



Hair Loss and Restoration

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Disclosures

Nutrafol: Research Grants

Church Dwight: Research Grants

Exocelicio: Advisory Board

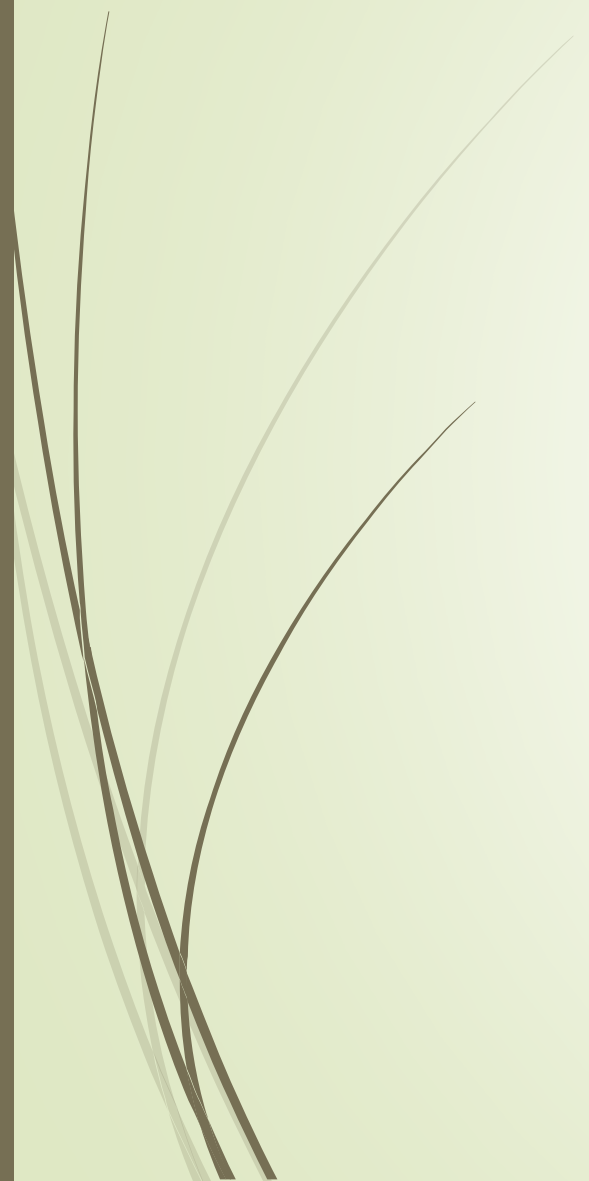
Sea Theory: Research Grants



Why Discuss it?

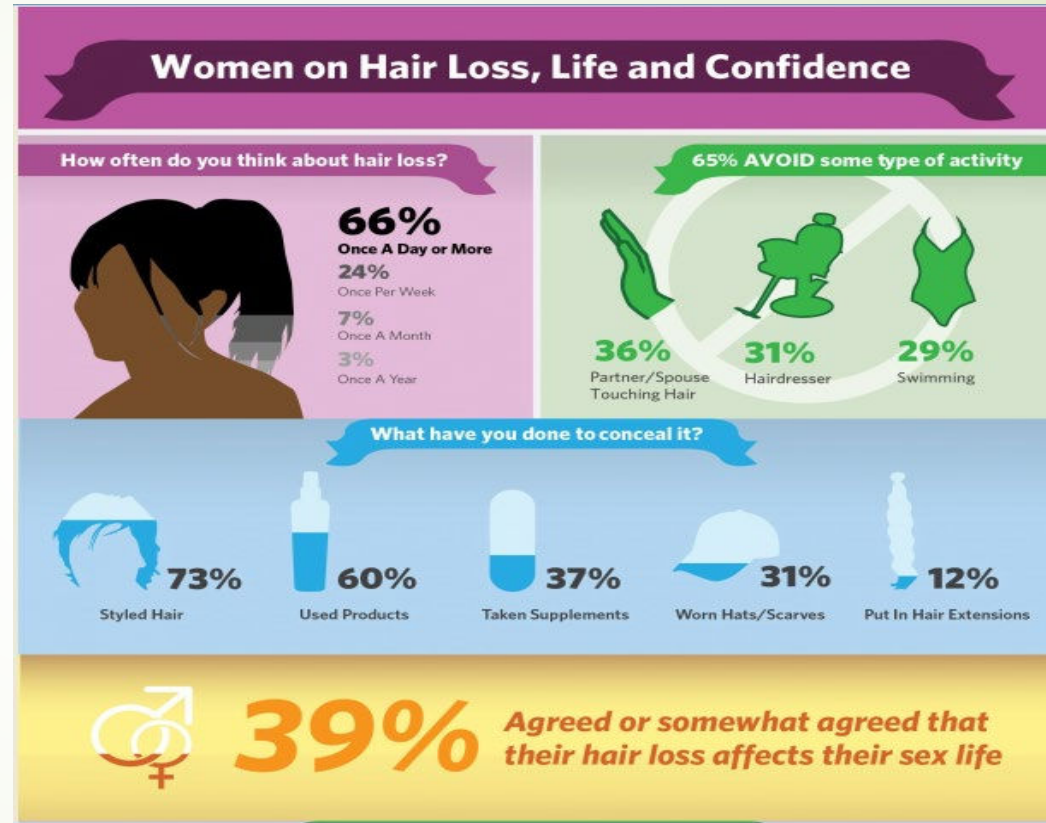
Treatments for hair loss represent 2nd largest segment of aesthetic procedures performed in US

>70 million Americans suffer from hair loss (20 million are female)



Female Hair Loss – Psychological Impact

- 2000 women, ages 25-55
- 66 % suffering from hair loss think about their hair loss
- 39% hair loss affects their sex life
- 79% less happy, 9% said hair loss makes them depressed.
- 55% feel judged
- 86% envy thick hair.



2011 independent survey by Lab42



Etiology

Multifactorial Etiology of Hair Loss: multiple triggers and Inflammation



Genetics



Hormone



Health/Nutrition



Lifestyle: hair styles, products, alcohol consumption, tobacco, extreme exercise



Stress(neuroimmune inflammatory effects on follicle)



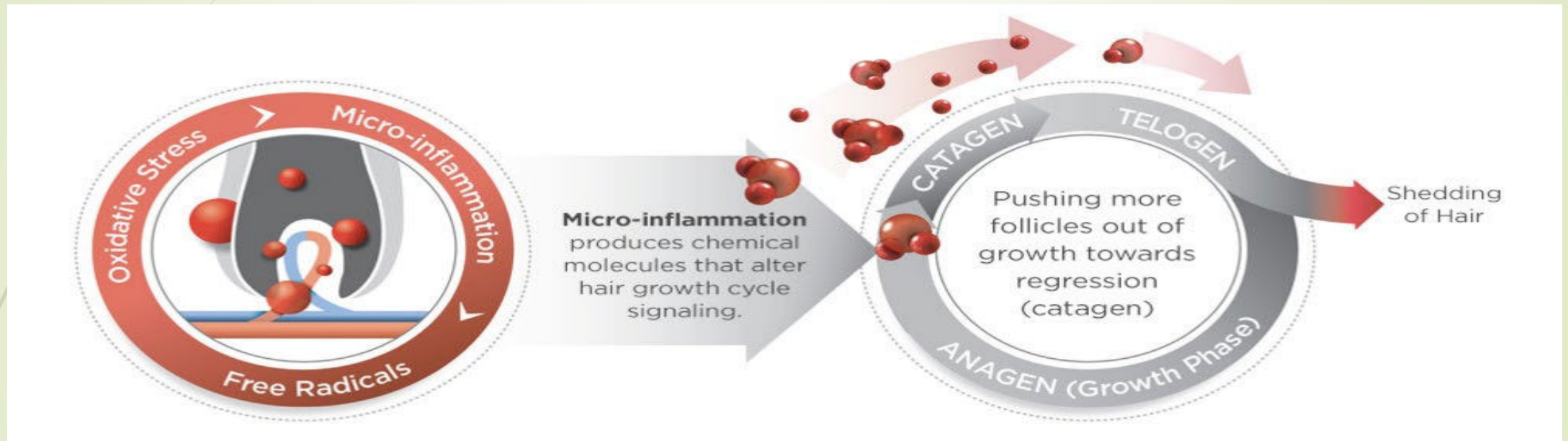
Environmental: pollution, UV



All TRIGGERS above lead to INFLAMMAGING: which creates**chronic microinflammation, free radicals,oxidative stress around follicle: multiple triggers throw the follicle out of balance

A NEW VIEW ON HAIR LOSS

INFLAMMATION LEADS TO DYSREGULATED SIGNALING


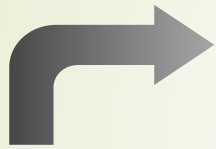


Excess inflammation, free radicals and generated cytokines **disrupt the normal signaling molecules** responsible for regulating the hair growth cycle and hair production – **tipping the scale towards regression**

Mahe et al. Androgenetic alopecia and microinflammation. *Int J Dermatol.* 2000;39(8):576-84



NEW NEUROLOGICAL, NEUROENDOCRINE & IMMUNE MECHANISMS BEHIND HOW
STRESS INHIBITS HAIR GROWTH

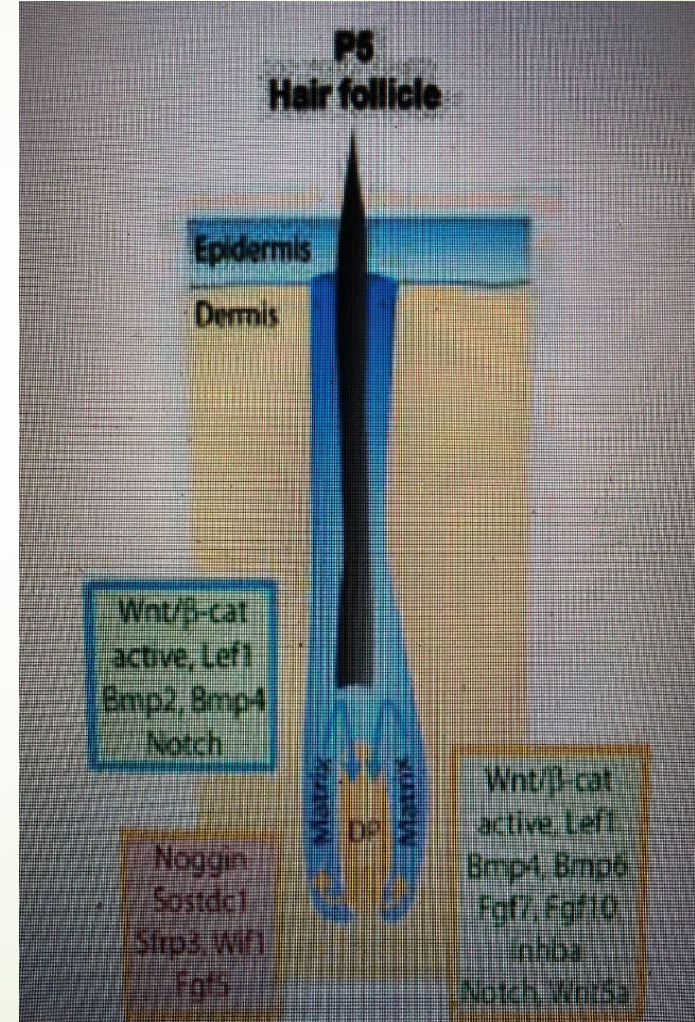


Peters et al. Probing the effects of stress mediators on the human hair follicle substance P holds central position. *Am J Pathol.*2007;17(6):1872-6

Hair growth pathways

- Wnt Signaling*
- MAPK(mitogen activated Protein kinases) Signaling
- TGF beta Signaling
- Signaling between matrix and DP during hair follicle growth

Song et al. Regional Control of Hairless Vs Hair-Bearing Skin by *Dkk2*. *Cell Reports* 2018



487 Active Studies (recently completed or recruiting) as of Jan 2024

- ▶ Hair Stimulating Complex (HSC) is derivative of hypoxia-induced multipotent cell conditioned media enriched key growth factors
- ▶ 15mg Chelate zinc supplement : additional to standard 5% minoxidil
- ▶ Herbal solution in Iran
- ▶ Botulinum toxin A
- ▶ Topical cetirizine 1% vs Minoxidil 5%
- ▶ Drug: tetrapeptide aldehyde proteasome inhibitor (NEOSH101)- Germany
- ▶ Cold atmospheric pressure plasma
- ▶ Nitrous Oxide gel



Treatment Options

Treatment Options

- ▶ Treat the cause: Attempt to correct lab abnormalities first
- ▶ Start supplements depending on etiology
- ▶ Consider Topical biomimetic peptides or topical Finasteride/Minoxidil (with or without microneedling)
- ▶ Consider Low Level Light Laser Therapy, home units/LED
- ▶ Possible intralesional corticosteroid (3-5mg/cc) injections, donor bone marrow stem cells/exosomes, intradermal minoxidil (4), or PRP with or without microneedling
- ▶ Discuss prescription meds (oral minoxidil, oral finasteride, oral spironolactone). Side effects seen with oral meds (1,2,3), oral antibiotics
- ▶ Topical Tacrolimus immune modulator
- ▶ Jak inhib, methotrexate, oral meds, other depending on Dx
- ▶ Experimental Protein injections with Copper
- ▶ Talk nutrition and stress management
- ▶ Consider transplant
- ▶ Always discuss price, frequency of in office visits, and duration of treatment (ie AGA Treatment is forever)

1. Randolph, Tosti. Oral Minoxidil Treatment for Hair Loss: A review of Efficacy and Safety. *JAAD*. 2020 Jul(1): S0190-9622

2. Sanabria, Vanzela et al. Adverse Effects of Low-Dose Oral Minoxidil for Androgenetic Alopecia. *JAAD*. 2020 Nov

3. Sinclair. Female Pattern Hair loss: a Pilot Study Investigating Combination Therapy with Low-Dose Oral Minoxidil and Spironolactone. *Int J Dermatol*. 2018 Jan 57(1):104-9

4. Iamsung, et al. Finasteride and Its Potential for the Treatment of Female Pattern Hair Loss: Evidence to Date. *Drug Des Devel Ther*. 2020 Mar 2(14):951-9

5. Uzel et al. Intradermal Injections with 0.5% Minoxidil for the Treatment of Female Androgenetic Alopecia: A Randomized Placebo-controlled trial. *Derm Therapy* 2020 Dec

A. Medical Treatments: Oral meds

Oral Finasteride

- Inhibits conversion of testosterone into DHT (causes hair miniaturization)
- Binds to sensitive follicles and destroys them
- No proof it helps with frontal hair loss
- Not safe in women of child-bearing age
- Continuous Tx required with AGA

**** Arif, et al, "Dutasteride in Androgenetic Alopecia: An Update," *Curr. Clin. Pharmacol.*, 2017 (12): 31-5

Oral Minoxidil

- Vasodilator: opens K⁺ channels, promotes blood flow = hair growth (i> O₂)
- Prolongs anagen phase and increases hair follicle size
- Topical vs 0.25mg oral, or 2% soln (1 tsp in two cups H₂O, drink 1.25tsp qam)
- Start 1.25-2.5mg bid, up to 5mg bid in men
- Can cause unexpected hair growth in unwanted places
- Continual treatment required with AGA

* Vastarella, et al, "Efficacy and safety of oral minoxidil in female androgenetic alopecia," *Dermatol. Ther.*, Nov. 2020;33(6):14234

A. Medical Treatments: Compounded prescription strength products

Topical Finoxidil

- ▶ Finasteride or Dutasteride /Minoxidil/Retinoic Acid/
- ▶ Adds penetration with retinoic acid
- ▶ Likely reduces side effects of oral finasteride (watch for sexual SE)
- ▶ No studies in women of child-bearing age
- ▶ New dutasteride topical even stronger than finasteride

Topical Minoxidil

- ▶ Similar side effects: hypertrichosis, unpleasant texture
- ▶ Strong evidence similar to oral minoxidil
- ▶ Best results with 5%,
- ▶ Safe on men and women

Ramos, et al. Minoxidil 1mg Orally vs Minoxidil 5% solution Topically for the Treatment of Female Pattern Hair Loss *JAAD* 2019 Aug

Rafi, Katz, "Pilot Study of 15 Patients Receiving a New Treatment Regimen for Androgenic Alopecia: The Effects of Atopy on AGA," *ISRN Dermatol.* Apr 2011 (2011):241953

B.Oral Hormonal Therapies

Spironolactone

- **Efficacy is** good, weak evidence
- **Side Effects:** rare, hypotension, irregular menses, increased urination, avoid with renal failure.
- Best for FPHL, but not for pregnant women or kidney dz
- Decreases testosterone production in adrenal gland affecting 17 alpha hydroxylase and desmolase, competitive inhibition of androgen receptor
- 100-200mg qd

R. Sinclair, et al "Treatment of female pattern hair loss with oral antiandrogens," *Br. J. Dermatol.* Mar 2005 (152): 466-73

Flutamide/Bicalutamide

- **Efficacy is** good, but weak evidence
- **Side Effects:** liver toxicity, hot flashes/Bicalutamide, lower toxicity for prostate cancer Tx, but GI complaints
- **Compliance:** Moderate for flutamide/high for bicalutamide
- Interacts with other meds, black box warning hepatic failure
- Antiandrogen
- 250mg qd

D. B. Johnson and S. Sonthalia, "Flutamide," in *StatPearls*, Treasure Island (FL): StatPearls Publishing, 2020.

C. Complimentary and Alternative Mgt: (I)Supplements

Nutraceutical Supplement with Standardized Botanical Extracts

- ▶ Different versions for women, men, postpartum, women's balance(menopause)
- ▶ Ashwaghandha: Stress adaptogen
- ▶ Biocurcumin: anti-inflammatory
- ▶ Tocotrienols: anti-oxidant
- ▶ Saw Palmetto: natural DHT-inhibitor
- ▶ Piperine: increase bioabsorption
- ▶ Different versions for women, men, postpartum, women's balance(menopause)

Deep Sea Marine Protein Supplement

- ▶ Amino Mar: 28% Marine Protein Complex:(ECM components of shark and mollusks)
- ▶ Vitamin C
- ▶ Horsetail extract, Flaxseed extract
- ▶ Biotin
- ▶ Fumed Silica
- ▶ Apple Extract

G. Ablon, "A 6-month, randomized, double-blind, placebo-controlled study evaluating the ability of a marine complex supplement to promote hair growth in men with thinning hair," *J. Cosmet. Dermatol.*, Dec. 2016.;15(4):358-66

Ablon, Kogan, "A Six-Month, Randomized, Double-Blind, Placebo-Controlled Study Evaluating the Safety and Efficacy of a Nutraceutical Supplement for Promoting Hair Growth in Women With Self-Perceived Thinning Hair," *JDD*, May 2018 17(5):558-65

C.CAM: (I)Supplements cont.

Serenoa Repens

- **Efficacy:** moderate, evidence weak
- **Side Effects:** rare
- Possibility of missing early prostate cancer detection
- Saw palmetto: inhib 5 alpha red'ase
- Best on vertex scalp hair growth

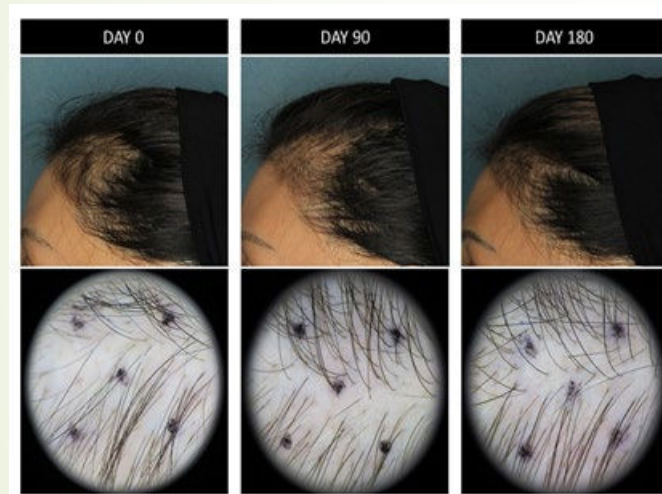
Murugusundram, "Serenoa Repens: Does It have Any Role in the Management of Androgenetic Alopecia?," J. Cutan. Aesthet. Surg...
Jan 2009 (2):31-2

Plant Based Oils

- **Efficacy:** unknown, need clin trials, anecdotal evidence
- **Side Effects:** SE GI discomfort, reduce PS
- **Compliance:** good
- **Cost:** affordable
- **Ethics:** need studies
- *Coconut oil, castor oil, amla oil, rosemary oil, tea tree oil, pumpkin seed oil*

Panahi, et al "Rosemary oil vs minoxidil 2% for the treatment of androgenetic alopecia: a randomized comparative trial," Skinmed Jan 2015 (13):15-21

Supplement Studies



Ablon, Kogan. **A Randomized, Double-blind, Placebo-controlled Study of a Nutraceutical Supplement for Promoting Hair Growth in Perimenopausal, Menopausal and Postmenopausal Women with Thinning Hair.** *JDD* Jan 2021 20(1):55-61



Burgess, Roberts, Downie, Kogan. **A Closer Look at Multi-Targeted Approach to Hair Loss in African American Women.** *JDD* Jan 2020: 19(1):95-98

D. Complimentary and Alternative Tx

(I) Devices: Low level laser Therapy



- **Clinical Evid:** strong, excellent efficacy
- **Side Effects:** none
- **Compliance:** moderate, need more studies for standardized protocols
- **Ethics:** best data of efficacy of all treatments, but expensive
- Energy Dispersed from Laser Array, Monochromatic (same wavelength) and Coherent Energy (NOT scattered) Red Spectrum (< 500 mW, no heat)
- BioStimulation Effect (hypothesis as mech unknown): decrease inflam, activate Wnt pathway, mitochondrial oxidative metabolism & stimulation of transcription factors promote blood flow by stim Nitric Oxide
- Stimulation of epidermal stem cells hypothesis, shifts follicle back into growth cycle:

D. Complimentary and Alternative Tx: (II) Devices: Light Emitting Diodes

- ▶ Clin Evid: moderate, Efficacy: good
- ▶ Home devices easier for pt access: dual band 620nm, 660nm
- ▶ Similar to LLLT promoting blood flow by stimulating nitrous oxide but also blocks DHT by downregulating 5-AR
- ▶ Noncoherent
- ▶ **Nitric Oxide:**
 - ▶ binds to free thiol in enzyme active site, stopping DHT production
 - ▶ enhances growth factors, reduces inflammation and increases blood flow to the hair follicle
 - ▶ Improves blood flow: increase cellular respiration, angiogenesis and vasodilation
- ▶ 10min qd



Before and 6 Months After LHG



Actual Patient of Dr Glynis Ablon

Before and 4 Months After LHG



Actual Patient of Dr Glynis Ablon

LED 6 month Daily Use



D. Complimentary and Alternative TX

(III) Devices: Microneedling

- Clin Evidence: weak to moderate, Efficacy: good
- Side Effects: rare, pain, bruising, folliculitis
- Works by releasing GF and dermal papilla assoc stem cells and activating wound regeneration mechanisms.
- Add GF topicals or topical OTC, PRP, exosomes

Neerja, "A study on the efficacy of microneedling with minoxidil solution versus microneedling with hair multivitamin solution for the treatment of androgenetic alopecia," *Int. j. dermatol. clin. res.*, Mar 2020(6):10-2

D. Complimentary and Alternative Therapy:

(IV) Platelet Rich Plasma

- Clinical evidence: strong, Efficacy: excellent
- Side Effects: scalp pain, HA, burn sensation
- deep dermis or subcutaneous injxn at a vol of 4-8 cc's/sessn, q mo, 3-4 sessions
- activated within 10 min, 95% secr by 1hr
- 94% platelets: contain proteins, cytokines, bioactive factors
- Enhanced prolif, differentiation and angiogenesis of dermal papillae and stem cells in bulge
- Usually injected but can be introduced by novel devices

Girijala, et al, "Platelet-rich plasma for androgenic alopecia treatment: A comprehensive review," *Dermatol. Online J.* Jul 2018(24)

*Gupta, Banimore. **Platelet-Rich Plasma Monotherapies for Androgenetic Alopecia: A Network Meta-Analysis and Meta-Regression Study.**JDD Sep 2022

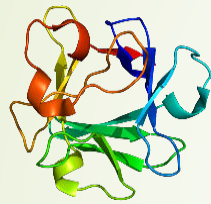
Key Growth Factors



EGF

(Epidermal Growth Factor)

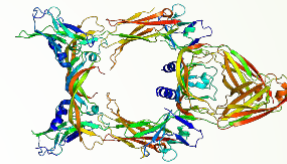
Promotion of epithelial cell growth, angiogenesis, promotion of wound healing



PDGF

(Platelet Derived Growth Factor)

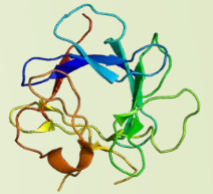
Cell growth, new generation and repair of blood vessels, collagen production



IGF

(Insulin-like Growth Factor)

Induces anagen phase



FGF

(Fibroblast Growth Factor)

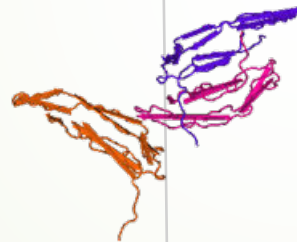
Tissue repair, cell growth, collagen production



VEGF

(Vascular Endothelial Growth Factor)

Growth and new generation of vascular endothelial cells



TGF-β1

(Transforming Growth Factor)

Induces cell apoptosis



3 months after therapy(4 PRP sessions)



Property of Dr Glynis Ablon

[Justicz. et al.](#) Platelet-Rich Plasma for Hair Restoration. *Facial Plast Surg Clin North Am.* 2020 May;28(2):181-187

[Gupta, Versteeg, et al.](#) The Efficacy of Platelet-Rich Plasma in the Field of Hair Restoration and Facial Aesthetics-A Systematic Review and Meta-analysis. *J Cutan Med Surg.* 2019 Mar/Apr;23(2):185-203.

E. CAM: Other

Lanatoprost

- **Clinical Evidence:** weak, **Efficacy:** good
- **Side Effects:** rare pain, bruising, folliculitis, hypertrichosis
- Only tried in mild AGA
- Prostaglandin analog, orig to treat glaucoma
- Prolong anagen phase

Blume-Peytavi, "A randomized double-blind placebo-controlled pilot study to assess the efficacy of a 24-week topical treatment by latanoprost 0.1% on hair growth and pigmentation in healthy volunteers with androgenetic alopecia," *J.AAD*, May 2012 (66):794-800

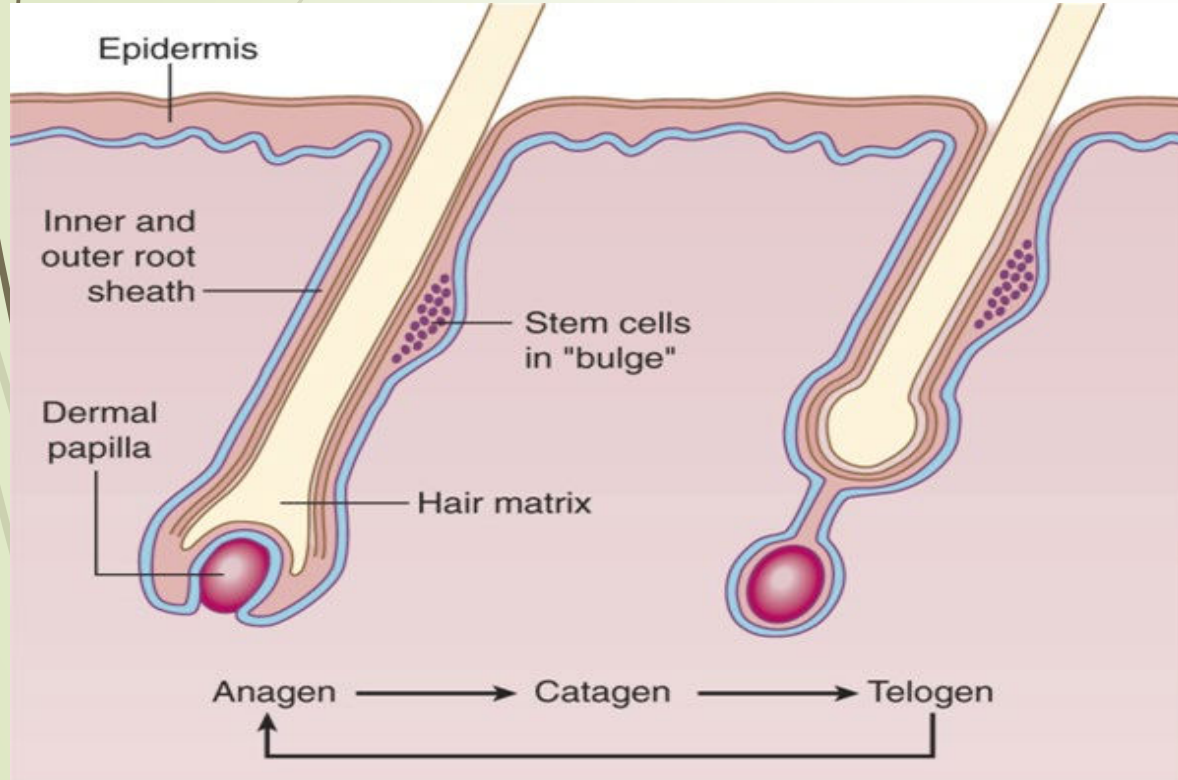
Bone Marrow Mesenchymal Stem Cells

- Sourced: regulated donor banks
- GF and cytokines filtered from stem cells to create conditioned media to coordinate repair
- Conditioned media primed with WNT pathway signaling growth factors delivered via nano lipid carriers (anti-inflam, no DNA)
- MRNAs stimulate good biosignals for hair growth
- Master regulator of biological fn, anti-inflammatory, pro-healing: 12 recombinant GF specific to follicle regeneration

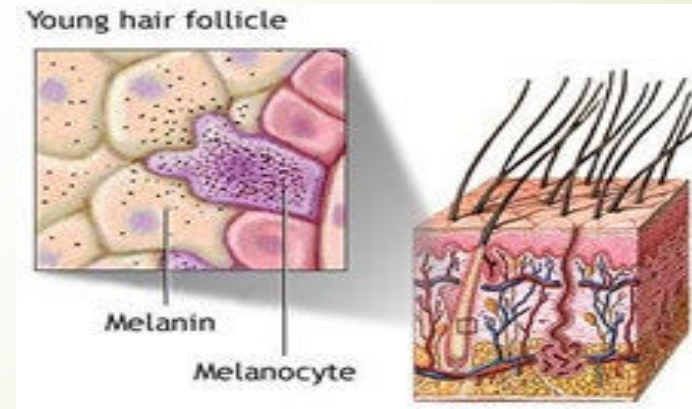
Hicok et al. Exosomes Origins: Why the Cell Source Matters. *Stem Cell & Regen Med* Dec 2019

Wnt Pathway Hair Regeneration

WNT Pathway regulates the growth and development of hair follicles.



- Treatment of MSCs with Wnt1a- conditioned medium activates DP cells and promotes hair follicle regrowth.



F. Exosomes



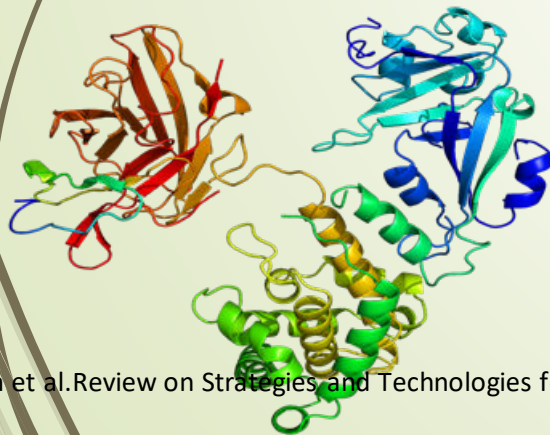
➤ **EXTRACELLULAR VESICLES (EVs)** LIPID BILAYER MEMBRANE MICRO-VESICLES SECRETED BY VARIOUS TYPES OF CELLS SUCH AS STEM CELLS THAT CARRIES GROWTH FACTORS

- **EVs target and repair damaged tissue** at sites of inflammation to transfer their content resulting in phenotypic functional changes
- **EVs contain growth factors**, mRNA and miRNA, lipids and cell-signaling proteins to repair and regenerate cells
- Reliable and **robust safety profile** and are acellular= **no DNA** or cellular material
- Source: Bone Marrow mesenchymal stem cells, Umbilical Cord Stem Cells, Plant Stem cells, Adipose Stem cells

Components of Exosomes

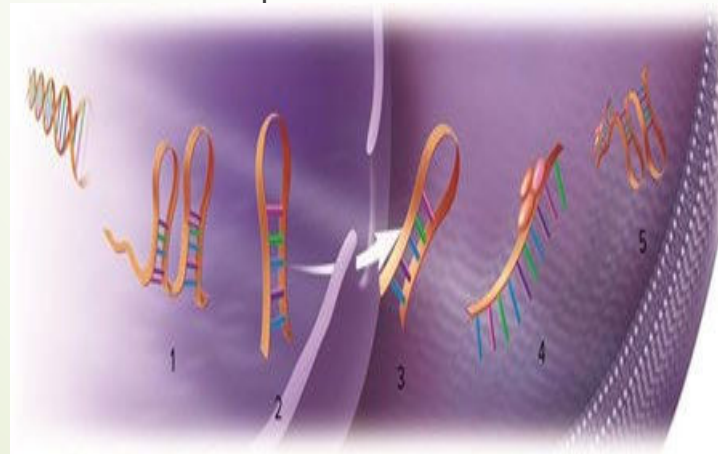
Growth Factors

- Stable protein bio-signals
- Manage inflammation and regeneration (enhance collagen and elastin synthesis)
- Used to enhance healing in aesthetic dermatological treatments



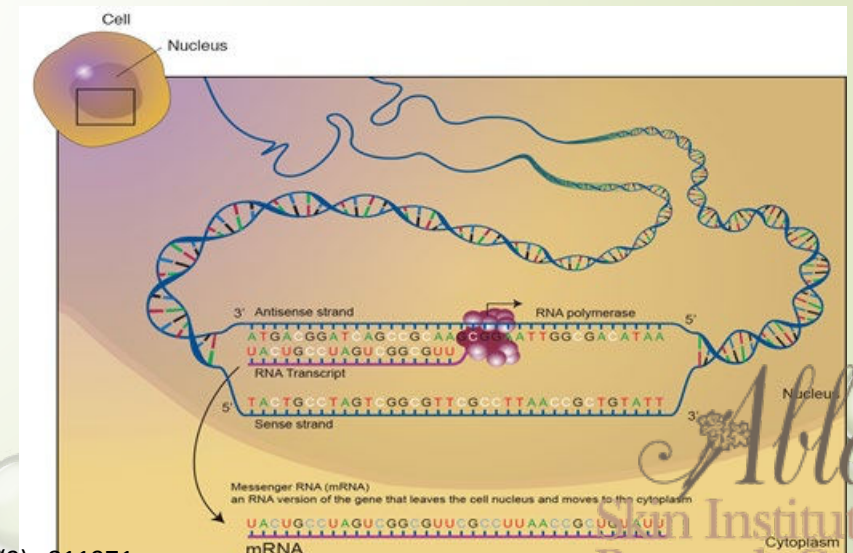
Micro RNA

- Regulate gene expression
- Promote keratinocyte migration
- Interact with messenger RNA
- Re-epithelialization of skin in



Messenger RNA

- Moderna COVID Vaccine
- Cancer Research
- Key component of Exosomes
- Natural vs. Synthetic



One session exosomes

before



6 wks after 1 session



Property of Dr Glynis Ablon

One year later



Single Exosome Treatment

Pre treatment



3 months after one session



Property of Dr Glynis Ablon

H. New and Upcoming Treatment Options

Clascoterone	Setipiprant	<u>Oral JAK inhib</u>
Antiandrogen (resembles DHT and spironolactone)	Oral CRTH2 antagonist: inhib proinflam effects in allergic response	AA =autoimmune attack on hair follicles with IL-15 production in response to interferon- γ secretion:
Antagonizing androgen rec on DP and inhib DHT on hair miniaturization and dermal inflam	Antagonist for Prostaglandin D2 receptor-blocks PGD2 mediated inflammation;CRTH2(chem oatrtractant receptor-homologous molecule expressed on Th2 cells	Mediated by JAK 1/2 and JAK 1/3 signaling in T cells via a positive feedback loop. JAK inhibitors disrupt this cycle and cause reentry of hair follicles into anagen phase, lead to hair growth.

Sun and Sebaratnam, "Clascoterone as a novel treatment for androgenetic alopecia," *Clinical and Experimental Dermatology*, 2020 (45): 913-4

"A Safety and Efficacy Study of Setipiprant Tablets in Androgenetic Alopecia in Males." <https://clinicaltrials.gov/ct2/show/results/NCT02781311> (accessed Feb. 16, 2021)

Yale, et al. "At the crossroads of 2 alopecias: Androgenetic alopecia pattern of hair regrowth in patients with alopecia areata treated with oral Janus kinase inhibitors," *JAAD*

Case Rep, vol. 6, no. 5, pp. 444-446, May 2020.



I. Others

- ▶ Synsepalum Seed Oil
 - ▶ Del Campo, Zhang, Wakeford. **Effect of Miracle Fruit Seed Oil on the Measurable Improvement of Hair Breakage in Women with Damaged Hair** *JCAD*. Nov 2017;10(11):39-48
- ▶ Change hair styles, products, blow dry low heat
- ▶ PDO threads, anecdotal
- ▶ Injectable peptides with Copper
- ▶ Estrogen Creams, anecdotal
- ▶ Topical Melatonin Babadjouni et al. **Melatonin and the Human Hair Follicle**, *JDD* March 2023
- ▶ Scalp Tattooing
 - ▶ Park, Kim. **Effectiveness of Scalp Medical Tattoo Technique for the Treatment of Advanced Male Pattern Baldness**. *Int. J. Dermatol*; 2018 Nov
- ▶ Hair Transplant

My Approach to the Hair Challenged Patient

- Determine type of hair loss/etiology
 - Includes lab work:
 - free/total testosterone
 - DHEA-S
 - Prolactin
 - Thyroid function tests
 - Ferritin
 - ?ANA
 - Possible biopsy
 - Trichoscan
 - Micro/macrophotography
- Discuss treatment options:
 - Treat the cause
 - Start supplements, topical solutions(OTC or Compounded)
 - LLLT, LED
 - Possible intralesional corticosteroid injections/PRP
 - Topical biomimetic peptides, growth factors, exosomes with or without microneedling(or new delivery devices), especially if failed topicals
 - Discuss prescription meds
 - Consider hair transplant



Conclusion

- ▶ Take your time with patient:
 - ▶ review mechanism of hair loss
 - ▶ Work up causes of hair loss before starting treatments
 - ▶ Review all treatment options, including prices, time frame, frequency
- ▶ Indefinite use of any modality chosen for androgenic alopecia
- ▶ Combination works best: need combo studies
- ▶ Discuss hair thinning with all patients
- ▶ Address stress issues, nutrition, lifestyle

Nestor, Ablon, et al. Androgenic Alopecia: Efficacy and Ethics of Treatment. *JCD*. March 2023

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DEFINITELY HIDING
A BALD SPOT



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FEMALE PATTERN HAIR LOSS AND ANDROGENETIC ALOPECIA

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Director, Lahey Hair Loss Center of Excellence and Research Unit

Disclosures

- Consultant and/or advisory board for for Eli Lilly, Prizer, Kintor, Inmagene, Abbvie, L'Oreal
- Research funding and PI: Eli Lilly, Concert, Follica, Leo, Santiste
- Speaker Lilly, Pfizer
- Board of Directors for the American Hair Research Foundation and the Scarring Alopecia Foundation
- Most treatments discussed in this talk are used off-label

Objectives

- Develop an approach for evaluating hair loss complaints.
- Review treatments for female pattern hair loss and androgenetic alopecia.

OUR CLINIC APPROACH



Tips that help us help patients

- Extensive intake forms.
- Take a comprehensive history.

Hair Loss Clinic
New Patient Intake Form

Patient Name: _____

Date of birth: _____

Did someone refer you to our office today? (circle) SELF PCP OTHER (please list): _____

When did you first notice your hair loss? (please provide approximate information on month/year)

Circle the type of hair loss you are experiencing: (circle all that apply)

Patchy (distinct spots of hair loss) Thinning Breakage "All Over" Other

Where on the scalp is your hair loss? (circle all that apply):

Top Back Frontal/Hairline Vertex/Crown Sides No Hair loss on Scalp

Did you ever have a period where you felt like your hair was shedding too much? (normal shedding is about 50-100 hairs per day) YES NO

If YES when was this? _____

Have you experienced hair loss anywhere besides the scalp? YES NO

If YES, circle all that apply: Eyebrows Eyelashes Arms/Legs Pubic Underarms Beard

Do you have any of the following scalp symptoms? (circle all that apply)

ITCH BURNING TENDERNESS/PAIN FLAKING REDNESS OTHER

Do your first degree relatives (parents, siblings, children) have hair thinning or hair loss? YES NO

If YES, circle all that apply: Mom Dad Sister Brother Child

Have you had a biopsy of your hair loss condition? YES NO

If YES, what did the biopsy show? _____

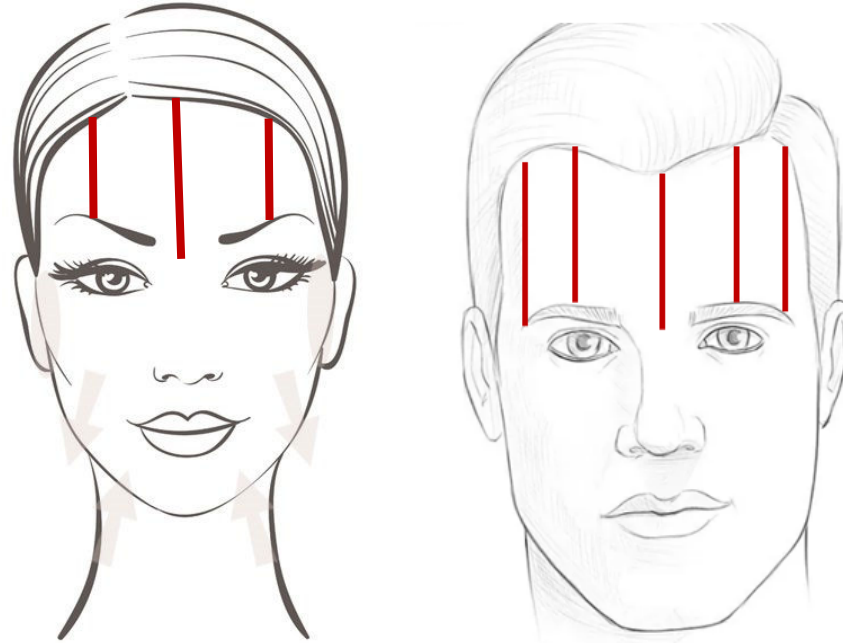
In the past year have you experienced any of the following?

Pregnancy	YES	NO
Illness with high fever	YES	NO

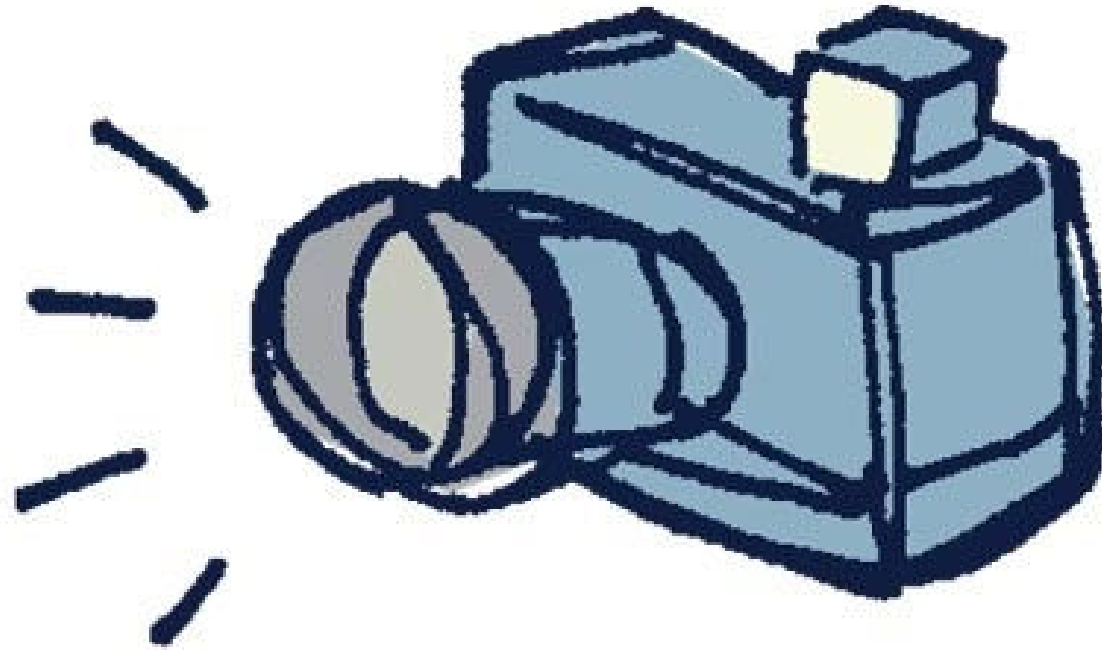
Tips that help us help patients: Measurements

Measure in cm from R mid brow, lower glabellar crease, L mid brow to hair line.

In men, also measure in cm from R and left lateral brow to hair line.



Tips that help us help patients: Photographs



“My hair loss is definitely worse. I see hair all over my pillow and bathroom floor.”

Before



After 6 months of treatment



“I can’t tell if I’m better...”

Before



After 6 months of treatment



Lahey Hair Loss Center of Excellence Approach

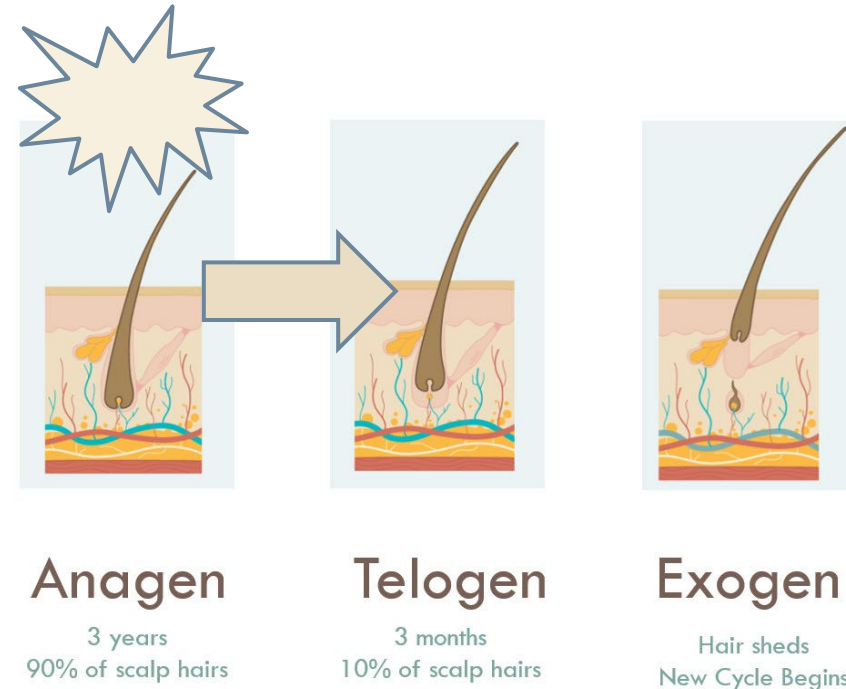
1. Rule out telogen effluvium.
2. Rule out inflammatory cause.
3. +/- Check specific labs.

TELOGEN EFFLUVIUM

Most common cause of hair loss

Telogen Effluvium

- The hair follicle is very sensitive to changes in some individuals.
- When a person experiences a stressful event or “trigger”, hair follicles prematurely switch from the growing anagen phase of the cycle to the resting telogen phase.
- After a three-month delay, these telogen hairs shed in enormous amounts, up to 300 hairs per day!
- Most people do not recognize the association between the trigger and the hair loss because of the three-month delay in between.



Telogen Effluvium: Our Clinic

- **Significant life stress (loss of job, loss of loved one, divorce, etc)—(40%)**
- **Weight loss ~10 lbs (30%)**
- **Stopped** hormone medications including birth control or IUD (10%)
- **Adjustments of thyroid medication (10%)**
- **Illness with high fever (recently COVID19 infection)**
- **Flare in or new diagnosis of underlying condition (IBD, SLE, RA, etc)**
- VERY rarely medications (methotrexate, lithium, β -blockers, valproic acid, bupropion >>>paroxetine)

Telogen Effluvium Screening Questions

In the past year have you experienced any of the following?

Pregnancy	YES	NO
Illness with high fever	YES	NO
Hospitalization or surgeries	YES	NO
Weight loss >10 lbs.	YES	NO
Started new medications or over the counter supplements	YES	NO
Started or stopped hormone medications including birth control and IUD?	YES	NO
Felt a great degree of emotional stress (more than usual)?	YES	NO

If you answered YES to any of the questions above please provide details here:

Telogen Effluvium



This is 12 cm or one year of regrowth!

Telogen Effluvium

Initial (5 months after husband's death)



3 month follow up (no treatment)



INFLAMMATORY ALOPECIA

Do not miss it!

Diagnosis?

LICHEN PLANOPILARIS



LICHEN PLANOPILARIS



Signs of inflammation may be subtle



Diagnosis?

Lichen Planopilaris



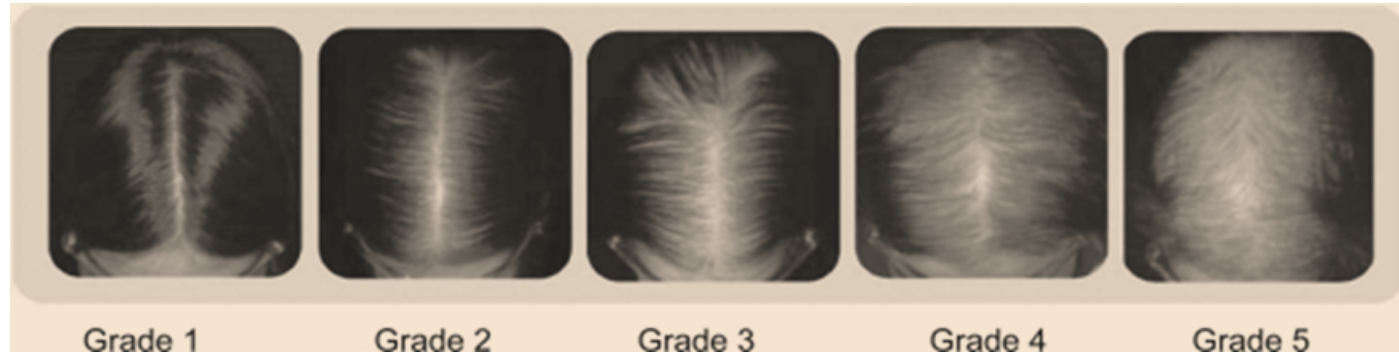
Lichen Planopilaris



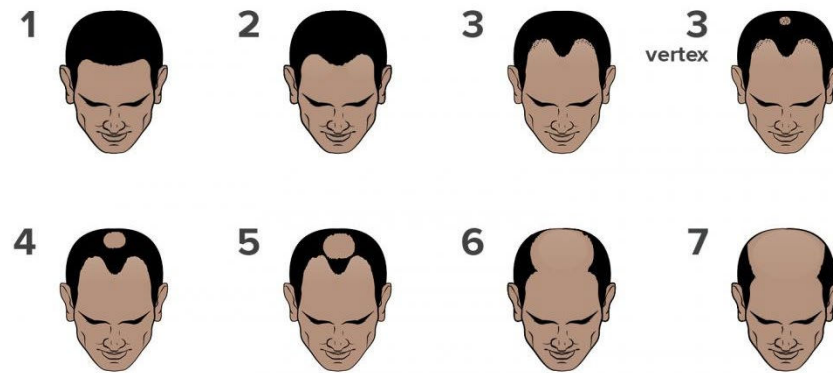
Cicatricial alopecia can present similarly to patterned hair loss in men and women



Female Pattern Hair Loss (FPHL) and Male pattern hair loss (AGA)



Norwood Scale





Work Up?

PCOS and FPHL

Polycystic ovarian syndrome in patients with hair thinning

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- Hirsutism and acanthosis nigricans are the most reliable clinical markers of PCOS.
- 8% of women presenting for hair thinning to our clinic had a known diagnosis of PCOS.
- Taking a detailed menstrual history with subsequent endocrinology referral led to a new diagnosis of PCOS in an additional 12 patients (2.5%).
- Notably, serum hormone values were not required in our patient population to meet PCOS diagnostic criteria.



NUTRITIONAL

Do you have a history of an eating disorder? YES NO
 Do you follow any special diet (vegan, vegetarian, etc.)? YES NO
 Have you ever had gastric surgery (lap band, other)? YES NO

Please list your typical breakfast, lunch and dinner below:

BREAKFAST: _____
 LUNCH: _____
 DINNER: _____

Approximately how many 8 ounce glasses of water do you drink a day? _____
 Do you drink well water? YES NO

How many alcoholic beverages do you consume in a 7-day week?: (circle one answer below)

None 1-2 3-5 6-7 8-10 11-12 13-14 15 or more

If you take herbs, vitamins, or other supplements, please list them here: (if no, leave blank)

Name of Supplement	Brand	Amount taken daily	Where do you purchase supplement?	Approximately when did you start supplement?

- ▣ If patients are limiting certain foods, yo-yo dieting, or have anorexia or bulimia, this can have a direct effect on their hair growth and potential to experience periods of over shedding.

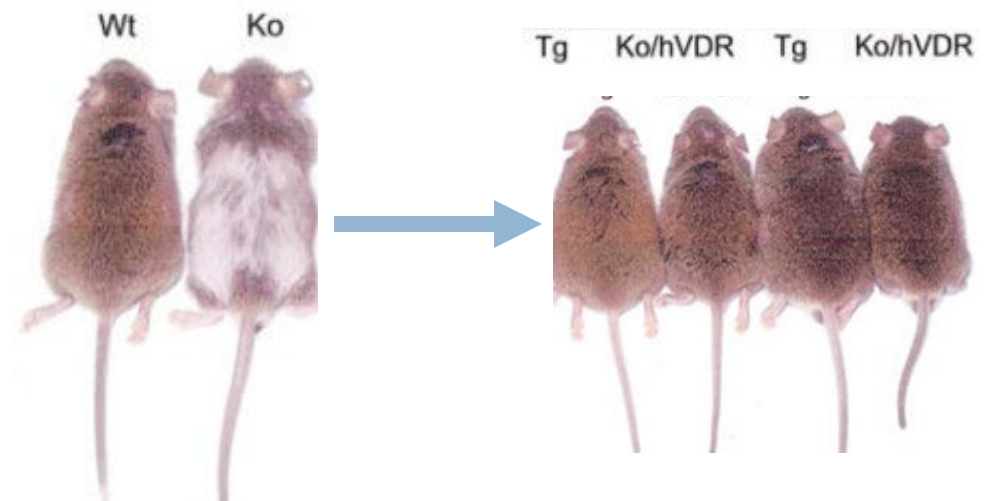
- ▣ I recommend that patients obtain their nutrients from their diet not supplements, with iron and vitamin D being the exceptions.

Iron

- ▣ Ferritin $< 40 \mu\text{g/L}$ best measure of iron deficiency. Even if not anemic by CBC, will recommend iron supplementation in hair loss patients.
- ▣ Iron is a cofactor in DNA synthesis, and because hair follicle matrix cells divide rapidly, they may be more sensitive to decrease in iron supply.
- ▣ More recent evidence suggests several genes in the stem cells of the anagen hair follicle stem cell region may be regulated by iron.

Vitamin D Receptor (VDR)

- The VDR is expressed in the hair follicle and sebaceous gland.
- VDR activation promotes hair follicle differentiation and hair growth.
- VDR knock out mice develop extensive alopecia. When given an VDR transgene, mice regrew hair.
- Mice that lack the vitamin D receptor (VDR) and mice that lack an activator of the VDR (otherwise known as MED) develop hair loss.



Xie et al. J Invest Dermatol 2002; 118: 11-6.

Kong et al. J Invest Dermatol 2002;118:631-638.

Oda Y et al. J Invest Dermatol 2012; 132: 1075-83

Vitamin D: “Until we understand it, we might as well optimize it”

- Vitamin D insufficiency is defined as 12 to 20 ng/mL
- Vitamin D deficiency is defined as < 12 ng/mL

- **Treatment**
- < 12 ng/mL: 50,000 IU Vitamin D3 po per week x 6-8 weeks then 800 IU daily.
- 12 to 20 ng/mL: 1000 IU Vitamin D3 daily and repeat level after 3 months.
- 20 to 30 ng/mL: 800 IU Vit D3 daily to maintain levels in the target range.

Treatment Options

MEN

- Low dose oral minoxidil 2.5 mg - 10 mg once daily.
- Topical finasteride 0.5% solution once or twice daily.
- Finasteride 1 mg daily.
- Dutasteride 0.5 mg (TIW or daily).
- Platelet rich plasma injections.

WOMEN

- Spironolactone 12.5 mg-200 mg daily.
- Low dose oral minoxidil 1.25-5 mg daily.
- Bicalutamide 25 mg once daily.
- Platelet rich plasma injections.

Finasteride in FPHL

JAAD 2000

- Type 2 5-alpha reductase inhibitor.
- 1 mg finasteride vs placebo x 12 months showed no benefit in 137 postmenopausal females.
- No controlled studies of higher doses of finasteride.
- In 36 hyperandrogenemic females with FPHL, 5 mg finasteride/day x 1 year showed similar results to females recruited to study who refused any treatment.

Spirolactone

- An aldosterone antagonist, used as a potassium-sparing diuretic for over 50 years and as treatment for FPHL for over 20 years.
- Blocks androgen receptors in target tissues.
- There are no FDA approved dermatologic indications for spironolactone, but it is commonly used to treat hormonally induced acne and FPHL.
- There are no randomized, placebo-controlled trials of spironolactone in FPHL.



Spironolactone for FPHL

- 79 women, average age 50 (21-79 years)
- Average spironolactone dose: 100 mg daily (range: 25-200 mg daily) for a minimum of 6 months.
- Average Sinclair Score improvement: 0.65. Patients with a baseline score of 2.5 or higher showed nearly a full integer change in improvement.



- Very well tolerated
 - 2 patients spotting between periods
 - 1 patient breast tenderness
 - 13 patients mild dizziness / lightheadedness which self-resolved
- 95% continued medication even if reported side effect because mild or self-resolving.

Low Dose Spiro



- 62 FPHL patients treated with low-dose spironolactone.
- The average age was 62 years (range 30-84).
- Spironolactone daily dose ranged from 12.5mg to 50mg, with an average daily dose of 35 mg.
- The average Sinclair scale before starting spironolactone and approximately 1 year after starting low-dose spironolactone decreased significantly from 2.47 to 1.81 ($p < 0.001$).

Spirolactone Considerations

- In PCOS, need 100 mg BID.
- Pregnancy contraindication.
- Increased risk of hypotension if on other anti-hypertensive medications.
- Be mindful of risk of hyperkalemia (especially if >65 yo, renal disease or on ACE inhibitor or Angiotensin Receptor Blocker)!
 - ▣ **Increased risk if baseline K+ \geq 4.5**
- **Can use lower spironolactone doses with great efficacy in older patients!**
 - ▣ **12.5 or 25 mg daily**

Spironolactone Monotherapy

Patient with PCOS

Before



After 100 mg bid x 6 months



Spironolactone Monotherapy

72 yo female

Before



After

12.5 mg daily x 6 months



Spironolactone Monotherapy

67 yo female

Before



After

25 mg daily x 6 mos (patient also on lisinopril)



Combination Therapy

After adding topical
minoxidil 5% once per
day x 6 months



Combination Therapy

Before



After 1 year of 50 mg
spironolactone BID and oral
minoxidil 1.25 mg



Combination Therapy

Before



Topical minoxidil
+
Spironolactone
50 mg daily

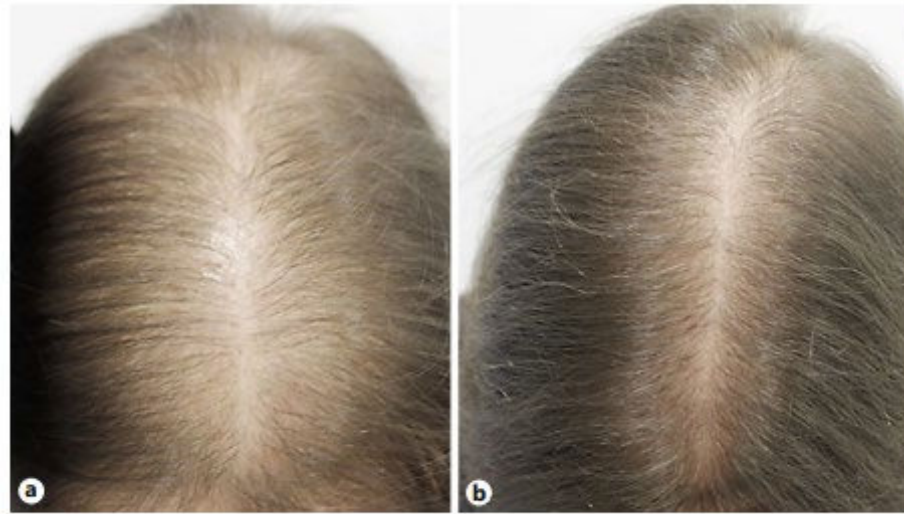
x 6 months

After



Oral Minoxidil for FPHL: Efficacy

- 148 women, mean age 47.2 years (range 17–85).
- Median dose 1 mg daily (0.25-2 mg), mean treatment duration 9 months (range 6–27).
- 118 patients (79.7%) had clinical improvement; no patients worsened.
- Adverse effects were occurred in (19%):
 - ▣ hypertrichosis (25 patients)
 - ▣ tachycardia (2 patients)
 - ▣ lower limb edema (1 patient)



Skin Appendage Disord 2020;6:175–176
DOI: 10.1159/000505820

Rodrigues-Barata et al.

Oral Minoxidil: Safety

- A total of 1404 patients (67.2% F); mean age of 43 years (18-86).
- Mean dose 1.63 mg (range 0.03-15 mg daily); mean duration of treatment 7.9 months (range 3-79).
- Adverse Events:
 - lightheadedness (1.7%) ~1-5 days
 - hypertrichosis (15.1%)
 - fluid retention (1.3%)
 - tachycardia (0.9%)
 - headache (0.4%)
 - periorbital edema (0.3%)

~60 days
- Transient increased hair shedding was noted in 5 patients.
- No life-threatening adverse effects were observed.

Oral Minoxidil for FPHL

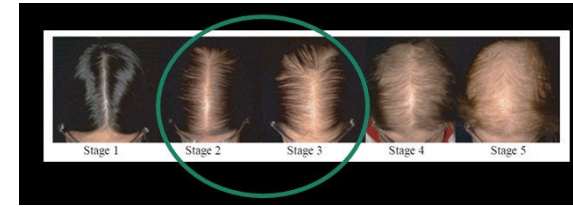
Before



After 1.25 mg daily x 6 months



Oral Bicalutamide



- An oral selective anti-androgen.
- 316 patients with female pattern hair loss treated with 10 mg daily.
- Side effects:
 - ▣ 3%: mild elevation of LFTs which was asymptomatic in all cases. This self resolved without changing dose in 4 of 9 patients.
 - ▣ 2%: lower leg swelling
 - ▣ 1% GI upset
- The mean Sinclair stage at baseline was 2.77. The average reduction in Sinclair stage was 0.5 at 6 months and 0.80 at 2 years.

Journal Pre-proof

Safety of oral bicalutamide in female pattern hair loss: a retrospective review of 316 patients

Fathima Ferial Ismail, MBBS, BMedSci, Nekma Meah, MBChB, MRCP (UK), Lara Trindade de Carvalho, MBBS, MD, Bevin Bhoynul, MBBS, MRCP (UK), Dmitri Wall, MB BCh BAO, MRCP (UK), MSc HIT, Rodney Sinclair, MBBS, MD, FACC



What about PRP?

Platelet Rich Plasma

PRP: Platelet Rich Plasma

- 1 treatment every 4-6 weeks x 3
- Clinic follow up 3-4 months after last treatment to compare before and after photos
- Maintenance: 1 treatment every 6 months thereafter

PRP Monotherapy

Before



Three months after having 3 monthly PRP injections



PRP Monotherapy

Before

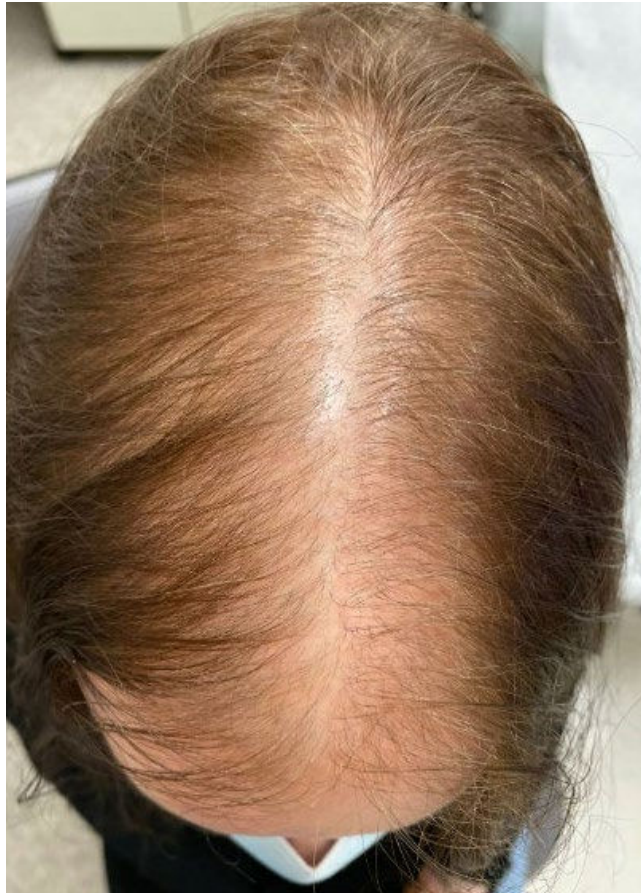


**Three months after having 3
monthly PRP injections**

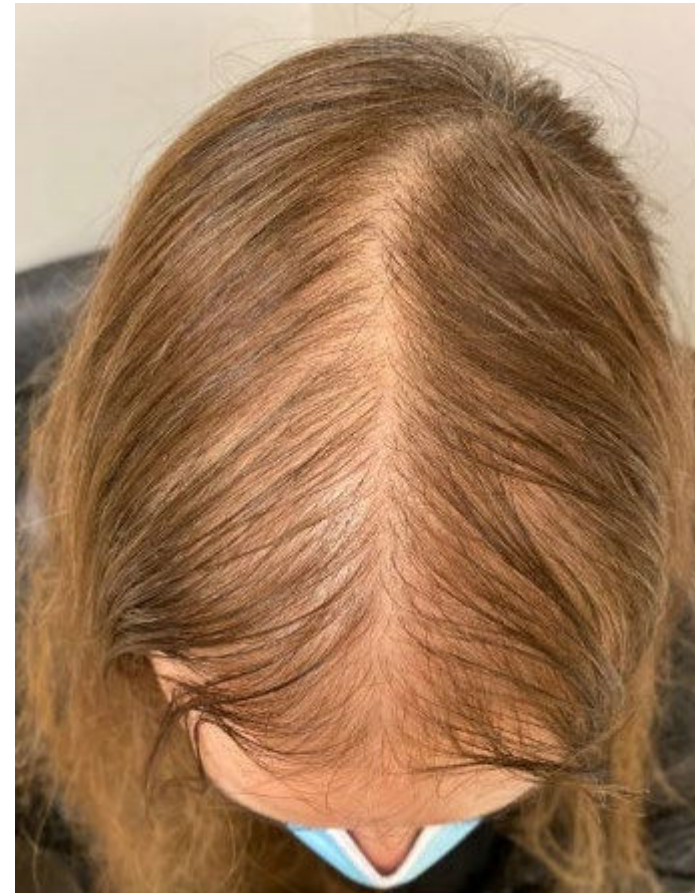


PRP Monotherapy

Before



Three months after having 3 monthly PRP injections



PRP Monotherapy



PRP Monotherapy

Before



Three months after having 3 monthly PRP injections



PRP Monotherapy



In Summary

- Having a systematic approach to hair loss patients helps prevent misdiagnoses and leads to better patient outcomes.
- There are treatments that help, but documentation is critical!