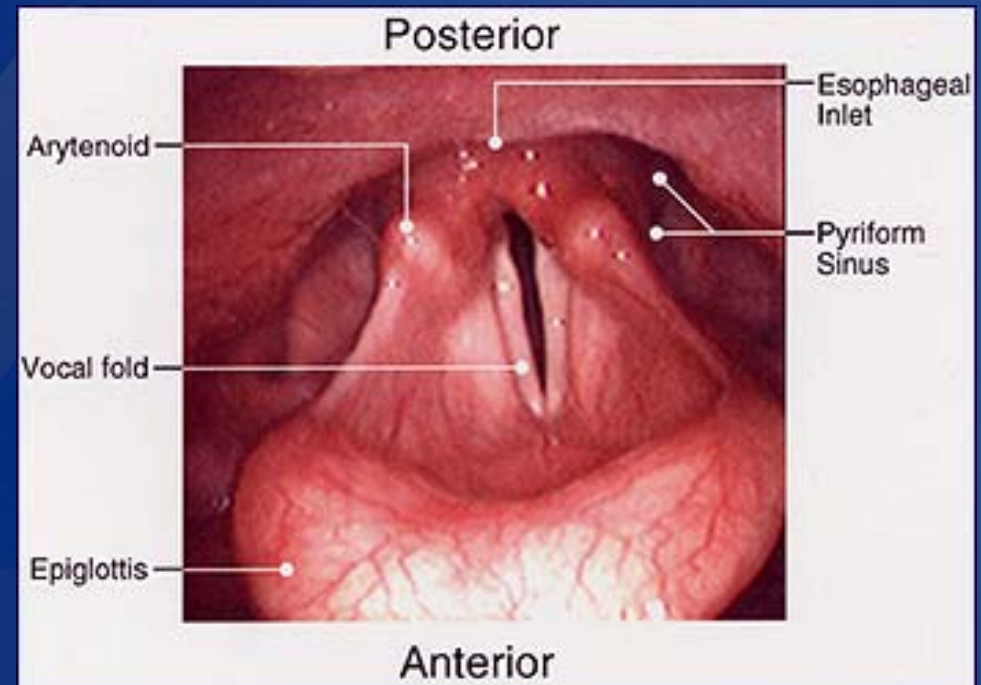
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Management of Nerve Injuries

- Temporary/Permanent
- Unilateral/Bilateral
- Complete/Incomplete
- Recurrent
Laryngeal/Vagus
- External Branch of
Superior Laryngeal

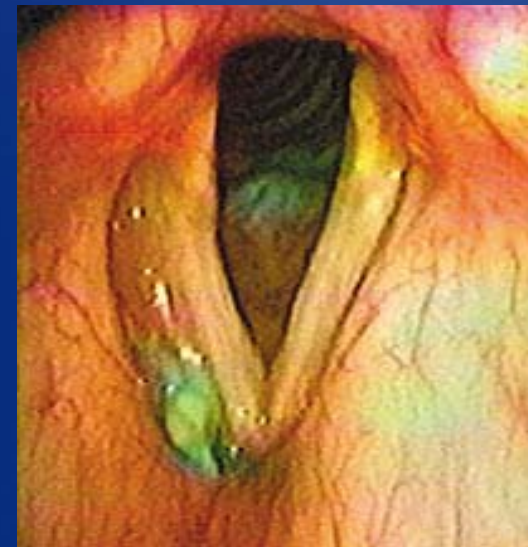


Superior Laryngeal Nerve

- Injury leads to impairment of upper vocal range
- Management is voice therapy

RLN Injury Effects

- Paralysis of the ipsilateral vocal fold and cord
- Dysphagia
- Aspiration – especially of liquids



Injury with intact nerve

- Temporary neuropraxia occurs due to manipulation or stretching of nerves
- Resolution over weeks to months
- Expectant management except for bilateral paralysis compromising airway or aspiration
- Most recover or compensate over time; laryngoscopy can distinguish



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Permanent Injury

- Flexible laryngoscopy to evaluate defects
- Voice therapy
- Medialization
 - Injection laryngoplasty
 - Laryngeal framework procedures
- Re-innervation
- Tracheostomy
- Feeding tube placement

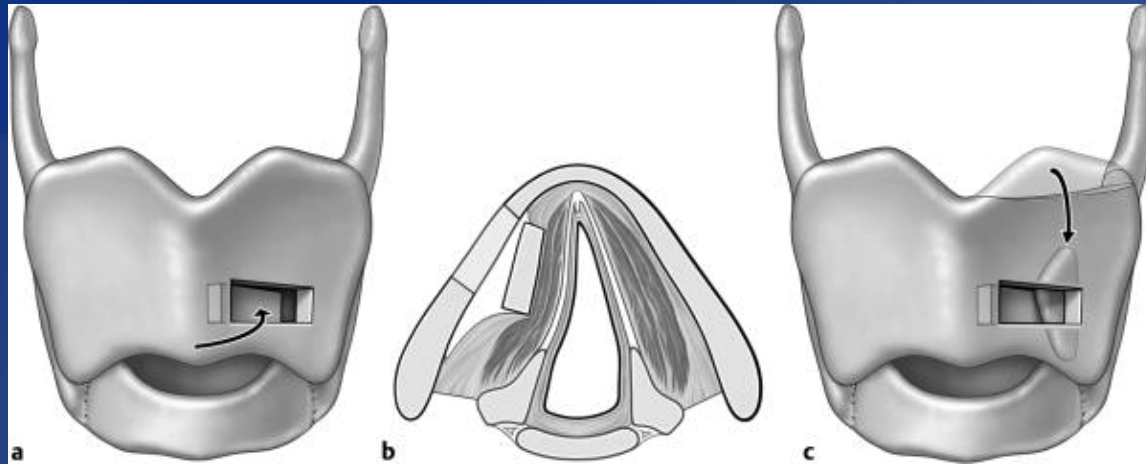


Medialization

- Correct voice defects
- Limits full opening of airway
- Best current results with thyroplasty for isolated nerve injury



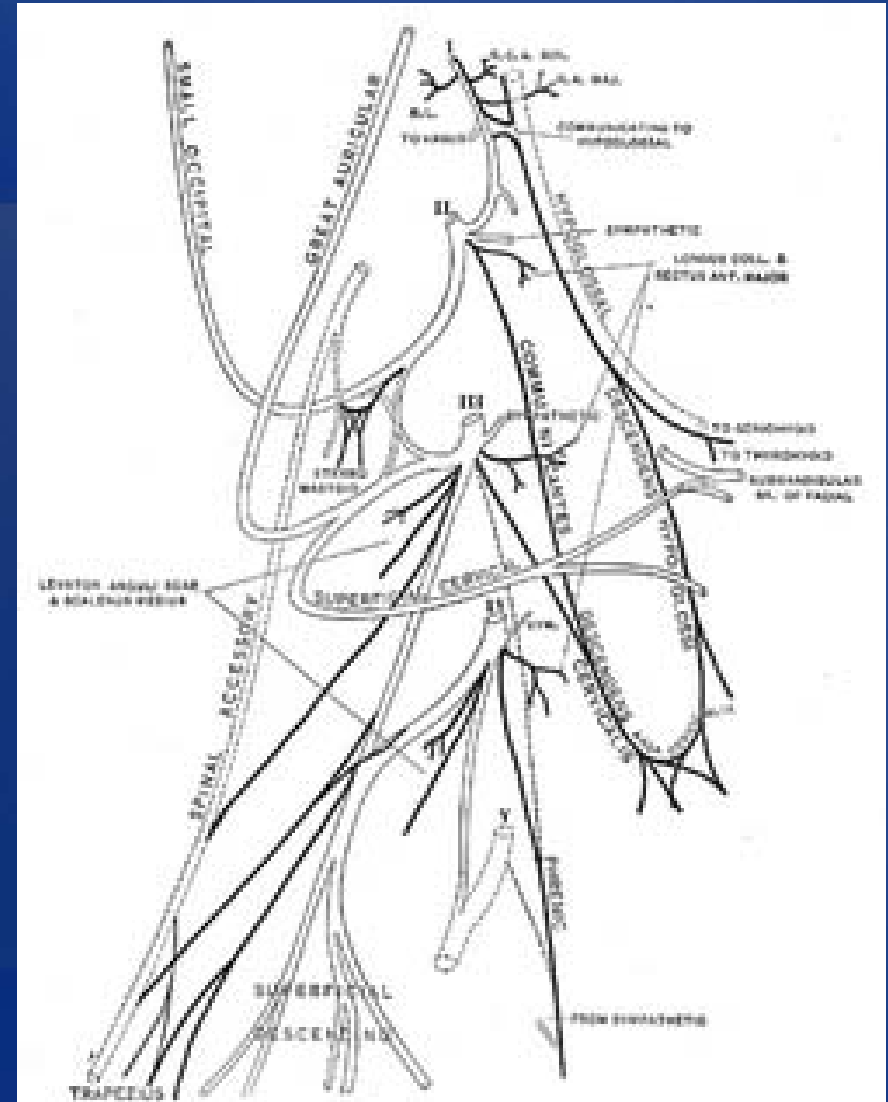
Type I Thyroplasty



- Medializes paralyzed cord with silastic placed through a window in thyroid cartilage
- Local anesthesia with larngoscopic and voice monitoring

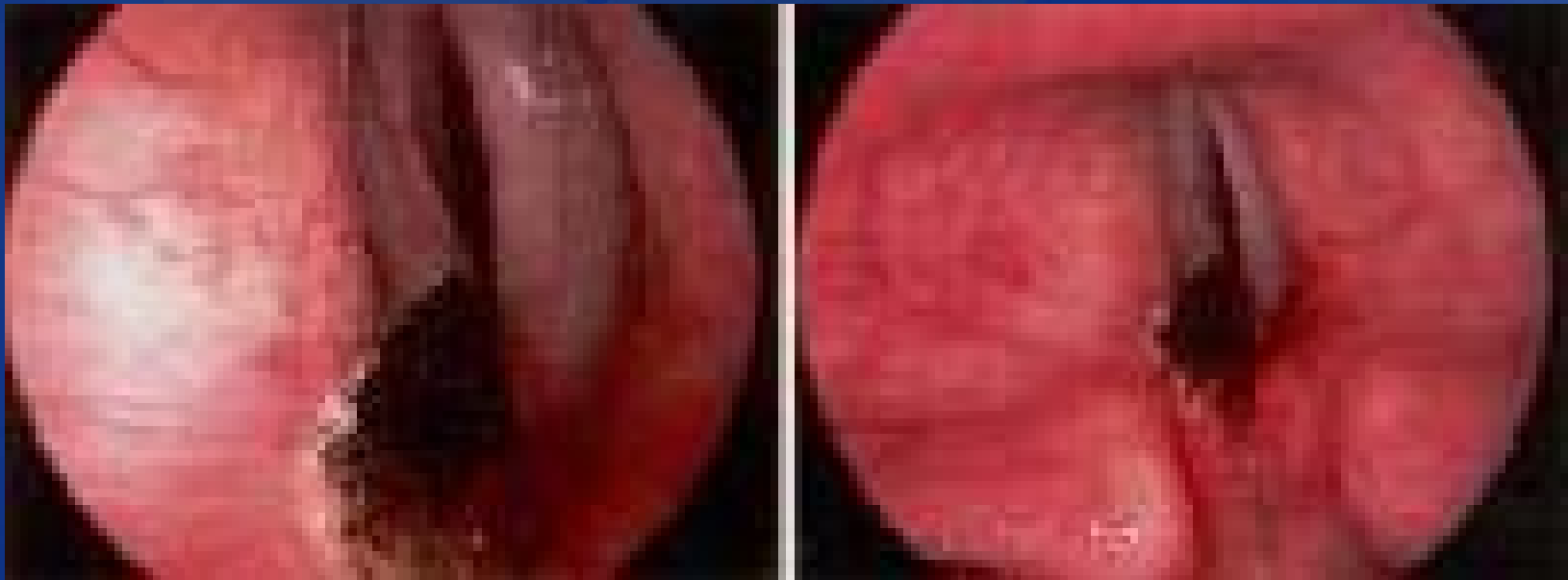
Re-innervation Procedures

- Transfer of ansa cervicalis to transected RLN can restore bulk and tone to vocal fold muscles – but not motion
- Nerve repair or transfer procedures not yet effective for RLN



Permanent bilateral injury

- Tracheostomy
- Posterior cordotomy
- Arytenoidectomy



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