Historical Development of Microflap Surgical Techniques

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Historical Factors Supporting The Microflap Concept

- Myoelastic-aerodynamic theory 1950s
- Stroboscopy 1980s

- 1973 Hirano
  Histology of VF and Body-Cover theory
- 1985 Leonard is one of many showing scar from VF stripping

Preservation of vibratory mechanism

However, Multiple Factors Also Refuted The Microflap Concept

- Meyer 1984
  Still debating myogenic vs passive nature of phonation
- 1973 Hirano
  Body-cover theory
- Microflap Concept
- VF scar from stripping

Lore 1940s
VF Regeneration
Rogerson 1996
Stripping vs lasers

Microflap Concept Put Into Early Practice

Beginning with Bouchayer in France, microflap excisions were being performed at leading medical centers by the early 1990s.

However, no standards existed in surgical indications, technique, nor rehabilitation.
Early Technique
[Sataloff 1986]

“When surgery is indicated for vocal cord lesions, it should be limited as much as possible to the area of involvement.”

“An incision should be made on the superior edge of the vocal fold and the lesion removed submucosally.”

Epidermoid Cyst Excision
with Double-Bladed Elevator
[Hirano et al 1989]

• Retrospective Case Review
• 8 patients with 12 cysts
  – All pts subjectively improved
  – All regained wave on stroboscopy

Lateral Microflap
[Vanderbilt Group 1995]

Technical evolution brought us to the lateral microflap in the 1990s.

Retrospective study of 40 microflaps in 32 patients (1990-1993)
  – Wave returned in 18 of 24 vocal folds and maintained in all others
  – Subjective improvement in 28 of 30

Medial Microflap
[Vanderbilt Group 1997]

• Medial microflap approach evolved from the lateral technique for a select subset of lesions.

• Indications for Medial Microflap Excision include exclusive involvement of the medial surface, the presence of mucosal wave, and easy separation from ligament on palpation.

• Retrospective review of 22 medial microflaps on 17 patients (1993-1995)
  – 10 polyps, 9 nodules, 3 cysts
  – Near 100% improvement in stroboscopy and perceptual voice analysis
From Concept to Reality

Relevant early literature includes:
- Hirano 1973 – Anatomy of phonation
- Sataloff 1986 – First published technique
- Hirano 1989 – Double-bladed elevator
- Vanderbilt 1995 – Lateral microflap case review
- Vanderbilt 1997 – Medial microflap case review

Microflap Technique:
From Concept To Reality

The concept is simple:
- Remove the lesion
- Minimize disruption and removal of uninvolved lamina propria and mucosal cover
- Preserve the vibratory mechanism that supports phonation

Microflap Technique:
From Concept To Reality

- Developing the procedure was not straightforward.
- Important thoughts that advanced the procedure came about during different activities and in various locales, including:
  - Clinic
  - OR
  - Presentations
  - Air travel
  - Dreams
- Even today the technique continues to evolve

Practical Considerations

1. Type of lesion
2. Preoperative & Intraoperative Evaluation
3. Intraoperative Principles
4. Recovery & Rehabilitation
5. Follow-up
1. Characteristics Of The Lesion

- Nodules
- Polyps
- Cysts
- Scar
- Others

In addition to the type of lesion, important characteristics are found at time of operation:

- Some are easy to dissect free.
- Others are tightly adherent to the epithelium and vocal ligament.

1. Characteristics Of The Lesion

Due to variations in lesion characteristics, no series of technical steps was universally applicable.

Therefore, understanding the characteristics guides the operation.

- But how to best evaluate the lesion?

2. Preoperative & Intraoperative Evaluation

**Stroboscopy:**
- Vibratory characteristics of the lesion & local vocal fold
- Ability to review images pre- and postoperatively

**Intraop Evaluation:**
- Visualization
- Palpation

Evaluation Directs Surgical Technique

**Lateral Microflap**
- Reduced or absent mucosal wave
- Lesion adherent to underlying vocal ligament by palpation
- Diffuse lesion with indiscrete borders by palpation

**Medial Microflap**
- Intact or slightly reduced mucosal wave
- Medial surface involvement
- Easily separable from underlying ligament by palpation
3. Intraoperative Principles

**Head & Neck Surgery**
- Progress from known to unknown
- Tunneling
- Sharp & blunt dissection
- Closure

**Otologic Surgery**
- Magnification
- Dry field
- Micro-instruments

4. Recovery & Rehabilitation

**Recovery**
- Voice Rest
- Gradual return to voice use

**Voice Therapy**
- Speaking & Singing
- Preoperative
- Postoperative
5. Follow-up

• Frequent interval follow-up during the 1st post-operative year

• Less frequent during subsequent years

• Assisted by video-stroboscopy

• Helps to gain full appreciation of short-term and long-term healing and voice results

Summary

Microflap patients should be supported by a multidisciplinary team, ideally at a Voice Center

– Video-stroboscopic evaluation
– Speaking and singing voice evaluation and therapy

Microflap education and research should involve a multidisciplinary team approach

– Complex disease processes and evaluation
– Advanced training in laryngology (Fellowship)
– “Work in progress” with continued evolution of best practices
THANK YOU