

Novel method to treat androgenetic alopecia using microneedle radiofrequency combined with Topical minoxidil: a Pilot Study

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Curriculum Vitae

- Medical Doctor: Airlangga University, Indonesia
- Dermatology training: Boston University Medical Center, United States of America
- Membership: PERDOSKI, IMCAS, ISDS, ASLMS (fellow), BMC Center for Ethnic Skin/Cosmetic/Laser center
- Publications: Journal of the American Academy of Dermatology (JAAD), JAMA Dermatology, American Journal of Clinical Dermatology (AJCD), Journal of Pediatric Health Care, Clinical Experience in Dermatology, Journal of Cosmetic and Laser Therapy.
- Journal Reviews: British Journal of Dermatology, Dermatologic Therapy Journal, Journal of Cosmetic Dermatology, Henry Journal of Clinical, Experimental & Cosmetic Dermatology Journal, Journal of Clinical & Experimental Dermatology Research

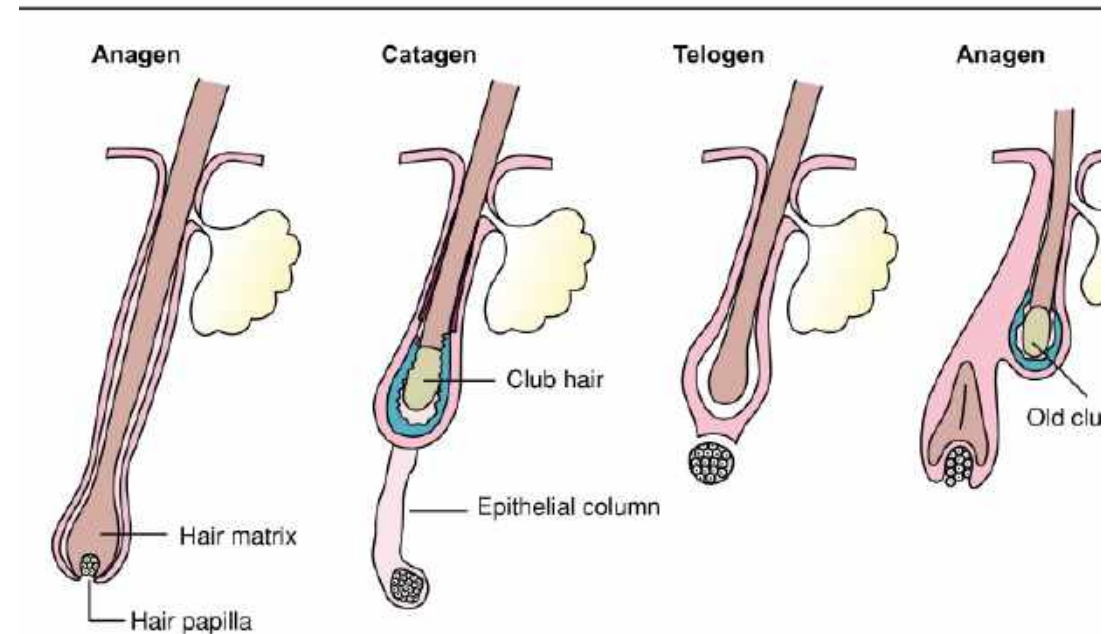
Androgenetic Alopecia (AGA)

- An extremely common condition
- Loss of hair due to prime susceptibility to androgenic miniaturization
- Up to 70% in males and 40% in females



How do AGA occur?

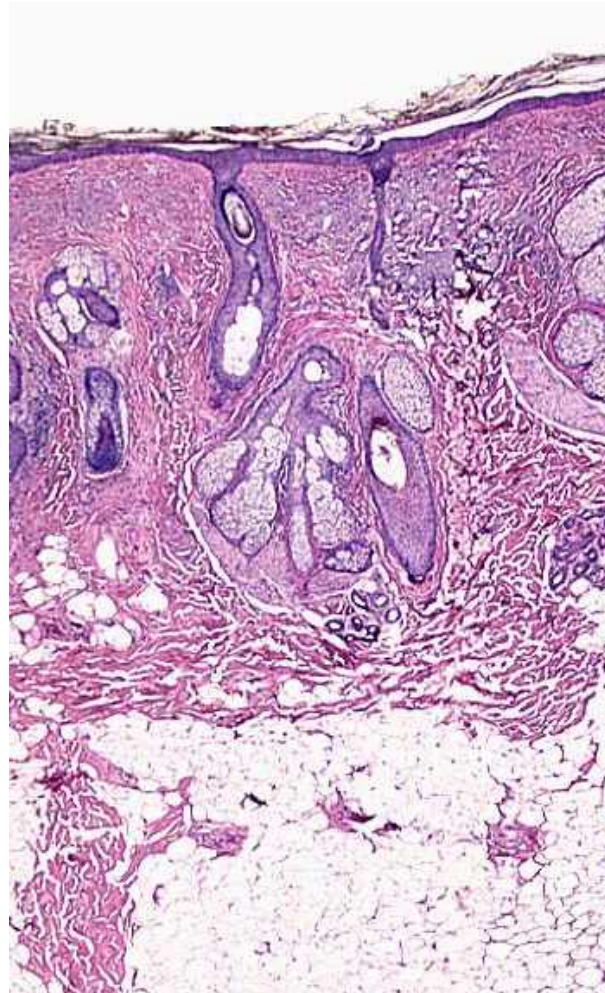
- Humans are born with the same number of follicles from baby to adulthood
- Shortened anagen phase
- Hair becomes "miniaturized"
- eventually baldness occur



Diagrammatic representation of the scalp hair cycle

Published in Expert Reviews in Molecular Medicine by Cambridge University Press (2002)

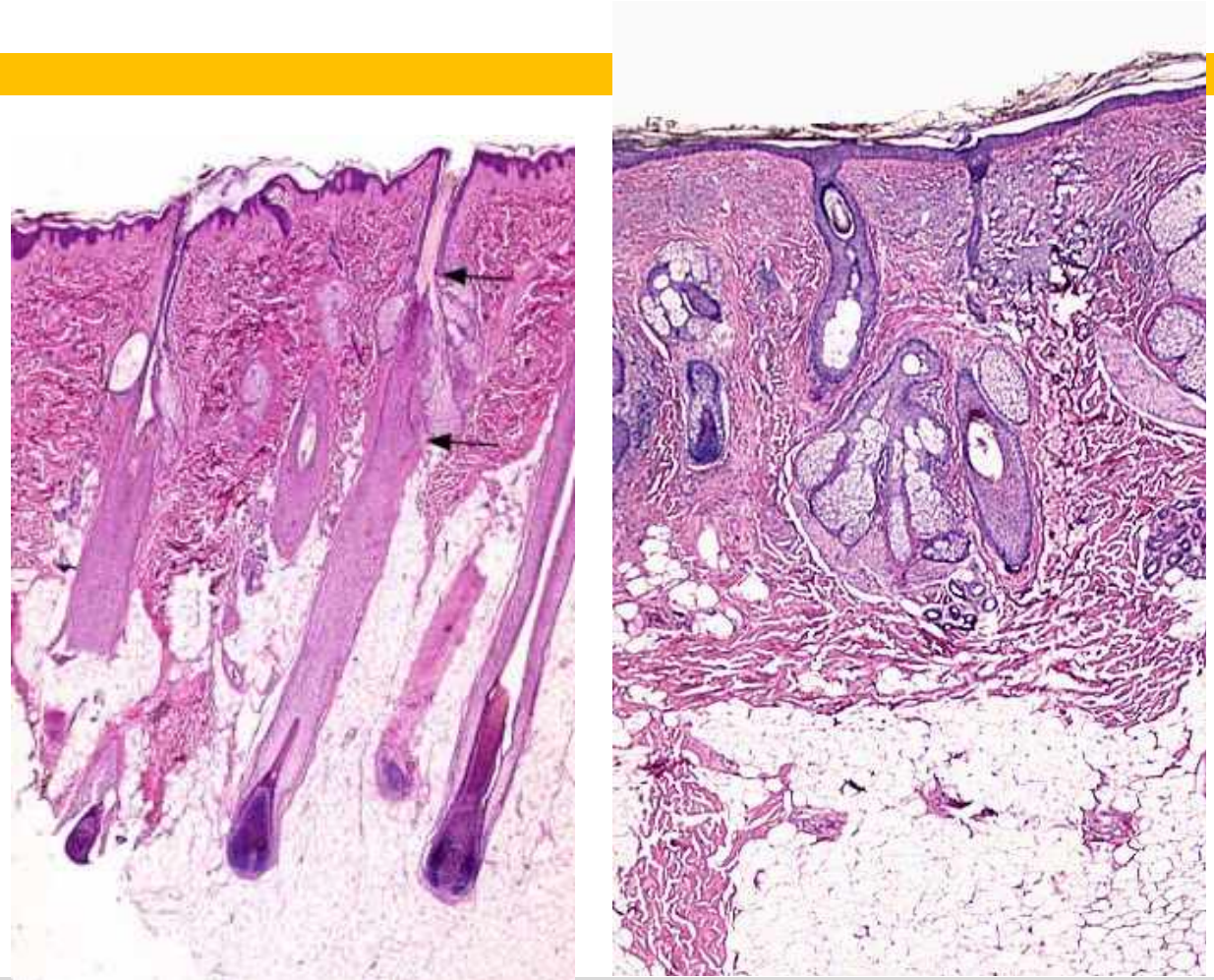
Normal vs AGA



- Decrease in size of anagen hair follicles
- Mild to moderate increase in number of telogen hair follicles
- Fibrous tracts

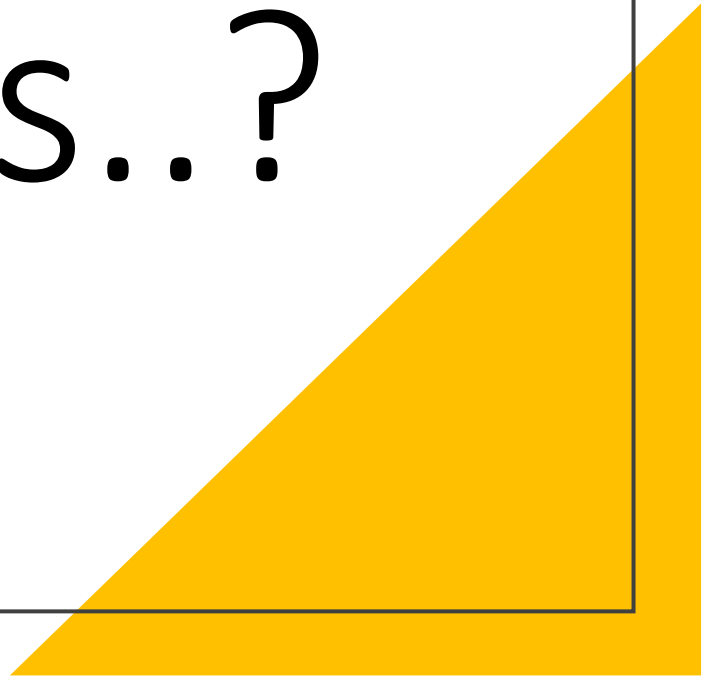
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The Question is..?

HOW DO WE EXTEND THE ANAGEN PHASE?



Current treatment of AGA

- Minoxidil 2% and 5% (FDA approved)
- Finasteride (FDA approved), dutasteride
- Cyproterone acetate
- Spironolactone
- Latanoprost
- Ketoconazole shampoo
- LLLT (FDA approved)
- Platelet rich plasma
- Microneedling
- Fractional lasers (Er:glass, Er:Yag, CO2)
- Hair transplant

We are still
trying!

- Only 3 methods are FDA-approved
- Low-efficacy of minoxidil
- Variable wavelengths and lack of consensus on LLLT
- Some methods are limited to women-only or men-only
- Some methods are difficult to perform (too expensive, need extra preparation eg. Shaving hair, etc.)

Any new ideas?

What about Fractional Radiofrequency (RF) Microneedling?

- Minimally invasive
- Combination of microneedle and RF energy
- Delivers bipolar RF through insulated/non-insulated microneedles
- Creates a controlled thermal zone at selected depth

Secret RF – an extremely useful dermatology tool

- Fractional Radiofrequency Microneedle
- Utilizes bipolar Radiofrequency on 10pin, 25pin, and 64pin (semi-insulated and non-insulated)
- Utilizes monopolar Radiofrequency (SmartCure) on 1 pin, 4 pin, as well as vascular, subcision, and lipolysis cartridge
- Maximum wattage up to 70W on 64pin, 25W on 25pin, and 45W on monopolar.

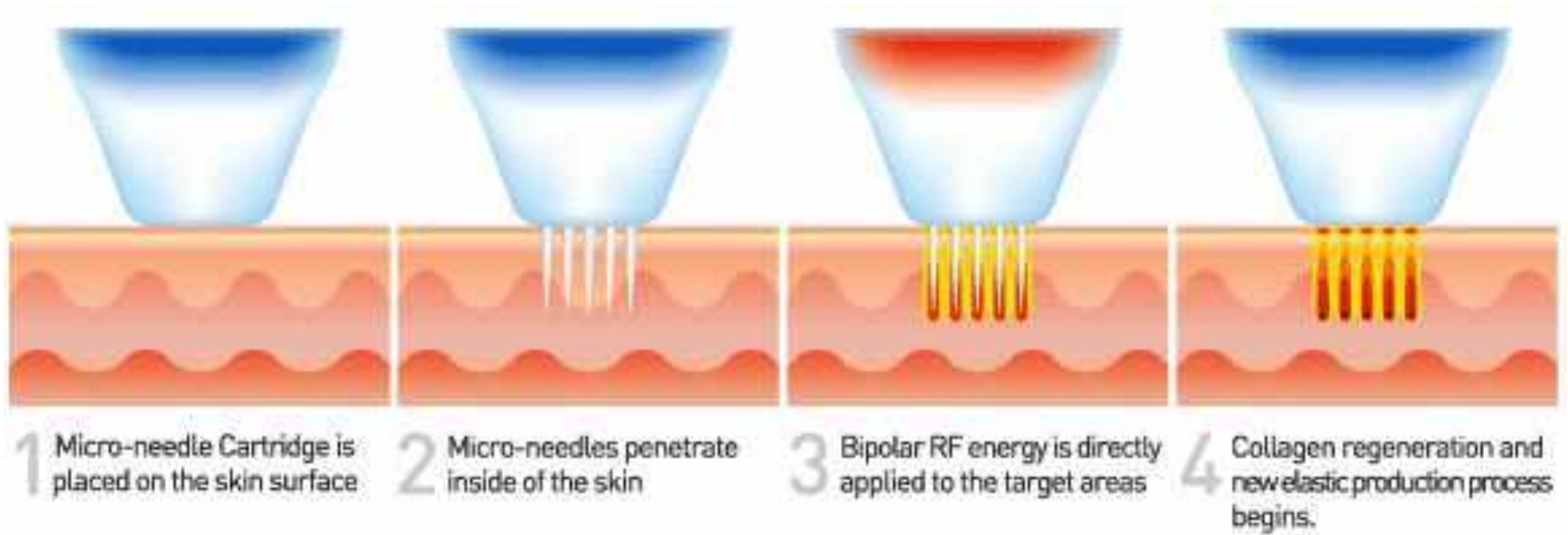
Secret™ RF



Secret RF – an extremely useful dermatology tool



- Multiple tip options
- Adjustable intensity
- Adjustable pulse width (how long to deliver the energy)
- 0.1-3.5mm choices of depth
- Adjustable firing speed



How does it work?

- Thus this device is great for rejuvenation, facial laxity, pores, wrinkles, acne scars

The Study

- Aim: to observe the effect of Secret RF in combination with 5% topical Minoxidil
- 10 males were enrolled
- EMLA was used as topical anesthesia for 45 mins prior to procedure
- Secret RF performed at a 4-weekly interval with minoxidil application after
- Patients were instructed to apply 5% Minoxidil twice daily
- Images taken during every follow up visit



Procedure

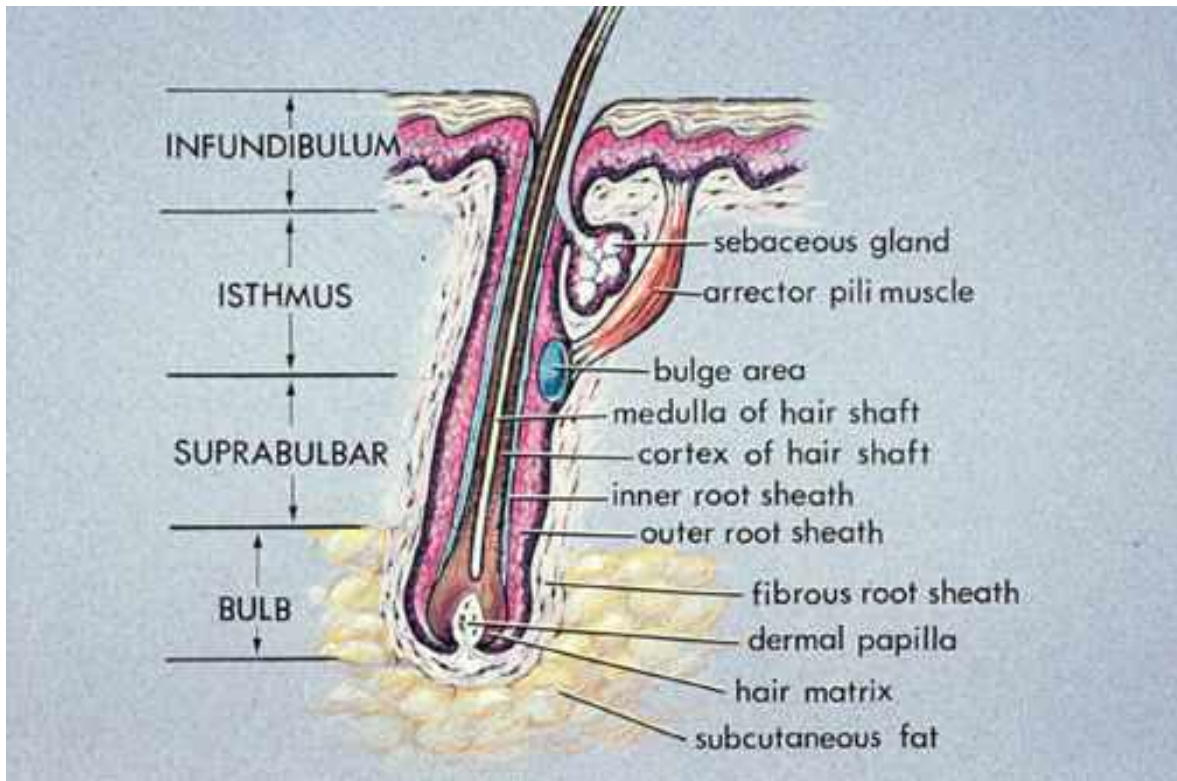
Video



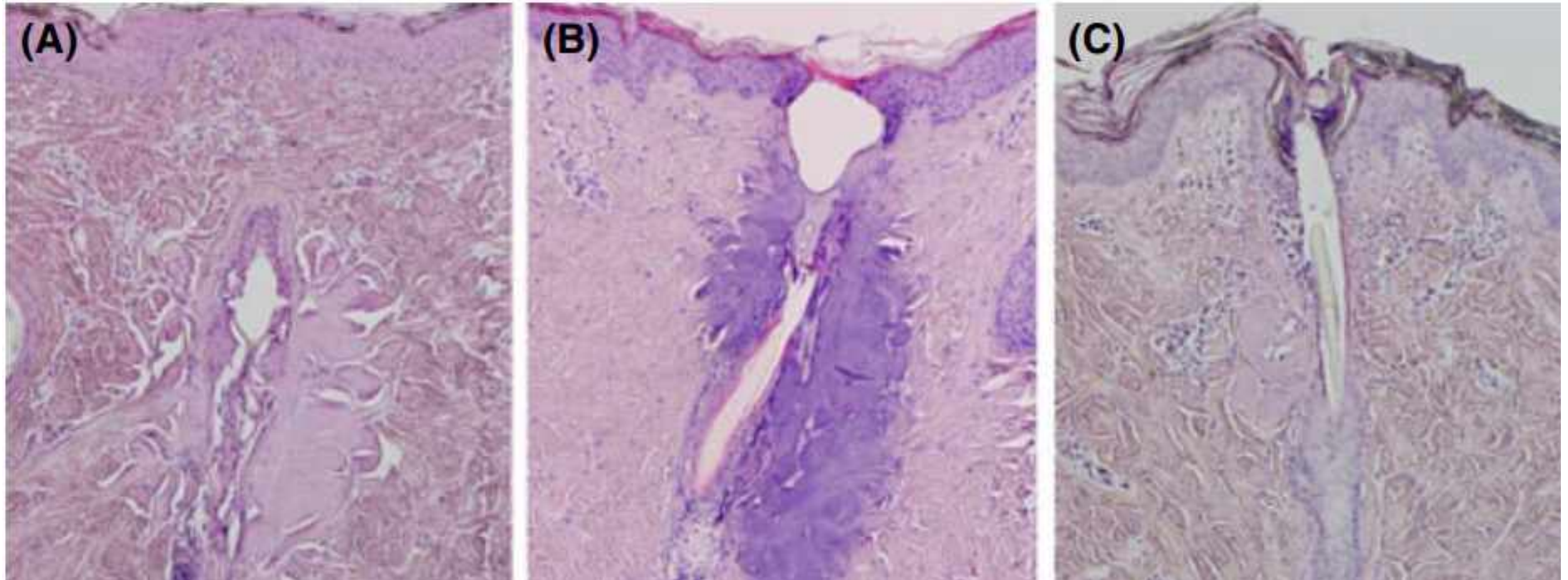
How does it work?

- The Secret RF inserts microneedles and release Radiofrequency energy --> vibration of the polar molecules --> thermal energy
- Thermal energy causes inflammation --> increases blood flow and follicular vascularization --> induce premature anagen entry
- Wound created by the needle --> stimulate stem cell populations and promotes follicular differentiation through the Wnt/B-catenin/Lef-1 signaling pathway
- Creation of channel pathways for minoxidil

Parameters



- We used 1.5mm depth, intensity 30%, duration 70-90ms depending on pain level
- Too much energy delivered can disrupt the structural integrity of follicular structures



To see it
microscopically

A. a zone of **coagulated** follicular epithelium and perifollicular structures --> disruption of the structural integrity of hair follicles --> permanent scarring

B. Immediate post-treatment with microneedle RF with preservation of adnexal structures

C. Re-epithelialization and mixed cellular infiltration, neovascularization, and granulation tissue formation around the hair follicles, with preserved follicular structural integrity

Compared to other modalities?

Secret RF

CO2 laser

**Regular
microneedle**

May damage existing hair
Approximate depth
Crusts may occur

More pain
Often longer downtime

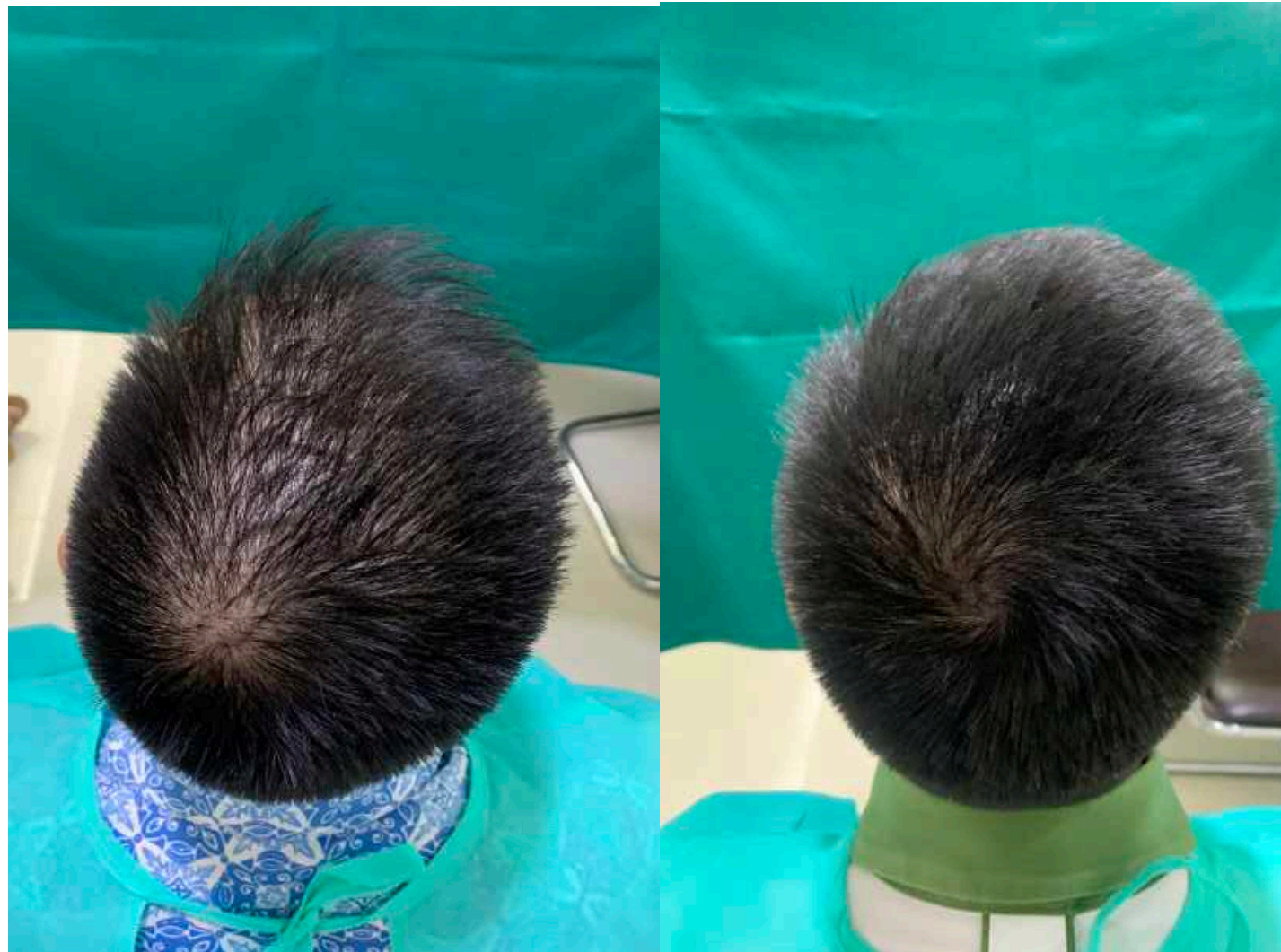
Results – Global assessment



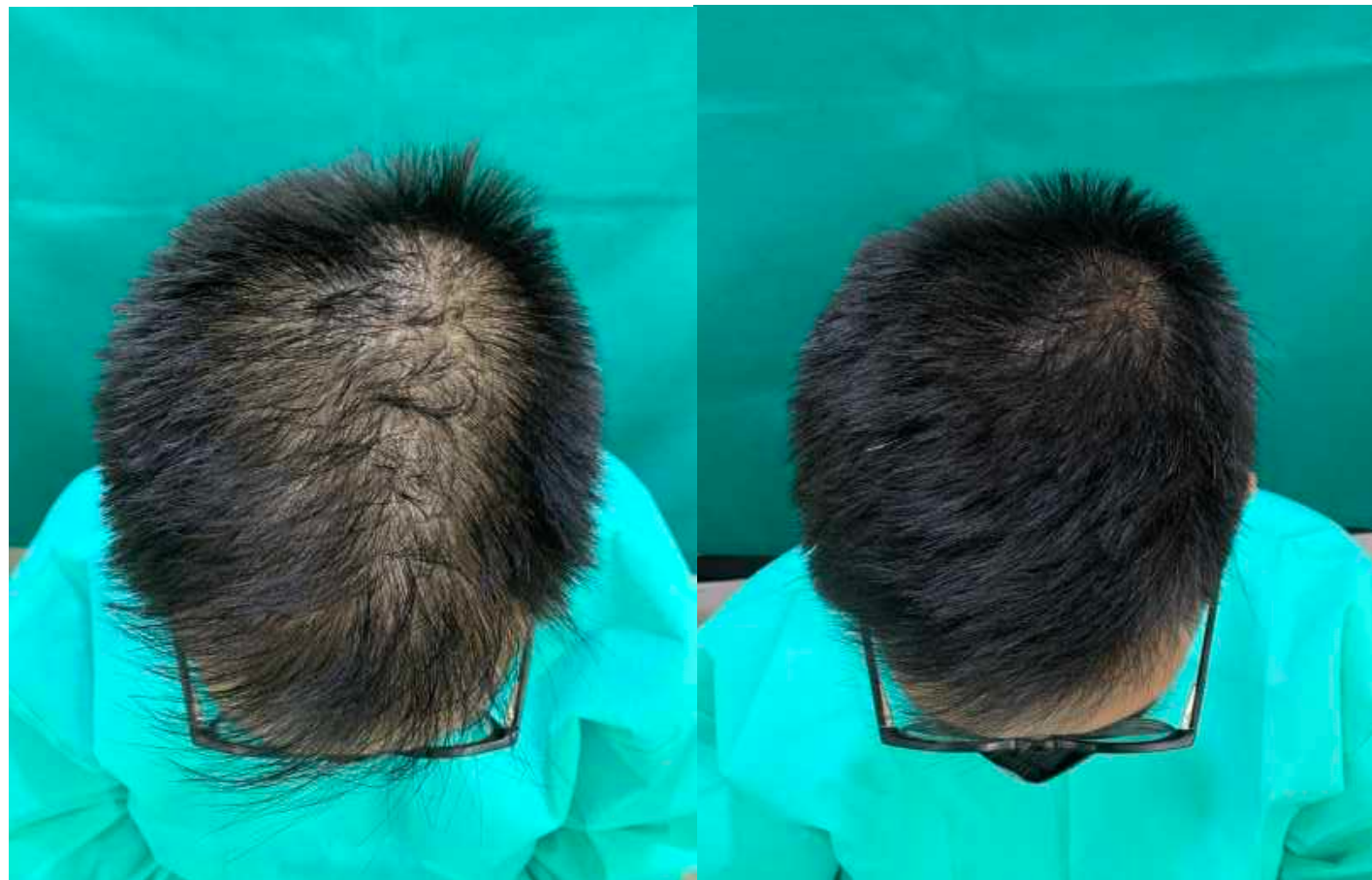
Results – Global assessment



Results – Global assessment



Results – Global assessment



Results – Global assessment



Adverse effects?

- Pain
- Redness on scalp

FAQ

- How long does the procedure take?
- Is anesthesia absolutely necessary?
- Downtime?
- Precautions

Danger?

- Very safe
- Parameters choice is extremely important -> may cause coagulation of the follicular and perifollicular structures
- Caution for those with Primary Cicatricial Alopecia and other autoimmune condition
- Possible contact dermatitis from Minoxidil

Key points

- AGA is a lifelong condition
- Many treatments, relatively low efficacy
- Secret RF can be used as a novel way to treat AGA
- The correct parameter is key
- Waiting between treatments is important
- Patience! Androgenetic alopecia is a lifelong treatment

THANKS