Surgical Approaches to the Oropharynx

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Design and Function

- Deglutition
- Immunologic Surveillance
- Special Senses
- Phonation
- Respiration
Anatomy

- Anterior
- Posterior
- Lateral
- Superior
- Inferior
Anatomy

- Lateral pharyngeal walls
- Posterior pharyngeal wall
- Tonsil region
- Base of tongue
- Soft palate
Posterior/Lateral Pharyngeal Walls

- **Superior Constrictor**
  - Skull base
  - Medial pterygoid plate
  - Pterygomandibular raphe
  - Mylohyoid line of mandible
  - Lateral tongue

- **Middle Constrictor**
  - Hyoid bone
  - Stylohyoid ligament
Medial Pterygoid plate
Mylohyoid line
Skull Base
Pharyngeal Walls

- Nonkeratizing stratified squamous epithelium
- Pharyngobasilar fascia
- Muscle
- Fascial compartments
- Prevertebral fascia
Pharyngeal Walls

Prevertebral fascia

Carotid Artery
Tonsillar Region

- Waldeyer’s Ring
- Tonsillar Pillars
- Tonsillar blood supply (ECA)
  - Ascending pharyngeal
  - Ascending palatine
  - Lingual and facial arteries
- Location of Carotid artery
Soft Palate

- Fibromuscular structure
  - Levator veli palatini
  - Tensor veli palatini
  - Palatopharyngeous
  - Palatoglossus
  - Muscularis uvulae

- Lymphatics/Innervation

- Functions
  - Phonation
  - Deglutition
  - Special senses
Soft Palate
Base of Tongue

- Sulcus Terminales
- Circumvallate Papillae
- Intrinsic muscles
- Extrinsic muscles
  - Genioglossus
  - Styloglossus
  - Chondroglossus
  - Hyoglossus
Vallecula/Epiglottis

- Lingual tonsils
- Epiglottis
- Hyoepiglottic ligament
The developing oropharynx
Mandible

- **Anatomy**
- **Blood supply**
  - Inferior alveolar vessels
  - Periosteum
  - Facial and lingual arteries
  - Anastomoses
Lymphatic drainage

- Generally levels I, II, III
- Midline structures drain bilaterally
  - Tongue base
  - Soft palate/uvula
  - Posterior pharyngeal wall
- Retropharyngeal drainage
Surgery in the Oropharynx

- Complete tumor control
- Adequate exposure
- Preservation of function
- Minimization of cosmetic deformity
- Simplicity of technique
Approaches to the Oropharynx

- Transoral
  - True Transoral
  - Exposure via Pull-through
  - Exposure via Mandibulotomy

- Transcervical
  - Pharyngototomy
  - Laryngotomy
  - Laryngectomy
Transoral approach

- Lesions of the faucial arches, tonsils, upper posterior pharyngeal wall
- Small lesions $\leq 1.5\text{cm}$
- Can be combined with other approaches
- Advantages: simple, mandible intact, flexible
- Disadvantage: limited exposure
Transoral Approach

- retractor
- soft palate elevation (suture vs. catheters)
- avoid beveling
- can sew mucosa to prevertebral fascia (no graft)
Pull-through Approach

- Bilateral level I (at least) neck dissections
- Identification of hypoglossal and lingual n.
- Floor of mouth mucosa and extrinsic tongue muscles are divided – “dropping” the tongue into the neck
- Lingual n. and sublingual gland kept with mandible
Pull-through approach
Pull-through Approach

- **Advantages**
  - Better exposure than transoral
  - Intact lip sensation
  - Good facial cosmesis
  - Intact mandible

- **Disadvantages**
  - Exposure
  - Lingual n. divided
  - Bleeding
  - May need additional approach
Lip-split Mandibulotomy

- Entire tongue, soft palate, posterior pharyngeal wall, tonsillar fossae

- Advantages: preserve lip sensation, excellent exposure, continuity of specimen with neck dissections, may be combined with other approaches

- Disadvantages: mandibulotomy, lingual n. sacrificed, division of anterior extrinsic tongue muscles, need for larger mandibulectomy if tumor invades mandible, poor exposure of inferior posterior pharyngeal wall.
Mandibulotomy

- Lip incision in midline (vs. visor flap)
  - Mark vermilion border
  - Usually curve around chin pad
- Incision of vestibular mucosa with minimal elevation of periosteum (no more lateral than mental n.)
- Shape plate and drill holes before osteotomy
- Midline vs. paramedian vs. lateral osteotomy
  - Thin blade saw vs. Gigli saw
  - Stairstep vs. notched vs. straight
Mandibulotomy

- At least level I neck dissection (hypoglossal, lingual n.)
- Floor of mouth mucosa incised
- Myelohyoid, digastric mm divided
- Sublingual gland & lingual n. left on mandibular side of incision
- Mandible retracted laterally
Lip-split mandibulotomy

- Can divide pterygoids if need more exposure
- Reapproximate divided structures
- Mandible is plated.
Lip-split mandibulotomy with lateral pharyngotomy
Median Labio-mandibulo-Glossotomy

- “Trotter’s Procedure”
- Base of tongue, upper posterior pharyngeal wall, soft palate, nasopharynx
- Can be combined with palatal split
- Advantages: preserves all sensation, minimal morbidity
- Disadvantages: Lip-split mandibulotomy, tracheostomy
Median labio-mandibulo glossotomy

- Lip-split mandibulotomy
- Tongue incised in midline
Lateral mandibulotomy

- Lesions of the tonsil, base of tongue, parapharyngeal space, upper posterior pharyngeal wall
- Advantages: CN XII not in danger, anterior extrinsic tongue muscles intact, visor flap can be used.
- Disadvantages: Lingual n, Mental n., Alveolar vessels sacrificed—seldom used today
- Osteotomy made posterior to mental foramen
Mandibulectomy

- “Composite Resection”
- Used for tumors (tonsil, tongue, soft palate) invading mandible.
- Lip-split vs. visor incision
- Cheek flap
- Subperiosteal dissection from mental n. to ascending ramus. Mucosa incised
Mandibulectomy

- Mandibulectomy cuts made
- Mandible resected with specimen
- Reconstruction plate fitted and holes drilled (3 holes on each side)
- Soft tissue reconstruction
Cervical Approaches to the Oropharynx

- Pharyngotomy
  - Suprahypoid
  - Transhyoid/Subhyoid
  - High lateral
  - Low lateral

- Laryngotomy with partial vs. total laryngectomy
  - Suprahypoid supraglottic laryngotomy
  - Subhyoid supraglottic laryngotomy
  - Transthyroid supraglottic laryngotomy
  - Total laryngectomy with tongue base resection
Pharyngotomy

- History repeats itself
  - Vidal di Cassis, Jeremitsch (1895), Hoffman
  - Grunwald
  - Moore, Calcaterra

- Tumor margins

- Precision surgery

- Recent studies
Suprahyoid Pharyngotomy

- Tongue base, faucial arches, suprahyoid epiglottis, low posterior pharyngeal wall lesions
- Apron flap—hyoid identified
- Divide suprahyoid mm.
- Identify hyoepiglottic ligament
- Pharyngotomy
Pharyngotomy
Subhyoid approach
- Tumor invades hyoid
- Similar to suprathyroid approach

High lateral approach
- Little advantage over anterior approach, blind entry into pharynx, injury to sup. Laryngeal n., hypoglossal n., lingual a.
- Usually used in combination

Low lateral approach
- Hypopharyngeal lesions
- Blind entry into pharynx with all risks of high lateral
- Rarely used alone
Lateral Pharyngotomy

- Neck dissection (therapeudic or for identification of important structures)
- Greater and lesser cornu of hyoid skeletonized and greater cornu usually resected, upper portion of thyroid cartilage can be resected for exposure
- Retraction of Sup. Laryngeal n., hypoglossal n., lingual a.
- Direct pharyngotomy (high entry)
- Division of inferior constrictor and elevation of piriform mucosa with subsequent pharyngotomy (low entry)
High lateral pharyngotomy
High Lateral Pharyngotomy
High Lateral Pharyngotomy
Low Lateral Pharyngotomy
Low lateral pharyngotomy
High pharyngotomy combined with lip-split mandibulotomy
Supra/Subhyoid supraglottic laryngotomy/ectomy

- Used to excise tongue-base lesions which are adjacent to or invade the vallecula. The more extensive the tumor, the farther inferior the approach.

- Approach is similar to suprahyoid pharyngotomy except:
  - Hyoepiglottic ligament is divided at its origin
  - Dissection in underlying preepiglottic fat reveals lateral border of epiglottis
  - Laryngotomy performed between epiglottis and false cords

- At least one sup. Laryngeal neurovascular bundle is preserved.

- Closure includes suspension of the hyoid/thyroid cartilage and partial closure of larynx, if indicated
Transthyroid supraglottic laryngotomy/ectomy

- Oropharyngeal lesions which deeply invade the supraglottic larynx, but do not involve the true vocal cords or lower paraglottic space.
- Can be combined with pull-through approach
- Approach similar to supraglottic laryngectomy with transthyroid cartilage laryngotomy
- Total laryngectomy is performed for patients with oropharyngeal lesions which involve the larynx. It should also be considered for patients with poor pulmonary reserve.
Related Topics

- **Mandibulotomy**
  - Median vs. Paramedian vs. Lateral
  - If stairstep--15mm vertical cut
  - Post-operative morbidity historically 20% (0-80%)
- **Marginal mandibulectomy**
- **Tracheostomy**
  - Indicated when airway obstruction or aspiration is expected.
  - >50% of tongue base, bulky flaps, bolsters, low pharyngotomy, laryngotomy, glossotomy
Now THAT’S a pharyngotomy!