Evaluation and Management of Ptosis

Pearls for the office and operating room

Oregon Academy of Ophthalmology

March 9, 2016

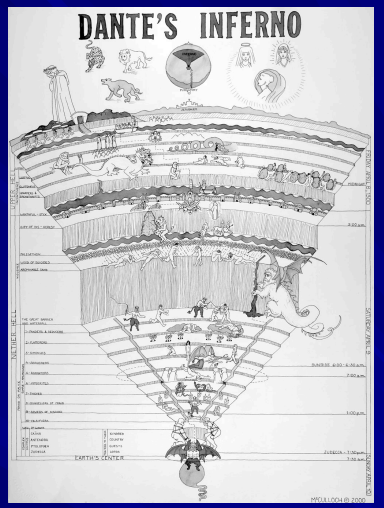
Mark J. Lucarelli, M.D., FACS

Professor

Director, Oculoplastic, Orbital & Facial Cosmetic Surgery

THE UNIVERSITY of WISCONSIN MADISON

Evaluation and Management of Ptosis



Overview

- classification
- history
- examination
- management options
  - external levator repair, conjunctival mullerectomy
- Lively Discussion!

broad scope for relevance – i.e. hx and exam

finer details re surgical technique

Evaluation and Management of Ptosis

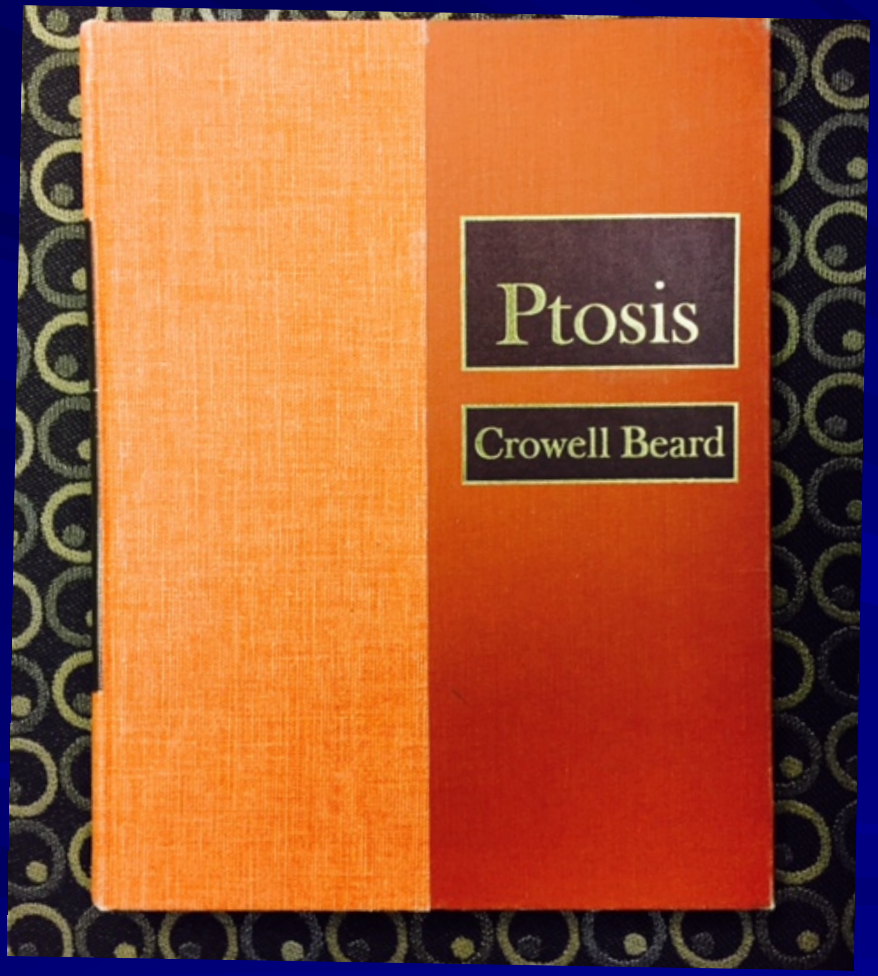
- Vast topic
  - PubMed search 2/11/18
  - "eyelid ptosis surgery"
    - English, Human, last 5 years
    - 494 citations

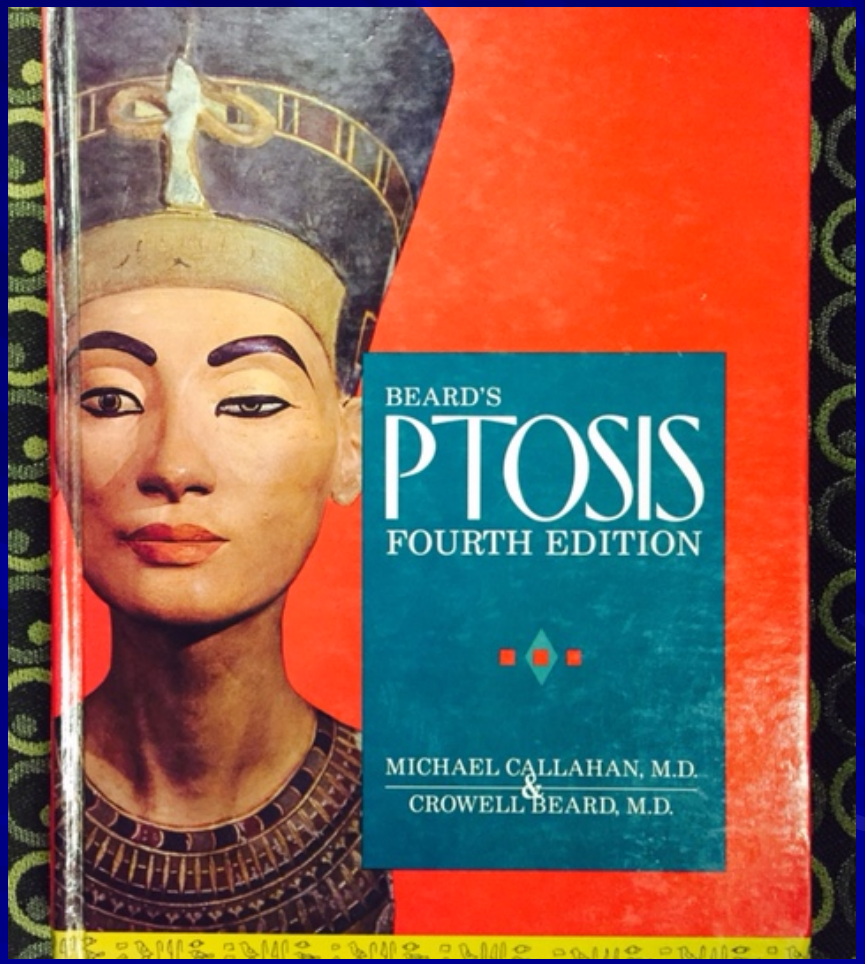
- Ptosis management can be challenging!

Dr. Crowell Beard 1940

Photo courtesy of Dr. George Bartley

Crowell Beard, MD





Evaluation and Management of Ptosis

- "Ptosis is hell…"
  - Richard K. Dortzbach, MD

9th Circle of Hell, Dante's *Inferno*

Image Credit: Wikipedia

Classification of Ptosis

- By Onset
  - Congenital
  - Acquired
- By Cause
  - Aponeurotic
  - Myogenic
  - Neurogenic
  - Mechanical
  - (Traumatic)

Classification of Ptosis

- Aponeurotic
  - Involutional
  - Trauma
- Myogenic
  - Congenital
  - Acquired myopathy
  - Trauma
- Neurogenic
  - Congenital
    - (CNIII, Horner's, MGunn)
  - Neurologic disease
  - Trauma
- Mechanical
  - Sev. dermato /brow ptosis
  - Tumor/ mass
  - Cicatrix / trauma

Involutional Ptosis

- acquired
- older age group
- good levator function
- high upper eyelid crease
- thin upper eyelid

Involutional Ptosis

Normal levator excursion

Congenital Ptosis

- usually subnormal levator excursion

Congenital Ptosis

Blepharophimosis Syndrome

Acquired Myogenic Ptosis

(Right gaze)

(Left gaze)

Chronic Progressive External Ophthalmoplegia

Acquired Neurogenic: Myasthenia Gravis

Variable measurements; assoc symptoms – diplopia

FatigabilityImprovement with ice test / Tensilon

Other diagnostics: Ach Rec Ab, SMFEMG

Neurofibromatosis

Multiple mechanism ptosis

History

- age of onset
- stable vs progressive
- common symptoms:
  - “heavy” eyelids
  - “tired” eyelids
  - usually worse in p.m.

History

- impairment of visual function
  - driving
  - television viewing, computer usage
  - reading
  - hobbies, esp. close work

History

- compensatory actions
  - brow recruitment
  - manual elevation of eyelids
  - chin up positioning
  - curtailing activities
    - driving
    - reading

History

- cosmetic concerns
  - fatigued / aged appearance

History

- Additional history
  - prior ocular or lid surgery, trauma, or chronic inflammation
  - contact lens usage
    - Especially hard lenses
      - removal method

History

- If history or exam atypical for involutional ptosis
  - variability
  - onset in young adulthood
  - sub-normal levator excursion (i.e. ≤ 11 or 12 mm)
- Then ask about other possible myopathic sx
  - diplopia
  - dysphagia
  - generalized weakness
  - family history of ptosis / muscular disorders

DDX: myasthenia, CPEO, oculopharyngeal dystrophy, etc.

History

- standard history prior to any eyelid surgery
  - dry eye
    - prior history, symptoms, artificial tear use
  - history of other ocular surface problems
  - anti-platelet / anti-coagulant medications
    - But often these must be continued

Ptosis - History

- Summary: 3 essential questions
  1. Involutional vs other etiology?
     - especially beware myasthenic / myopathic symptoms
  1. Visually symptomatic or not?
  2. Risk factors for repair
     - Significant dry eye or chronic ocular surface irritation?

Examination

Overview

- eyelid structure and function
- associated structure
  - brow ptosis, dermatochalasis, fat prolapse, etc.
- routine ocular exam
  - ocular surface
  - surface protection
  - even more important than in pre-blepharoplasty eval

Examination – lid measurements

- key upper eyelid measurements
  - margin reflex distance (MRD1): 3.5-4.5 mm

Examination – lid measurements

MRD-1 is to lid margin

Not to overhanging skin fold (MRD-F) *

* MRD-1 or MRD-F necessary for Medicare Criteria for Functional Eyelid / Brow surgery

Examination – lid measurements

- Levator excursion

  (levator function) ≥ 14 mm

Tip: effect of frontalis must be neutralized.

Exam - Lid Measurements

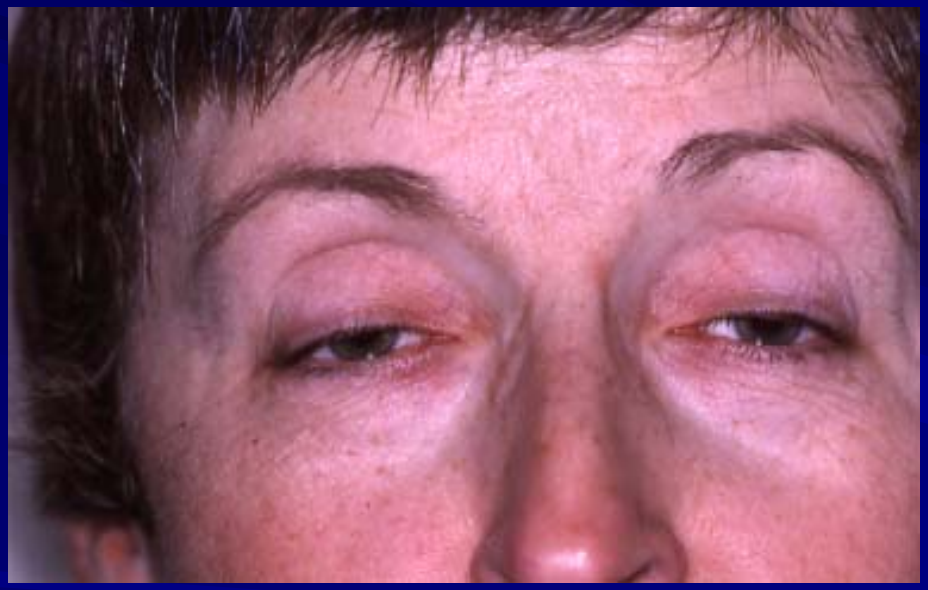
– eyelid crease

- 7-8 mm
- 8-9 mm
- 3-5 mm in Asian ethnicity

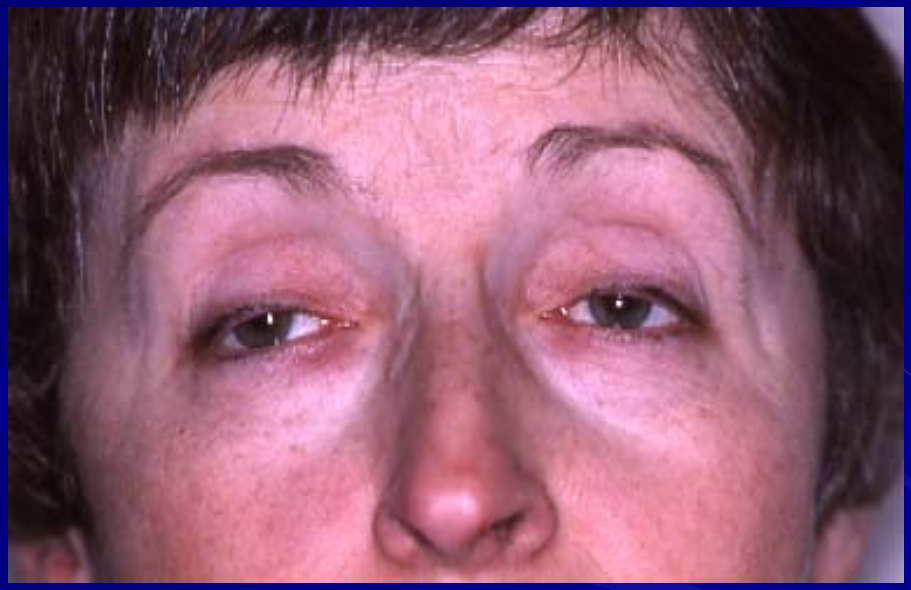
  – higher in involutional ptosis

  – less well-developed in congenital / myogenic ptosis

Exam - Lid measurements



Primary gaze



Up gaze

Examination – lid measurements

- Lid position in down gaze / reading

  Examine in reading position after ~20-30 seconds

Exam - Hering's effect

Phenylephrine test

Examination - ocular surface protection

- spontaneous blink
- complete eyelid closure

- Other (prn):
  - Bell's phenomenon
    - Usually poor with CPEO variants, 3rd nerve
    - Important consideration when levator function is sub-normal
    - Critical when frontalis suspension anticipated
  - corneal sensation (selected patients)
    - e.g. prior herpetic keratopathy

Examination

- Ocular Surface

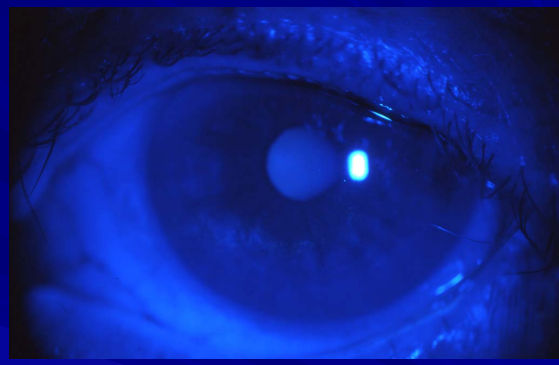
  look for low-grade irritation / dryness

  - mild conjunctival injection
  - tear meniscus (at slit lamp): *beware if ≤ 0.1 mm*

Burkat CN, Lucarelli MJ. *Ophthalmology* 2005;112:344-348.

Examination – ocular surface

- If any of the following warning signs:
  - History of punctal plugs
  - Current artificial tear use > 3x / day
  - Conjunctival injection (1+ or more)
  - Low Tear meniscus (≤ 0.1 mm)



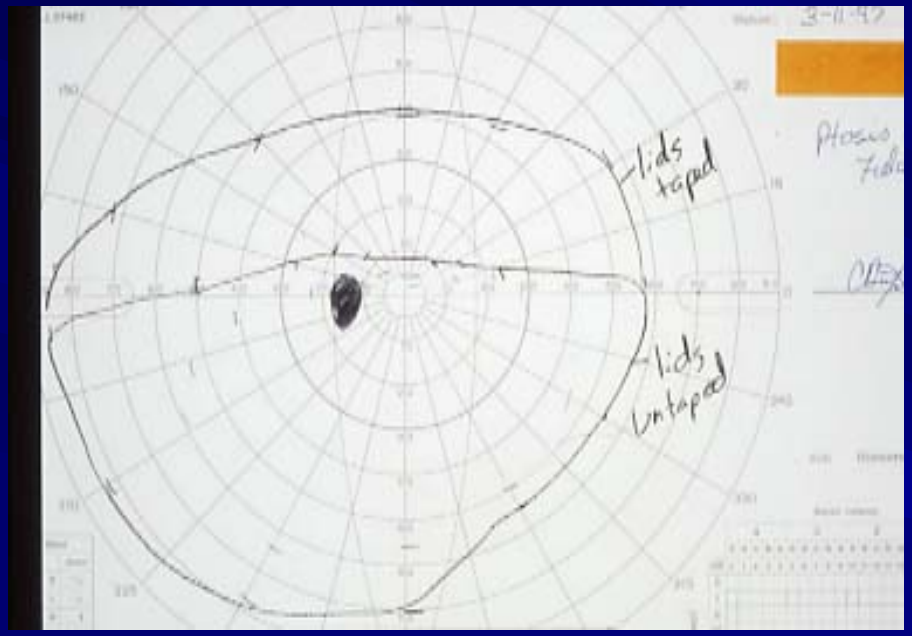
- Then:
  - Examine ocular surface with fluorescein
  - Some recommend Schirmer's

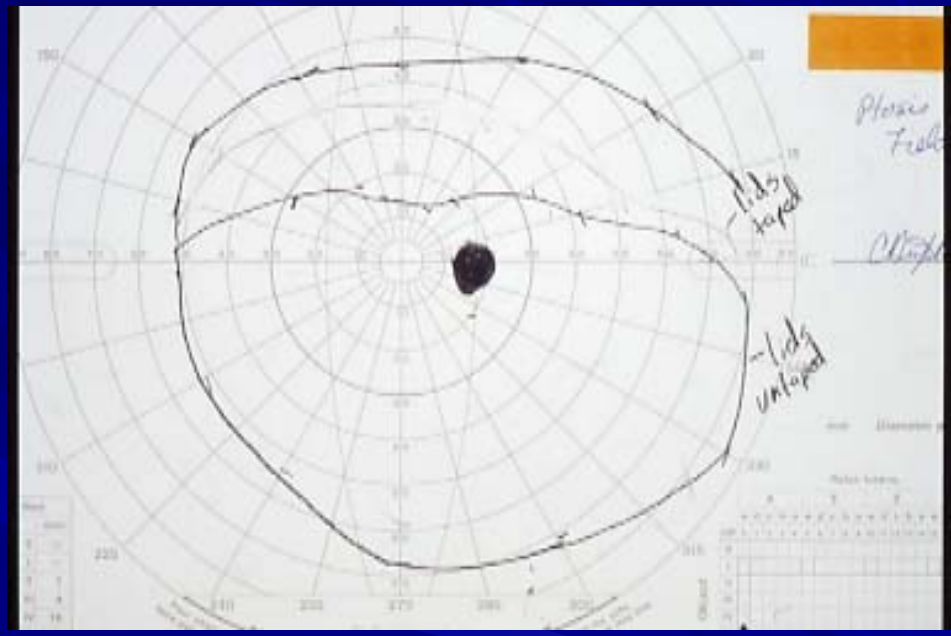
Visual Field Testing

Required prior to functional blepharoplasty or ptosis repair by most insurers and most Medicare LCD's

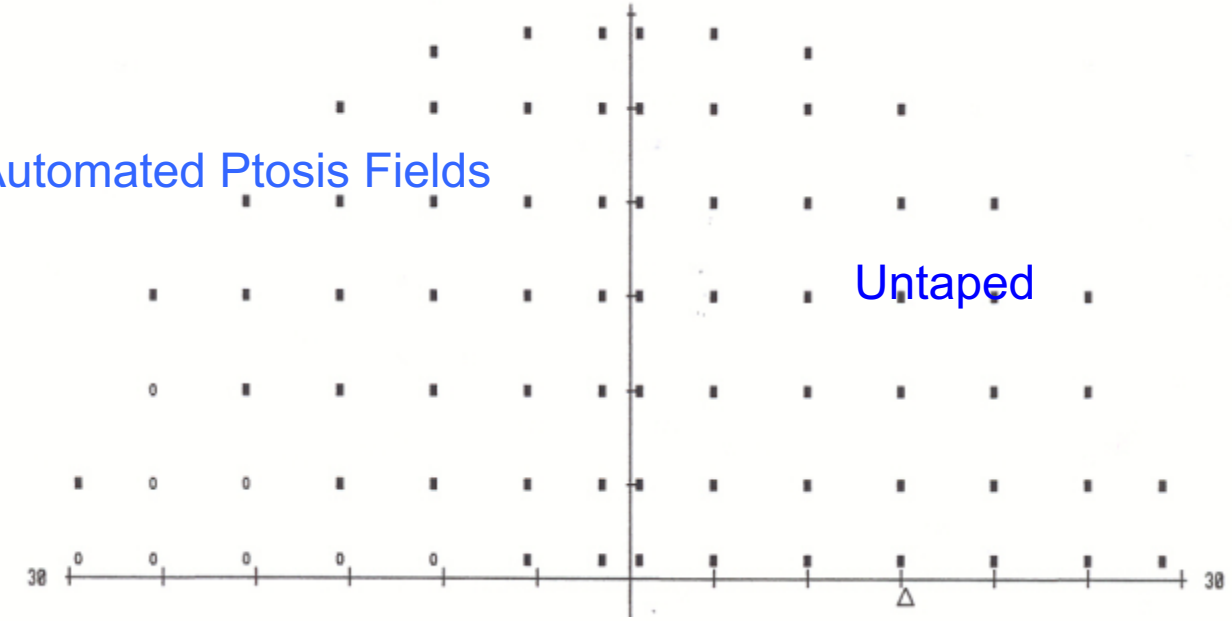
- Medicare (Wisc NGS LCD)
  - 30% improvement of superior visual field
  - 12 degree improvement of superior field
- U.S. commercial insurers
  - Highly variable
  - Most: Superior field encroachment between 20-30 degrees above horizon
  - *Some carriers now requiring obstruction inside 20 deg!*

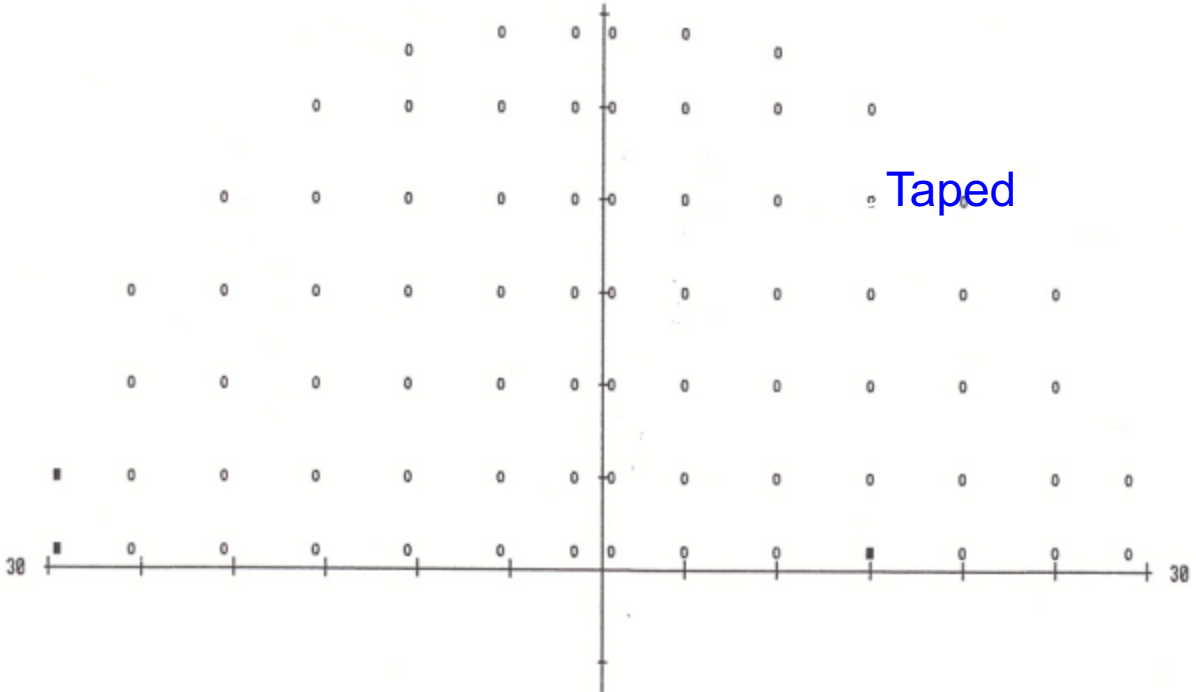
Goldmann Ptosis Visual Fields

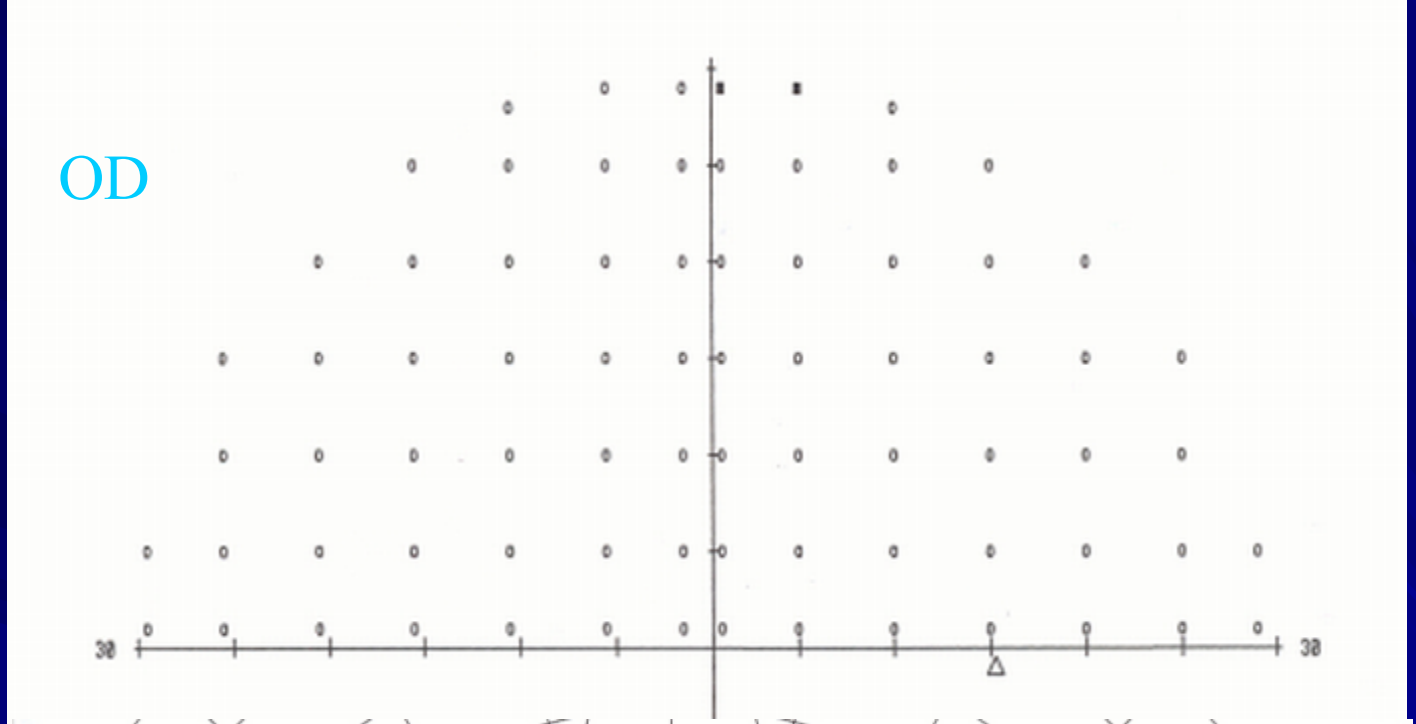


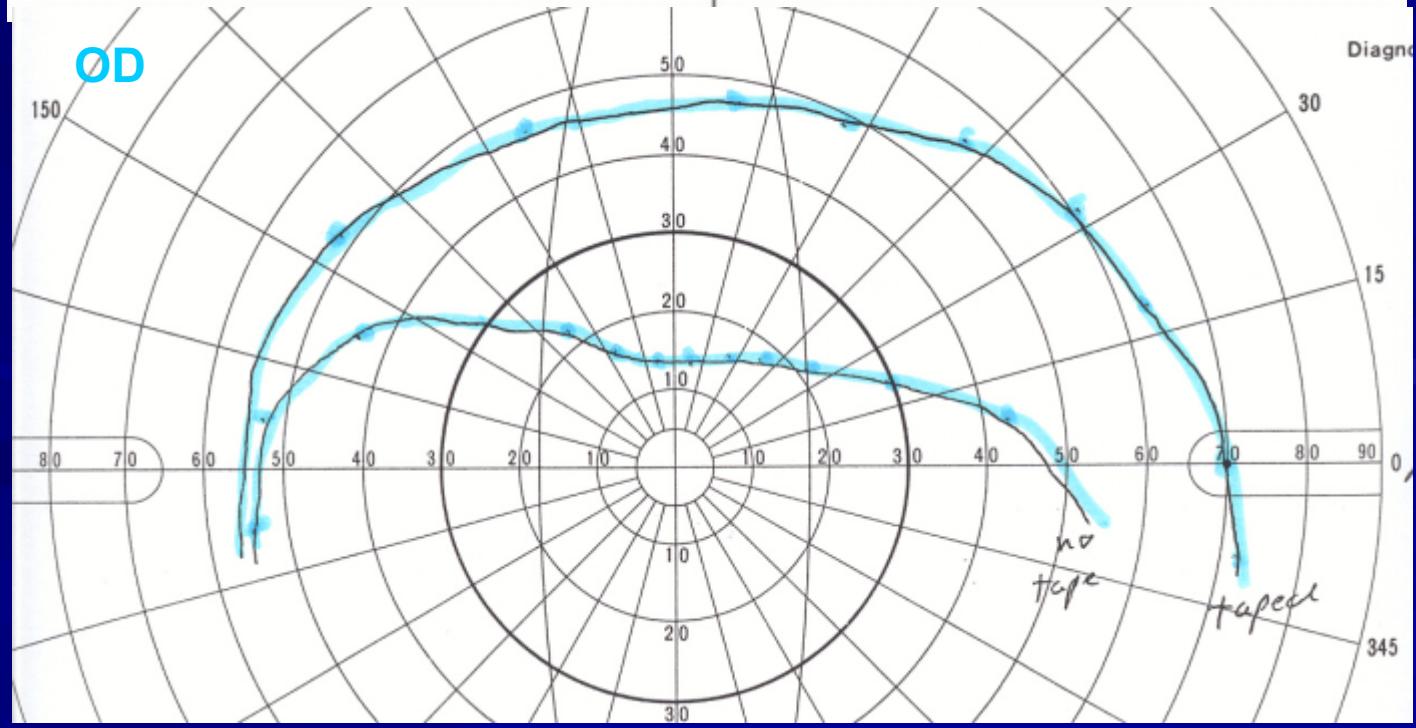


Automated Ptosis Fields






OD
30
30


OD
150
30
15
345
50
40
30
20
10
10
20
30
40
50
60
70
80
90
no tape
taped

Medicare Fnx Eyelid Surgery

- Noridian LCD L36286) 10/2015

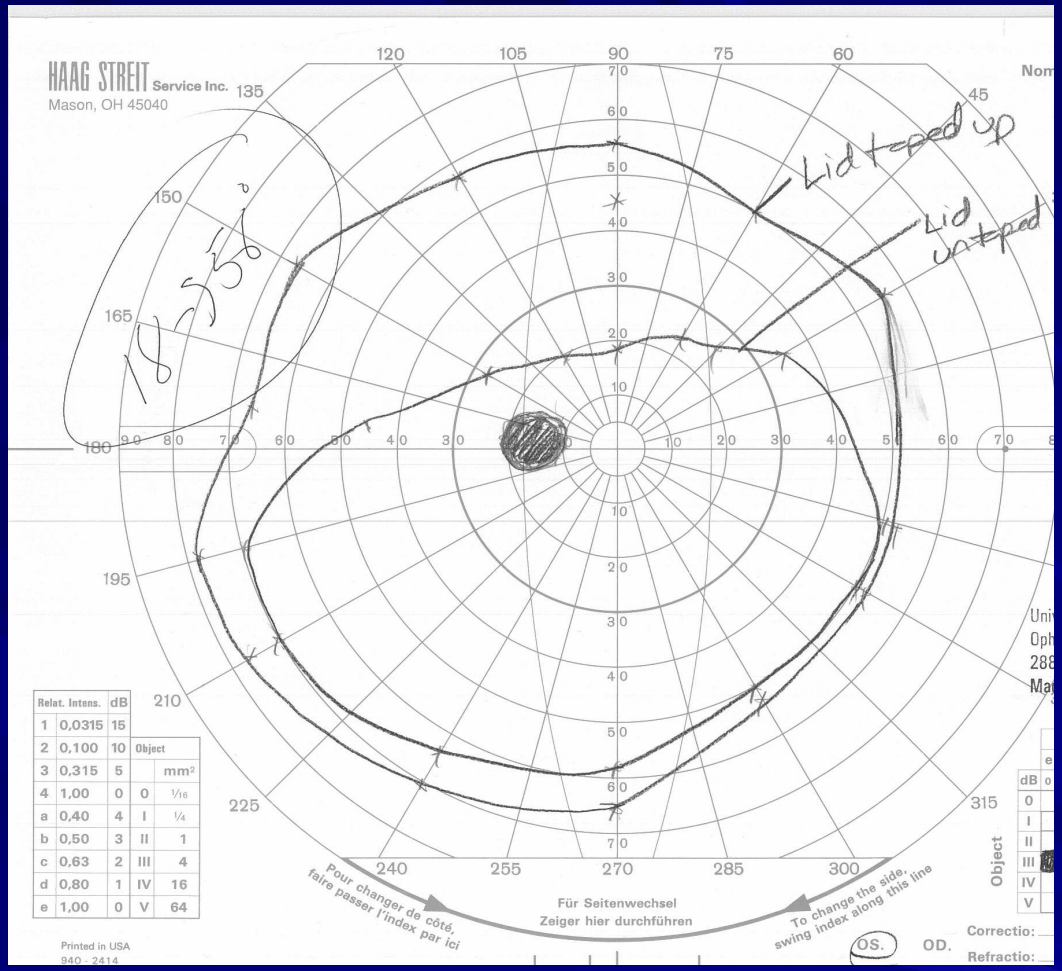
  - Patient complaints and physical signs
    - MRD ≤ 2.0 mm for ptosis repair
    -"Pseudo-MRD" (aka MRDf) < 2.0mm for bleph

  - Photos

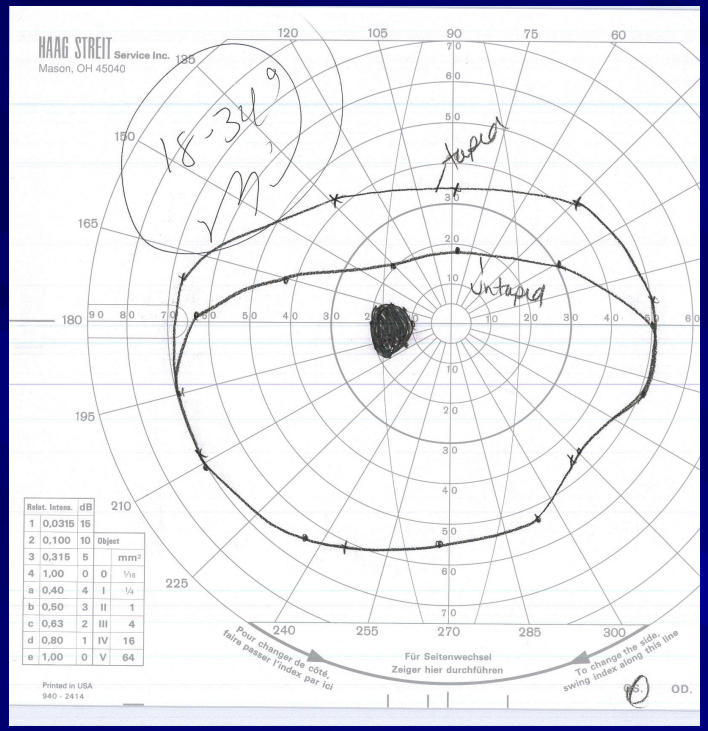
  Visual Fields NOT required

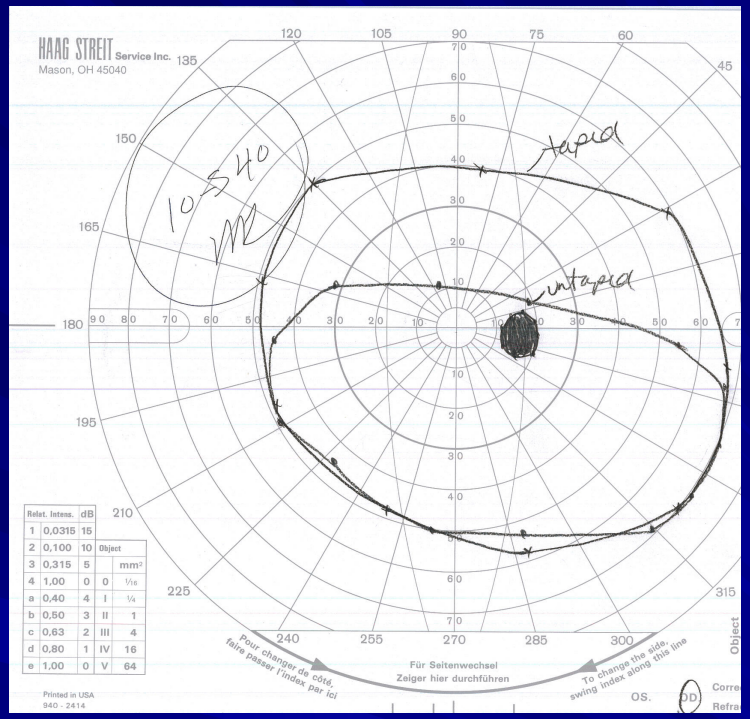
Medicare Fnx Eyelid Surgery

- NGS Medical Policy Article 51525
  - MRD ≤ 2.5 mm (even for blepharoplasty)
  - Visual Fields: 12 degree or 30% improvement
  - Photos



Impression: Visually signif dermatoch and brow ptosis





Impression: Visually signif involuional ptosis

Ptosis Surgical Options

- Most frequently utilized:
  - Conjunctival-mullerectomy
  - External levator repair
  - (Frontalis suspension)

Conjunctival Mullerectomy

- posterior approach
- “Putterman technique”
- phenylephrine test predicts result
- great technique

Putterman A. Urist M. *Arch Ophthalmol;* 1975.

Conjunctival Mullerectomy

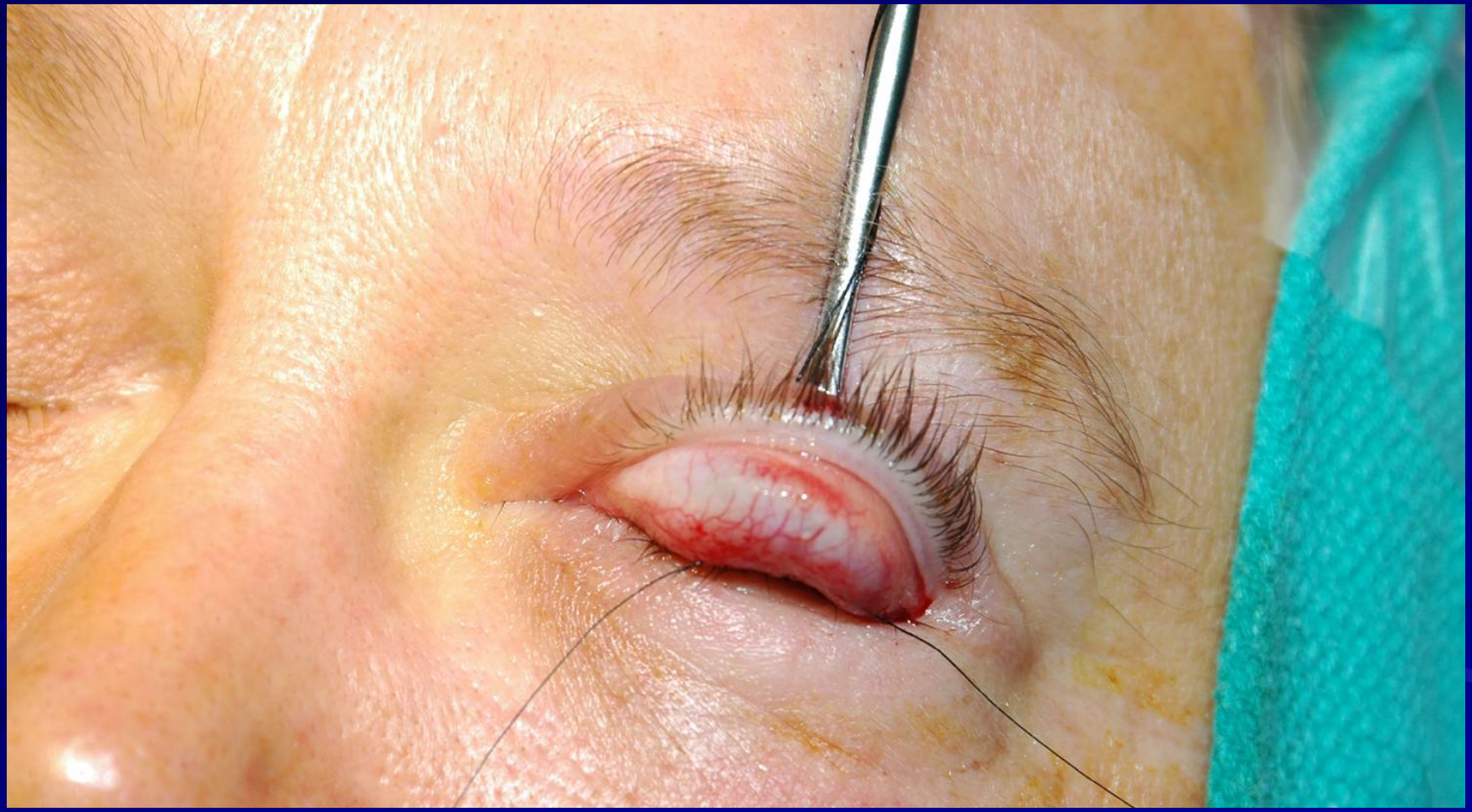
- Many useful descriptions / modifications:
  - Putterman A. Urist M. *Arch Ophthalmol;*1975
  - Weinstein G, Buerger G. *Am J Ophthalmol*; 1982
  - Dresner S. *Ophthal Plast Reconstr Surg*; 1991
  - Foster JA, Holck DE, Perry JD et al *OPRS*; 2006

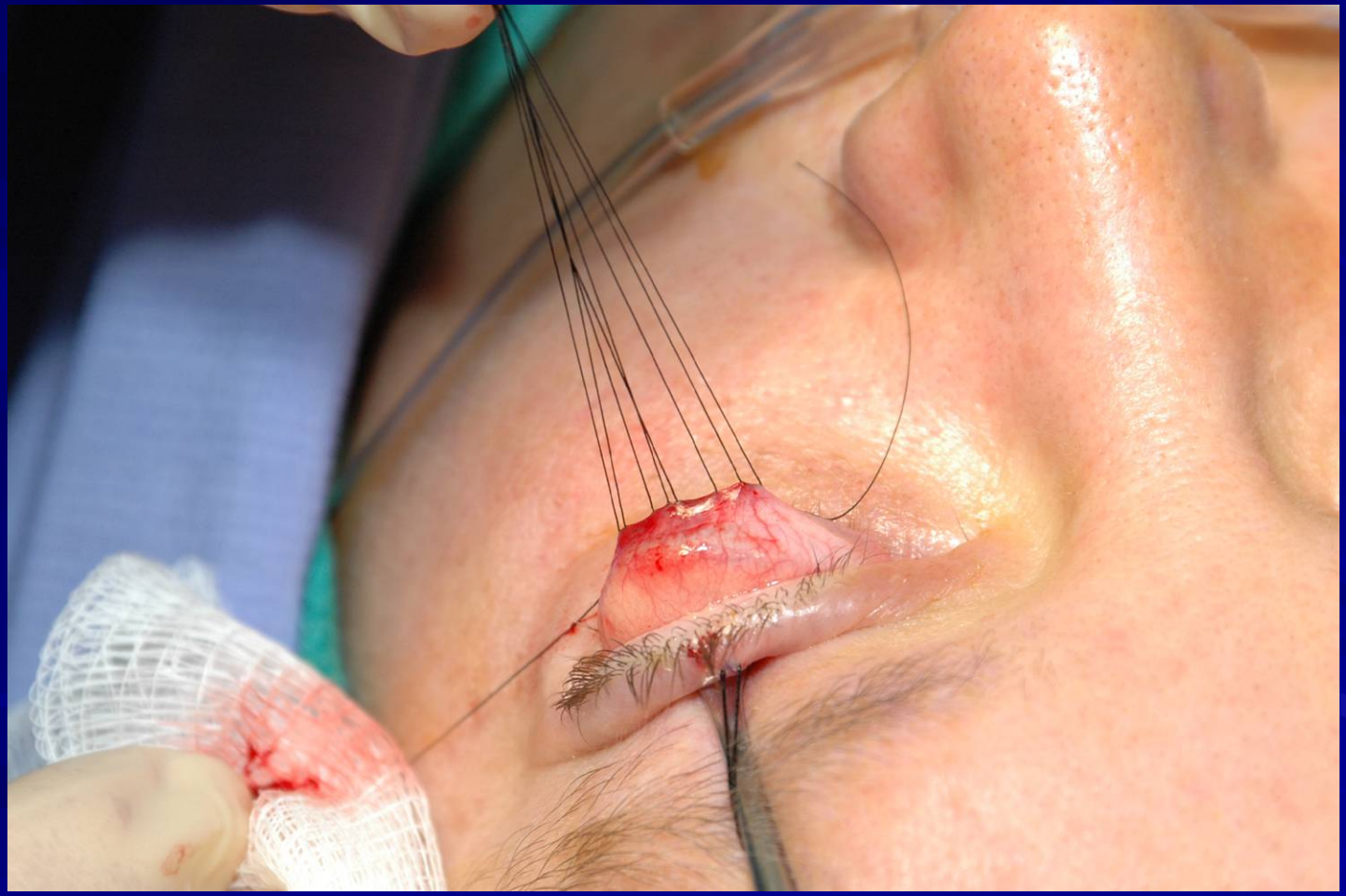
Conjunctival Mullerectomy

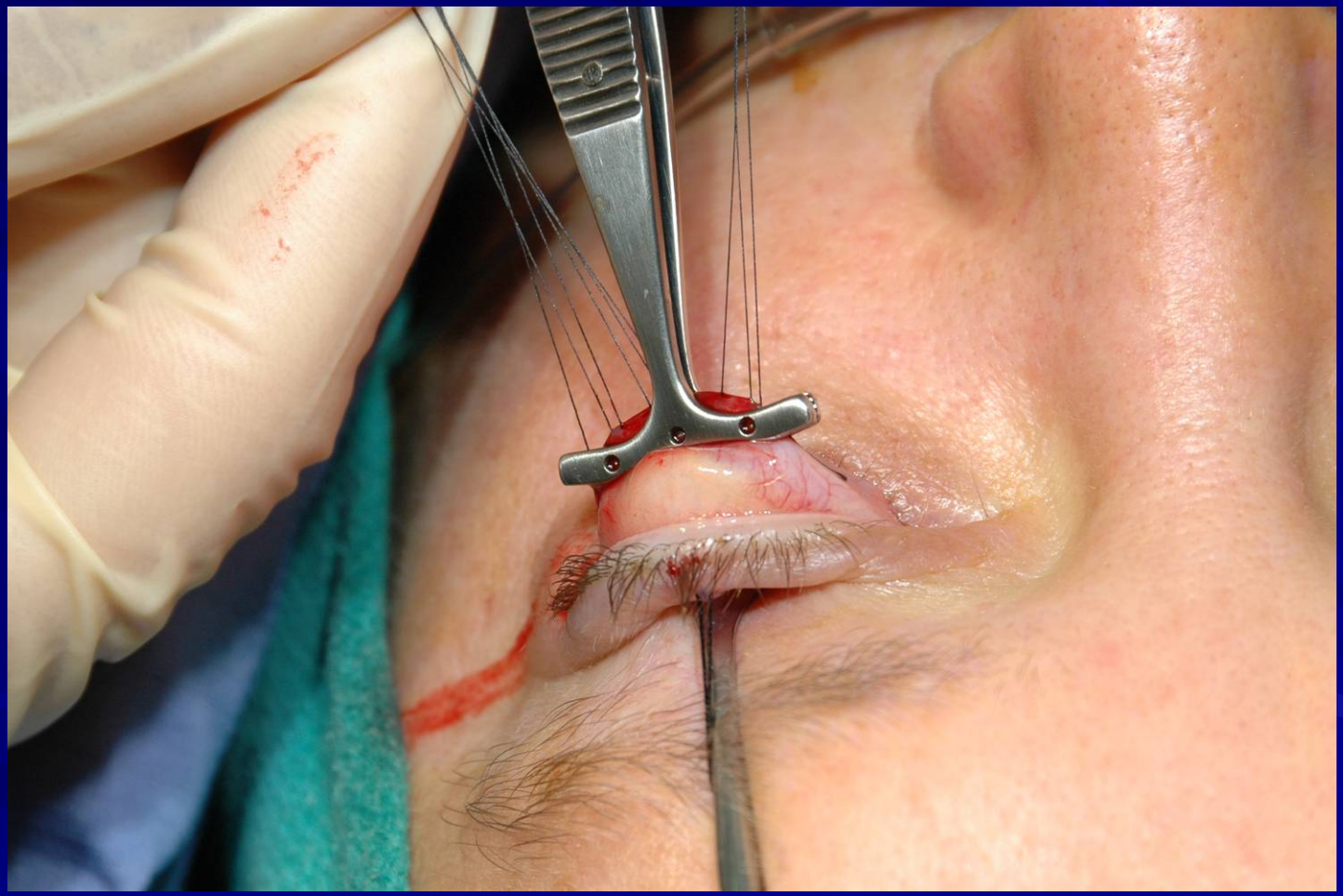
- Advantages:
  - Predictable and effective
  - Quick
  - Not technically challenging
  - Patient “participation” not needed
    - Great with deep sedation or general anesthesia
    - Avoids skin incision
  - Can be graded to degree of ptosis present

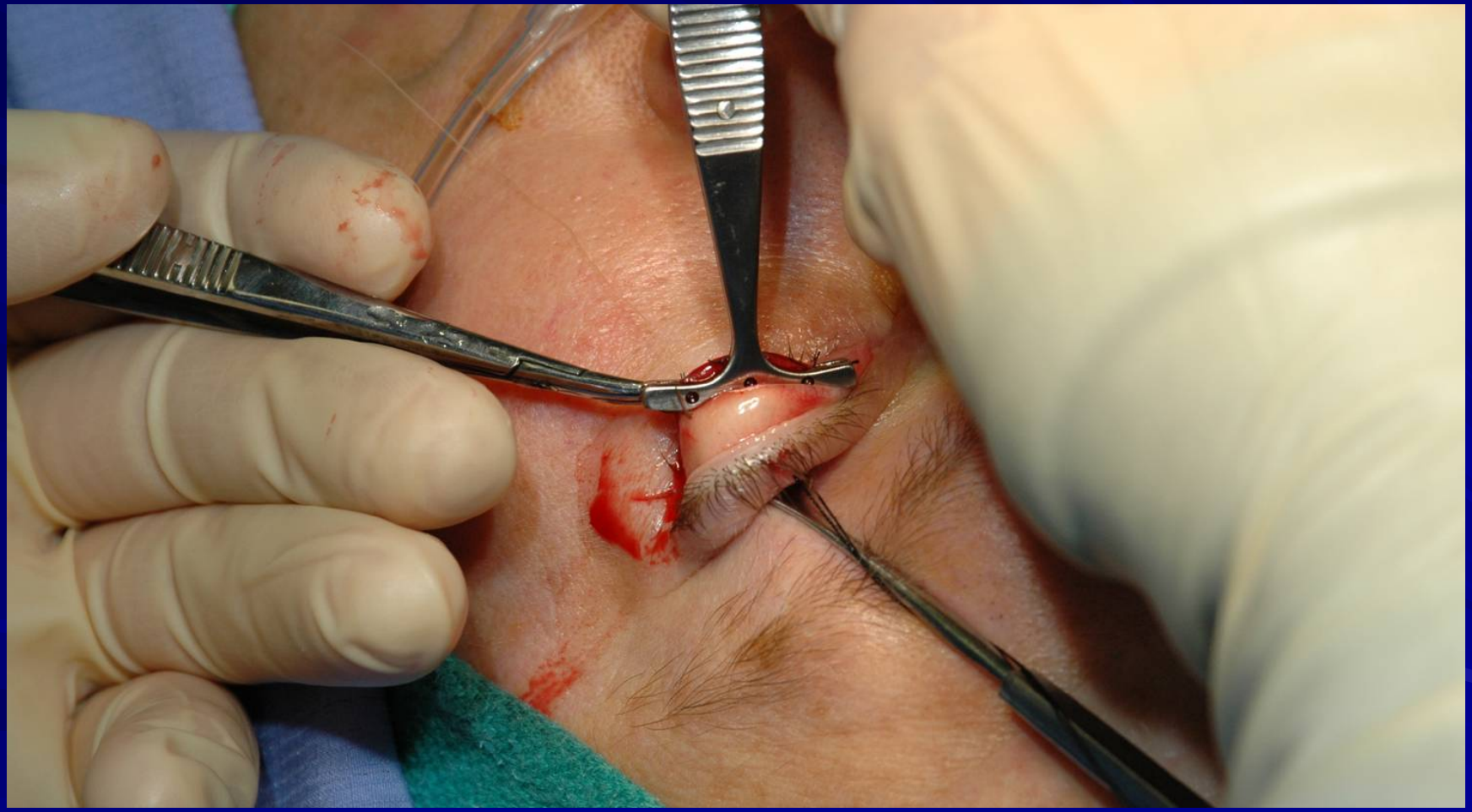
Conjunctival Mullerectomy

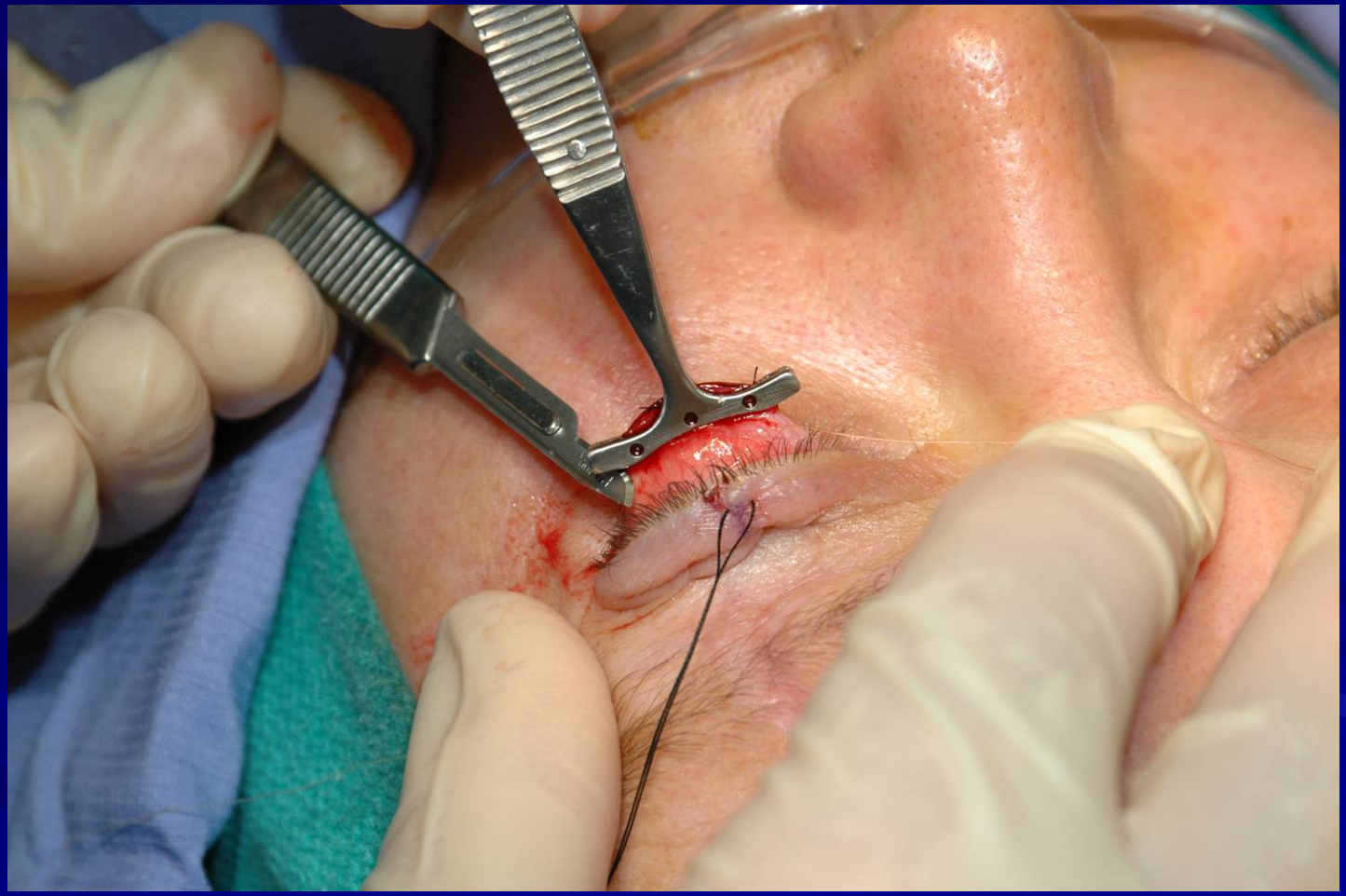
- Favored:
  - When no blepharoplasty is desired
  - When phenylephrine test suggests good result
  - Unilateral cases (no alteration of lid crease)
  - Generally for ptosis of 2-2.5 mm or less
  - Microptosis
  - For highly anxious patients











External Levator Repair

- Work-horse for ptosis surgery
- Especially useful with simultaneous blepharoplasty
- Adjustable intraoperatively and post-operatively
- Versatile: useful for any degree of ptosis with levator excursion ≥ 5 mm.
- But: somewhat less predictable than conj. mullerectomy

Anatomy

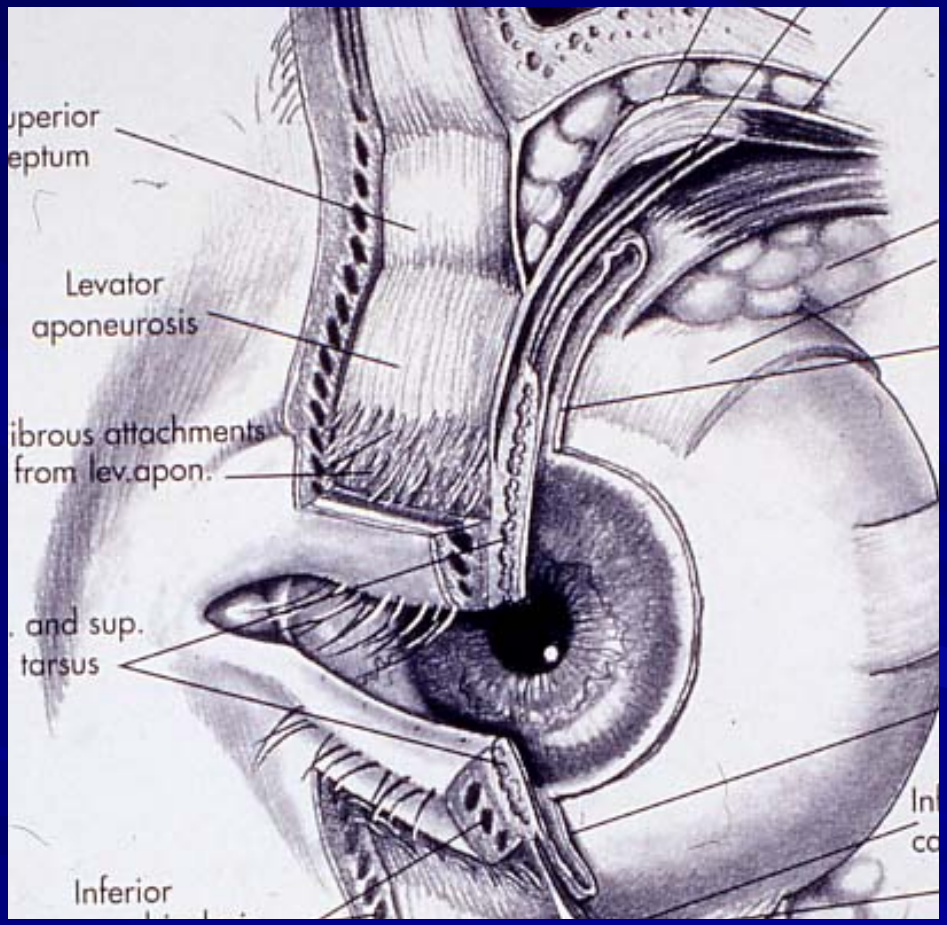
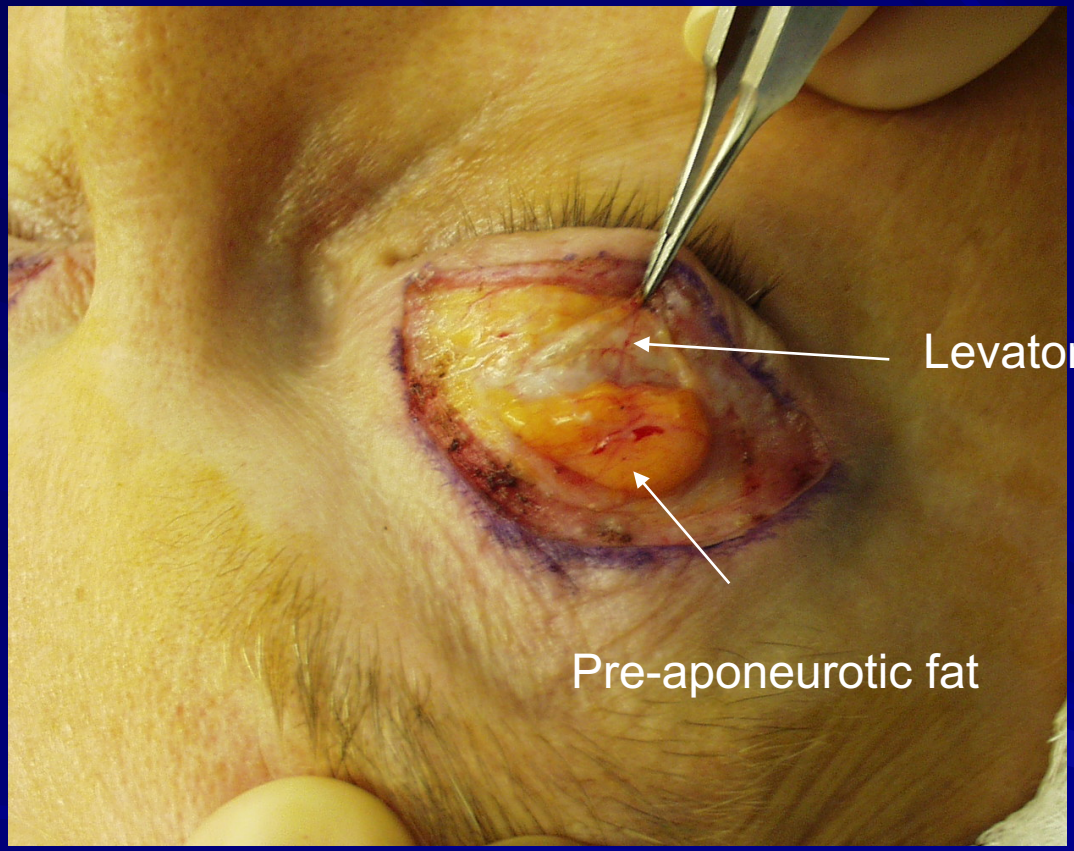


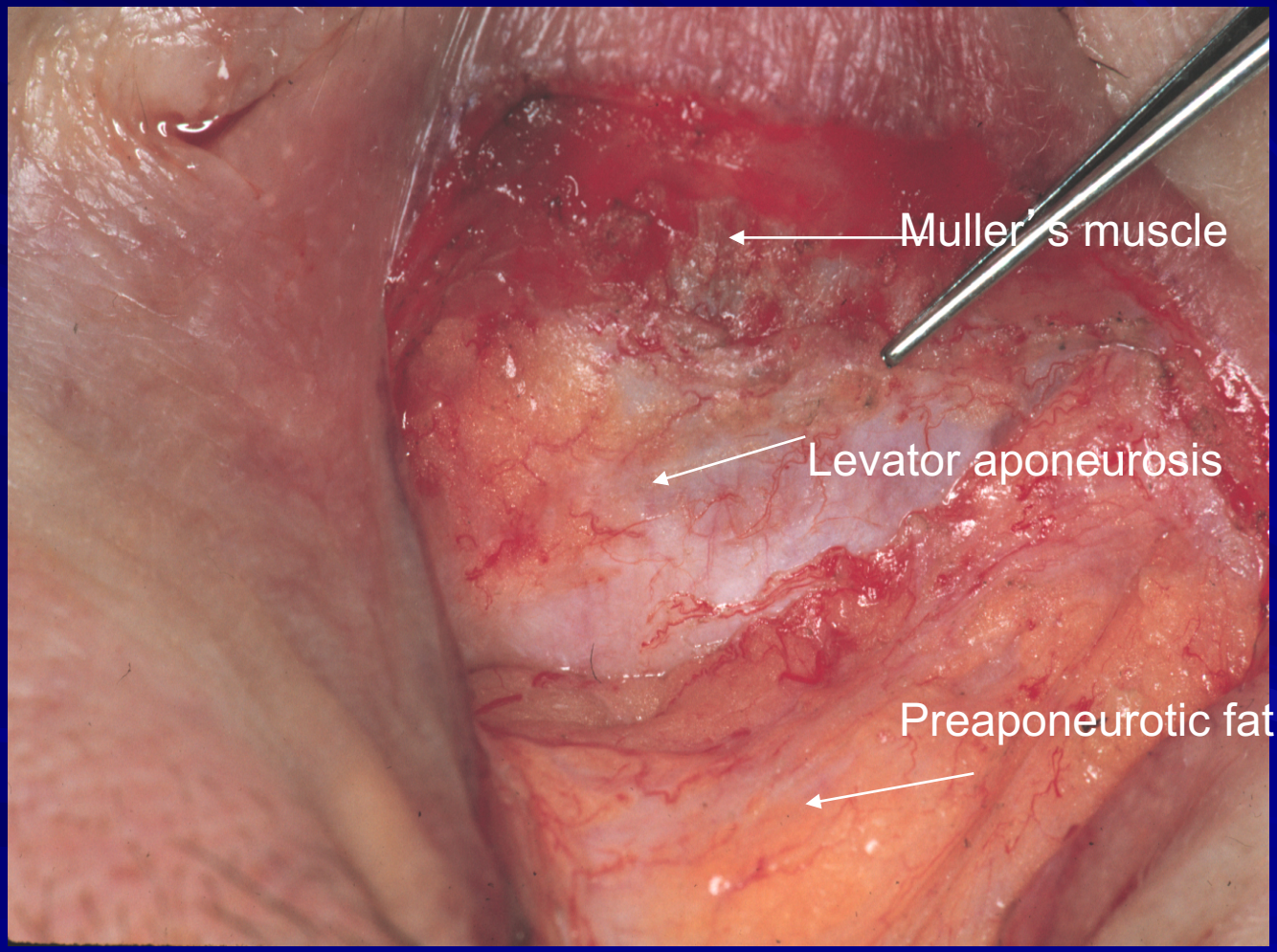
Image credit: Lemke BN, Lucarelli MJ. In Nesi FA.

External Levator Repair

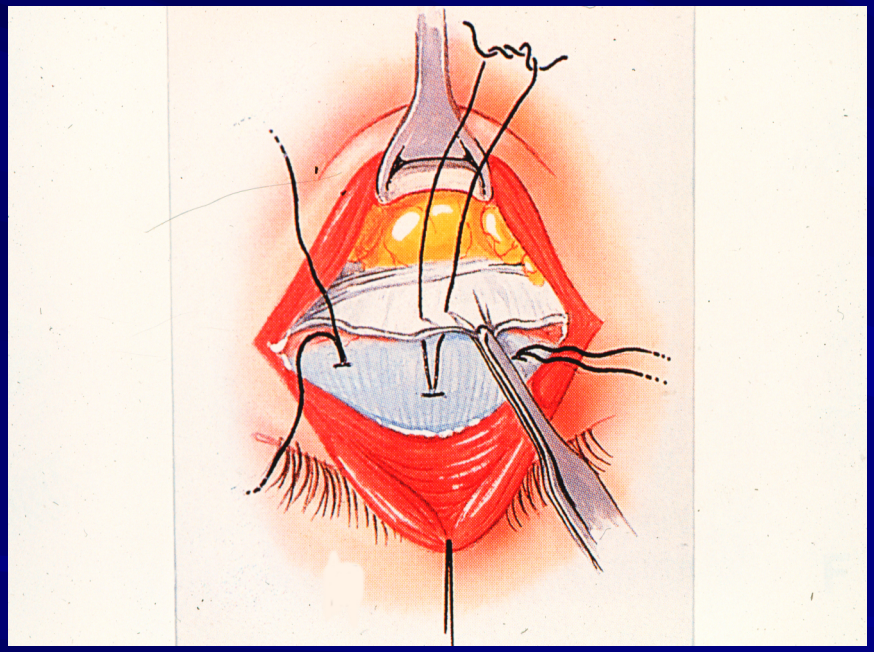


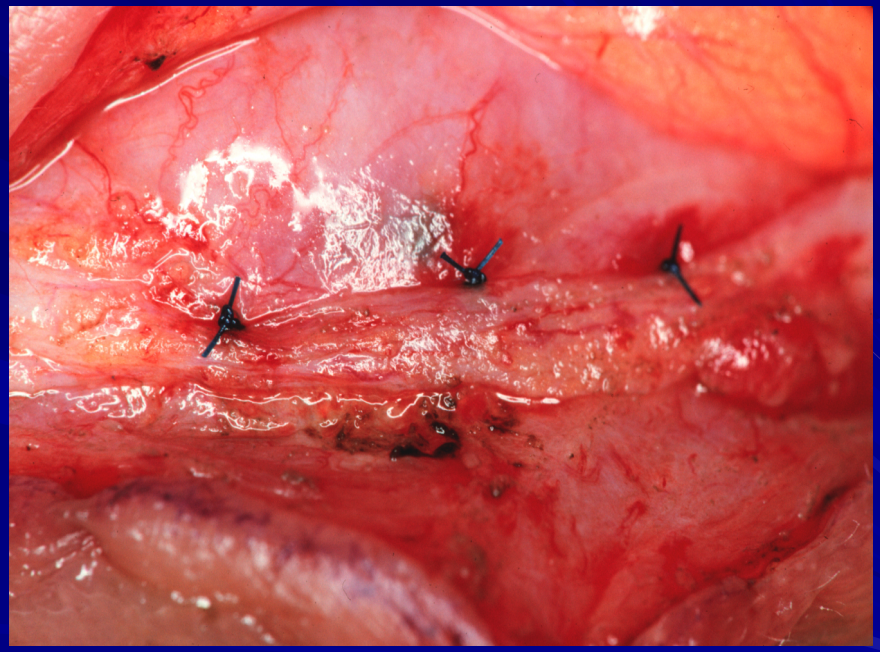
Surgeon's View

Levator Dehiscence



External Levator Repair





External Levator Repair

Beard's Table

Degree of Ptosis	Levator Function	Choice of procedure, amount of levator resection
Mild 2mm or less	Good (8 to 12 mm)	Fasanella-Servat or Small levator resection (10 to 13mm)
	Fair (5 to 7 mm)	Moderate levator resection (14 to 17 mm)
Moderate (3mm)	Good (8 to 12 mm)	Moderate levator resection (14 to 17 mm)
	Fair (5 to 7 mm)	Large levator resection (18 to 22 mm)
	Poor (4 mm or less)	Maximum levator resection (23 to 27 mm)
Severe (4mm or less)	Poor (4 mm or less)	Callahan procedure Beard procedure Super-maximal levator resection (27 mm) Unilateral sling
	Fair (5 to 7 mm)	Maximum levator resection (23 to 27 mm)

From Beard's Ptosis, Fourth Edition

External Levator Repair

Minimizing variables → Better results

Intraoperative Variables

- local anesthetic
- edema, hemorrhage
- supine vs. upright position
- squinting- discomfort, lights
- sedation
- anxiety – increased sympathetic tone
- Hering's effect

External Levator Repair

- Minimizing variables:
  - Avoidance of NSAIDS, ASA, etc. pre-op
    - Increasingly NOT possible; documentation of informed consent
  - Reduce patient anxiety (i.e. coach patient pre-op to participate intra-op)
  - Communication with Anesthesia team
    - Propofol
    - Avoid long acting sedative / narcotic agents
    - "This patient needs to sit up and be completely awake 20 minutes into surgery..."
    - 10 minute warning

External Levator Repair

- Minimizing variables:
  - Mark lids (including pupillary position) before local
  - Symmetric, limited volume of local anesthetic: 1 cc/ lid
    - 50%/ 50% mix 2% lido and 0.5% Marcaine, 1/100,000 epi
  - Meticulous hemostasis
    - Thrombin and gelatin hemostatic prn
  - Limit dissection to what is needed
    - Limit pretarsal dissection to area of potential supporting sutures
    - Advancement of aponeurosis favored over levator resection for involutional etiology
    - Deal with fat after lid height is set

External Levator Repair

- Minimizing variables:
  - Non-absorbable sutures advancing levator aponeurosis (6-0 polypropylene)
  - Horizontal position of cardinal suture guided by marking of pupil from beginning of case
  - Suture high on the tarsus (superior 1/3)
  - Inspect after cardinal suture(s) placed
  - Careful inspection with patient fully awake and upright
    - Primary gaze
    - Up gaze
    - Reading position
    - Gentle closure
  - Attention to both lid height and contour

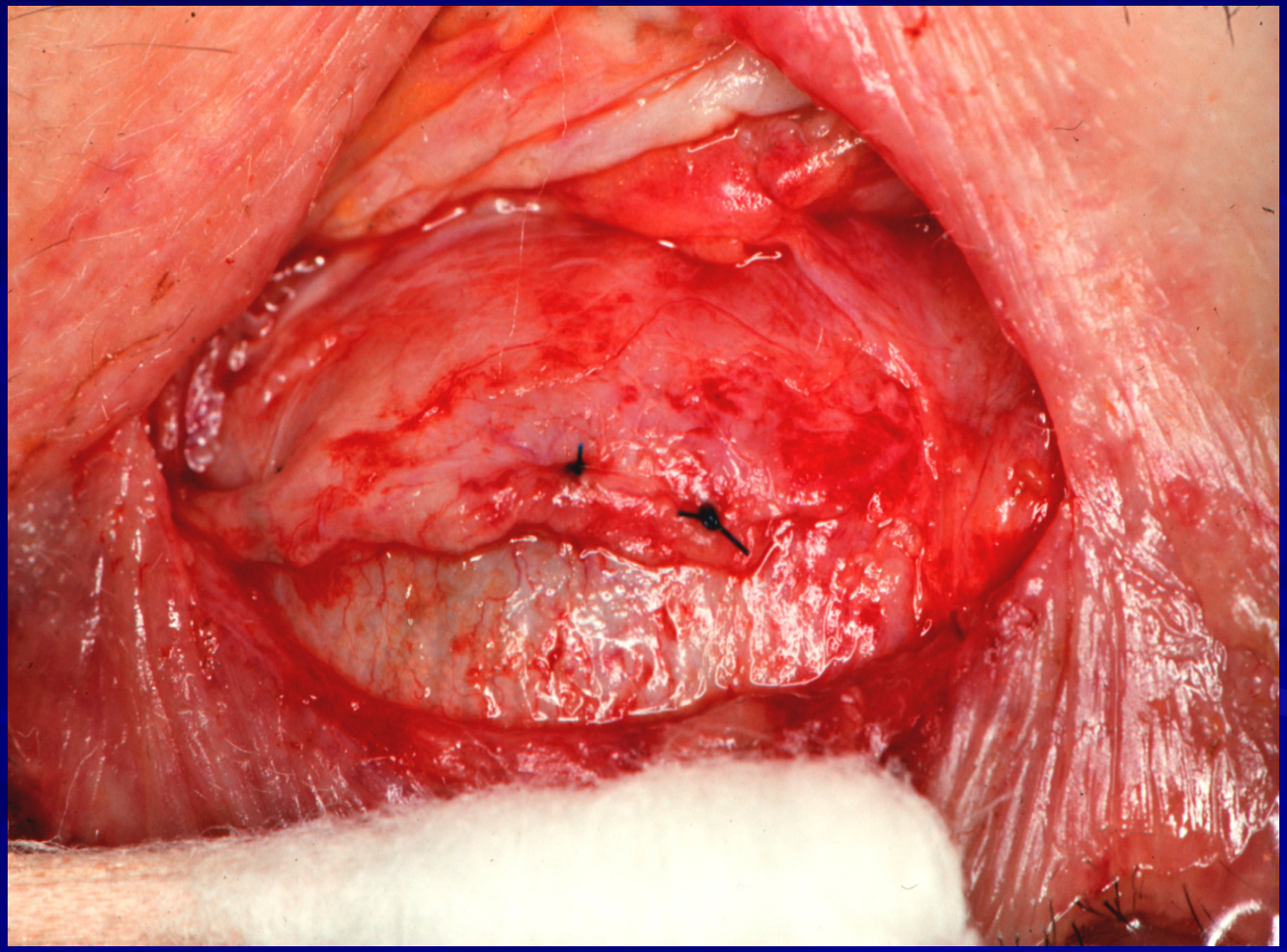
External Levator Repair

- Minimizing variables:
  - Adjustment / replacement of cardinal suture
    - “hang-back” suture adjustment works well
  - Supplemental medial and lateral supporting sutures as needed
  - Tie any hang-back sutures over Catroviejo needle holder
  - Post-op: delay any office adjustments until about 2 weeks p.o.

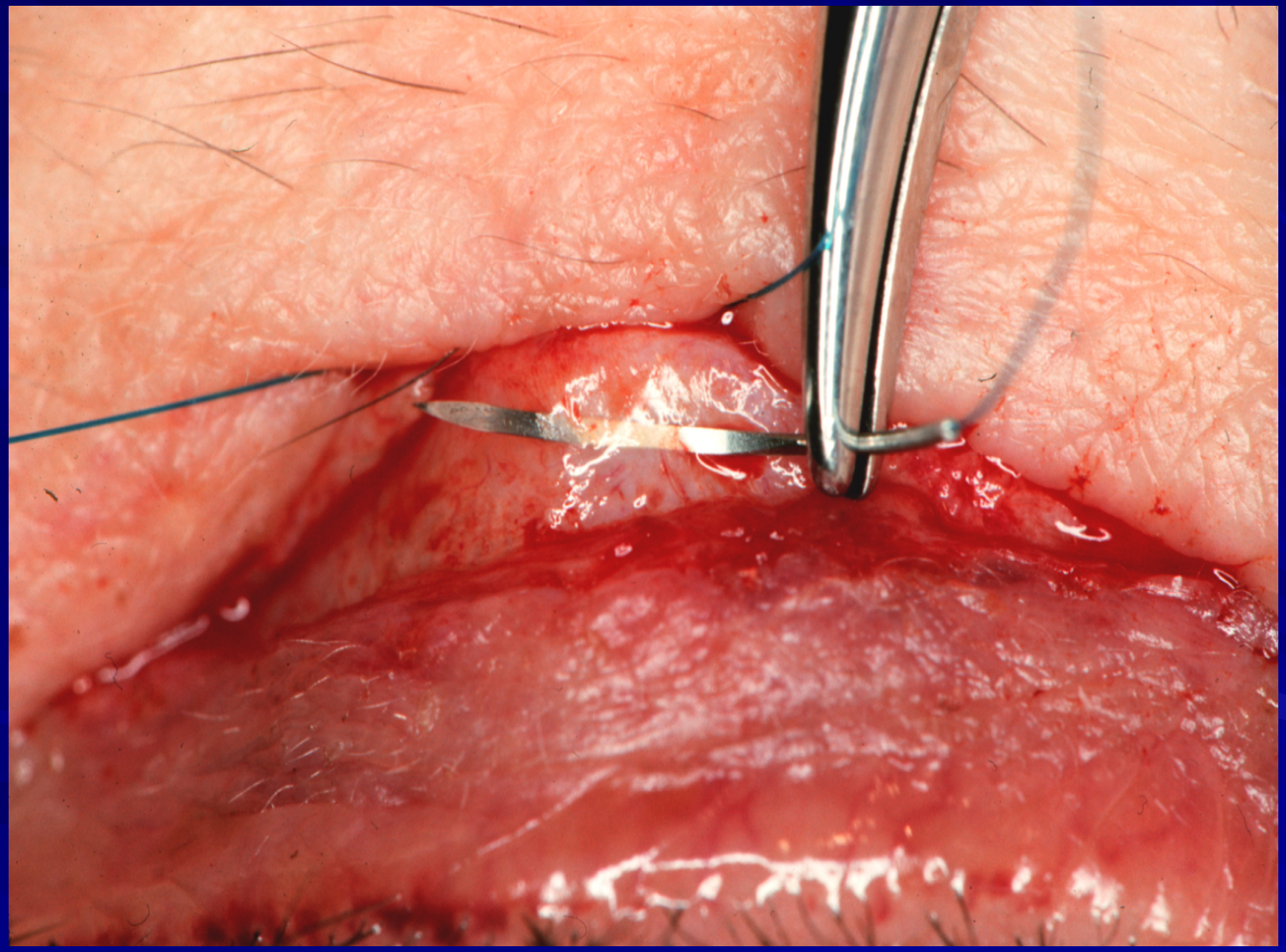
Instruments For Office Revision

Opening Wound

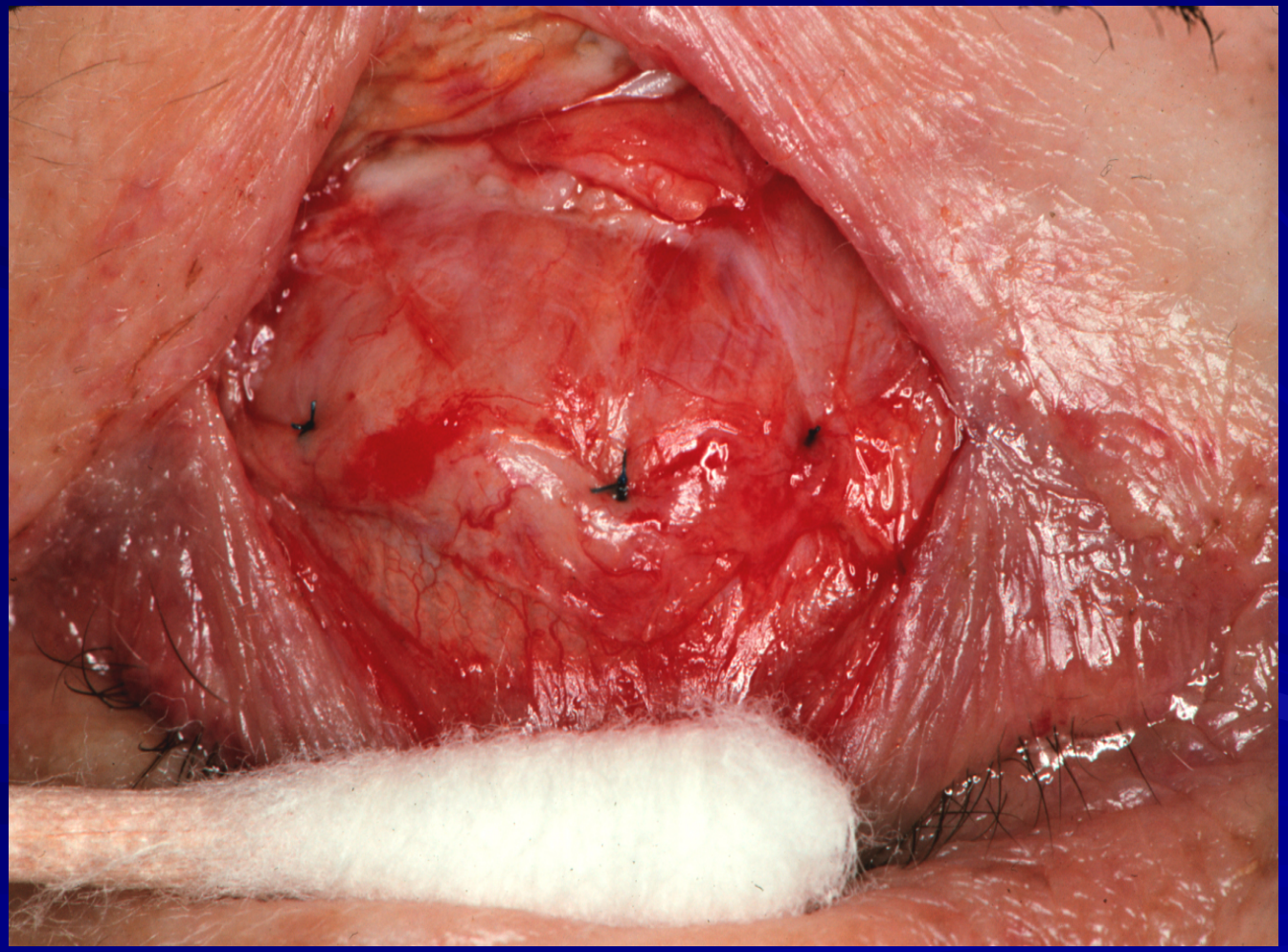
Exposing Prolene Sutures



Replacing tarsal sutures

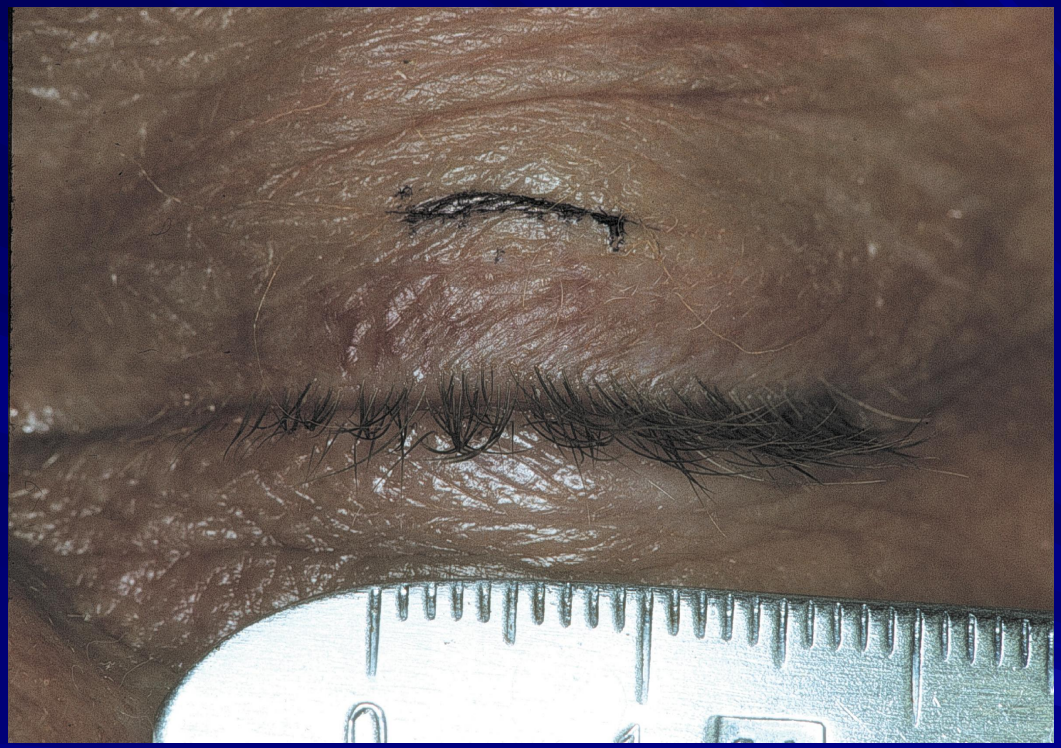


New Prolene Sutures



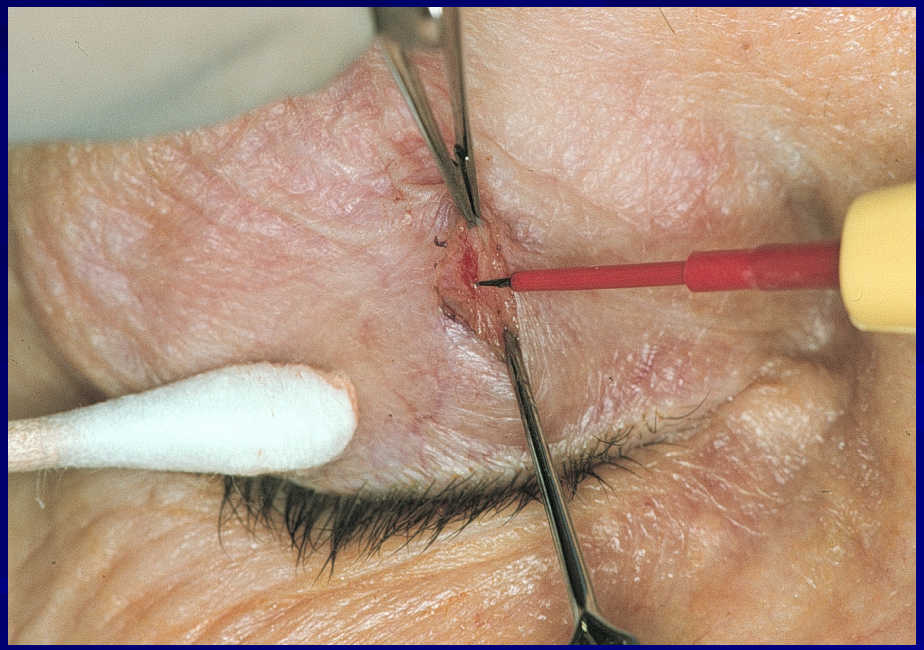
Incision Closed

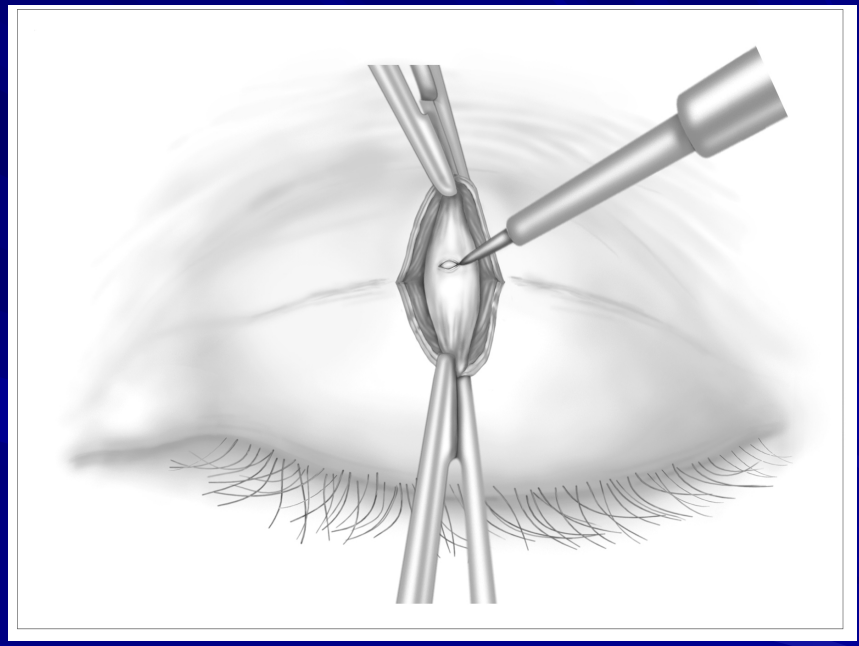
Small Incision Ptosis Repair



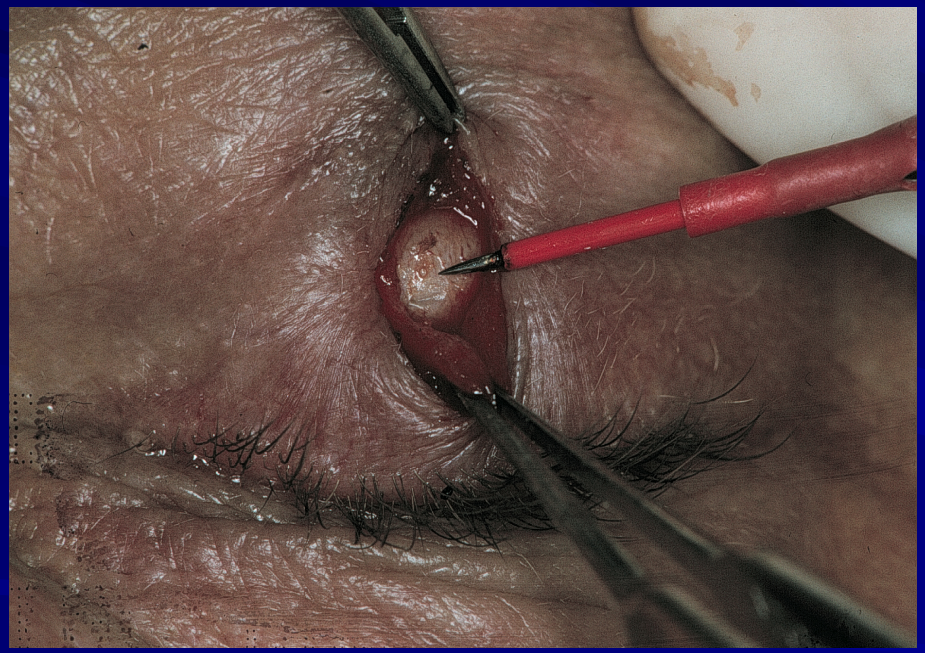
Lucarelli MJ, Lemke BN. *Am J Ophthalmol* 1999

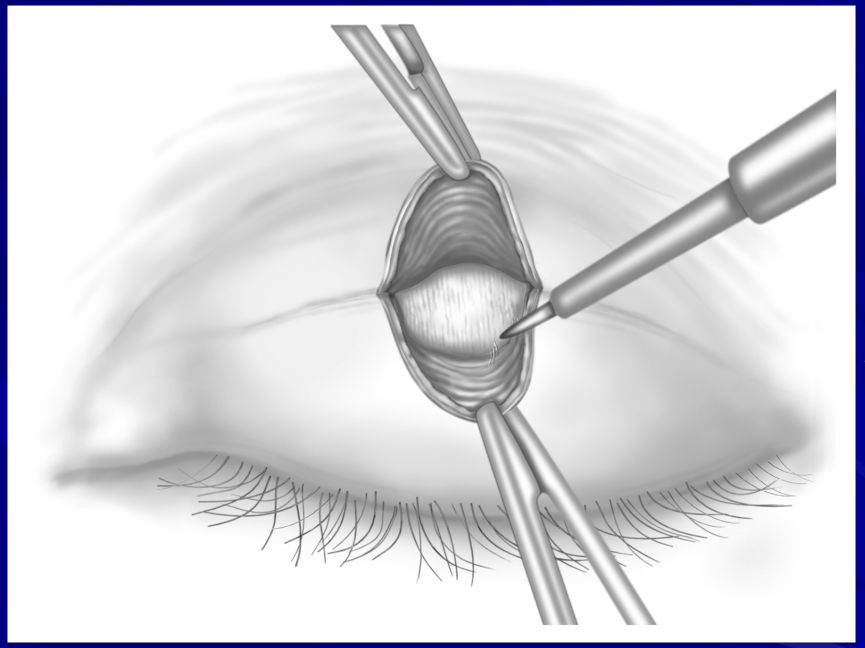
Small Incision Ptosis Repair



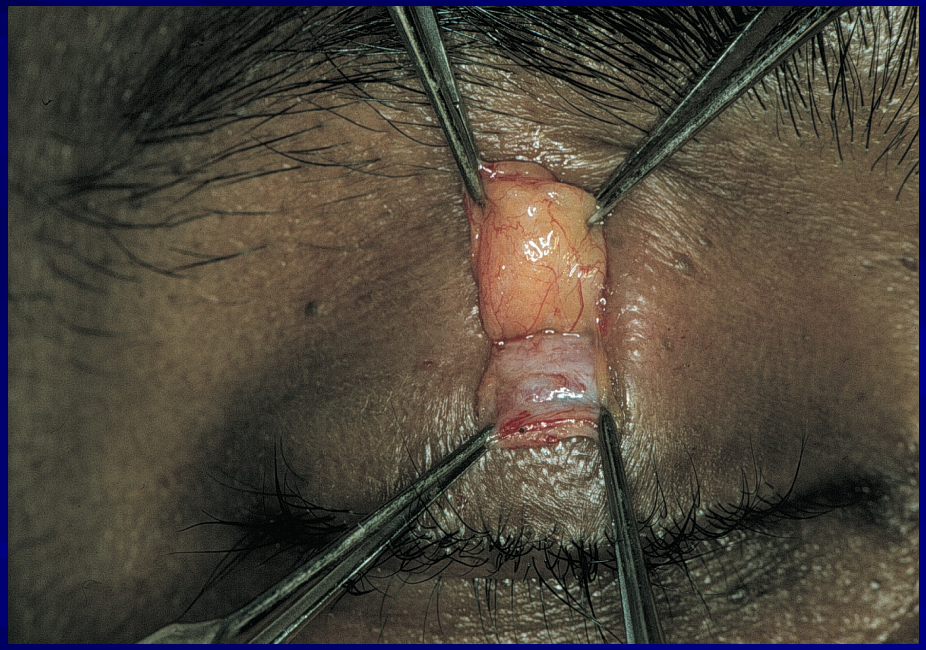


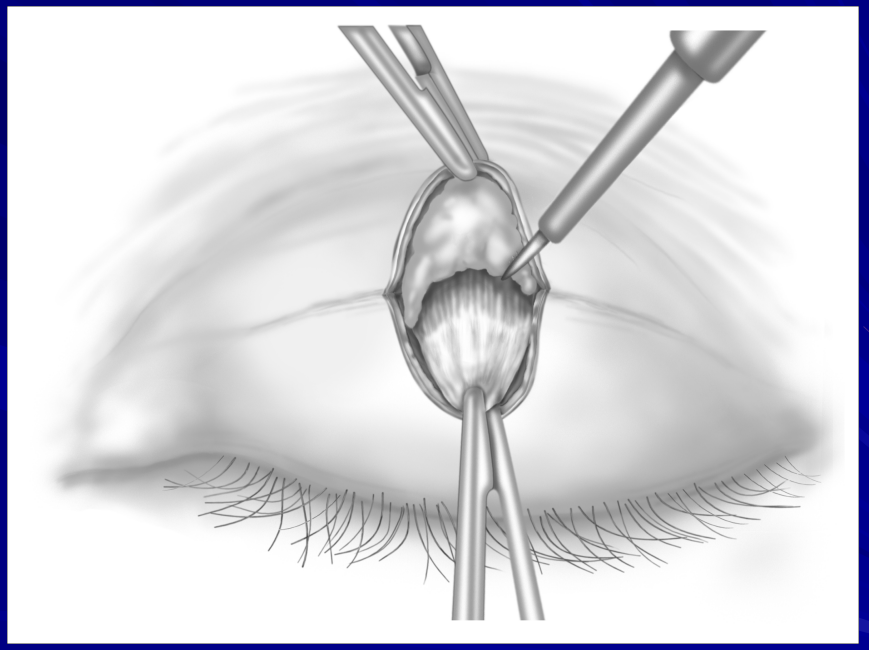
Small Incision Ptosis Repair



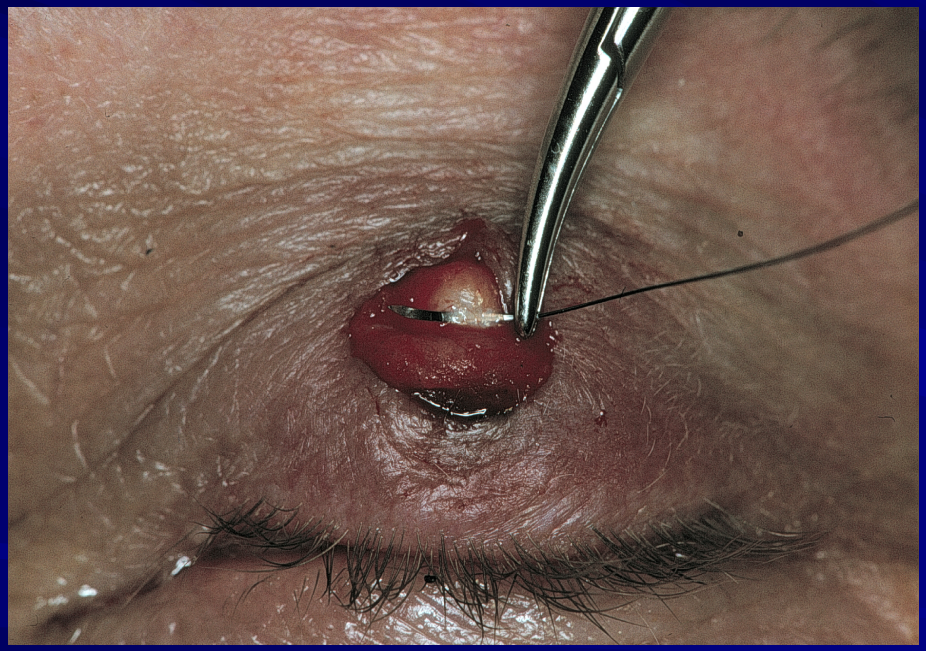


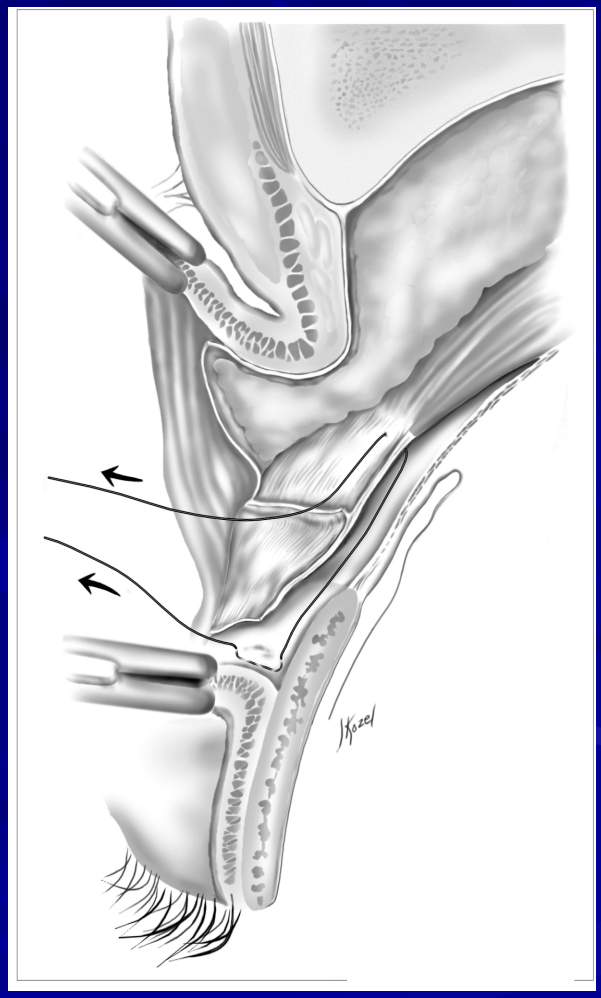
Small Incision Ptosis Repair





Small Incision Ptosis Repair





Modified Sm. Inc. Ext. Levator

- Results
  - 48 / 320 (15%) patients undergoing external levator repairs (4 year period)
  - Age: 8 - 82 years
  - Mean improvement in MRD: 3.5 mm
  - No intraop. complications
  - No contour problems
  - 7 of 77 (9%) lids undercorrected (MRD < 3 mm)
    - 3/7 undercorrections in myogenic patients

Lucarelli MJ, Burkat CN. ESOPRS, 2006

Frontalis Suspension

- useful when levator function is poor
  - i.e. Levator excursion < 5 mm
- recruits frontalis muscle function
- autologous or donor fascia lata
- silicone rods
  - especially with compromised surface protection

Frontalis Suspension

- very imperfect solution
  - poor up gaze
  - downgaze retraction
  - lagophthalmos

Frontalis susp. w autolog fascia

Ptosis Surgery: Summary

- Careful History and Exam
  - Visually significant?
  - Etiology: involutional, myogenic, or other?
  - Risks for ocular surface decompensation?
  - (Associated involutional findings?)
    - Dermatochalasis, fat prolapse
    - Brow ptosis

Ptosis Surgery: Summary

- Surgical Management
  - Conjunctival Mullerectomy and External Levator repair are both excellent options
    - Each should be used to advantage
  - For excellent results minimize intra-op variables
  - Many ways pre-op and intraop to stack the deck in your patient's favor!

Discussion

Thank you for the kind invitation!

Mark J. Lucarelli, M.D., FACS

www.UWHealth.org/Lucarelli