

Alopecia!

Evidence Based Hair

Morteza Jafari, PD, MD-PhD



Case Study

Hair Loss in a Male Patient

- **Age:** 55 years old
- **Gender:** Male
- **Chief Complaint:** Progressive hair thinning over the past 10 years, especially on the crown
- **Personal History:** healthy
- **Family History:** Positive for alopecia (father and maternal grandfather)



Hair Loss in a Male Patient

Scalp Examination:

- Receding of the forehead-hair borders, especially at the temples with formation of receding hairline.
- Hair diameter diversity noted under dermatoscope.
- No scarring or significant inflammation.

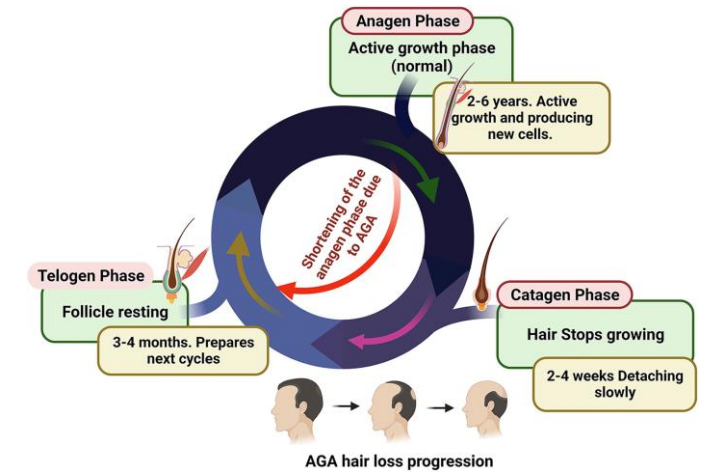


Diagnosis?

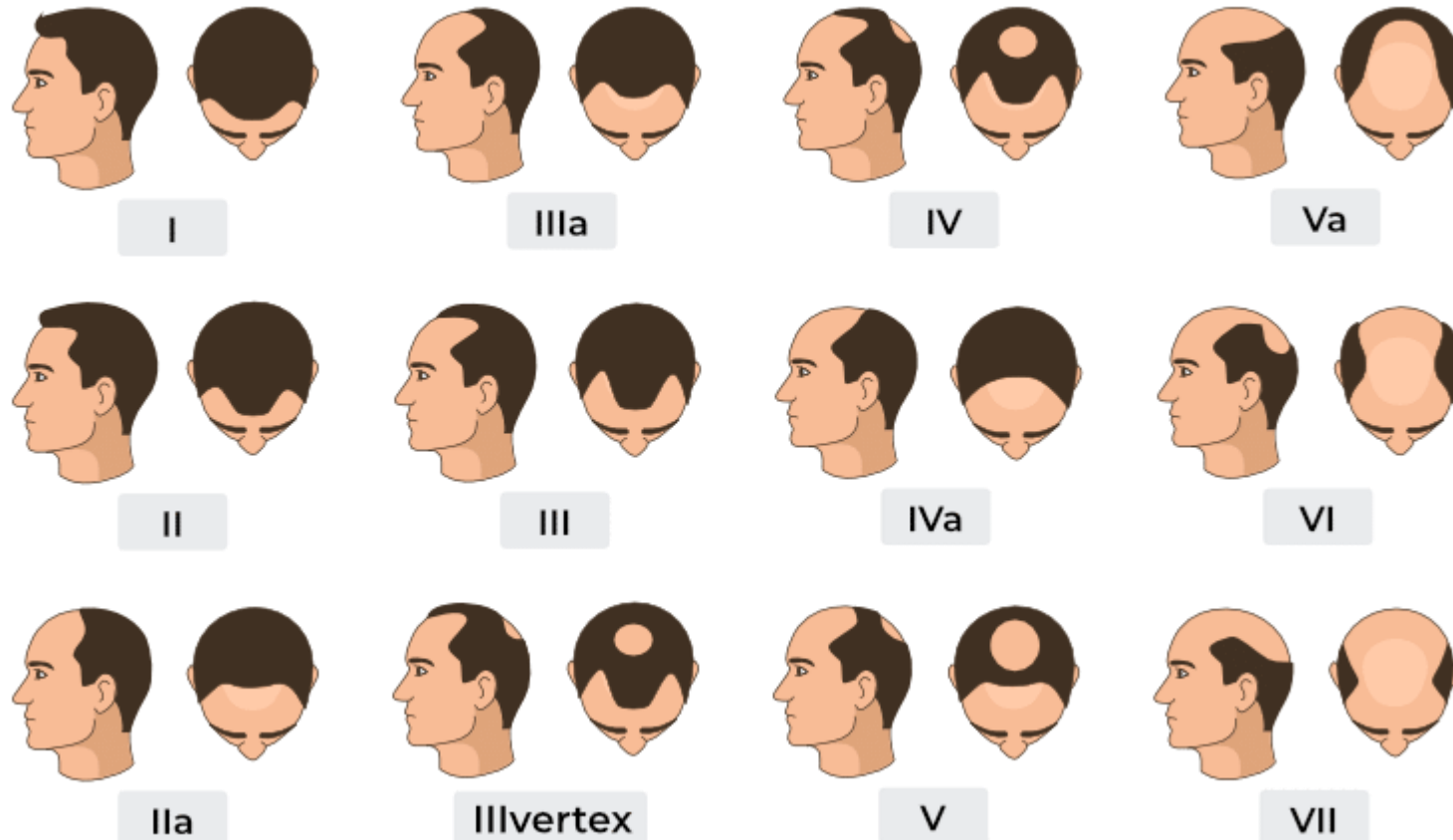
Male Pattern Hair Loss (Androgenetic alopecia)

Androgenetic alopecia

- Most common type of hair loss in males.
- progressive loss of terminal hairs in a characteristic distribution.
- The diagnosis is essentially clinical, with **no** need for laboratory tests



Hamilton–Norwood scale



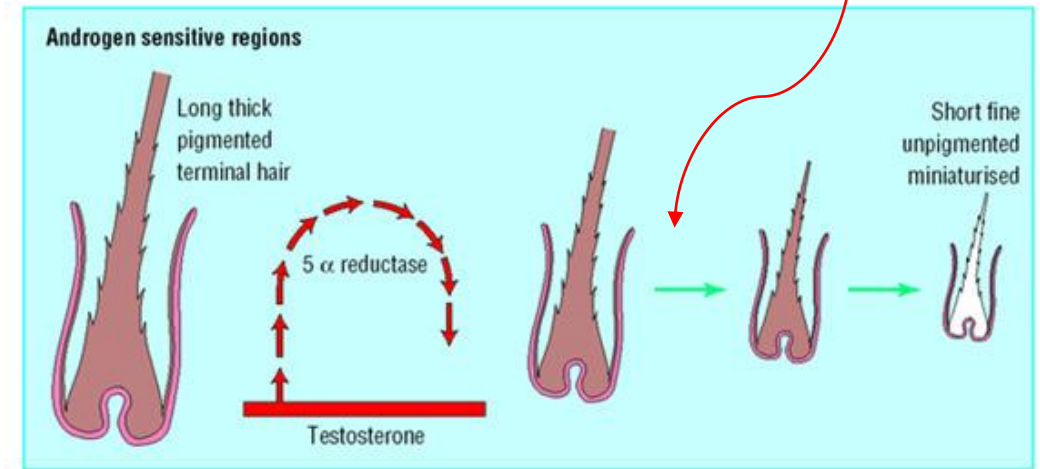
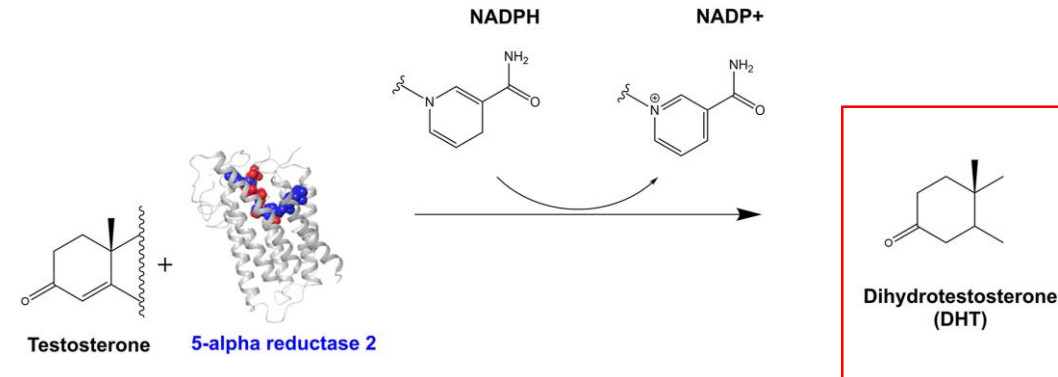
Androgenetic alopecia

Genetics

- AGA susceptibility is primarily influenced by hereditary factors, contributing to around 80% of the predisposition

Androgens and androgen receptors

- Testosterone is converted by type 2, 5-alpha reductase into DHT, leading to AGA.
- Excessive DHT shrinks hair follicles, replacing terminal hairs, with vellus hairs.



Stepwise miniaturisation of the hair follicle and shortening of the anagen growth phase, mediated by dihydrotestosterone

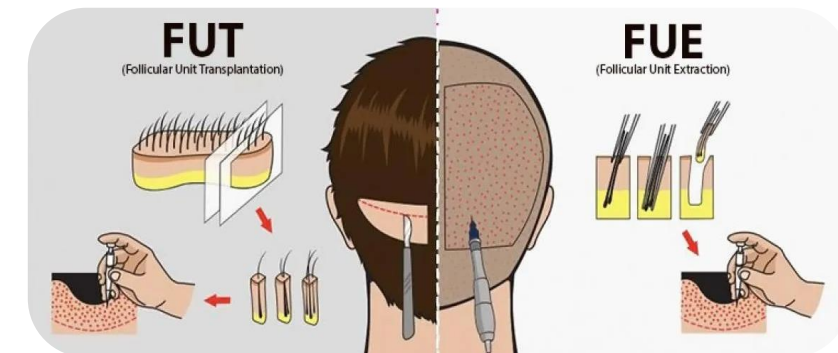
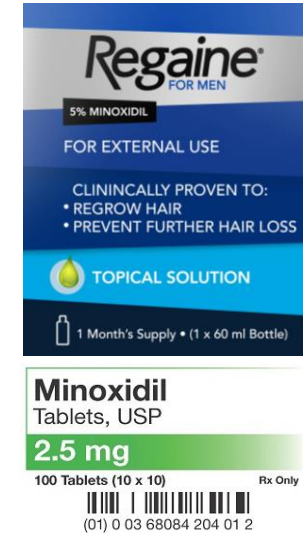
Management



***Selecting a
Treatment Approach***

Management

FDA-approved therapies	Off-label (oral)	Off-label (local)	Emerging therapies
Topical minoxidil (approved for MPHL and FPHL)	Oral minoxidil	Mesotherapy/PRP	LLLT (Low-Level Light Therapy)
Oral finasteride 1 mg (approved for MPHL)	Oral dutasteride 0.5 mg (approved for MPHL in Japan & South Korea)	Topical/local dutasteride	Exosomes
Topical finasteride (approved for MPHL)		Botulinum toxin injection	Tricopat



Final words- MPHL

- The diagnosis is essentially clinical.
- **Factors in therapy selection:**
 - Age, severity of alopecia, patient preference,
 - **Personalized** treatment necessary
- **Set the expectation:**
 - **Maintenance= success**
 - **Several months** of treatment are often required to assess effectiveness.

MPHL



Approved therapies

- Topical Minoxidil 5%
- Oral 5 α -Reductase inhibitors (eg, finasteride and dutasteride)
- Combination

Alternative or adjunctive therapies

- Topical finasteride
- Low dose oral minoxidil (off-label)
- Photobiomodulation (low-level laser therapy)
- Platelet-rich plasma (PRP)
- Mesotherapy with dutasteride

Hair restoration surgery

- Follicular unit extraction (FUE)
- Follicular unit transplantation (FUT)



Case Study

Hair Loss in a Young Female Patient

- **Age:** 25 years old
- **Gender:** Female
- **Chief Complaint:** progressive hair thinning over the past 3 years, especially on the crown
- **Personal History:** diagnosed with polycystic ovary syndrome at age 22. Presents with irregular menstrual cycles
- **Family History:** positive for alopecia (father)



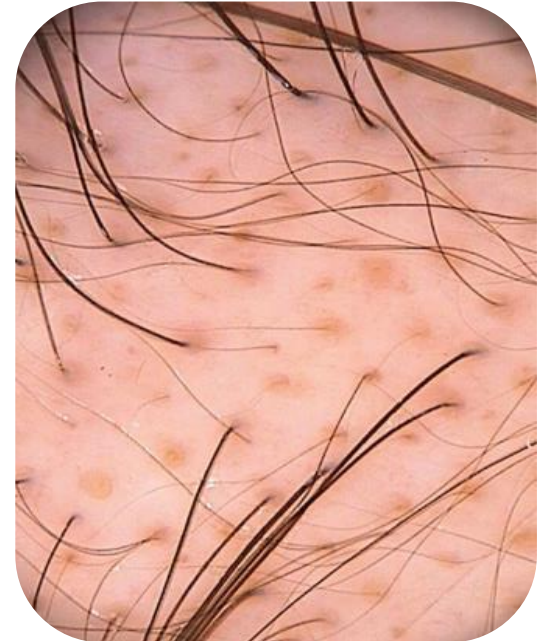
Hair Loss in a Young Female Patient

Scalp Examination:

- Diffuse thinning over the crown area
- Hair miniaturization noted under dermatoscope.
- No scarring or significant inflammation.

Other Signs:

- Mild facial hirsutism (upper lip and chin).
- Persistent acne on the lower face and jawline.



Diagnosis?

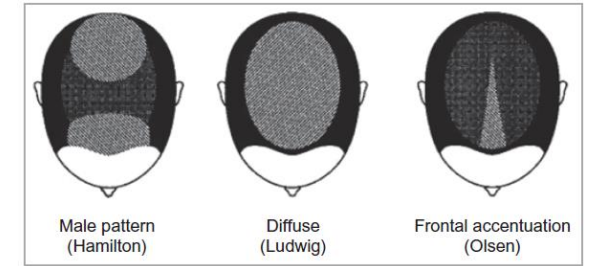
Female Pattern Hair Loss (Androgenetic alopecia)

Clinical presentation

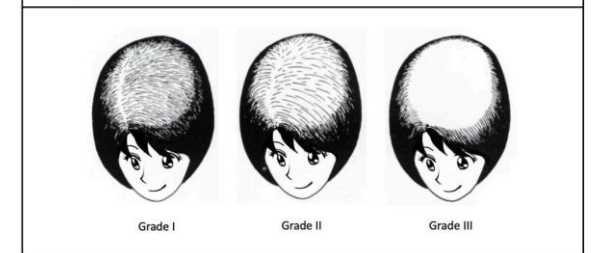
Decrease in hair density, with a usually characteristic pattern distribution



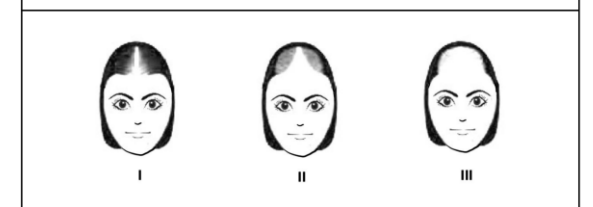
Different classification of FPHL



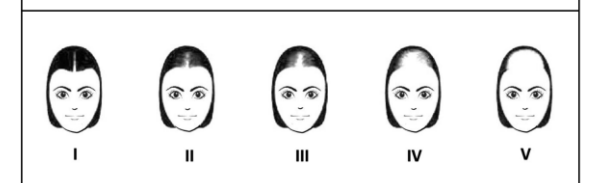
Ludwig's classification



Olsen's classification



Sinclair's classification





Complementary test

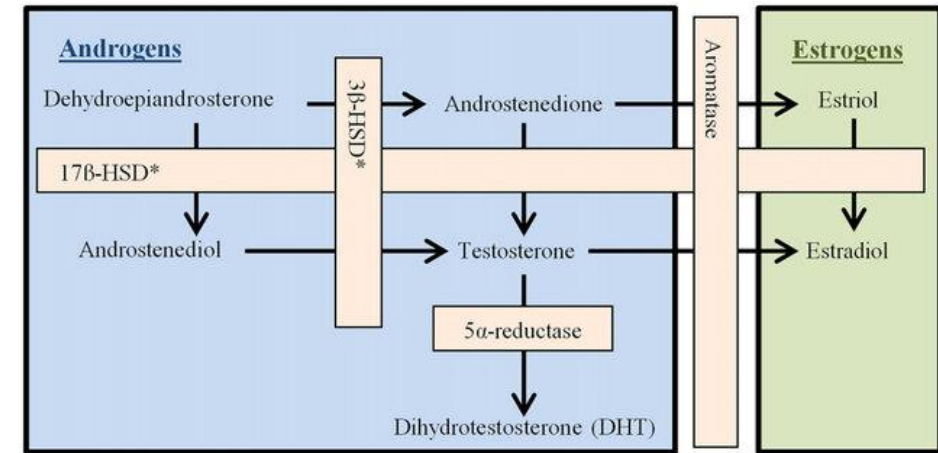
- **No** serologic tests provide a definitive diagnosis of FPHL
- Other contributors to hair loss (**TSH and substrates**)
- An extensive endocrinological work-up is **not** necessary
- Testing for **hyperandrogenism** in cases of:
 - Menstrual irregularity
 - SAHA-syndrome: **S**eborrhoea, **A**cne, **H**irsutism, **A**lopecia
 - **P**olycystic **o**vary **s**yndrome
 - Acanthosis nigricans or galactorrhea



Complementary test



- **No** serologic tests provide a definitive diagnosis of FPHL
- Other contributors to hair loss (**TSH and substrates**)
- An extensive endocrinological work-up is **not** necessary
- Testing for **hyperandrogenism** in cases of:
 - Menstrual irregularity
 - SAHA-syndrome: **S**eborrhoea, **A**cne, **H**irsutism, **A**lopecia
 - **P**olycystic **o**vary **s**yndrome
 - Acanthosis nigricans or galactorrhea



- Free/total testosterone level
- Dehydroepiandrosterone sulfate (DHEAS)
- 17-Hydroxyprogesterone
- LH, FSH, Prolactin, Estradiol
- Serum androstenedione
- Total testosterone/Sex hormone-binding globulin ratio
- Ovarian ultrasound

Management



***Selecting a
Treatment Approach***

Management

FDA-approved therapies

Topical minoxidil
(approved for FPHL)

Off-label (oral)

Oral minoxidil

Off-label (local)

Topical finasteride
(approved for MPHL)

Emerging therapies

LLLT
(Low-Level Light Therapy)

Oral spironolactone
(approved for hyperandrogenism)

Oral finasteride
(approved for MPHL)

Mesotherapy/PRP

Exosomes

Oral contraceptives
(approved for hyperandrogenism)

Oral dutasteride 0.5 mg
(approved for MPHL in Japan)

Topical/local dutasteride

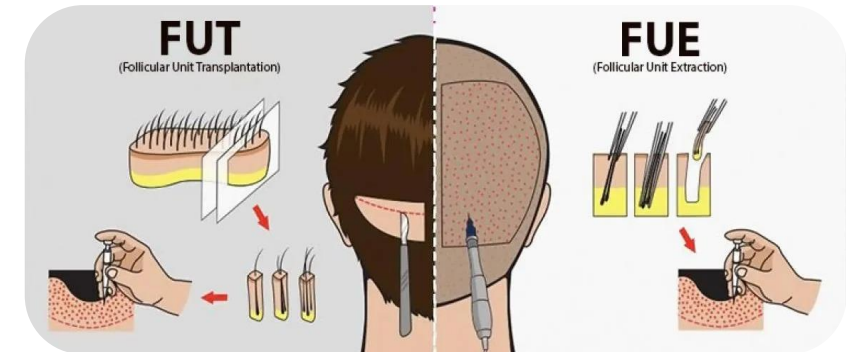
Microneedling

Cyproterone acetate
(approved for hyperandrogenism)

Oral bicalutamide

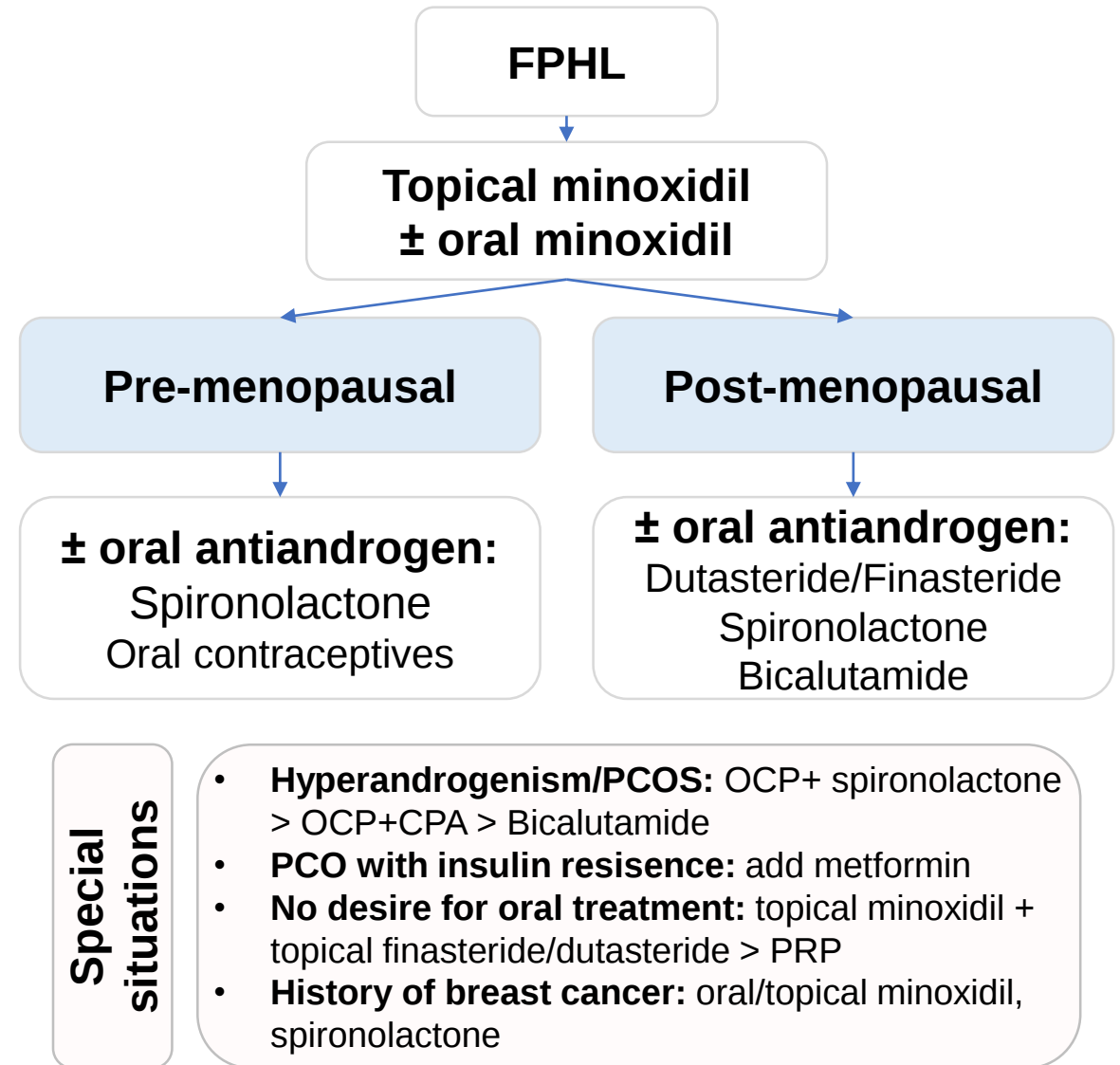
Botulinum toxin injection

Tricopat



Final words- FPHL

- Most of the treatments are **off-label**.
- **Factors in therapy selection:**
 - Age, severity of alopecia, patient preference, hormonal imbalance, family planning (pregnancy and lactation)
- **Set the expectation:**
 - **Maintenance = success**
 - **Several months** of treatment are often required to assess effectiveness.





Case Study

Patchy Hair Loss in a Young Male Patient

- **Age:** 19 years old
- **Gender:** Male
- **Chief Complaint:** Sudden onset of multiple round patches of hair loss on the scalp over the past 2 months.
- **Personal History:** No history of atopy, thyroid disease, or other autoimmune conditions.
- **Family History:** No known family history of alopecia or autoimmune disorders.



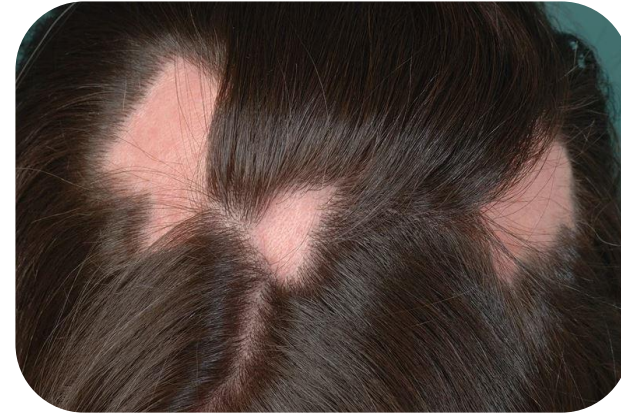
Patchy Hair Loss in a Young Male Patient

Scalp Examination:

- Well-demarcated, round patches of hair loss
- Exclamation mark hairs, at the periphery of patches.
- No signs of scarring or inflammation

Other Signs:

- Punctate true leukonychia (pits), finger nails

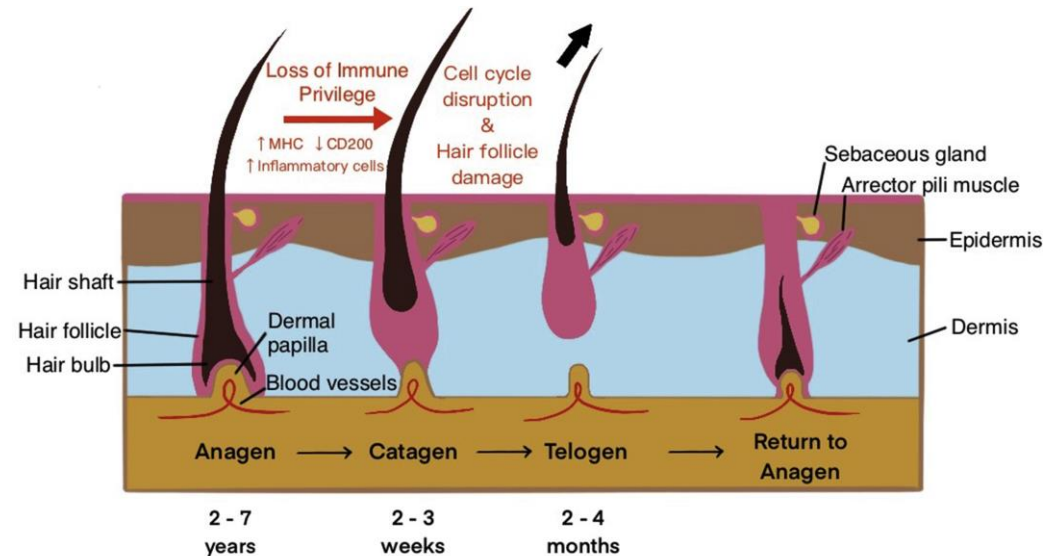


Diagnosis?

Alopecia areata multilocularis

Alopecia areata

- Chronic, immune-mediated non-scarring disorder, targets anagen hair follicles.
- Affects 2% of the global population
- The normal hair growth cycle is disrupted and the hair follicle is prematurely launched into the telogen phase



Pathogenesis

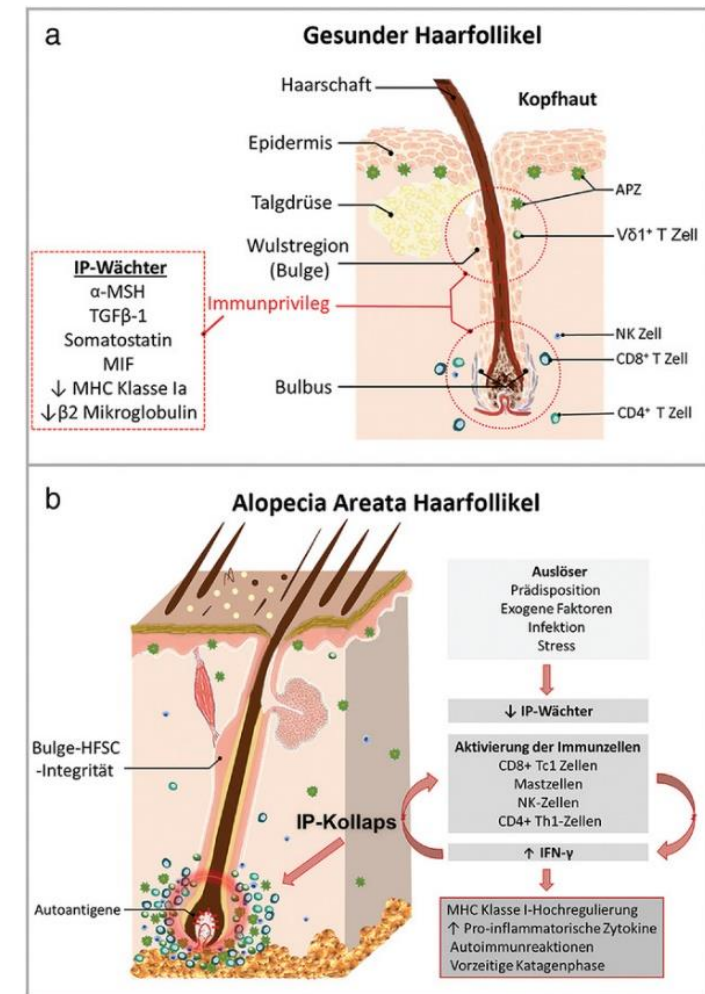
Autoimmunity

Loss of immune privilege and immune dysregulation

Alopecia Areata

Environmental factors

Triggers: infections, vaccines, medications, stress, diet, hormonal factors, gut microbiota,



Genetic factors

10-20% family background

Genes/loci involved in regulation of immunity, inflammatory responses, signaling pathways in hair follicle cycling
Cr 6,10,18,18; Genes CMH, CTL4, PRDX5, STX17, ULBP, Interleukins (ILRA, IL2/IL21)

Alopecia areata- Clinical Features



Alopecia areata- Differential Diagnosis

Congenital
triangular alopecia



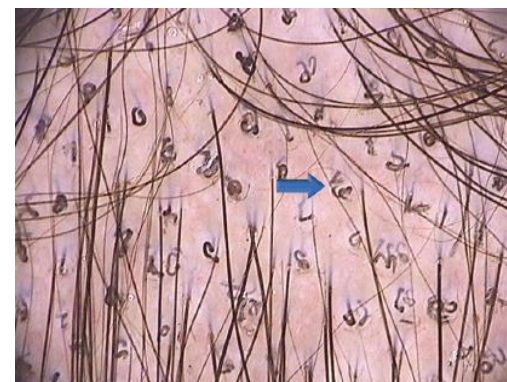
Trichotillomania



Tinea capitis



Cicatricial alopecias



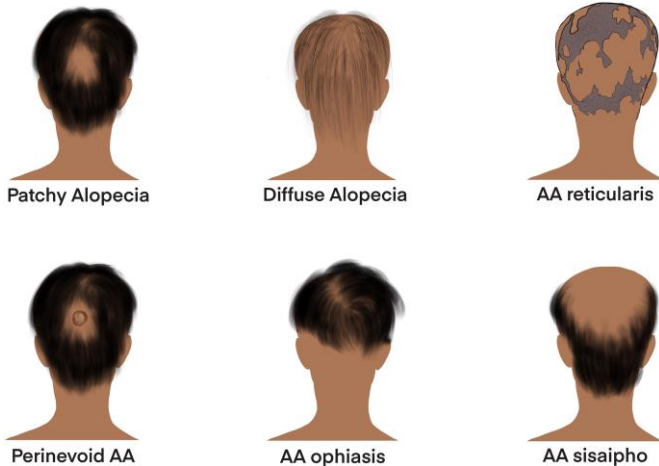


Complementary test

- **No** serologic tests provide a definitive diagnosis of **AA**
- Thyroid studies (TSH, T3, T4, TPO-Abs and Tg-Abs) are **recommended**.
- Vitamin D, zinc, and folate levels tend to be **lower compared to controls**.
- Evidence is **conflicting or insufficient** to suggest differences in levels of iron, vitamin B12, magnesium, or selenium.
- Patients with clinical signs or symptoms suggestive of other autoimmune diseases should be evaluated for those disorders. In the absence of such features, routine testing for other autoimmune diseases is **not advised**.

Final words- alopecia areata

- Alopecia areata prognosis is **unpredictable**
- Spontaneous regrowth can occur within 6–12 Months up to **50%**, depends on severity
- **High** relapse rate with often **chronic** course



Treatment selection

Age

- *Children*: need more patience
- *Adult*: more potent treatment considered

Severity

Limited, patchy hair loss (<50% of scalp hair):

- Topical and/or intralesional corticosteroids
- Poor response: topical immunotherapy or systemic therapies

Extensive hair loss (>50% of scalp hair):

- Topical immunotherapy or systemic therapies
- Adjunctive local corticosteroids



Case Study

Diffuse hair shedding in a Child

- **Age:** 12 years old
- **Gender:** Male
- **Chief Complaint:** Diffuse hair shedding over past 3 months.
- **Personal History:** Picky eater with a diet low in iron-rich foods (e.g., red meat, leafy greens).
- No significant past medical history. No recent infections, major surgeries, or significant stressors.
- **Family History:** No family history of alopecia or other hair disorders.



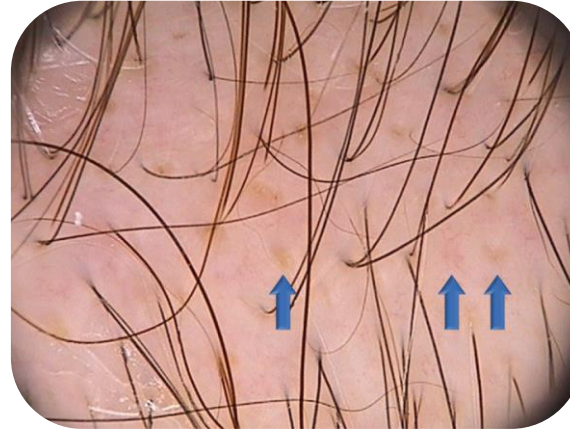
Diffuse hair shedding in a Child

Hair Examination:

- Diffuse thinning of hair over the scalp
- Hair pull test positive
- Dermoscopy shows empty follicles without signs of inflammation, scarring, or alopecia areata.

Laboratory Findings:

- Low hemoglobin and serum ferritin



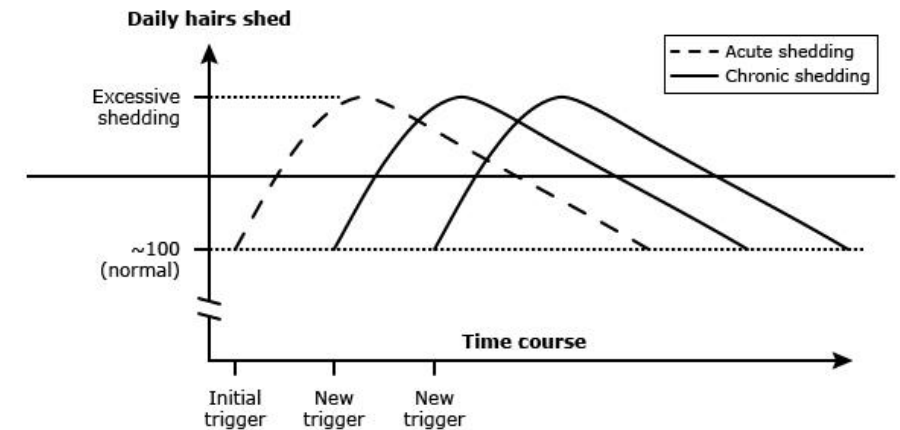
Parameter (Unit)	Value	Reference range
Hemoglobin (g/l)	7.1	10.8-12.7
MCV (f)	48	73-101
MCH (fmol)	0.71	1.40-2.00
RBC count (10^6 cells/ μ l)	6.19	3.70-5.30
WBC count (cells/nl)	7.6	5.0-12.0
Platelets (10^3 cells/ μ l)	754	140-360
Reticulocyte count (10^9 cells/l)	316	68-108
Retikulocyte hemoglobin (fmol)	1.04	1.74-2.17
Hypochromic RBCs (%)	90	<5
Ferritin (ng/ml)	2	6-67
RDW (%)	20.3	11.5-14.5
CRP (mg/l)	0.9	<5
Iron (μ M)	2.0	5.7-18.6
Transferrin (g/l)	2.86	2.0-3.6
Transferrin-Saturation (%)	2.8	7-44
Haptoglobin (g/l)	1.96	0.30-2.00
Bilirubin (μ M)	2.8	<32

Diagnosis?

Telogen effluvium

Telogen effluvium

- One of the common forms of non-scarring hair loss
- An abnormal amount of hairs transitions from anagen to telogen phase, resulting in increased diffuse shedding.
- The induction of telogen effluvium is usually due to major surgery, serious illness, childbirth, malnutrition, drugs, and severe emotional distress.
- **Acute telogen effluvium:** occurs 3–4 months after an inciting event, lasts approximately 3 months, and spontaneously resolves.
- **Chronic telogen effluvium:** usually lasts longer than 6 months



Acute telogen effluvium is characterized by a single episode of hair shedding that exceeds an individual's normal rate of hair loss. Chronic telogen effluvium may occur when triggers for hair loss persist or recur.

Final words- TE

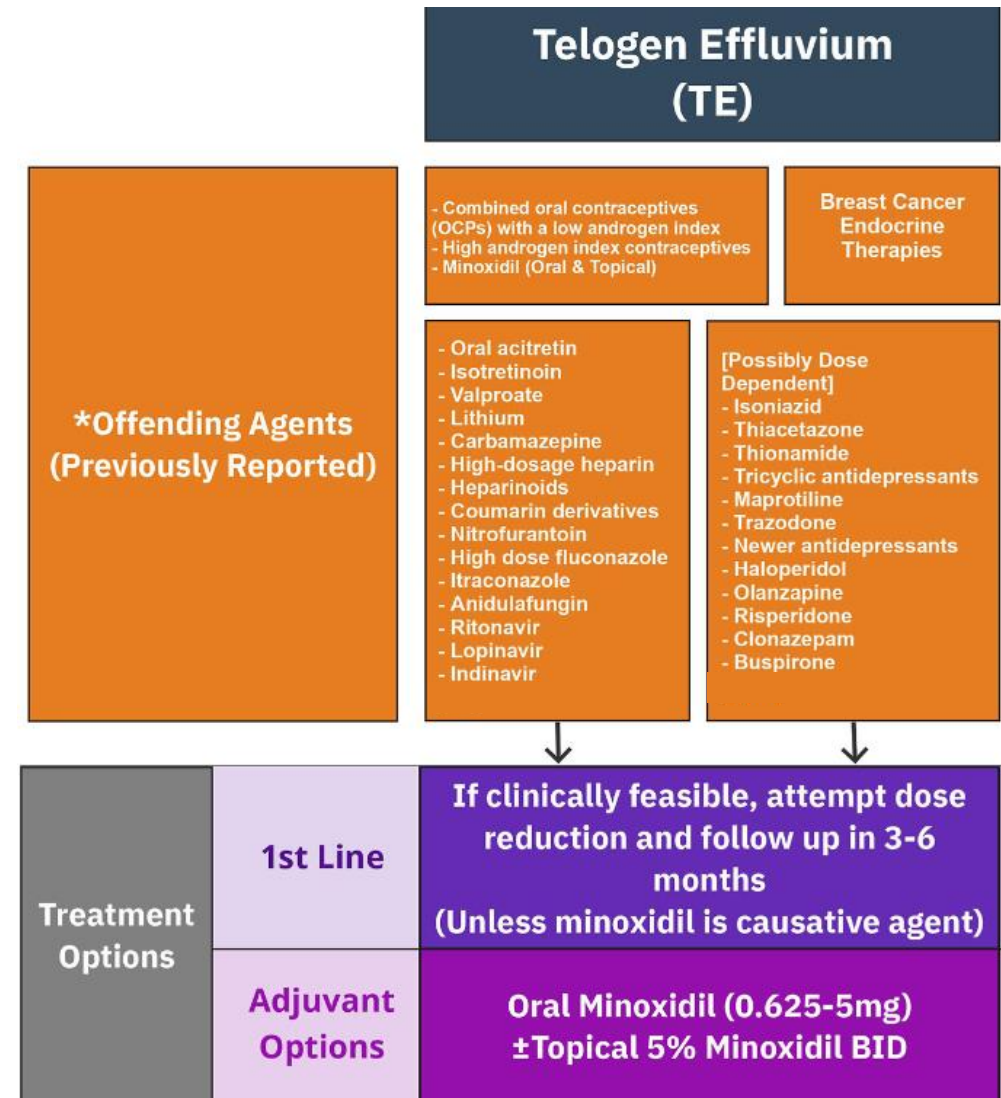
- Medical **history** is really important for the diagnosis.

Complementary test:

- A complete blood count, thyroid-stimulating hormone with additional tests for nutrition deficiencies (ferritin, vitamin-B12, Zinc,...)

The management includes:

- Generally reassurance and avoidance of triggers
- Identifying and correcting the underlying cause
- Psychological support
- The efficacy of topical minoxidil is unclear





Case Study

Patchy Hair Loss with scarring in a female Patient

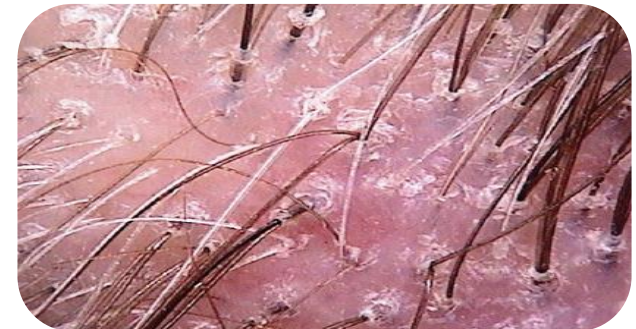
- **Age:** 45 years old
- **Gender:** Female
- **Chief Complaint:** Progressive hair loss with associated scalp itching and burning sensation over the past 2 years.
- **Family History:** No significant family history of hair disorders or autoimmune conditions.

Scalp Examination:

- Patchy areas of hair loss

Trichoscopy:

- visible scarring, perifollicular erythema, scaling, hyperkeratosis



Diagnosis?

Cicatricial alopecia
(Lichen planopilaris)

Cicatricial alopecia

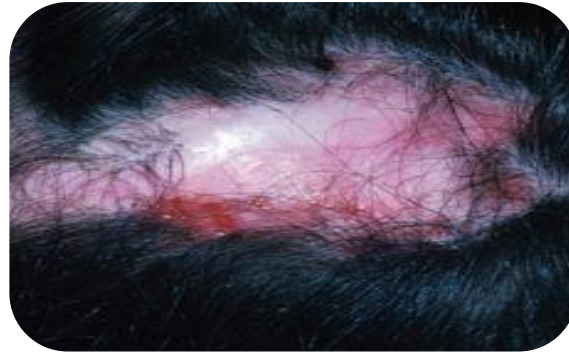
- Inflammation that destroys the bulge of the outer root sheath destroys the hair follicle and leads to **cicatricial alopecia**.
- **Primary cicatricial alopecia** is an inflammatory disorder of unknown cause that leads to irreversible hair loss.
- In **secondary cicatricial alopecia** destruction of the hair follicle is incidental to a non-follicle-directed cause, such as thermal burns, metastatic cancer, trauma or radiation.

Primary CA	Secondary CA
Lymphocyte-associated: CCLE LPP Classical type Frontal fibrosing alopecia Graham–Little syndrome Classic pseudopelade (Brocq) CCCA Alopecia mucinosa Keratosis follicularis spinulosa decalvans Neutrophil-associated: Folliculitis decalvans Dissecting cellulitis/ folliculitis (perifolliculitis abscondens et suffodiens) Mixed inflammatory infiltrate: Folliculitis (acne) keloidalis Folliculitis (acne) necrotica Erosive pustular dermatosis Nonspecific	Infections: Bacterial, viral, fungal Immunological: Sarcoidosis, necrobiosis lipoidica, morphea, graft versus host disease. Neoplasms: Alopecia mucinosa, lymphoproliferative Exogenous: Burns and surgical and traumatic scars. Dermatoses: Psoriasis, immunobullous disorders Hamartomas: Organoid nevus Miscellaneous

Abbreviations: CA, cicatricial alopecia; CCCA, central centrifugal cicatricial alopecia; CCLE, chronic cutaneous lupus erythematosus; LPP, lichen planopilaris

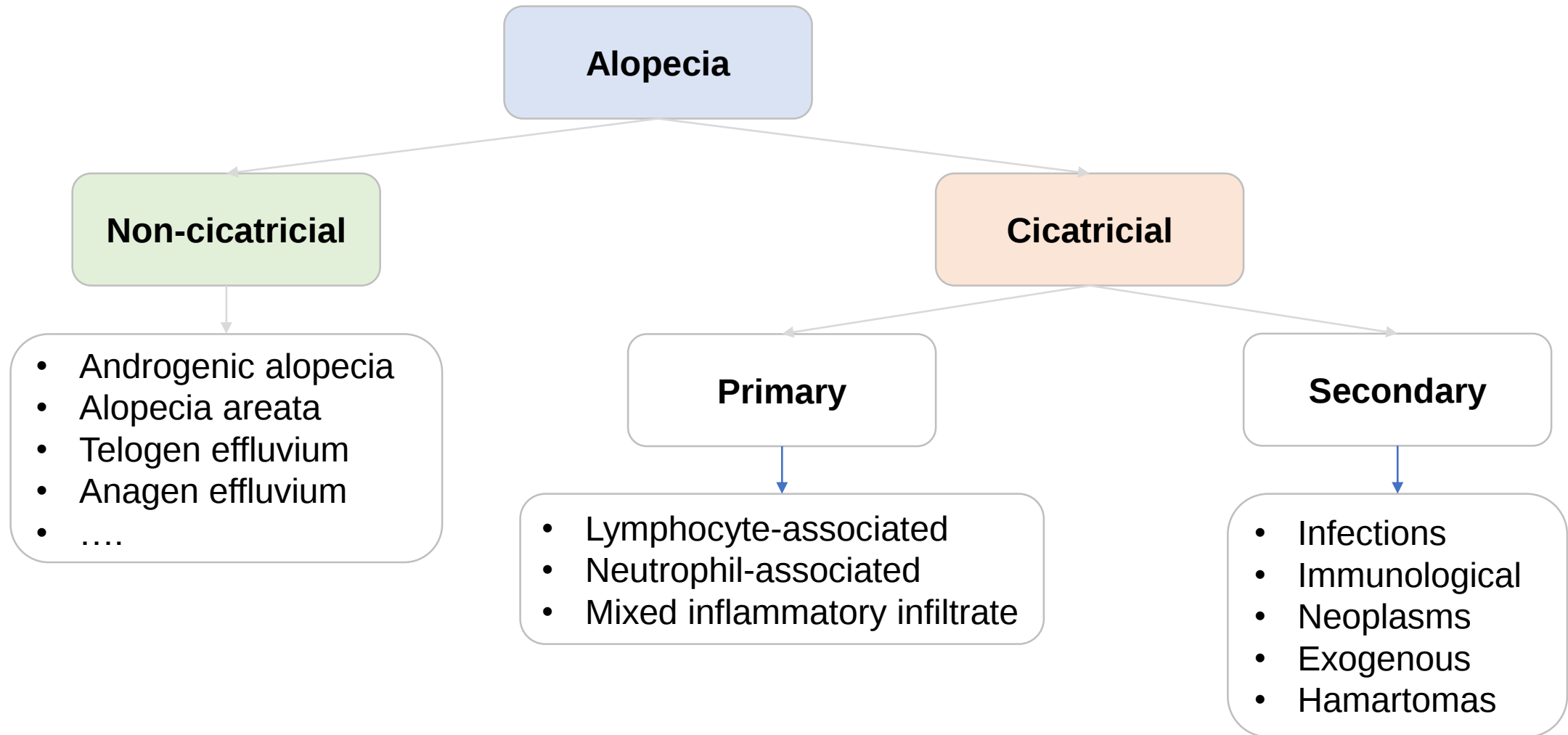
Cicatricial alopecia

Referral to a dermatologist for clinical and histological (**scalp biopsy**) evaluation is necessary!



Take home message!

Alopecia Classification



Location and pattern of hair loss

Nonscarring Alopecias

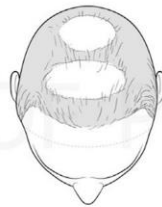
TRACTION ALOPECIA

Alopecia occurs along the hairline, along the frontotemporal scalp from excessive tension on the hair follicle. Can transition to a cicatricial alopecia if tension is prolonged and repeating.



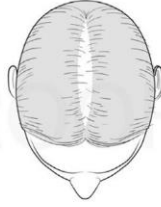
MALE PATTERN HAIR LOSS

Alopecia occurs in the frontotemporal region and in the scalp vertex.



FEMALE PATTERN HAIR LOSS

Alopecia occurs along the central part and presents as widening of the central part.



TELOGEN EFFLUVIUM

Presents as diffuse shedding across the entire scalp.



ALOPECIA AREATA

Alopecia can occur as a patchy alopecia of the scalp with multiple patches or a single patch that enlarges peripherally over time. Alopecia can also expand to include the entire scalp and the eyebrows (Alopecia totalis). Alopecia can also expand to other hair-bearing areas of the body, like the arms, legs, groin and underarms (Alopecia Universalis).



TINEA CAPITIS

Alopecia can occur as a diffuse patchy alopecia with a fine scale present on the scalp. Alopecia can also occur as an erythematous patch or nodule with pustules.

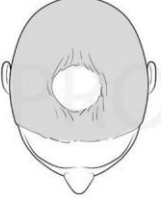


Cleveland Clinic © 2022

Scarring Alopecias

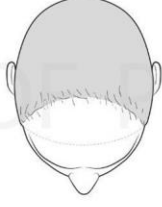
CCCA (CENTRAL CENTRIFUGAL CICATRICAL ALOPECIA)

Occurs centrally and spreads peripherally and symmetrically.



FRONTAL FIBROSING ALOPECIA

Alopecic band occurring along the frontotemporal region and often includes the eyebrows. Can present with the pseudo fringe sign, which is when some hair is retained along the original hairline.



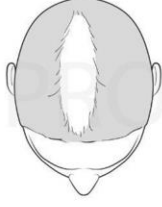
DISCOID LUPUS ERYTHEMATOSUS

Erythematous alopecic patch with follicular hyperkeratosis and areas of hyper- and hypo- pigmentation occurring on the scalp. Patients can also have lesions located on the face and ears.



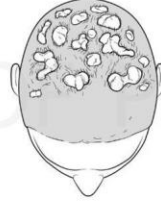
LICHEN PLANOPILARIS

Can occur in a patchy, diffuse or patterned form. Patchy - alopecia occurs in small patches and merge to form larger alopecic patches. Diffuse - alopecia generally starts at the crown. Patterned - blend of androgenetic alopecia and diffuse LPP.



DISSECTING CELLULITIS

Alopecia occurring most commonly on the vertex and occiput that results from multiple firm to fluctuant inflammatory nodules, abscesses and plaques on the scalp, with an overlying patch of alopecia.



ACNE KELOIDALIS NUCHAE

Papules, pustules and keloid masses occurring in the occiput and nuchal region.



Cleveland Clinic © 2022



Final Pearls: Alopecia

✓ Classification is Key

- Non-scarring vs. scarring → always the first step
- Patterned vs. diffuse → narrow the differential

🔍 Diagnosis

- Mostly, history and clinical exam are sufficient
- Biopsy, or labs for specific diagnostic questions

💡 Treatment Principles

- Many therapies are off-label
- Consider always different aspects

▶ Indications for referral to dermatologists:

- **uncertain** or atypical presentation
- **Tinea capitis** with severely inflamed scalp skin
- **Alopecia areata**, particularly severe forms
- All suspected cases of **scarring alopecia**

discussion time!