UNIVERSITÄTS-
KINDERSPITAL
ZÜRICH

Hair loss in children

Agnes Schwieger-Briel
Pediatric Dermatology, Kinderspital **Zürich**
& Youkidoc **Basel**

Das Spital der Eleonorenstiftung

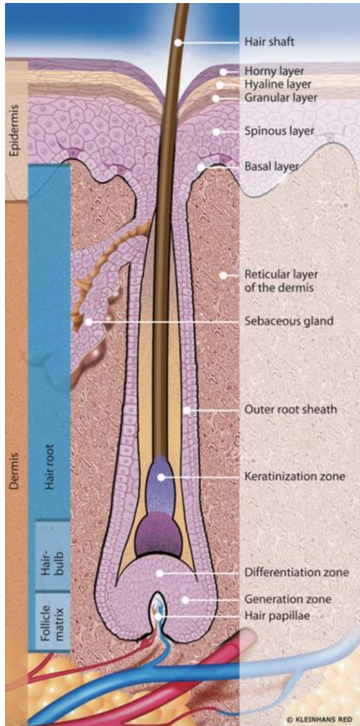
Hair

1. Has great importance for **social interaction**
2. Stands for general **health, beauty, attraction**
3. Hair styles are used for **expression of individuality**
4. …or to **blend in with peer group**

→ Hair loss leads to significant **distress and reduction of QoL**

D Williamson et al. JEADV 2001
Putterman, JAAD 2019

The hair follicle



Lanugo hair

- very fine thin, longer hair, little pigment

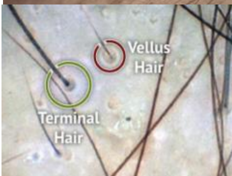
Vellus hair

- very fine body hair, often barely visible in infancy

Terminal hair thicker, pigmented, coarse, can grow long on scalp, axilla, chest, pubic area

Intermediate hair

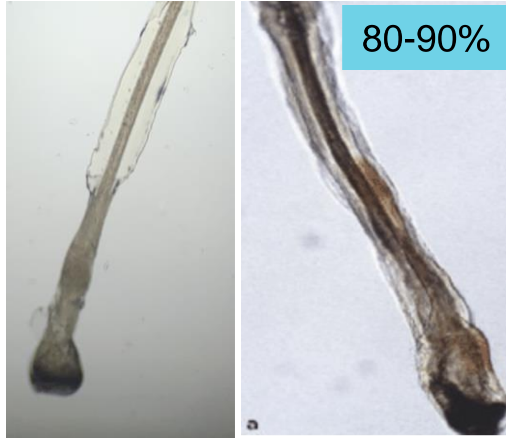
-„infant/ toddler hair“ less pigmented, finer than terminal hair



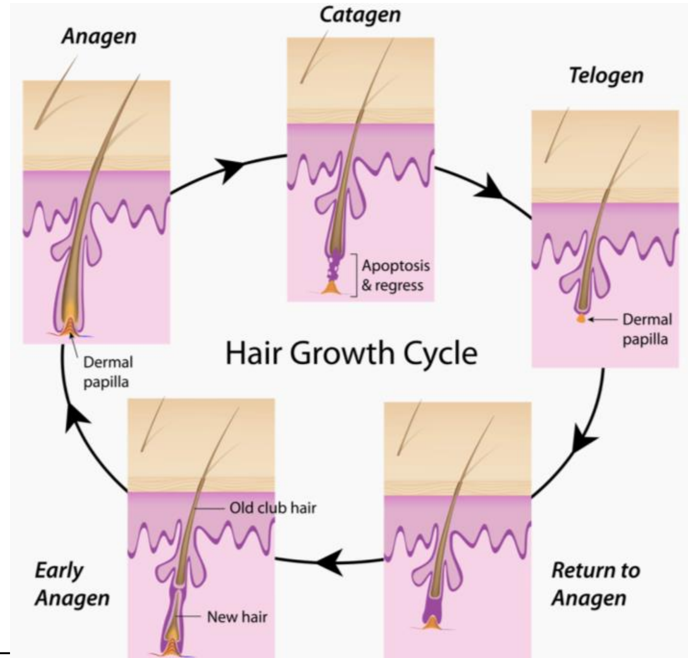
Hair growth cycle

Terminal hair follicles go through different phases (individual growth pattern)

ANAGEN (2-6 years):



Brush-like tip
well visible root sheath



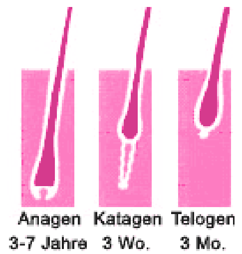
CATAGEN (2 wks)

TELOGEN (3 mo)

Bulb/ club-like tip, remnants of / no remaining root sheath

https://www.villagedermatologyhouston.com/hair-growth-cycle
Whiting, Trüeb, & Blume-Peytavi, 2008

Effluvium and Alopecia



Normal loss of hair 50-100- (150) hair /day

Effluvium:

Increased loss of hair (>100/ day) , not always immediatedly visible

→Anagen/ Telogen Effluvium

→Effluvium due to inflammatory disease (e.g. scalp eczema, psoriasis)

Alopecia: visible hair loss of variable cause

How to approach hair loss in children?

Approach to pediatric hair loss

HISTORY

Congenital? Aquired?

How fast, extent ? Hair styling? Personal, Family Hx.

CLINICAL EXAM

Diffuse | Patchy | Focal

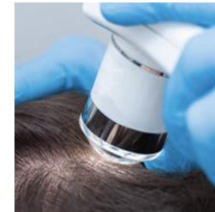
Non-scarring | Scarring

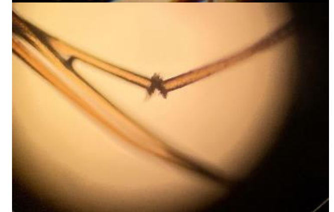
ADDITIONAL FINDINGS ?
(Scaling, erythema, pustules, follicular plugging; involvment of teeth, nails, sweat glands etc.?)

Adapted from Xu et al. *Front. Med. 2017*

Easy diagnostic tests in hair loss

- **Counting lost hair** → >100 lost hair/day?
- **Tug test, hair pull test** → no breakage, normal: <3 hair lost
- **Microscopy (shaft, root) / Trichogram**
- **Trichoscopy/ Dermoscopy of scalp and hair**
- **(Trichoscan)**





McDonalds, JAAD 2016; HautArt.ch

Hair loss in infants- mostly transient

Transient neonatal alopecia

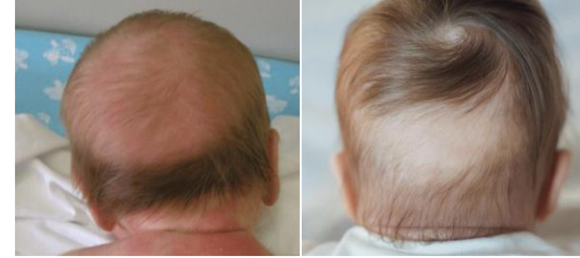
-affects 12% of infants

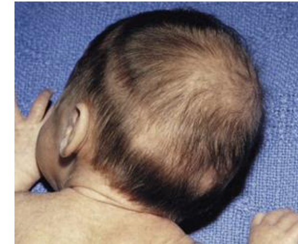
-is often attributed to friction

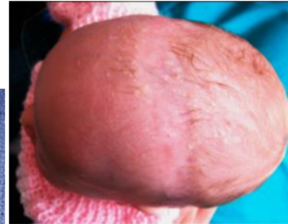
-caused by loss of remaining lanugo hair

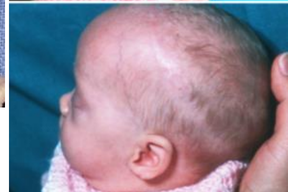
-typical age 2-6 month of age

-DD **Halo scalp ring** secondary to perinatal localized pressure, caput succedaneum









Cutrone M, Grimalt R; Eur J Pediatr 2005

Martin Ped Dermatol 2009

Aquired hair loss in children

Sudden diffuse alopecia → Pull test positive

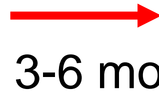
Trichoscopy
Broken hair, exclamation mark hair,
(yellow dots not always visible)

→ Alopecia areata

Sudden diffuse alopecia → Pull test positive
Resp. infection 2 months prior

→ Telogen effluvium

Telogen Effluvium

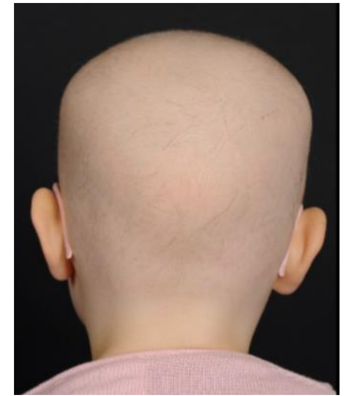


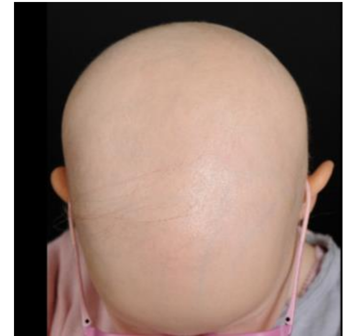
3-6 mo

- In 3% of acute pediatric alopecia
- a percentage of hairs move prematurely from anagen to telogen
- diffuse shedding and decreased hair densitiy around 2-3 mo after inciting event
- Fever, illness, medication, stress, nutritional deficiency
- Self resolving within 3-6 months
- Rarely chronic

Cranwell W, AJGP, 2018

Course of disease- AA→ AU





Alopecia areata

T-cell mediated autoimmune disorder of the anagen follicle

40-60% before age 20 years,

20% in infancy

1-2 von 100 people affected during their life time

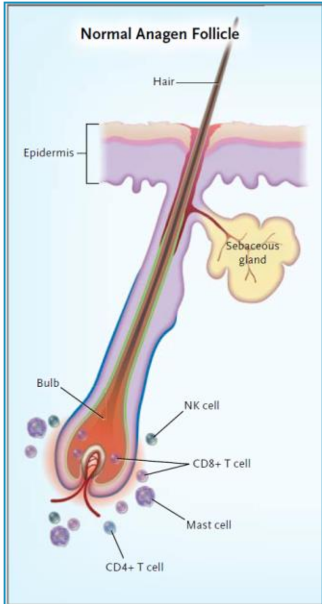
Typically between

7-12 years

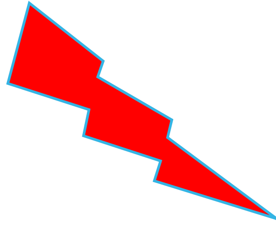
Gilhar A. N Engl J Med 2012
Xing, L. Nat Med 2014
Goh C. J Eur Acad Dermatol Venerol 2006

Pathogenesis

Follicle with immune privilege

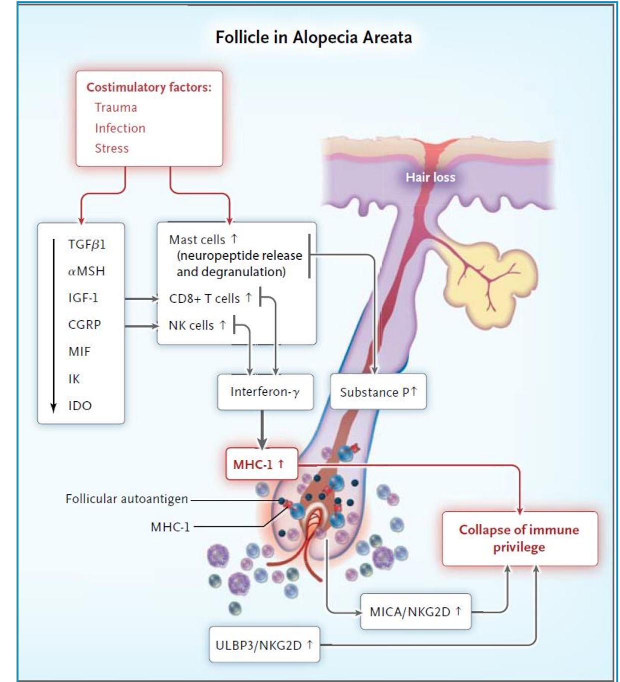


Genetic predisposition



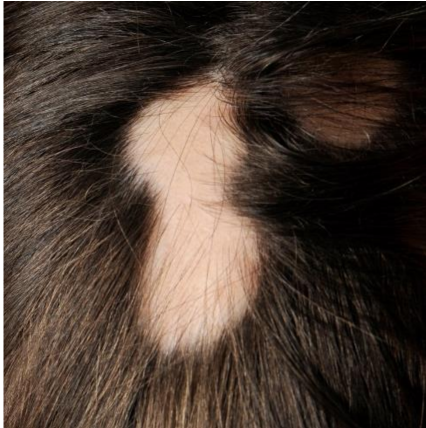
Trauma, infection, stress

→ Presentation of antigen

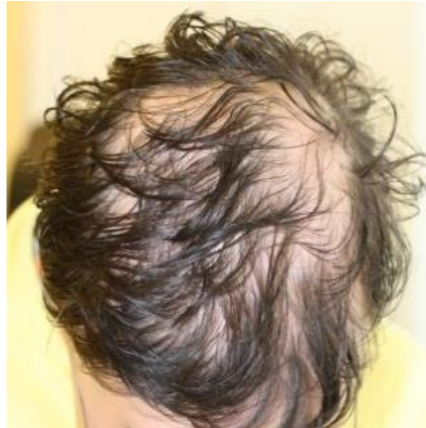


Strazzula et al. JAAD 2018
Gilhar A.et al., N Engl J Med 2012

Alopecia areata- different types



AA
multi-locularis

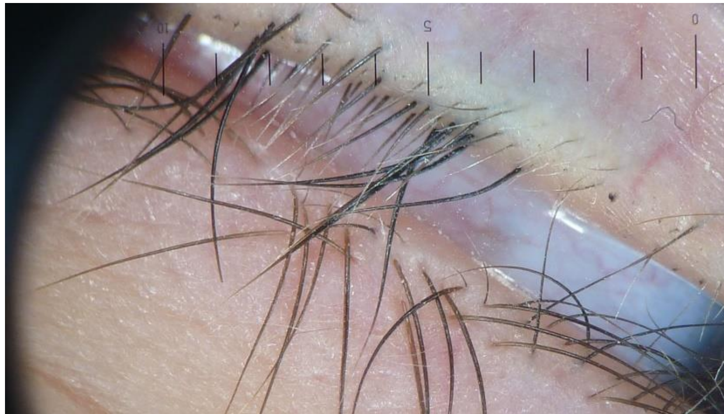


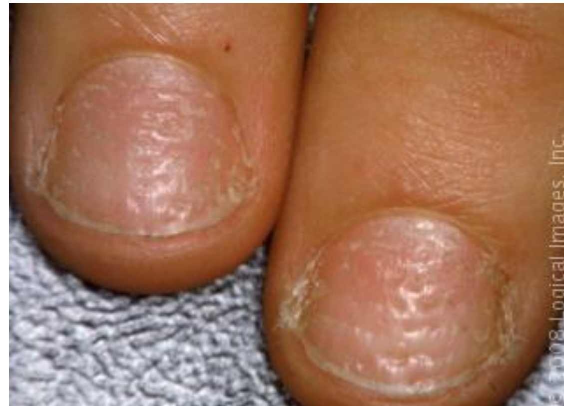
AA diffusa

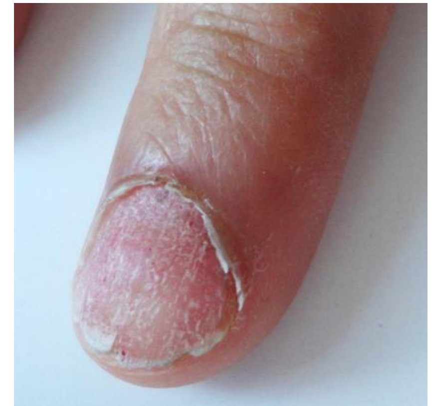
AA totalis

AA universalis

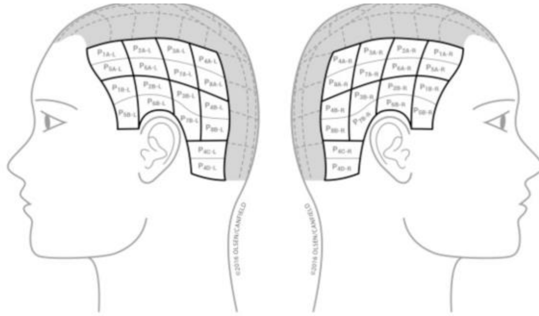
Involvment of eyebrows, eyelashes, nails is possible

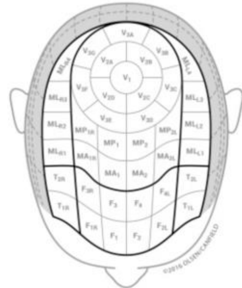


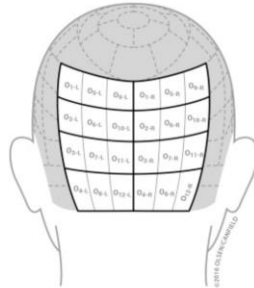




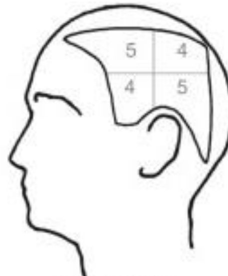
Measurement of extent: SALT Score (0-100)


LEFT SIDE: 18%   RIGHT SIDE: 18%

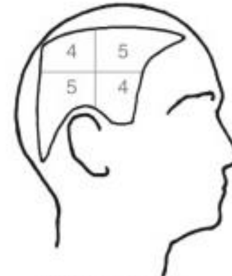

TOP: 40%


BACK: 24%

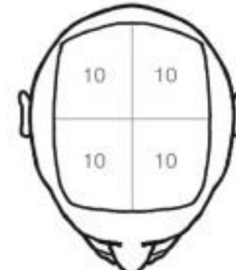
Site:	Subject:	Visit:	Date:
Quadrant	**Percentage involved**	**Multiplier**	**Score**
Left side		0.18	
Right side		0.18	
Top		0.40	
Back		0.24	
Total			



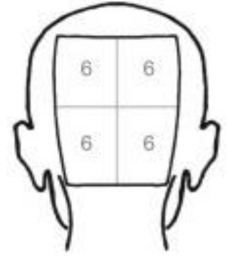
Left side: 18%



Right side: 18%



Top: 40%



Back: 24%

Nach Olsen et al., 2004

The course of disease is unpredictable

Alopecia areata multilocularis

- in 50% spontaneous regrowth within 1 year – recurrences very common
- In young children tendency for worsening even with mild initial involvement (5% progressing to AT/ AU)

Alopecia totalis/ universalis

- in <10% spontaneous and lasting regrowth

Gilhar A. N Engl J Med 2012; Harris MJ et.al. BMJ 2010
Alkhalifah A et al. J Am Acad Dermatol 2010

Therapeutic dilemma

Expectations by families and patients

Few longterm treatments

Extent of treatment should rely on the extent of mental stress and stigmatism experienced by the patient (and the family)

Gilhar A. N Engl J Med 2012
Xing, L. Nat Med 2014

Therapy Alopecia areata

„immunosuppressive /immunomodulating“

Localized

- Topical/ intralesional steroids

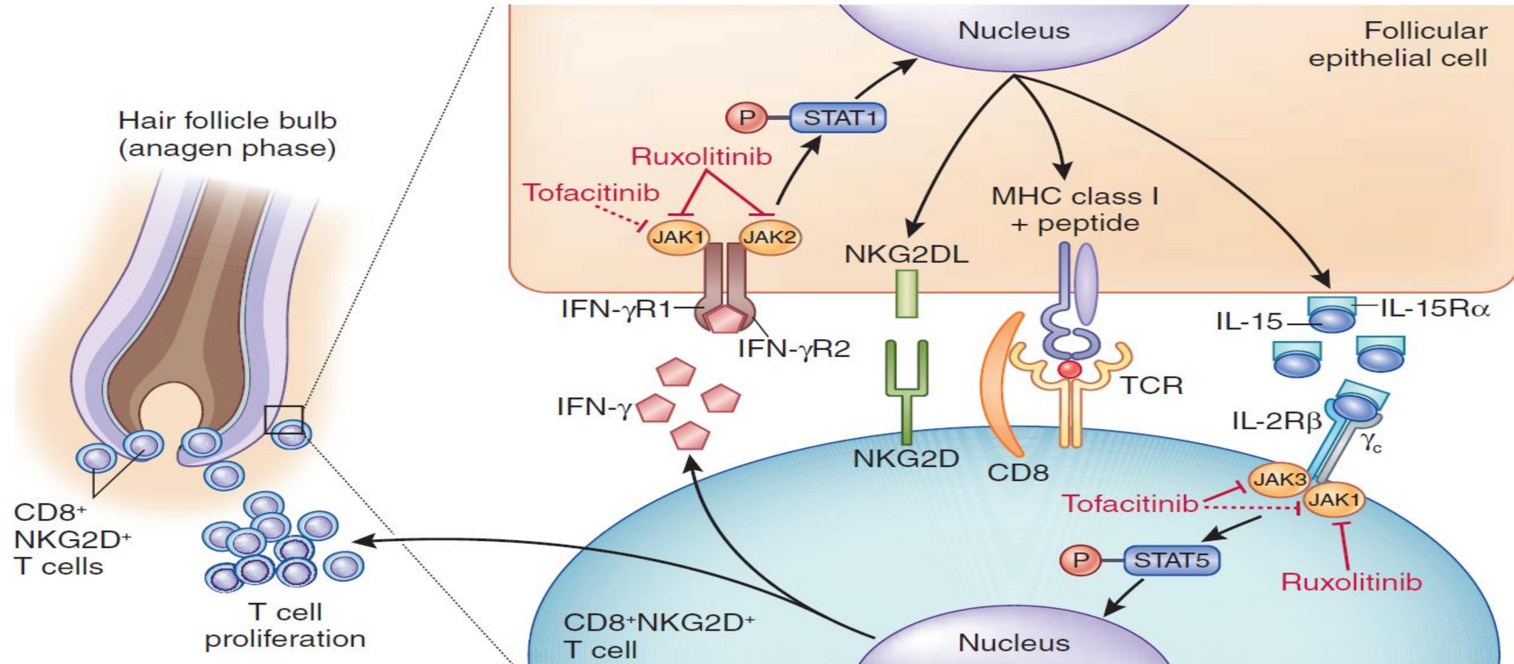
Acute and rapidly progressive

- Systemische Steroide +
- MTX

Chronic course, extensive disease

- Diphencypron (DCP)
- Dithranol (Anthralin)
- No treatment
- JAK-Inhibitors, Dupilumab, ..

JAK-Inhibitors (Tofacitinib, Ruxolitinib)



Divito SH et al, Nature Medicine, 2014

Efficacy of JAK Inhibitors is good

–**Systematic meta analysis with adult 346 patients**
(288 tofacitinib ; 58 ruxolitinib)

- The 50% improvement rate was 66%
- AA responded better than AT, AU

- Infections and laboratory abnormalities in 98 and 65 cases of 319 patients
- More laboratory abnormalities when treated > 6 months (24% vs. 7%; $P = 0.04$).
- No severe AE

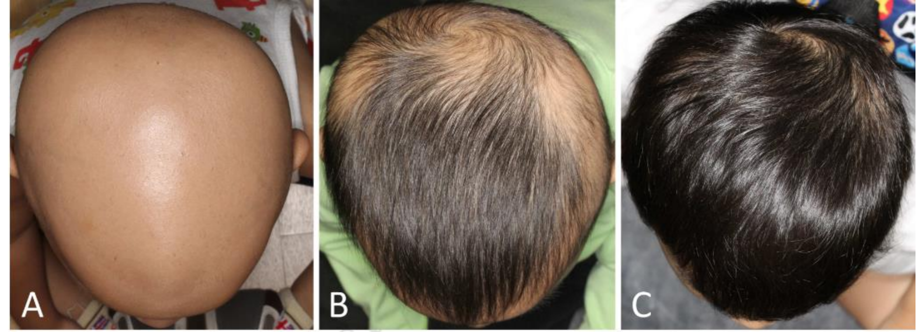
- Recurrence within three months after discontinuation in 74% of patients

Yu DA, et al. Indian J Dermatol Venereol Leprol 2021;87:621-7.
Liu et al JAAD 2017

Dai YX. JAAD 2019

Oral tofacitinib, 3 children age < 5 yrs

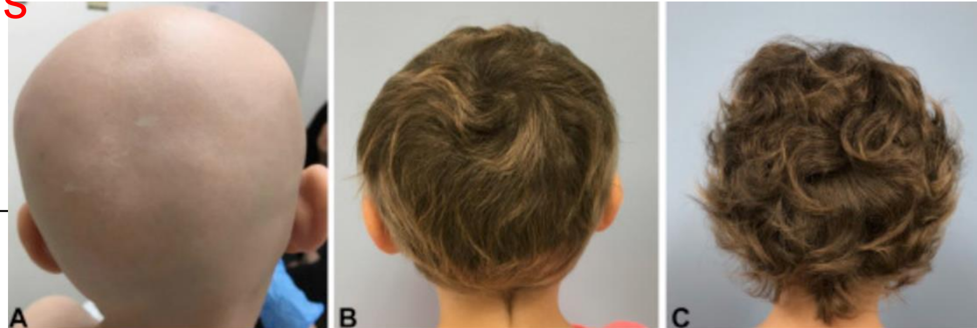
8 months



1x 90% regrowth, 2x 50% regrowth
Effects mosttly within 2-6 months
Dose 1-2x 2,5(-5) mg

Craiglow BG. JAAD 2019

Oral tofacitinib, 4 children age 8-10 yrs



2x 100% regrowth,
1x 60% regrowth
Dose 2x 5mg

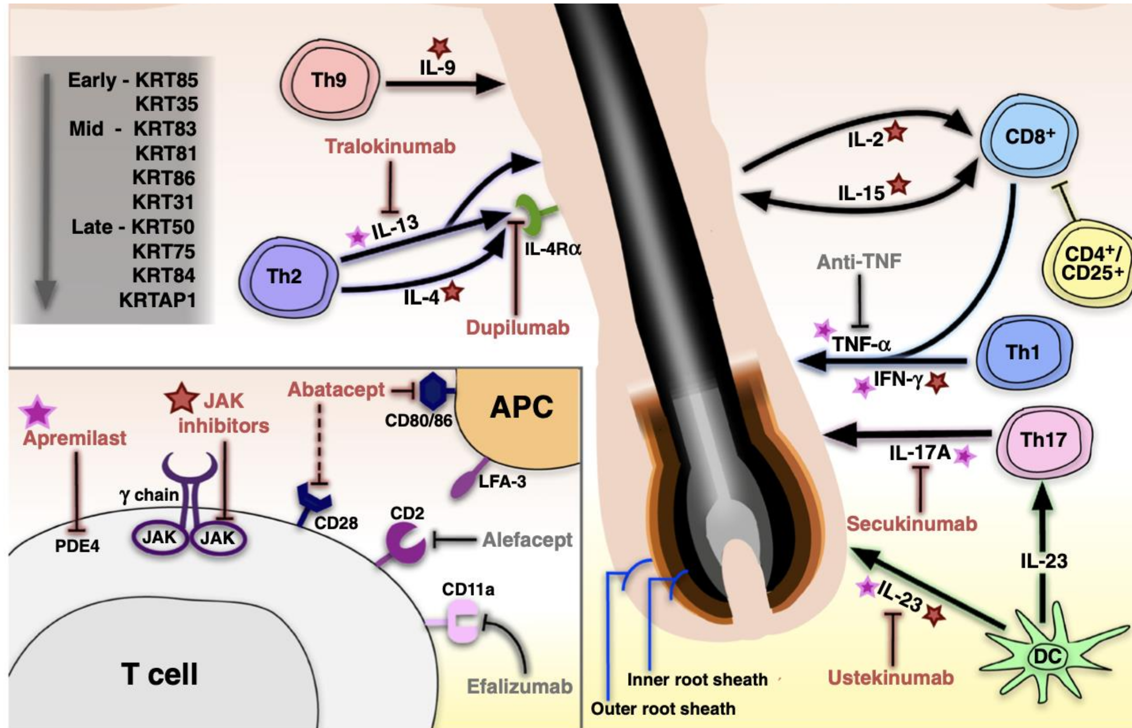
July 2021

Initial safety trial results find increased risk of serious heart-related problems and cancer with arthritis and ulcerative colitis medicine Xeljanz, Xeljanz XR (tofacitinib)

FDA will evaluate the trial results

Cost Xeljanz: 2x 5mg/day: 25.000 CHF/ year

Other players on the way?



Ismail, Sinclair Expert Review of Clinical Pharmacology 2020

My child‘s hair does not grow…

Not growing unruly hair
Hair pull negative/ positive
Painless extraction possible

Dystrophic anagen hair
devoid of sheath,ruffled cuticle
→ **Loose anagen hair**

Jerjen R et al. BJ Dermatol 2021

Normal hair shaft, little growth

Short anagen hair

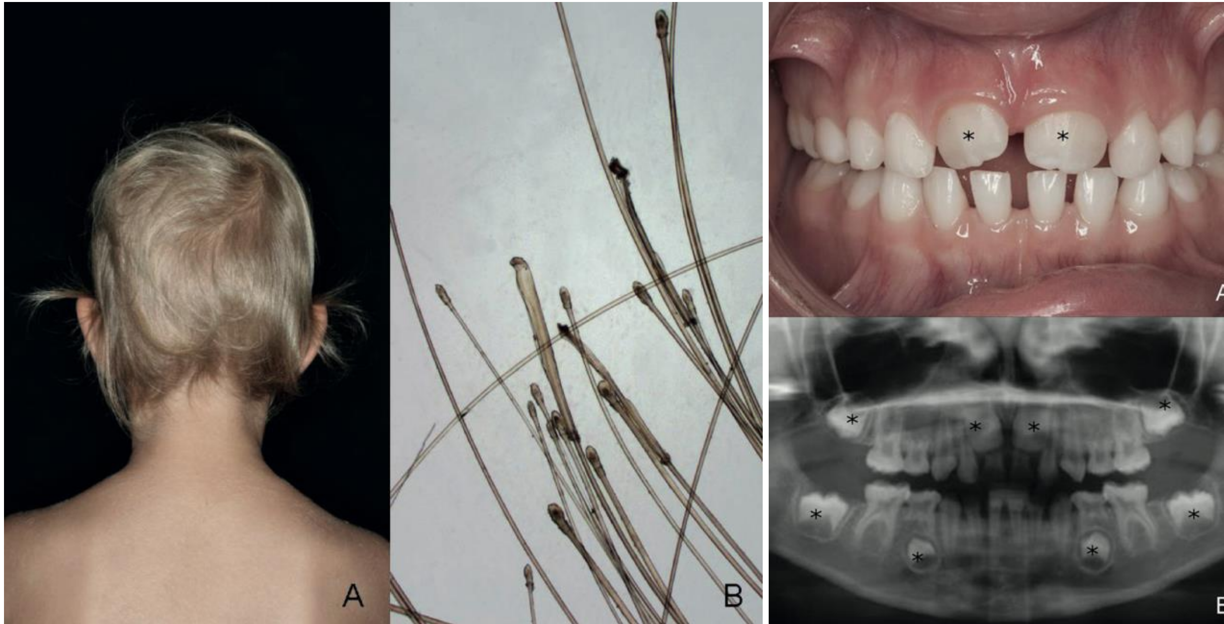
-due to shorter anagen phase
-intermittent shedding
-anagen: telogen 65/40 (n: 85/15)

-improvement with oral biotin 2.5-5mg
-minoxidil potentially helpful
-improves with age

Normal but not growing hair, very short
Hair pull negative/ positive
No painless extraction

Prachi Chetankumar Gajjar
Ind. J Pediatr. Dermatol 2019
Starace et al. Ped Dermatol 2021

Trichodental syndrome



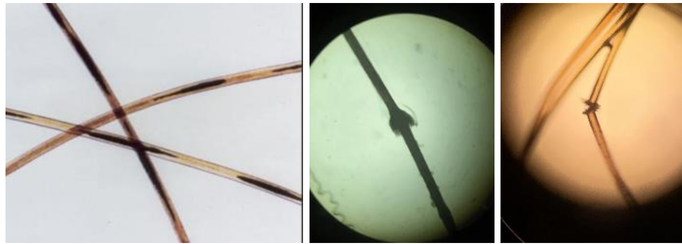
Stieler et al, Acta DermV 2020

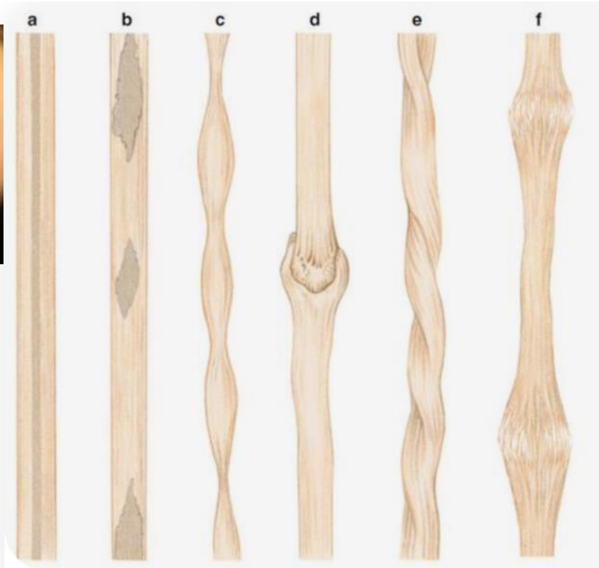
Telogen effluvium
and abnormal dentition

Mutation in *WNT10A*

Congenital hair anomalies

Hair shaft anomalies are often associated with increased breakage; can be isolated or syndromic/ ED





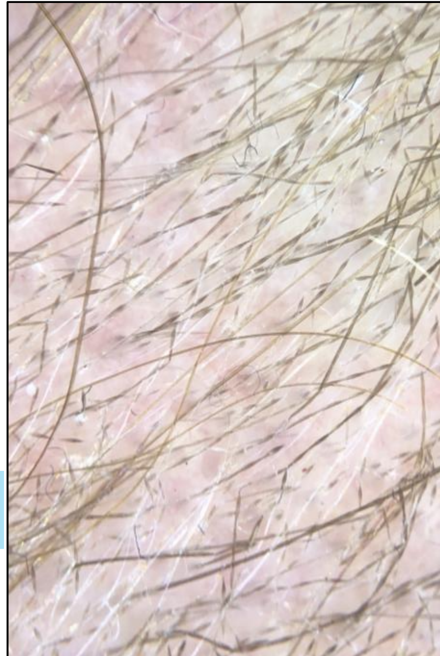
Hair shaft abnormalities:
a: Normal hair
b: Pili annulati
c: Monilethrix
d: Trichorrhexis invaginata
e: Pili torti
f: Trichorrhexis nodosa

Burgdorf , Braun-Falco 2009

„No hair growth“

Hair pull negative
hair tug → breakage

Follicular plugging

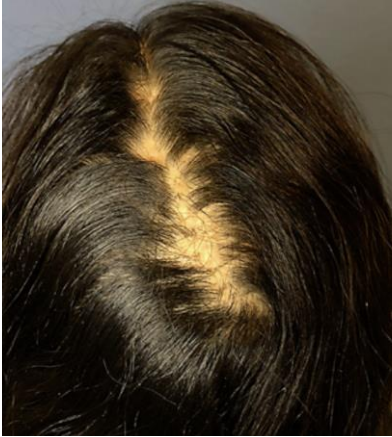


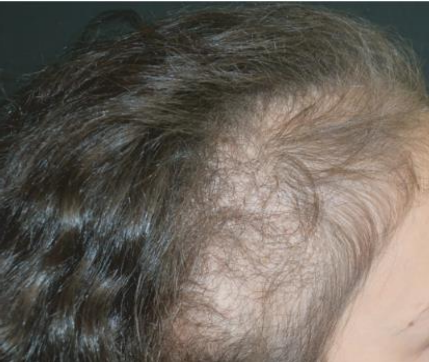
- Hair often normal at birth,
- Then does not grow
- lusterless, brittle

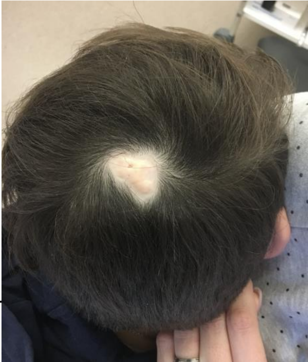
- Involvement of eyebrows
- follicular plugging
- Trichoscopy: „beady“ hair
- → Monilethrix
- Inheritance AD(AR)
  (KRT81, KRT83, or KRT86. DSGL4)

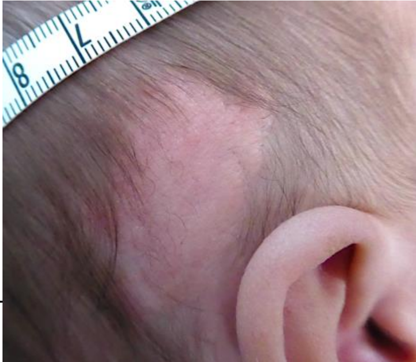
DD: other inherited hypotrichosis

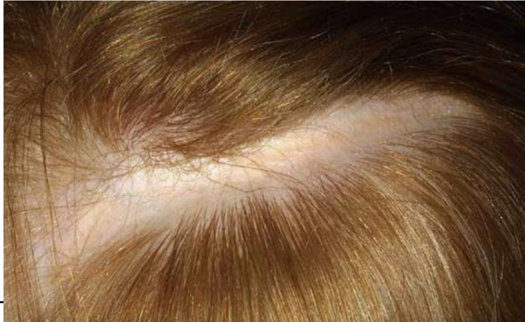
Localized hair loss/ hypotrichosis





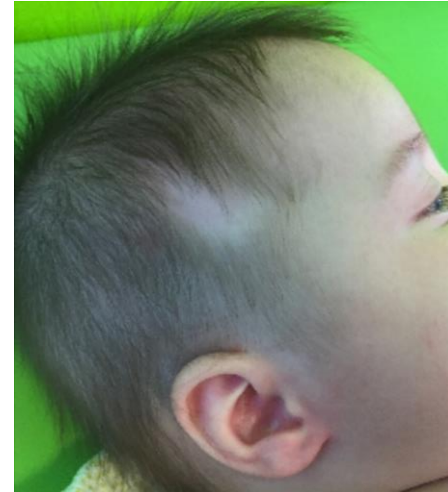


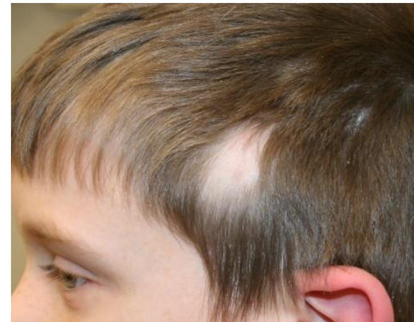




Triangular alopecia

1. Unilateral (rarely bilateral) patch
2. Triangular, oval or lancet shaped
3. Usually temporal but can be also frontal
4. Covered by vellus hair

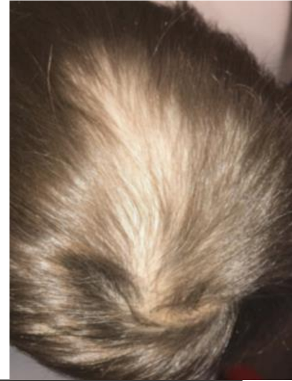




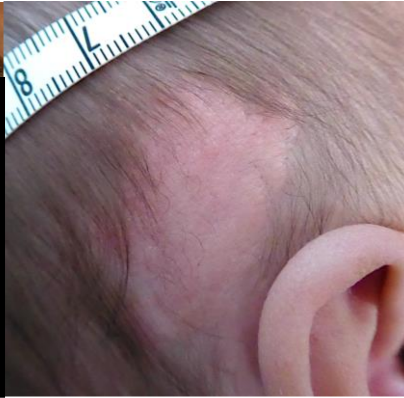
http://www.huidziekten.nl/zakboek/dermatosen/atxt/AlopeciaTriangularisCongenita.htm

But not every temporal hairless spot is triangular alopecia..

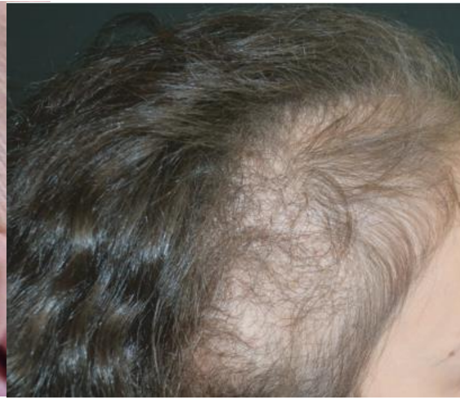
A thorough history-taking and good dermatoscope is of great help



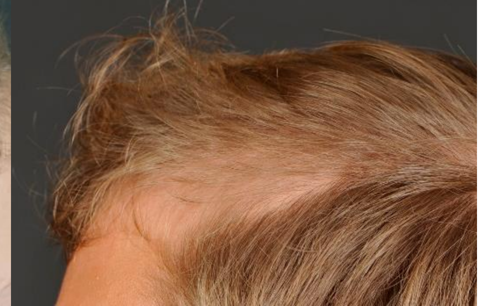
Alopecia areata



Sebaceus Nevus



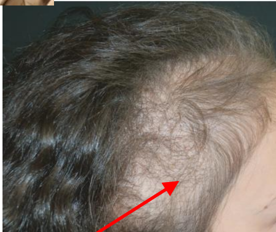
Traction alopecia



Trichotillomania

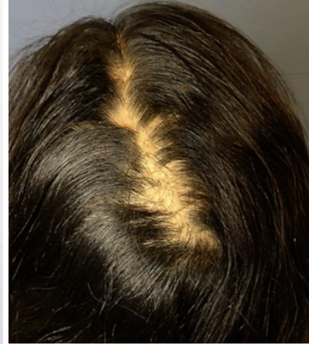
Traction alopecia- can be scarring when chronic

Mostly do to certain hair tight styles, marginal TA

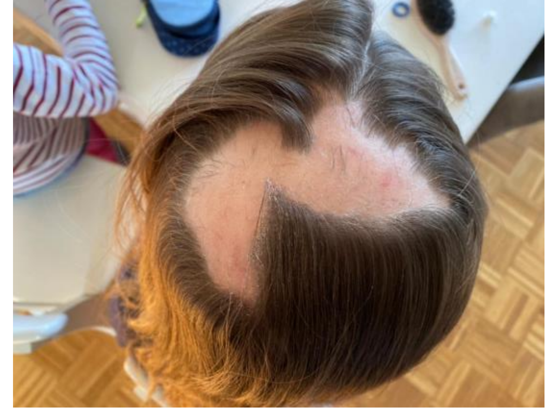


Fringe sign

Rapunzel-Alopecia (not Rapunzel Syndrome)

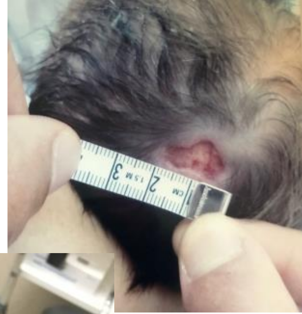


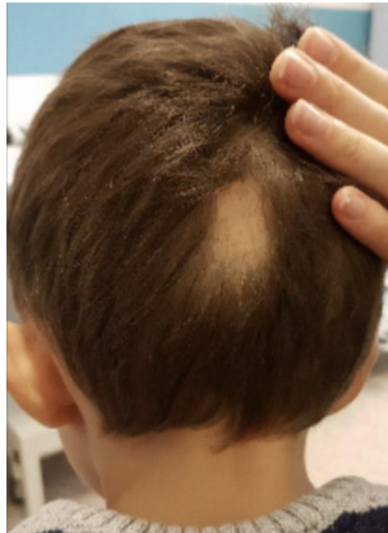
Kitchen- Aid alopecia

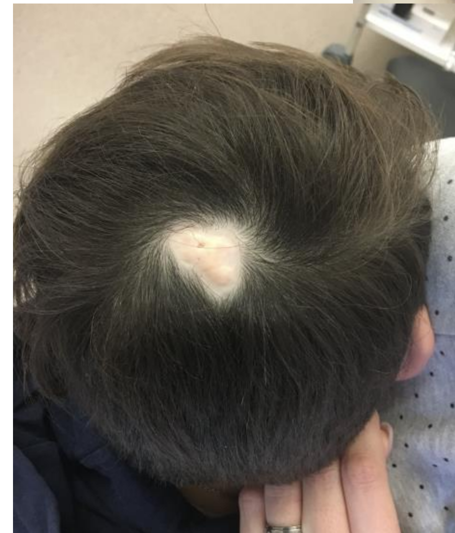


Samrao A, Dermatol Online J 2011
Lobato-Berezo Skin Appendage Disord 2020
Giacaman et al Pediatr Dermatol 2022

Anything else to consider?





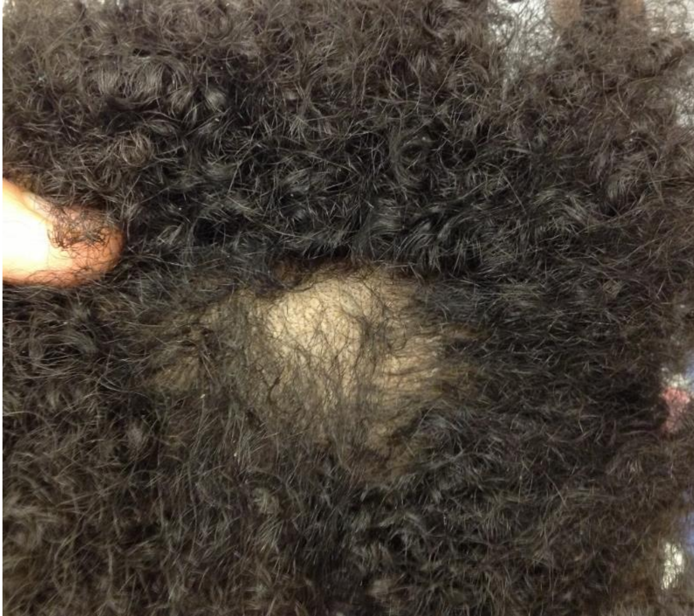


Androgenetische Alopezie

Pressure alopecia

Aplasia cutis

And last but not least-



never forget good old tinea capitis

UNIVERSITÄTS-
KINDERSPITAL ZÜRICH

Thank you!

Agnes.schwieger@kispi.uzh.ch

Das Spital der Eleonorenstiftung