

Modern Aesthetics for the Optometric Physician

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DISCLOSURES

No relevant financial disclosures for this course
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COURSE OVERVIEW

-  Basic definitions, including types of ocular surgical procedures
-  General office considerations when offering aesthetic eye care services
-  Science behind radio frequency, plasma ablation, neuromodulators, & IPL
-  Various aesthetic therapies & aesthetic devices & emerging treatments in eye care

Q&A

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DEFINITIONS

Surgery – from Greek & Latin for “hand work”

- Ancient medical specialty that uses operative manual & instrumental techniques on a patient *to investigate &/or treat a pathological condition (such as disease or injury), to help improve bodily function or appearance, or to repair unwanted ruptured areas* (e.g. perforated ear drum)


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DEFINITIONS

Types of Surgery (cont.)

- **Excision(al)** - removal (of a tumor, etc.) by cutting
- **Incision(al)** – the act of *cutting into* a substance, especially via a scalpel or similar medical instrument in the context of a surgical procedure
- **Ablation** - surgical alteration/removal of a body part, an organ, or especially a tumor (an abnormal growth)

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DEFINITIONS

Categories of Surgeries/Procedures

- **Non-Elective** – to correct life-threatening condition
- **Elective** - correcting a non-life-threatening condition, at patient’s request (e.g. cataract sx)
 - **Cosmetic/Aesthetic** – elective procedure done to *subjectively improve the appearance of an otherwise normal structure*

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DEFINITIONS

Aesthetic

- (noun) – a branch of philosophy dealing with the nature of beauty, art, & taste and with the creation & appreciation of beauty
- (adjective) - done or made to improve a person's appearance or to correct defects in a person's appearance

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SHOULD OD'S OFFER "COSMETIC" PROCEDURES?






- Most already do!!
 - Red eye, CL, high index, etc.
- Who's better trained to provide ocular/periorcular aesthetics?

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General Aesthetic Considerations for ODs...

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HOLISTIC AESTHETIC APPROACH

-  Up-to-date office equip., furniture, fixtures, optical offerings, CL
-  Robust marketing plan (social media, website, brochures, e-blasts, etc.)
-  Must have proper staff involved
-  Image matters!
-  Marketing matters!!

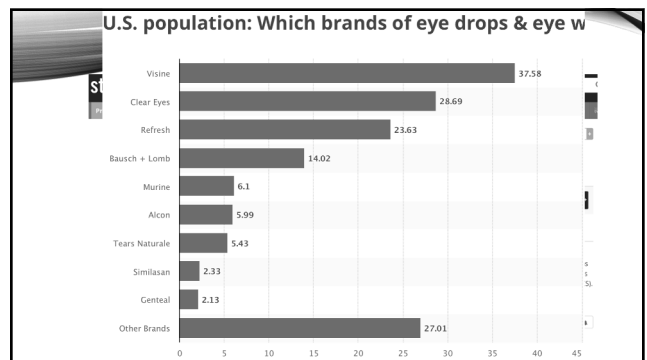
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The Aesthetics/Cosmetics Market

2018: U.S. considered most valuable Beauty & Personal Care market in the world (statista.com)

- Generating \$89.5B (U.S.) dollars in annual revenue

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Conjunctival Injection Relief

Lumify (Valeant/B&L)

- FDA-approved Dec. '17
- OTC redness reliever
- Brimonidine tartrate 0.025%
- Venule-based mechanism
- Low risk tachyphylaxis
- Minimal chance rebound hyperemia



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TOPICAL LASH ENHANCEMENT RX OPTIONS

Latisse (bimatoprost 0.03%)

- Rx only
- Dosed qd
- Single use applicators
- Lash growth/enhancement



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NON-RX LASH ENHANCEMENT

- Rodan + Fields Lash Boost*
- Xlash Eyelash Enhancer*
- Neulash*
- RevitaLash*
- Nutraluxe MD Lash*
- NeuveauBrow*
- M2 Lashes Eyelash Activating Serum*
- Peter Thomas Roth Lashes to Die for Platinum*
- Zoria Boost**
- Boost Lash**
- Lash Food**, etc., etc., etc!!!



*synthetic prostaglandin
**no prostaglandin

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The Aesthetics/Cosmetics Market (cont.)

2018: U.S. considered most valuable Beauty & Personal Care market in the world (statista.com)

- Generating \$89.5B (U.S.) dollars in annual revenue
 - Cosmetic Subcategory (skincare, hair care, makeup, perfumes, toiletries & deodorants, & oral cosmetics)
 - \$49.2B in annual revenue
 - 40% of Cosmetic Spend (\$19.7B) on Skincare Products

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DARK CIRCLE/WRINKLE REDUCERS



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BRUISING/SCAR REDUCERS



Celacyn™

Scar Management Gel

Celacyn™ Scar Management Gel is a hydrocortisone acid (HCA) based prescription product that modulates wound and scar sites to promote lighter, flatter, less prominent scarring.

Available in 28 g

- Contains Tri-Terfenadine Stabilized HCA*
- Non-scented
- Non-irritating
- Non-staining
- Steroid-free
- Antibiotic-free
- Moisturizing
- Fragrance-free

*Request Sample or More Info

Rx Only



OTC

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GENERAL AESTHETIC SKIN ADVICE

- Caffeine (vasoconstrictor) can reduce dark circles
- Stay hydrated/avoid xs late alcohol
- Rest!!
- Treat underlying allergies
- Cold compresses in a.m.
- Sunscreen (don't forget the lids!)
- UV coating on glasses (regular & sun)
- Quality makeup remover



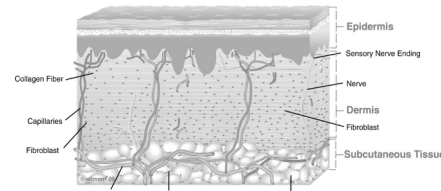
THE MAKEUP REMOVER KIT
for everyday eye makeup removal

Eye Makeup Remover Oil • EyeKid Foaming Cleanser

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Skin Anatomy

The Skin



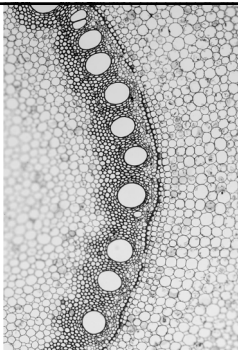
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Aging Reduces Collagen Production

- Skin sags & gets thinner
- Early rhytid formation (i.e. fine lines)

Photodamage Decreases Elastin Production

- Rhytid formation (i.e. deeper wrinkles)
- Loss of skin elasticity
- Malar edema (bags under eyes)



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ACQUIRED BLEPHAROPTOSIS


Causes, Impact, and Diagnosis

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BLEPHAROPTOSIS (PTOSIS)


- Abnormally low-positioned upper eyelid margin in 1° gaze
- Severity depends on degree of eyelid droop¹
- Causes:
 - Unilateral or Bilateral
 - Congenital or Acquired

Untreated blepharoptosis can affect:²⁻⁴




Function
Pupil obstruction, superior visual field deficits

Appearance



Asymmetric or 'sleepy' look



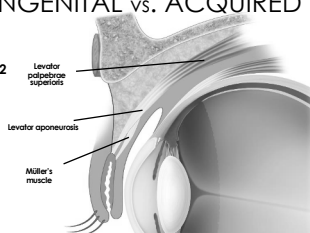
¹ References: 1. [Review] Ptosis: causes, presentation, and management. *Indian J Ophthalmol*. 2017;65(1):1-6. doi: 10.4103/0365-3113.124914. 2. [Review] Ptosis: causes, presentation, and management. *Indian J Ophthalmol*. 2017;65(1):1-6. doi: 10.4103/0365-3113.124914. 3. [Review] Ptosis: causes, presentation, and management. *Indian J Ophthalmol*. 2017;65(1):1-6. doi: 10.4103/0365-3113.124914. 4. [Review] Ptosis: causes, presentation, and management. *Indian J Ophthalmol*. 2017;65(1):1-6. doi: 10.4103/0365-3113.124914.

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CAUSES OF BLEPHAROPTOSIS: CONGENITAL vs. ACQUIRED

Congenital blepharoptosis^{1,2}

► Typically resulting from developmental levator muscle myopathy or innervation abnormality



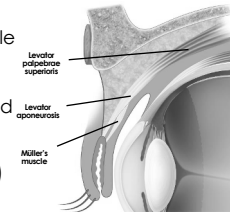
References: 1. Sudhakar P, Vu Q, Kosoko-Lasaki O, Palmer M. Upper eyelid ptosis revisited. *Am J Clin Med*. 2009;4(3):5-14. 2. Custer PL. Blepharoptosis. In: Yanoff M, Duker JS, eds. *Ophthalmology*. 3rd ed. St Louis, United States: Elsevier; 2008. 3. Kleich W, Vislisel JM, Allen RC. A primer on ptosis. Available at: <http://webeye.ophth.uiowa.edu/levator/tutorials/Ptosis/index.htm>. Accessed September 27, 2019.

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CAUSES OF BLEPHAROPTOSIS: CONGENITAL vs. ACQUIRED

Acquired blepharoptosis^{1,3}

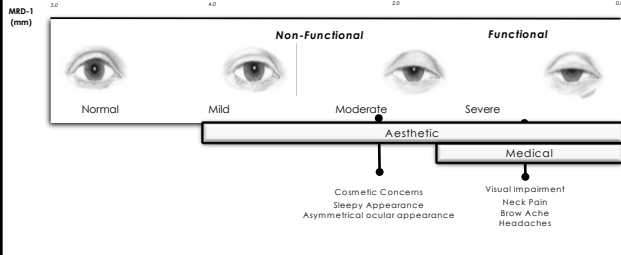
- ▶ Most often, from stretching of levator muscle or disinsertion of its complex (**aponeurosis**)
- ▶ Can also be caused by:
 - Reduced nervous input to the upper eyelid retractor muscles (**neurogenic**)
 - Injury (**traumatic**)
 - Excess skin/eyelid heaviness (**mechanical**)
 - Primary muscle dysfunction, such as myotonic dystrophy (**myogenic**)



References: 1. Sudhakar P, Vu Q, Kozak-Dasoli C, Palmer M. Upper eyelid ptosis revisited. *Am J Clin Med.* 2009;4(3):5-14. 2. Custer PL. Blepharoptosis. In: Yanoff M, Duker JS, eds. *Ophthalmology*, 3rd ed. St. Louis, United States: Elsevier; 2008. 3. Klejch W, Vislisel JM, Allen RC. A primer on ptosis. Available at: <http://webeye.onth.uiowa.edu/eyeforum/tutorials/Ptosis/index.htm>. Accessed September 27, 2019

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ACQUIRED BLEPHAROPTOSIS (PTOSIS)



References: 1. Finsterer J. Ptosis: causes, presentation, and management. *Aesthetic Plast Surg.* 2003;27(3):193-204. 2. Klejch W, Vislisel JM, Allen RC. A primer on ptosis. Available at: <http://webeye.onth.uiowa.edu/eyeforum/tutorials/Ptosis/index.htm>. Accessed September 27, 2019.

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ACQUIRED BLEPHAROPTOSIS: RISK FACTORS

- ▶ Acquired blepharoptosis is typically associated with **aging**

Estimated 11.5% of adults aged 50+ have it, & prevalence **increases with age**¹

In the U.S. population, this corresponds to an estimated **13 million** patients aged 50+ with blepharoptosis in 2020!^{2*}

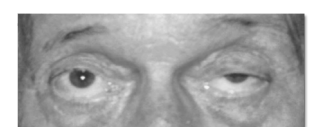
- ▶ Other known risk factors include:
 - **Ocular surgery** (glaucoma, cataract, corneal, strabismus)^{3,4}
 - **Contact lens wear**⁵⁻⁹
 - **Underlying disease**¹⁰

* Estimated U.S. population over 50 years of age with ptosis calculated as estimated number of individuals aged 50 and older (U.S. Census) multiplied by 11.5% prevalence observed in study by Sridharan et al. **References:** 1. Sridharan CV, Taha RS, Leppiharjo B, Forman WW. A community survey of ptosis of the eyelid and age of elderly people. *Age Ageing.* 1995;24(2):24-28. 2. US Census Bureau, Population Division. Table Y9. Projections by sex and age for the United States: 2015 to 2060. NP2014-19. December 2014. 3. Wang Y, Liu L, Liu J. The incidence and risk of ptosis following ocular surgery: a systematic review and meta-analysis. *Statist Aust Clin Exp Ophthalmol.* 2019;22:397-404. 4. Goodyer A, Tom BS, Kikawa DO. Blepharoptosis following ocular surgery: identifying risk factors. *Curr Opin Ophthalmol.* 2016;27(3):37-41. 5. Hwang K, Kim JI. The risk of blepharoptosis in contact lens wearers. *Cornea Surg.* 2015;33(4):474-476. 6. Rikawa T. Hard contact lens wear and the risk of acquired blepharoptosis: a case-control study. *Eye.* 2013;13(9):926-7. 7. Theon JH, Michals AA. Blepharoptosis in RGP and PMMA hard contact lens wearers. *Can Eye Ophthalmol.* 2004;87(1):14-18. 8. Salariano N, Brown MS, Zwiabel S, Guyuron B. Environmental factors that contribute to upper eyelid ptosis: A study of identified twins. *Aesthetic Surg J.* 2010;30(5):254-4. 9. Bensen J, Hernandez CA. Demogogone's T. van der Bosch WA, Wiltschko R, Prandera DA. Not only hard contact lens wear but also soft contact lens wear may be associated with blepharoptosis. *Canad J Ophthalmol.* 2011;46(4):333-6. 10. Finsterer J. Ptosis: causes, presentation, and management. *Aesthetic Plast Surg.* 2003;27(3):193-204.

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ACQUIRED BLEPHAROPTOSIS (PTOSIS)

- Typically slowly progressive
- Etiology:
 - Aging
 - Myogenic
 - Traumatic
 - Mechanical
 - Neurogenic



Ptosis in a patient with myasthenia gravis (Finsterer J. *Aesthetic Plast Surg.* 2003;27(3):193-204).

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DIFFERENTIAL DIAGNOSIS: NEUROLOGICAL DISEASE

- ▶ **Focused neurological examination** should be conducted prior to treating blepharoptosis¹ as it can be a **sign of more serious underlying neurological disease**.^{1,2}

1. Finsterer J. Ptosis: causes, presentation, and management. *Aesthetic Plast Surg.* 2003;27(3):193-204. 2. Klejch W, Vislisel JM, Allen RC. A primer on ptosis. Available at: <http://webeye.onth.uiowa.edu/eyeforum/tutorials/Ptosis/index.htm>. Accessed September 27, 2019.

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DIFFERENTIAL DIAGNOSIS: NEUROLOGICAL DISEASE

- **Horner's syndrome:** mild ptosis assoc. with ipsilateral miosis, possible redness, & anhidrosis^{1,2}
 - can be 2° to trauma, CVA, or vasc. ds.
- **Myasthenia Gravis:** variable uni-/bilateral ptosis, often accompanied by diplopia &/or strabismus^{1,2}
- **Chronic Prog. Ext. Ophthalmoplegia:** symmetric, bilateral ptosis & ophthalmoparesis, initial presentation typically 30's^{1,2}
- **Third Nerve Palsy:** ptosis, ophthalmoplegia, diplopia, & poss. poorly-reactive/dilated pupil^{1,2}
 - can be result of ischemic injury or aneurysm

1. Finsterer J. Ptosis: causes, presentation, and management. *Aesthetic Plast Surg.* 2003;27(3):193-204. 2. Klejch W, Vislisel JM, Allen RC. A primer on ptosis. Available at: <http://webeye.onth.uiowa.edu/eyeforum/tutorials/Ptosis/index.htm>. Accessed September 27, 2019.

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ASSESSING ACQUIRED BLEPHAROPTOSIS

Marginal Reflex Distance (MRD-1)¹
Distance between the center of the pupillary light reflex and the upper eyelid margin with the eye in primary gaze.
Normal MRD-1 is 4-5 mm.

Eyelid crease height (superior sulcus deformity)¹
Distance between the upper eyelid margin and eyelid crease

Levator function¹
Assessed by firmly pressing on the brow and measuring the distance moved by the upper lid margin when the patient shifts from downward gaze to upward gaze

Visual field testing²
Functional assessment of the visual field, performed using various methods (Humphrey, Leicester Peripheral Field, Goldmann)


References: 1. Klejch W, Vissel JM, Allen RC. A primer on ptosis. Available at: <http://webeye.ophth.uiowa.edu/eyeforum/tutorials/Ptosis/index.htm>. Accessed September 27, 2019. 2. Ho SF, Marawski A, Sampath R, Burns J. Modified visual field test for ptosis surgery (Leicester Peripheral Field Test). Eye. 2011;25:365-369.

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ASSESSING ACQUIRED BLEPHAROPTOSIS

Marginal Reflex Distance (MRD-1)¹
Distance b/w center of pupillary light reflex & upper eyelid margin in 1° gaze.
Normal MRD-1 is 4-5 mm.

Visual field testing²
Functional visual field, performed using various methods (Humphrey, Leicester Peripheral Field, Goldmann)



MRD-1

References: 1. Klejch W, Vissel JM, Allen RC. A primer on ptosis. Available at: <http://webeye.ophth.uiowa.edu/eyeforum/tutorials/Ptosis/index.htm>. Accessed September 27, 2019. 2. Ho SF, Marawski A, Sampath R, Burns J. Modified visual field test for ptosis surgery (Leicester Peripheral Field Test). Eye. 2011;25:365-369.





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CAN WE DO ANYTHING ABOUT IT?



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ACQUIRED BLEPHAROPTOSIS: TREATMENT OPTIONS

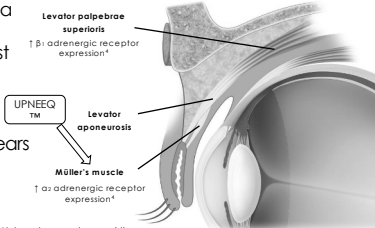
-  Non-surgical **Mechanical Intervention** (e.g. eye crutch, eyelid tape, scleral contact lenses)
-  **Surgery** (ant. or post. approach) or **Lid Tightening Procedure**
-  **Off-label Medication Use** (e.g. apraclonidine)
-  **Rx Eye Drop** Oxymetazoline HCl 0.1% ophth. Soln. (Upneeq)

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UPNEEQ - MECHANISM OF ACTION

► Oxymetazoline HCL 0,1% is a potent, direct-acting β -adrenergic receptor agonist with a ~5:1 affinity for α_2 : α_1 receptors^{1,2,3}

► When applied to eye, appears to stimulate contraction of Müller's muscle, raising the upper lid



References: 1. Haenisch B, Walstab J, Herberich S, et al. Alpha-adrenoceptor agonists. Clin Pharmacol. 2010;24(4):729-739. 2. Sugden D, Anwar N, Klein D. Rat pineal α_1 -adrenoceptor subtypes: studies using roazogana binding and reverse transcription-polymerase chain reaction analysis. Br J Pharmacol. 1996;118(5):1244-1252. 3. Haslett LO, Snyder C. Over-the-counter ocular decongestants in the United States – mechanisms of action and clinical utility for management of ocular redness. Clin Optom. 2020;12:95-105. 4. Emceel-Gutlein B, Hewlett B, Fosby R, Oestreicher J, Harvey J. Distribution of adrenergic receptor subtypes in the retractor muscles of the upper

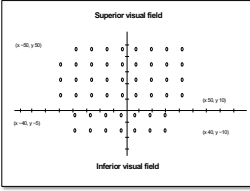
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PHASE 3 EFFICACY ENDPOINTS

STUDY RVL-1201-201 AND STUDY RVL-1201-202

Primary efficacy endpoint

- Change from baseline in the number of points seen in the top 4 rows on the **Leicester Peripheral Field Test (LPFT)**
 - Assessed @ screening, treatment day 1 (baseline & 6 hours post-drug instillation), & treatment day 14 (2 hours post-drug instillation)

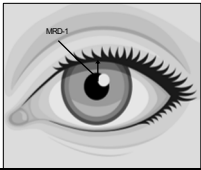


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PHASE 3 EFFICACY ENDPOINTS STUDY RVL-1201-201 AND STUDY RVL-1201-202

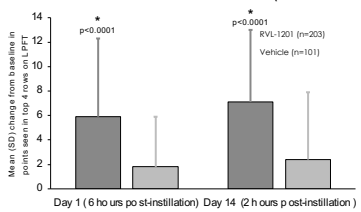
Secondary efficacy endpoint

- Change from baseline in **Marginal Reflex Distance (MRD-1)**
 - Assessed @ screening, treatment day 1, treatment day 14, & treatment day 42 (end of study)



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PRIMARY EFFICACY ENDPOINT: IMPROVEMENT ON THE LPFT COMBINED EFFICACY STUDIES (RVL-1201-201, RVL-1201-202)

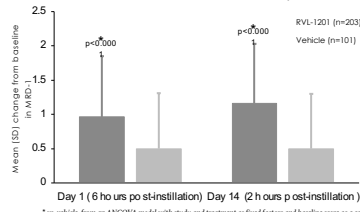


Time Point	RVL-1201 (n=203)	Vehicle (n=101)
Day 1 (6 hrs post-instillation)	~6.0	~2.0
Day 14 (2 hrs post-instillation)	~7.0	~2.5

• Increase in points seen on LPFT = improvement in superior visual field

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SECONDARY EFFICACY ENDPOINT: IMPROVEMENT IN MRD-1 COMBINED EFFICACY STUDIES (RVL-1201-201, RVL-1201-202)

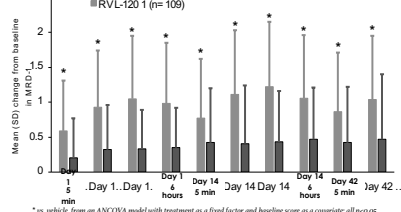


Time Point	RVL-1201 (n=203)	Vehicle (n=101)
Day 1 (6 hrs post-instillation)	~1.0	~0.5
Day 14 (2 hrs post-instillation)	~1.2	~0.5

► Significantly greater elevation of the upper eyelid was seen with RVL-1201 than with vehicle

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SECONDARY EFFICACY ENDPOINT: IMPROVEMENT IN MRD-1 EFFICACY STUDY RVL-1201-202



Significant effect vs. vehicle at all time points, including **5 minutes** (rapid onset) and **6 hours** (sustained effect) after drop application

*Note: The 5 minute time point was only measured in efficacy study RVL-1201-202 & not in study RVL-1201-201

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Case 1

Right eye has achieved a 3.3 mm lift (+117% MRD-1)

RIGHT EYE	LEFT EYE	SYMMETRY
MRD-1: 3.3 mm ± 31%	MRD-1: 2.9 mm ± 30%	BEFORE: 96% → AFTER: 92%
MRD-2: 3.8 mm ± 6%	MRD-2: 3.3 mm ± 2%	Total Symmetry: No improvement at this time

16 minutes elapsed, 11/24/2020



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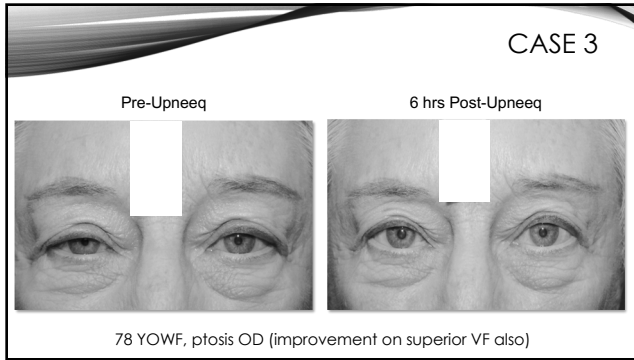
CASE 2

Baseline Day 1, pre-Upneeq Day 1, 2 hrs post-Upneeq

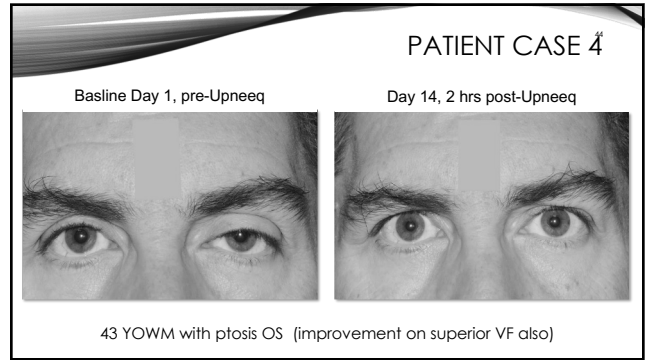


44 YOWF, asymmetric, bilateral ptosis

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SKIN REJUVENATION?

Several therapeutic procedure options available..

1. RF at non-ablation energy levels can be used to tighten skin, reduce fat (lipolysis), &/or promote healing
2. Intense Pulsed Light (IPL) can remove sun spots & brighten skin
3. CO₂ Lasers can induce replacement of damaged skin
4. Neuromodulators can tighten skin
5. Others?




A background image of several lit candles in a glass jar, creating a warm, soft glow.

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What is Radiofrequency (RF)?

- RF waves have affinity for intracellular H₂O molecules, causing them to vibrate
- Vibration causes heat buildup b/t molecules
- Higher power = more violent vibration
 - Water vaporizes to steam, & depending on *rate of heating*, either:
 - Causes cell to explode (CUT)
 - Causes cell to desiccate/dry (COAG)
 - Low power = Heats tissue from inside
- *IS NOT CAUTERY!!! (i.e. the tip never gets hot)*

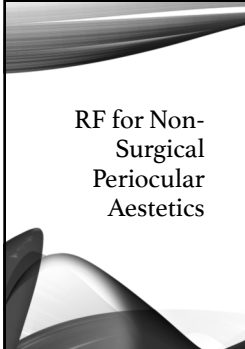


A circular diagram showing a cross-section of a tissue layer with a central point where energy is being applied, illustrating the concept of heating from the inside.

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RF for Non-Surgical Periocular Aesthetics

- Prolongs need for Blepharoplasty/ptosis surgery
- Treats Periorbital Fine Lines
- Reduces Lateral Hooding
- Improves Dermatochalasis
- Corrects Mild Ectropion
- (Bonus: also effective for MGD)




A close-up image of a handpiece used for radiofrequency treatment, showing its curved, metallic tip.

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RF SKIN REJUVENATION

- Periocular Indications
 - Skin tightening with modest reduction in fine lines & wrinkles
- How it works...
 - Elevate temp. of dermis (target = 42°C/108°F)
 - Produces transient denaturation of structural collagen fibrils
 - Contraction/tightening of the skin
 - Dermal fibroblasts elicit a heat shock response
 - Net increase in collagen production in upon cooling
 - 2-3 treatments, ~4 wks apart generally needed for clinically measurable response
 - Narins, D.J. and Narins, R.S. (2003) Non-surgical radiofrequency facelift. *J. Drugs Dermatol.* 2:495-500



A black and white photograph showing a person's face during a radiofrequency treatment. A hand is holding a device against the skin, and a small amount of gel is visible on the forehead.

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RF WOUND HEALING RESPONSE

I) Inflammatory Phase (Days 1-3)

- a) 5-10 min = early blood vessel contraction
- b) Hour 1 to 3 days = vasodilation to increase supply & cells infiltrate area to remove tissue/destroy bacteria

II) Proliferative Phase (1st 3 wks)

- a) Days 2-3 = ongoing tissue repair & fibroblast activity induced
- b) Days 7-21 = collagen synthesis, then fibroblast apoptosis & old collagen removal via collagenase

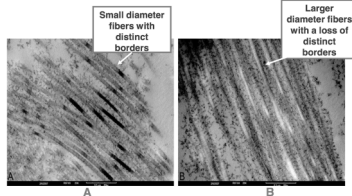
III) Maturation Phase (up to 6 mos+)

- a) New collagen generation

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Courtesy: Cynosure

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TEM (25,000x) shows scattered diffuse changes in collagen fibril architecture with shift from smaller diameter collagen fibers in the untreated samples (A) to larger diameter and loss of distinct borders fibers in the treated samples (B) compared with normal fibrils

Javate, R. Cruz, R. Khan, J., Trekos, N., Gordon, R. Nonablative 4-MHz Dual Radiofrequency Wand Regeneration Treatment for Periorbital Rhytides and Midface Laxity. *Ophthalmic Plastic Reconstructive Surg.* Vol. 0, No. 0, 2011

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TempSure Envi (Cynosure/Hologic)

- Therapeutic Logic Control (consistent treatments)
- Temp. Monitoring (real time display)
- 300W generator, 4Mhz RF
- 99% of patients described tx as comfortable/relaxing
- Previous Model = Pelleve'



TempSure™ Envi

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NuEra Tight (Lumenis)

- High power, temperature-controlled RF
- Treatment of skin laxity (& cellulite)



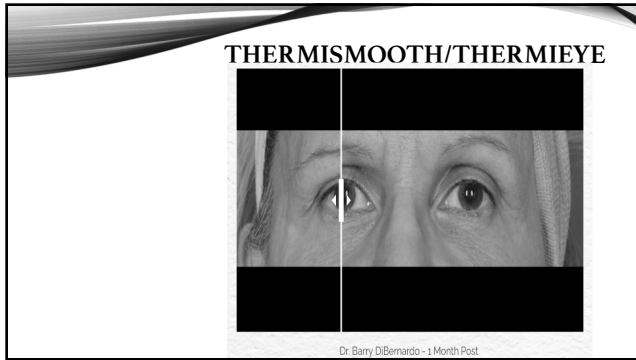
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THERMI

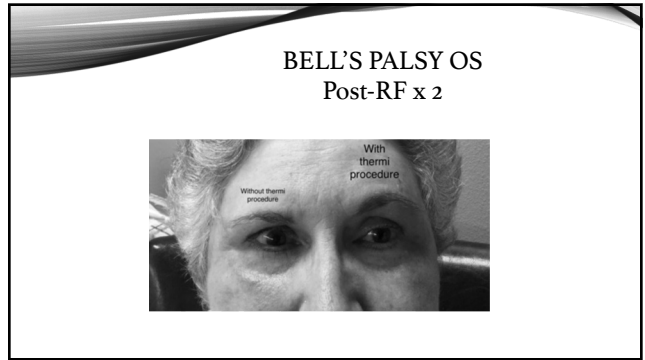
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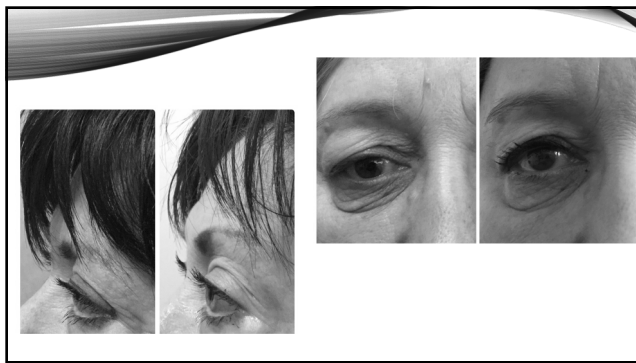
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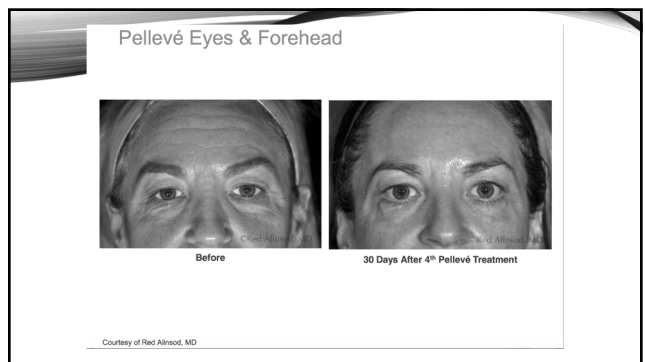
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Alternative Models

- If OD scope of practice restricts performing...
 - Can set up agreement with MD to have your staff perform treatments while MD is on-site “supervising” (or even nearby off-site if laws allow); or
 - Can employ licensed Aesthetician to perform, if state law allows

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INTENSE PULSED LIGHT THERAPY (IPL)

- Brief, powerful bursts of light (500-800 nm) emitted by handpiece & absorbed by oxyhemoglobin
- Heat coagulates cells causing vascular thrombosis, ↓ redness & ↓ problematic skin flora
- FDA-approved: Acne & Rosacea
- Off-label for MGD/DES & to rejuvenate skin



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INTENSE PULSED LIGHT THERAPY (IPL)

Penetrates to dermis & pigment absorbs energy which is converted to heat, destroying pigment (sun spots, freckles, etc.) & improving skin appearance



Before After

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INTENSE PULSED LIGHT THERAPY (IPL)

1 Day After



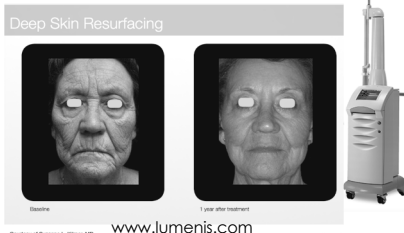
1 Week After



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CO₂ LASER

- 10,600 nm
- Absorbed by H₂O
- Tissue ablation
- Damaged skin replaced in healing process



Courtesy of Suzanne L. Kirsch, MD www.lumenis.com

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DEFINITIONS

Neuromodulator


- (noun) – “something (as a polypeptide) that potentiates or inhibits the transmission of a nerve impulse but is not the actual means of transmission itself”

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INJECTABLE NEUROMODULATORS

Botulinum toxin

- Neurotoxic protein from *Clostridium botulinum*
- Muscle relaxant (prevents acetylcholine binding)
- Original FDA-approval: *blepharospasm* & *strabismus*
- Side effect: skin tightening
 - >7M U.S. injections/yr
- Botox®, Botox Cosmetic®, Dysport®, Xeomin®, Jeuveau®, Myobloc®
- Cost ~\$500/vial (typically 50, 100, or 200 units/vial)
- Must reconstitute but can refrigerate up to 24 hrs (@ 36°-46° F)



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INJECTABLE NEUROMODULATORS

BOTOX® Cosmetic (onabotulinumtoxinA) Injection techniques

For moderate to severe lateral canthal lines

- Injections should be given with the needle bevel tip up and oriented away from the eye
- Inject a dose of 0.1 mL into each of 6 sites (3 injections per side) for a total dose of 0.6 mL

Two approved injection patterns:

Case 1: Feet injection pattern #1
If lines are both above and below the lateral canthus:

1. First injection at least 1.5 cm to 2.0 cm temporal to the lateral canthus and just temporal to the lateral orbital rim
2. Second injection 1.5 cm to 2.0 cm above the first injection site and at an approximate 30° angle medially
3. Third injection 1.5 cm to 1.7 cm below the first injection site and at an approximate 30° angle medially

Case 2: Feet injection pattern #2
If lines are primarily below the lateral canthus:

1. First injection at least 1.5 cm to 2.0 cm temporal to the lateral canthus and just temporal to the lateral orbital rim
2. Second injection 1.5 cm that angle from anterior to posterior
3. Ensure that the most anterior injection is lateral to a line drawn vertically from the lateral canthus
4. Remember to keep the most anterior injection superior to the medial prominence

For moderate to severe glabellar lines

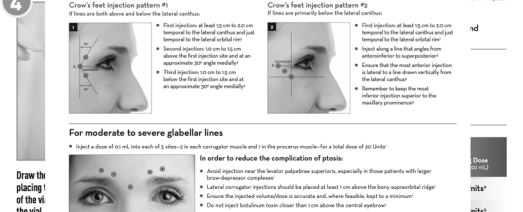
- Inject a dose of 0.1 mL into each of 5 sites in each corrugator muscle and 1 in the procerus muscle for a total dose of 0.6 mL

In order to reduce the complication of ptosis:

- Avoid injection near the levator palpebrae superioris, especially in those patients with larger brow-forehead contracture
- Lateral corrugator injections should be placed at least 1 cm above the brow superciliary ridge
- Ensure the injected volume is accurate and, where feasible, kept to a minimum
- Do not inject botulinum toxin closer than 1 cm above the central eyebrow

Draw the placement of the vial.

Disphagia and Breathing Difficulties
Treatment with BOTOX® and other botulinum toxin products can result in paralytic or toxic effects. Patients who are eating, drinking or breathing difficulties may be more susceptible to these complications. In most cases, this is a temporary




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INJECTABLE NEUROMODULATORS

Botulinum toxin

Contraindications:

- ALS, Myasthenia Gravis (muscle weakness diseases)
- Hypersensitivity to botulinum-A
- Pregnant/breastfeeding
- Tetracycline & aminoglycoside antibiotics




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INJECTABLE NEUROMODULATORS

Botulinum toxin

Cautions

- Blood thinners
- Injections at least 8-12 wks apart due to antibody risk




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INJECTABLE NEUROMODULATORS

Botulinum toxin

Most Common Adverse Events

- Injection site bruising, infection, pain, edema, redness
- Surrounding muscle weakness (e.g. brow/lid ptosis) for weeks
- Headache, Respiratory Problems, Dysphagia, Seizure, Flu-like symptom



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BLEPHAROSPASM

- Involuntary, bilateral blinking/twitching/closure of lids
- Disappears during sleep
- Etiology = Idiopathic(?)
- Differential
 - Myokymia
 - Assoc. with stress, caffeine, hypertension
 - Usually unilateral & slight lower lid preference?

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BOTOX FOR BLEPHAROSPASM

67 YOWM presents reporting "Jumpy Eyelid"



Botox injected directly in the affected muscle relieves the muscle spasm & duration of effect lasts ~3-5 months

2 units per 0.1 ml in 3 injection sites per lid

Photo Courtesy: West Tennessee Eye

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BOTOX COSMETIC EFFECT

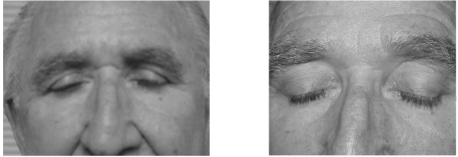


Photo Courtesy: West Tennessee Eye

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BOTOX FOR BLEPHAROSPASM & MORE



www.botoxcosmetic.com

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"Remember this your lifetime through:
 Tomorrow there will be more to do.
 And failure waits for all who stay with
 some success made yesterday.
 Tomorrow you must try once more,
 and even harder than before."
 – John Wooden, Basketball Coach

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THANK YOU!

Chris Wroten, O.D.
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 Fellow – American Society of Optometric Surgeons
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