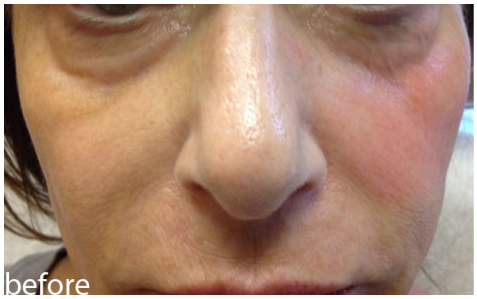
SKIN TIGHTENING

With Creams, Hormones, Laser Resurfacing,
and Surgical Lifting

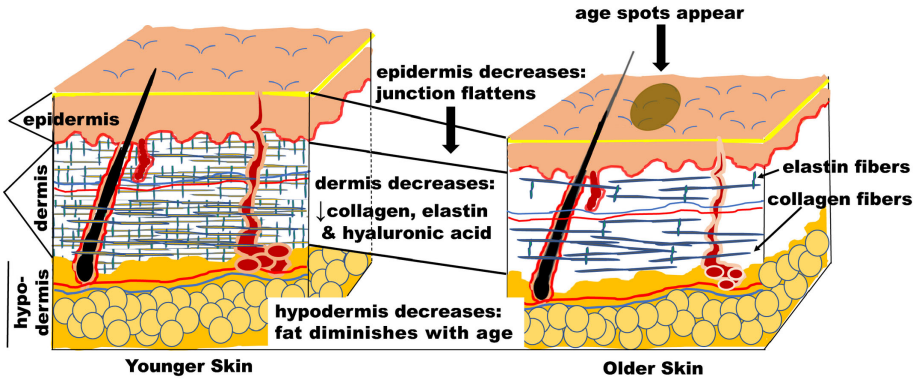
Ronald Moy, MD, FAAD
Lauren Moy, MD, FAAD



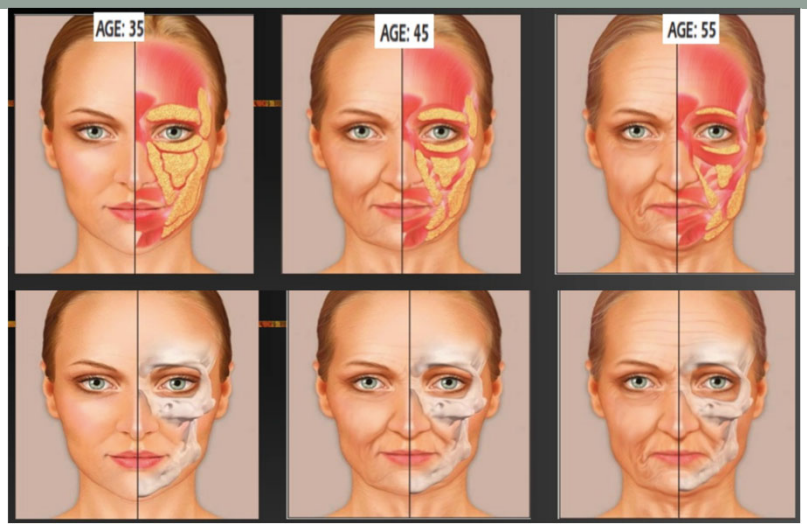
We Age Because Hormones Decline

- Aging happens to everyone, but aging-related decline is optional
- Hormone decline is at the root of many aging-related diseases
- Hormone replacement therapy can be safe & beneficial
- **HRT is a cornerstone of anti-aging therapy**

Changes in Skin with Age



Lephart, Edwin D. A review of the role of estrogen in dermal aging and facial attractiveness in women. *Journal of cosmetic dermatology* 2018;17(3): 282-288.

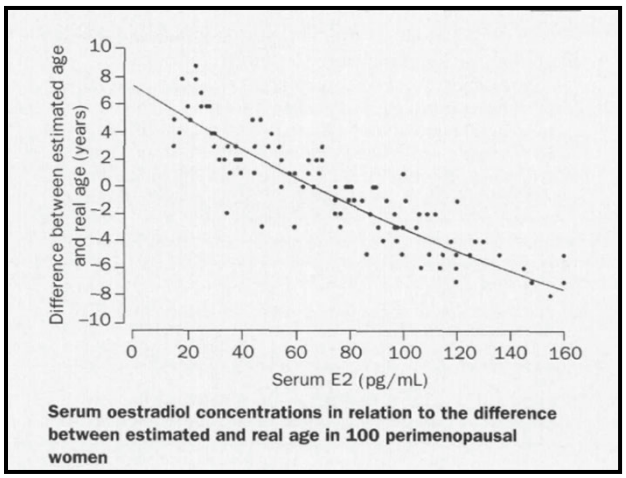


Facial Changes with Age

Collagen type I and collagen type III are thought to decrease <u>by as much as 30% in the first 5 years after menopause</u> along with a decrease in skin thickness, which correlates with <u>estrogen deficiency</u>

- increase moisture and skin turgor [1-3]
- increase fibroblast viability and stimulate the proliferation of keratinocytes [3,4]
- act as natural antioxidants, where they protect against oxidative stress and inflammation [4]

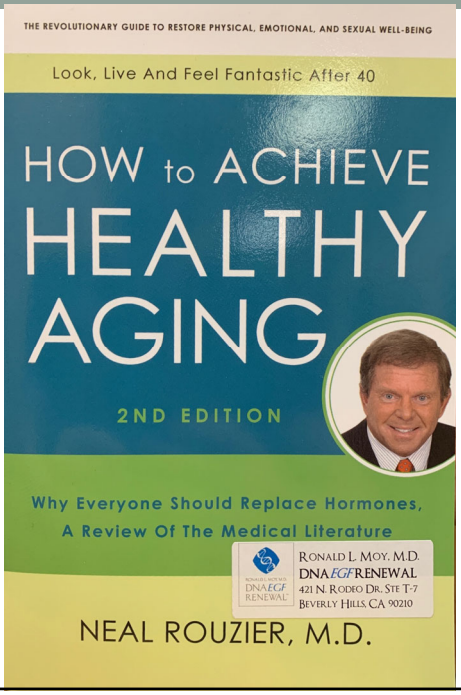
The Role of Estrogens



Serum oestradiol concentrations in relation to the difference between estimated and real age in 100 perimenopausal women

Skin Aging- Role of Estrogens

Estrogen, Progesterone, DHEA, HGH, Testosterone



Editorial Commentary

The Women's Health Initiative Reports: Critical Review of the Findings

R. Don Gambrell, Jr, MD

Safety of estrogen replacement

- **There are now more than 60 published studies indicating that estrogen can be safely given to women with a history of breast cancer**
  - Breast cancer survivors using ERT experienced **no increase in the risk of recurrence** compared with controls (relative risk, 0.72; 95% confidence interval, 0.47–1.10) and had **significantly fewer deaths** (3.0%) than did the nonusers (11.4%) over the combined study periods (relative risk, 0.18; 95% confidence interval, 0.10–0.31) [1]

ERT is safe among women with a history of breast cancer

- *Synthetic Estrogen Alone* is associated with increased breast cancer risk (**HR = 1.49**) [1]
- *Bioidentical Estrogen Alone* is associated with decreased breast cancer risk (**HR = 0.65**) [1]
- Hazard Ratio for breast cancer risk for women taking *bioidentical estrogen and bioidentical progesterone* was **0.9** [2]

Bioidentical estrogen is superior to synthetic (CEE)

Why Bio-identical HRT?

- Prevents Alzheimer's, osteoporosis, heart disease, macular degeneration, cataracts, colorectal cancer
- Decreases visceral fat (central obesity)
- Improved sleep, energy and mood
- **Patients feel better**
- AND, there are cosmetic benefits

- Increases skin thickness [1,2]
  - Including thickening the dermal layer [3]
- Increase epidermal hydration, skin elasticity[1,4,5]
- Reduces skin wrinkles [6]
- Enhances content and quality of collagen [2,7,8,9]
- The level of vascularization is enhanced [2,7,8]

Estrogen Replacement and Skin Benefits

CLIMACTERIC 2007;10:320–334

A prospective, randomized, double-blind, placebo-controlled study on the influence of a hormone replacement therapy on skin aging in postmenopausal women

P.-G. Sator, M. O. Sator, J. B. Schmidt, H. Nahavandi†, S. Radakovic, J. C. Huber* and H. Hönigsmann*

Results: After **7 months** of HRT, **skin elasticity increased** significantly and **skin hydration improved significantly**. **Skin thickness improved significantly** but skin surface lipids did not.

- Maheux et al demonstrated that oral estrogen replacement increased the thickness of the skin ($p < 0.01$), as assessed by ultrasonography, and of the dermis ($p < 0.05$), as assessed by skin biopsy

A randomized, double-blindeffect of conjugated estrogens on skin thickness., placebo-controlled study on the

Topical Application of Estrogens

- Shown to increase collagen fibers after 6 months [1,2]
- When applied to the face for 14 weeks, it statistically improves dryness, skin laxity, atrophy and dullness, and fibroblasts, compared to vehicle in a recent double-blind randomized pilot study [3]
- Increases skin thickness and skin laxity [4,5]

Estrogen cream increases skin thickness and treats fine wrinkles in a double-blind, placebo controlled study

The First National Health and Nutrition Examination Survey (NHANES I)

- Topical estrogen significantly improved appearance of wrinkles (n=3875 post-menopausal women) [1]

In 1983, Brincat et al. concluded that postmenopausal women on hormone replacement therapy with estrogen and testosterone had a **collagen content 48 % higher** compared to the content measured in untreated women, who were grouped by age.[1]

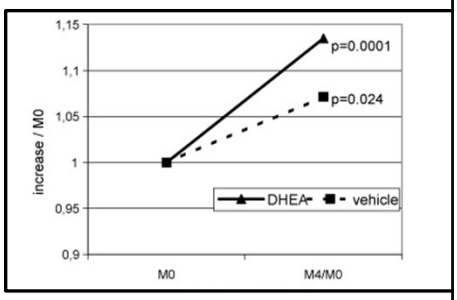
Testosterone Replacement and Skin Benefits

When supplementing individuals, aged 60-79, with 50mg DHEA:

- Increased epidermal thickness
- Increased epidermal hydration
- Reduced facial pigmentation
- Increased sebum production

DHEA Replacement and Skin Benefits

- Increases rate of sebum production at 4 months[1]
  - Correlated with skin brightness
- Increases skin thickness at 4 months[1]
- Increases collagen metabolism at 4 weeks[2]
- Increases expression of COL1, COL3, COL5[3]



Topical DHEA and Skin Benefits

Topical DHEA and Skin Benefits

- In a **placebo-controlled, randomized, prospective study** (n=75 post-menopausal women) received twice daily DHEA (0.1%, 0.3%, 1%, 2%) vs. placebo
- Procollagen levels increased
- Heat shock protein increased (especially among higher doses) [1]

- Low levels of growth hormone have been associated with decreased skin thickness and is commonly seen in older age.
- Among GH deficient elderly men, skin thickness decreased to 94% of baseline after 18 months in the control group, while the experimental group, which received HGH replacement, experienced a **+4% increase in skin thickness.**[1]

Human Growth Hormone Replacemen and Skin Benefits

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Effects of Human Growth Hormone in Men over 60 Years Old

Daniel Rudman, M.D., Axel G. Feller, M.D., Hoskote S. Nagraj, M.D., Gregory A. Gergans, M.D., Pardee Y. Lalitha, M.D., Allen F. Goldberg, D.D.S., Robert A. Schlenker, Ph.D., Lester Cohn, M.D., Inge W. Rudman, B.S., and Dale E. Mattson, Ph.D.

After 6 months of treatment, the sum of skin thicknesses at four sites increased 7.1 percent (P = 0.07).

- HRT helps prevent aging especially skin thinning and sagging
- HRT prevents Alzheimers, osteoporosis and heart disease
- Feel better, more energy, sense of well being.

- HRT with bio-identical hormones is SAFE
- Estrogen replacement (oral and topical) can thicken skin, increase elasticity, and cause a more youthful appearance
- Testosterone replacement can increase collagen synthesis
- DHEA replacement (oral and topical) can increase skin thickness and collagen production
- HGH can increase skin thickness

Topical EGF can thicken skin, reducing fine lines and senile purpura

Take Home Points

Use of epidermal growth factor to thicken skin

- Topical EGF has been shown to increase skin thickness, decrease senile pupura,[1] improve wrinkles,[2,3] and improve signs of photoaging[4]

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Reduced Appearance of Under-eye Bags With Twice-daily Application of Epidermal Growth Factor (EGF) Serum: A Pilot Study

Rachel Seidel BA,[a] and Ronald L. Moy MD FAAD[b,c]
[a]Georgetown University School of Medicine, Washington, DC
[b]Keck School of Medicine of the University of Southern California, Los Angeles, CA
[c]Moy-Fincher-Chapp Dermatology, Beverly Hills, CA

ABSTRACT

Background: Under-eye bags are a common manifestation of age and a frequent complaint among patients who no longer feel youthful. Non-invasive topical agents are largely ineffective at reducing their appearance.

Objective: We studied the ability of a topical serum containing epidermal growth factor (EGF) to minimize the appearance of under-eye bags.

Methods: A single-center clinical trial was performed on eighteen volunteer male and female patients with under-eye bags. Subjects applied EGF serum to the infraorbital area twice daily for 12 weeks. At each visit, subjects were evaluated using clinical photography and written self-assessment. A grade on the Merz Infraorbital Hollowness Scale was also given and two independent, blind investigators assigned an Investigator's Global Assessment (IGA) score. At the trial's end, patients shared their final evaluation and perception of results with a questionnaire.

Results: Sixteen subjects completed the trial. The final average Merz grade was 1.63 (SEM = .273), statistically significantly lower than the mean baseline average of 2.06 (SEM = .232) ($P = .0018$). A reduction in average IGA score was also significant ($P < .0001$). Average initial IGA was 2.75 (SEM = .270) and average final IGA was 2.00 (SEM = .310). All but two subjects reported improvement at the final visit. Improvement was quantified as 76-100% by two subjects, 50-75% by three subjects, and 25-49% by nine subjects. Eleven subjects classified their under-eye bags as milder at the end of the trial compared to the first visit. Seven subjects reported greater satisfaction with their overall facial appearance. Of the subjects who had used other topical treatments in the past, two reported the serum to be "significantly better" and four said it was "better" in treating their under-eye bags.

Conclusion: Our results offer evidence that topical EGF can reduce the appearance of under-eye bags.

J Drugs Dermatol. 2015; 14(4):xxx-xxx.

INTRODUCTION

With age, lower eyelid skin laxity leads to sagging of the infra-orbital area, a feature referred to commonly as "under-eye bags." Research has shown that the presence of this condition can detrimentally influence first impressions and general public perception. Understandably, the conflict between what is inferred and the patient's true character can be a significant source of distress and feelings of one's appearance can decline to the point of impairing self-esteem.

Though sometimes seen in younger patients owing to genetic influences, the overwhelming majority of under-eye bags result from age-related processes that accelerate over time. Changes in the extracellular matrix and loss of key structural proteins collagen and elastin cause the skin to lose structural support and elasticity.[1] Incapable of countering gravitational forces, skin overhangs beyond the lid margins, forming palpebral bags.

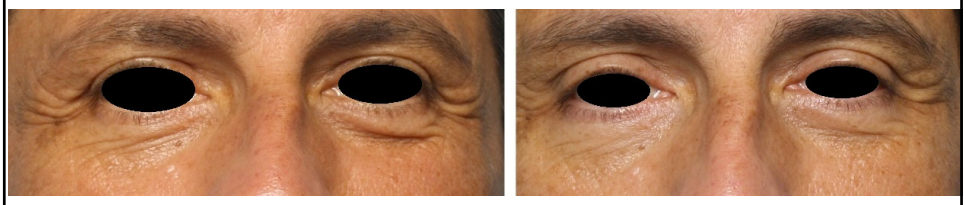
Laser resurfacing is a popular modality for the treatment of under-eye bags because it triggers an inflammatory process that ultimately leads to the synthesis of collagen and elastin.[2] However, the process of tissue ablation is not without peri-operative discomfort, a variable recovery period and an array of potential side effects. Knowing this, we investigated a less invasive treatment capable of producing similar changes to the extracellular matrix while circumventing the need to inflict damage to tissue.

Known for its ability to promote neovascularization and dermal thickening, epidermal growth factor (EGF) is released during the process of inflammation and wound healing and has cytoprotective, anti-apoptotic and mitogenic activity during the course of normal cellular development.[3] Topical EGF in various applications has been well tolerated, though its efficacy in treating under-eye bags has not been thoroughly studied. As a result, we performed a clinical trial using a synthetic, barley-derived EGF to investigate its effect on the appearance of under-eye bags in volunteer patients.

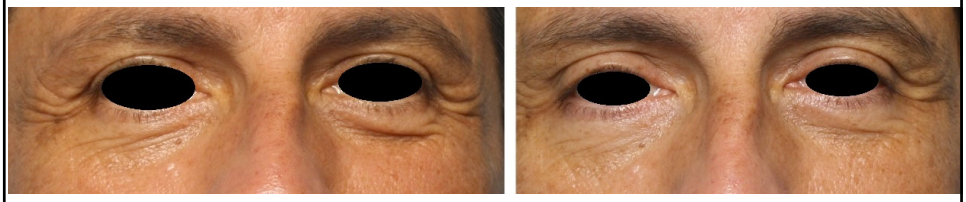
METHODS

A single-center clinical trial was performed on eighteen self-selected subjects (13 women, 5 men; mean age 52) with evidence of under-eye bags on clinical exam. Sixteen subjects self-report-

Baseline (left) and end of trial (right) photographs of a subject who reported “excellent” improvement



Baseline (left) and end of trial (right) photographs of a subject who reported “excellent” improvement



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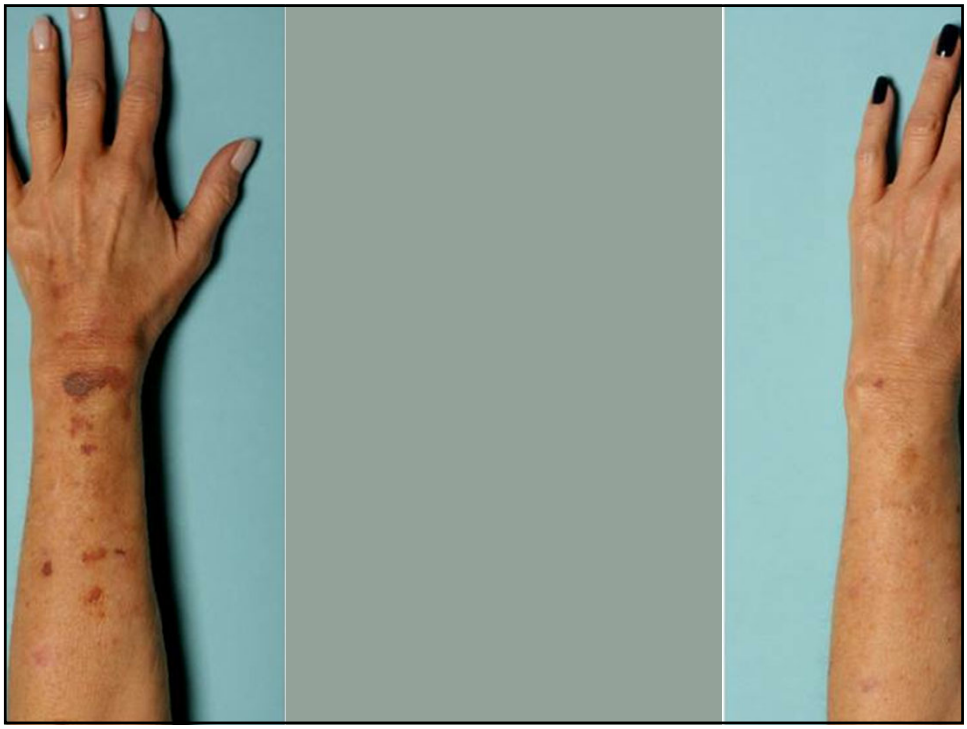


Figure 4: 63 year old female's forearm before (above) and after (below) 6 weeks of treatment with h-EGF serum.

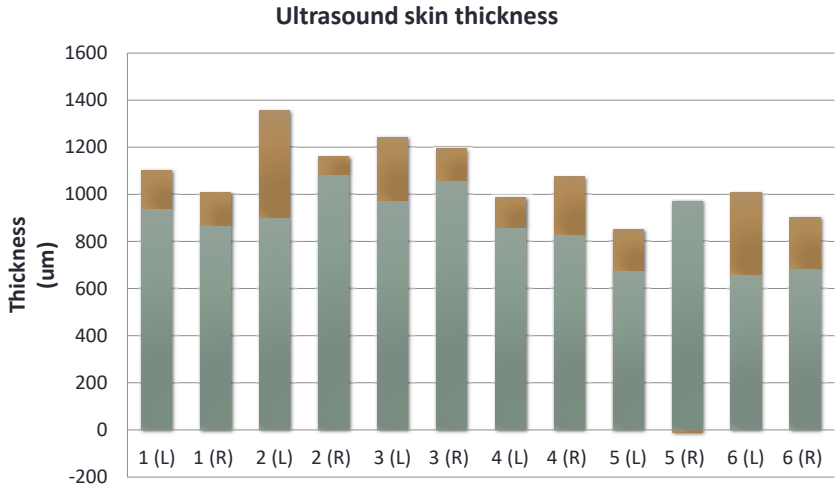


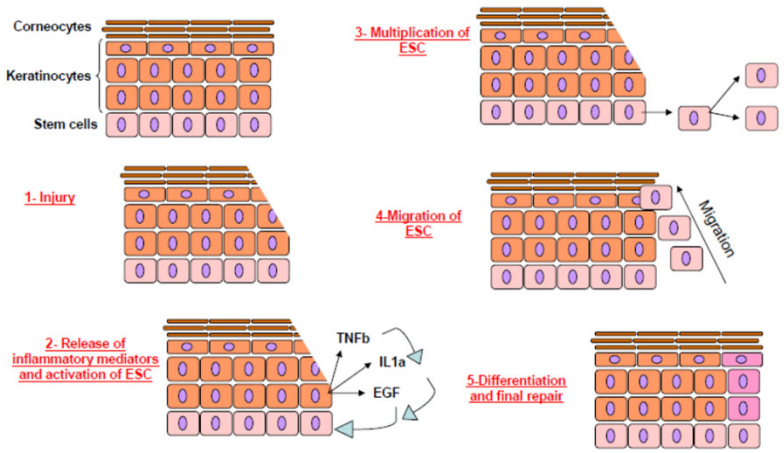
Figure 1: Ultrasound skin thickness measurements of the left (L) and right (R) arms of patients 1-6. The blue column indicates the initial ultrasound measurement. The height of the red column indicates difference in skin thickness at the final visit.

Why It Works

In all trials, improvement related to:

- Neocollagenesis: directly targets the causative pathophysiologic mechanisms
- Stimulation of epidermal stem cells: promotes epidermal thickening

Activation/Multiplication of ESC(stem cells) with our GF creams



IL1a = Interleukin 1 alpha TNFb = Tumor Necrosis Factor beta EGF = Epidermal Growth Factor

Together, these effects:

1. Soften the appearance of atrophic acne scars by minimizing dermal atrophy and “plumping” the skin

2. Reduce infra-orbital bags by increasing dermal thickness, which results in skin tightening

3. Prevent the formation of senile purpura by strengthening the connective tissue matrix and thickening the overlying epidermis, reducing dermal vessel susceptibility to trauma

Conclusions

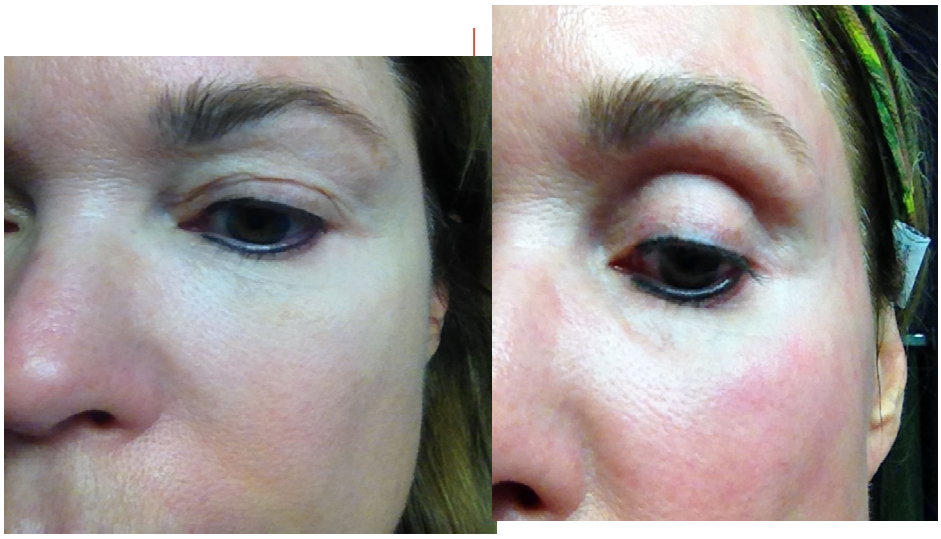
- Topical GF can reduce the appearance of under-eye bags, atrophic acne scars and senile purpura by increasing skin thickness and tightening skin

Laser Resurfacing to Tighten Skin

Instead of Blepharoplasty
Facelift with lasers over mouth and eyes
Neck Lift- light resurfacing
Laser resurfacing for acne scars, wrinkles, crinkly skin

Will growth factors thicken and tighten skin?

Skin tightening of upper lid with laser



Skin tightening of infraorbital skin

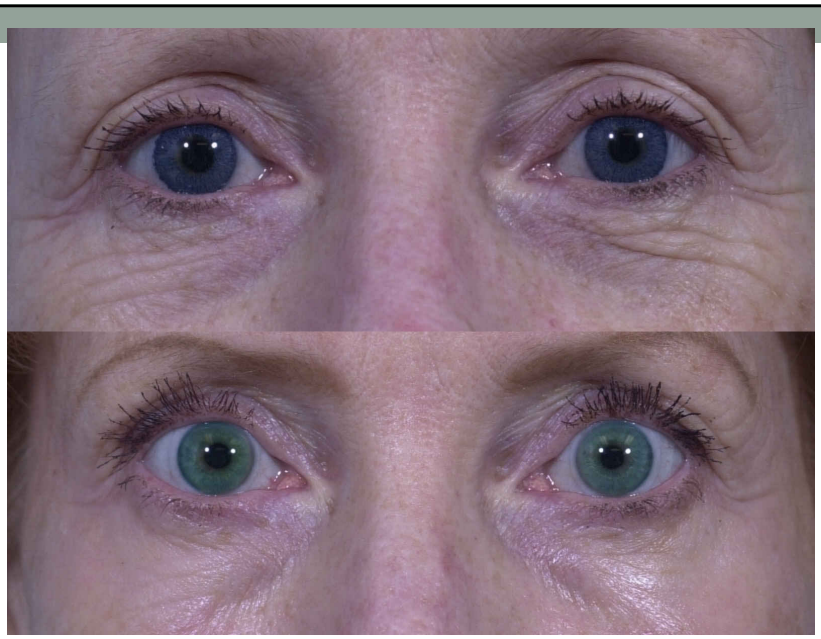
PSR 2

Fractional carbon dioxide laser resurfacing Results

Before

1 Year After

Photographs courtesy of Ron Moy, MD



Same person, different contact lenses!

Fractional Laser Resurfacing Results

Fractional Resurfacing - Clinical Results

Clinical Results : TotalFX

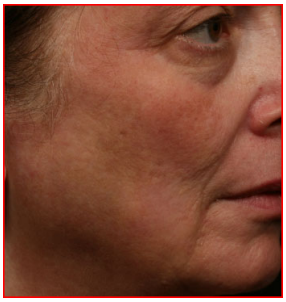
Courtesy of Ronald Moy MD

Deep FX 20J/cm^2, Density 20%

Active FX 125 J/cm^2 3-9-6

Fractional Resurfacing - Clinical Results

Clinical Results : TotalFX



Courtesy of Ronald Moy MD

Deep FX 20J/cm^2, Density 20%

Active FX 125 J/cm^2 3-9-6

improvement in peri-ocular rhytids nine (9) days after treatment

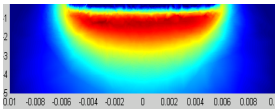
Tightening with Fractional Laser Resurfacing

- We did tattoo studies, post-auricular using carbon dioxide laser and found 10-15% tightening
- We have found same results with fractional carbon dioxide laser resurfacing
- We see immediate tightening and heat generated is over 60 degrees

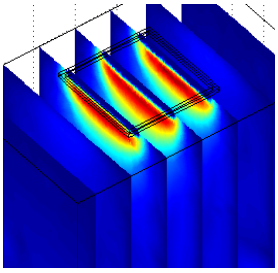
Uses for Tightening with Fractional Carbon Dioxide Laser Resurfacing

- Upper eyelid tightening instead of blepharoplasty
- Lower eyelid tightening instead of lower blepharoplasty
- Improving wrinkles

How it Works



TEMPERATURE CONTROLLED RADIO FREQUENCY



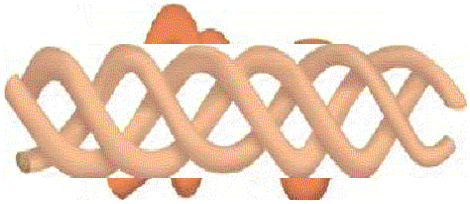
"The Science using temperature as a clinical endpoint of Heat"

- Smooth skin @ 42-45C
- Shrink mucosa @ 42-45C

Safe, painless, precise energy delivery

Heating of the skin and mucosa promotes 3 different kinds of effect:

- Immediate contraction of collagen
- Immediate collagen remodeling and elasticity
- Long term stimulation in producing new collagen



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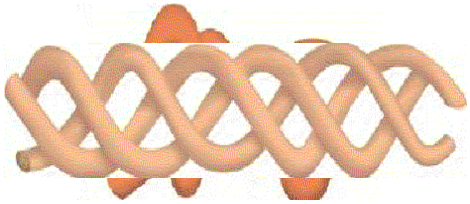


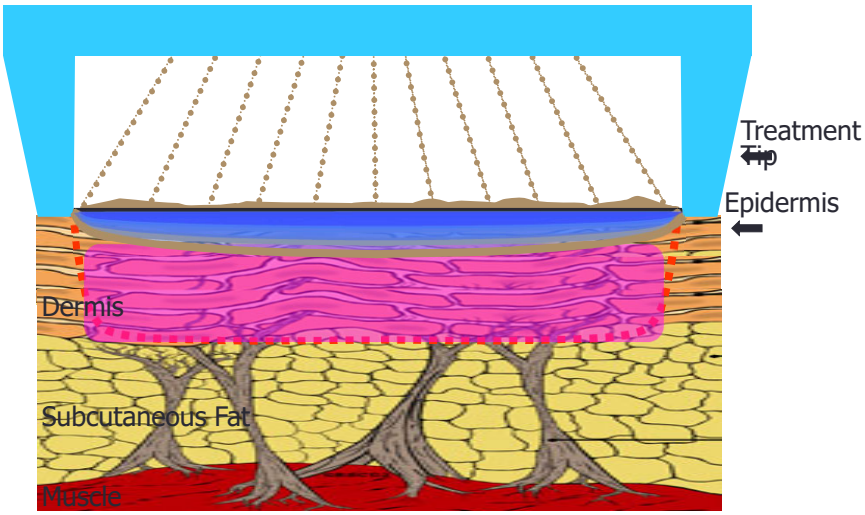
Radiofrequency on all skin types

"Half Time" Assessment for Visual Change

Treated Side | Un-Treated Side

Perform Multiple Passes to a <u>visual endpoint</u> of tightening/contouring

Heating/Cooling Schematic



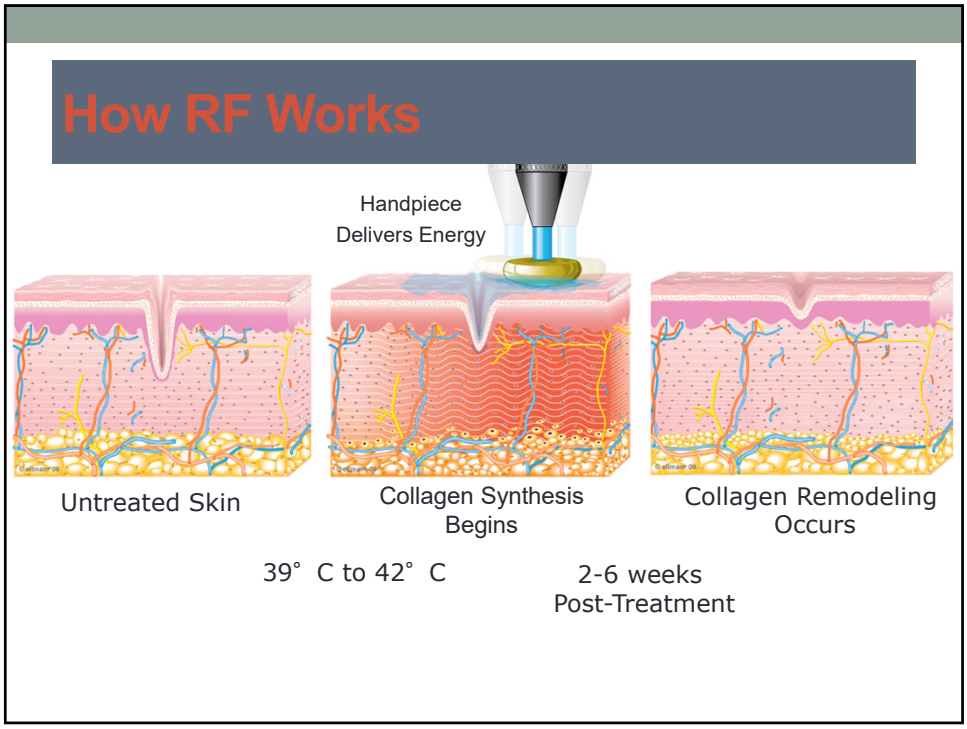
Radiofrequency- single pass

Quantitative Assessment of Radiofrequency Brow Lift

- Objective changes in brow position, superior palpebral crease, angle of the eyebrow and jowl surface area after volumetric radiofrequency treatments to half of the face.

Nahm W.K., Su T.T., Rotunda A.M., Moy R.L. *Dermatologic Surgery* 2004;30:922-928.


2.60 cm
2.70 cm
151.4°
0.29 cm
B
2.89 cm
2.92 cm
143.2°
0.71 cm


How RF Works
Handpiece
Delivers Energy
Untreated Skin
Collagen Synthesis
Begins
Collagen Remodeling
Occurs
39° C to 42° C
2-6 weeks
Post-Treatment

180 Day Photo

Pretreatment

180 Days Post-treatment

Pellevé™ Patient

Pretreatment

120 Days Post-treatment

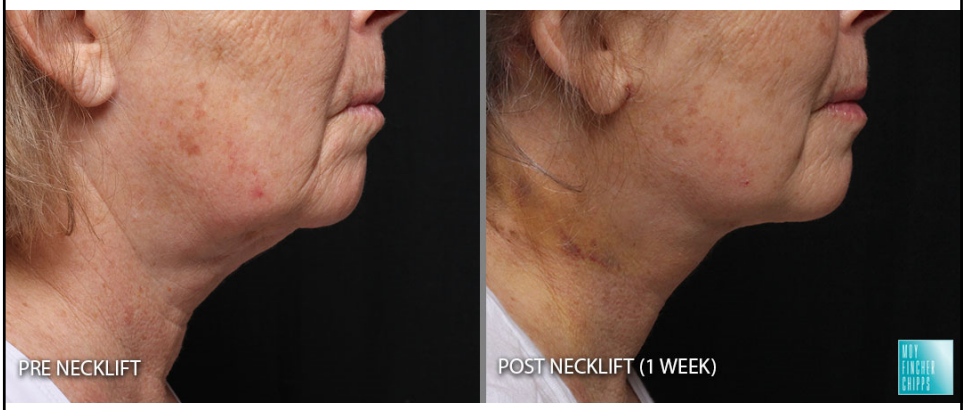
Single Pellevé™ Treatment

Photos courtesy of Edgar Fincher MD


PRE ACCUTITE
POST ACCUTITE

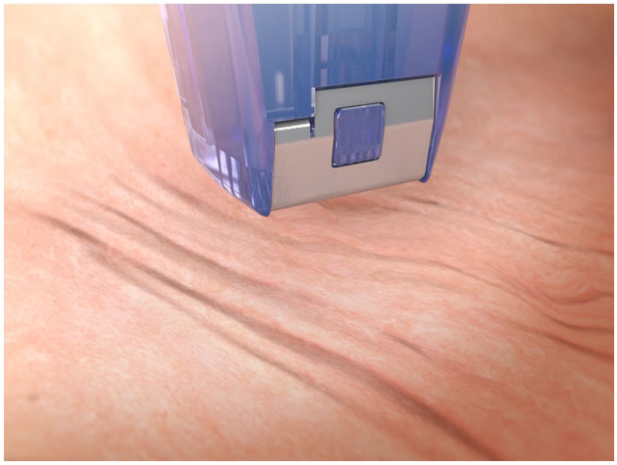

PRE NECKLIFT
POST NECKLIFT

Neck lift improves jowls



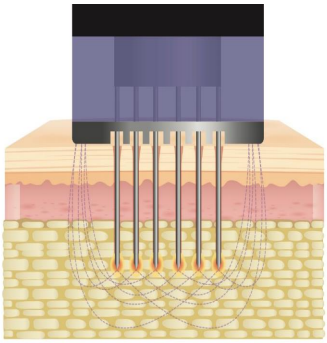
Neck lifts improves jawline

FRACTIONATED RADIOFREQUENCY



SUBDERMAL ADIPOSE FRACTIONAL REMODELING

- **Triple action:**
  - Fat coagulation
  - Connective tissue contraction
  - Sub-necrotic bulk heating of skin



UPPER FACE

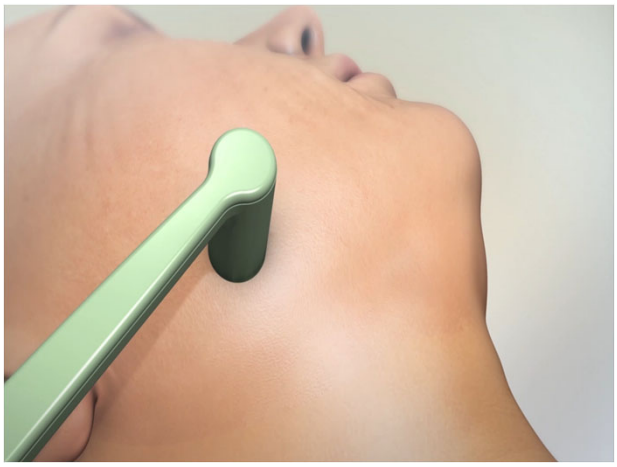
MID FACE

JOWLS

ABDOMEN

ARMS

RADIOFREQUENCY-ASSISTED LIPOLYSIS



BEFORE AND AFTER


EMBRACERF

BEFORE AND AFTER

Transconjunctival blepharoplasty are common in Asians with skin tightening using RF

BEFORE AND AFTER

TEST QUESTION

- What are treatments that do NOT cause skin thickening?

- 1. DHEA
- 2. Topical EGF
- 3. Progesterone
- 4. Carbon dioxide laser resurfacing

Minimally invasive skin tightening

- EGF topically
- HGH, Testosterone cream, DHEA, estrogen
- Microneedling RF or RF
- Under the skin RF (AccuTite, FaceTite)
- Carbon Dioxide laser resurfacing
- Neck lift with carbon dioxide laser resurfacing