

Dr. Ronit Malka:

Hi there, and welcome back to another episode of ENT in a Nutshell. My name is Ronit Malka, and today, I'm joined by Dr. Jesse Smith to talk about alopecia. Thanks for being with us, Dr. Smith.

Dr. Jesse Smith:

Thanks for having me.

Dr. Ronit Malka:

We'll deviate from our standard format a bit here and start with the discussion of our differential. While I think we all hear and think about male pattern baldness as a front runner on our differential, what are the things should we be including?

Dr. Jesse Smith:

So, the most common type of alopecia is androgenic alopecia. As we've spoken about previously, this happens in male pattern baldness. There's also female androgenetic alopecia, and there's traction alopecia, which commonly occurs after multiple, multiple braids for long periods of time. We see this a lot in females or males that wear braided hair quite a bit. After that, we think about dermatophytes, demodex, folliculorum, folliculitis, secondary and tertiary syphilis, which cause patchy alopecia, seborrheic dermatitis, psoriasis, and pityriasis.

Dr. Ronit Malka:

How do these patients usually present in clinic?

Dr. Jesse Smith:

We frequently see males with male pattern baldness, and this is the most common presentation. The incidence usually occurs with increasing age, 30% at 30 years old, 50 to 60% at 50 years of age, and a lot of times, in Caucasian and Hispanic men, as well Asians. It usually starts with bitemporal recession and then begins with balding in the vertex as well.

Female androgenic alopecia is fairly common in my practice as well, and I do see quite a bit of it. It doesn't always need an operation, and this is where lab workout and good history and physical come in. Did they start to lose hair recently? Did they lose hair as a child? Do they have intermittent hair loss, and does it swing back and forth to where it's full and then thin again? These are all things that you can look at for systemic disease, but the androgenic alopecia for women comes a lot of the times, by looking at their mother or their sisters. If their mother and sister had hair loss, then a lot of times, this has to do with androgenic alopecia. This can commonly be fixed with 50 to 100 milligrams of spironolactone, and it is an easy fix and usually, within 12 to 16 weeks, these guys are coming in, and they're extremely happy.

For traction alopecia, this is common in people who like to wear tight braids, and it can be male, female, ethnic, non-ethnic. It just is exactly what it says it is. It's a traction problem, so the braids or the braided hair gets kind of pulled so tight, or it has so much weight on it from a braided lock that it actually pulls the hair out slowly and works it out. It is the equivalent to plucking the hair over a slow period. These are really hard to fix because as traction alopecia occurs, it leaves scarring behind, and one thing that's really, really hard to get a good result in hair transplant surgery is trying to place a follicle in a scar. It just doesn't work as well because the collagen there is not the same, and the blood flow is definitely not the same.

For infectious causes that are related to syphilis, usually, we see redness, scaling, irritation. It almost looks like an infection would on any other area, but we can also see quite a bit of skin excess in that area where you get a lot of epidermal sloughing, and so if you do see that, it's a common sign with a little bit of redness and folliculitis, this is a possible infectious agent.

Dr. Ronit Malka:

Since it's key to our further discussion, can we briefly review the pathophysiology behind normal hair growth?

Dr. Jesse Smith:

We usually have about 100,000 to 150,000 follicles in the scalp. Each follicle contains, on average, 2.3 hairs per follicle. The follicle is in the reticular dermis, which is below the papillary dermis. A bulb of hair equals the papilla plus the surrounding epidermal cells that begin to make the hair, and follicular unit is usually one to four hairs plus its neurovascular plexus, the arrector pili muscle, as well as a sebaceous gland. Vellus hairs are different from terminal hairs. Vellus are very fine hairs, and you usually see these on children in the sideburn area. They're very fine, and they only grow to a finite length.

There are three phases of hair growth. There's anagen, which is the growth phase. It lasts about two to five years. 90% of our follicles are in this phase at any given time. There's catagen, which is an involutional phase. This lasts about three weeks, and less than 1% of our hair follicles are in this phase at any given time. Telogen is a resting phase, and this lasts about three months. Five to 10% of our follicles are in this phase at any given time. As hair loss progresses, more and more hairs go into telogen phase and stay in that phase over time.

If we look at scalp anatomy, S-C-A-L-P is an excellent acronym for this. It stands for skin, dense connective tissue, epicranial aponeurosis, which is continuous with the SMAS in the face, and the loose connective tissue, as well as the periosteum. The loose connective tissue and the periosteum together make up a pericranium. There are five main arteries that supply the scalp, the supratrochlear arterial system, the supraorbital artery, the superficial temporal artery, the occipital arterial system, and the posterior auricular system. We really start to notice hair loss about 50 grafts or 50 follicles per square centimeter. The back of the hair usually has a constant of about 80 to 100 follicles per square centimeter. When we really start to notice hair loss is 50 and below.

Dr. Ronit Malka:

When you're examining these patients, what things are you making sure to assess?

Dr. Jesse Smith:

We often assess age, skin to hair color match, hair curl, and the hair density.

Dr. Ronit Malka:

Are there any criteria or grading systems you use for balding patients?

Dr. Jesse Smith:

The most common grading criteria and grading systems are the Norwood grading system. This is common for men. It's classified as a Roman numeral one through seven and Roman numeral two, three, four, and five also have an A category, and Roman numeral three has a vertex category as well. For

women, the female androgenic alopecia, we look at a Ludwig classification system, and those are numeric values one through three.

Dr. Ronit Malka:

Is there any other workup like labs or imaging you routinely get when assessing a patient with alopecia?

Dr. Jesse Smith:

I also, in females, strongly encourage people look at iron levels, ferritin levels, thyroid levels including T3, T4 and TSH. I think you need to ask about PCOS, B vitamin levels, vitamin D, vitamin K, total iron-binding capacity, hemoglobin content, and DHEA. All of these come into play not only in females but all individuals, and I think that these things need to be assessed with a full history and physical exam prior to going on to any other treatment.

Dr. Ronit Malka:

Moving on to treatment options, what are our non-surgical options for treating alopecia, and when would you want to use these?

Dr. Jesse Smith:

This has come a long way within last 10 years, and it's extremely exciting. We've come so far with medications as well as non-surgical therapies. We started off with minoxidil, which is Rogaine, which has a really interesting history. Minoxidil was originally used as an oral medication, and it dilates blood vessels. It's a potassium channel opener, so it increases blood flow by dilation of blood vessels. That medication didn't work so well for hypertension, so it kind of went off the market for a while. Then, it came back as minoxidil because somebody thought, "We should use this topically in the scalp," and it really does work well. It has to have constant use, but it really does turn some of these vellus finer hairs that are in those later phases of telogen and brings them back as a terminal hair. By increasing blood flow, increasing nutrients, increasing oxygen to these areas, the number of follicles in anagen increases.

Then, we started using Propecia or finasteride. Finasteride inhibits 5-alpha-reductase type 2. It blocks the conversion of testosterone into DHT, and it is contraindicated in women of reproductive age because of risk of birth defects in the male fetus, but with recent advances in benign prostatic hypertrophy, Avodart or dutasteride became available. Now, Avodart dutasteride do a better job at blocking the conversion of 5DHT, so in several countries, Avodart is actually used for male pattern baldness including South Korea and Japan. That dose is 0.5 milligrams per day, and it was found in several studies to improve hair growth in men more rapidly and to a greater extent than even 2.5 milligrams per day of finasteride, and we usually only only prescribe one milligram per day of finasteride for these gentlemen.

The other things that are exciting is bimatoprost, which is Latisse. Bimatoprost was first used as a medication within the eye as an eye drop for open-angle glaucoma. Interestingly enough, these people that were using the medication reported fabulous growth of their eyelashes, and they loved it. So, that became Latisse, which was put out by Allergan. That worked really well for eyelashes for women. It was placed on topically and not in the eye. So, we got the idea of let's put this on brows that are diminishing as well as scalps, and it does work. So, here's another topical solution that we can put on the hair to assist with hair growth.

There's now a laser hair therapy with a 655-millimeter diode, and these are diode laser with low-level laser photo modulation therapy. These are worn on the scalp as almost like a ball cap, and

they're done for three times per week at about 15 minutes per session. This is really exciting for guys because even before or after hair transplant, we're increasing blood flow to the scalp. We're decreasing inflammation, and this has been a great adjunct procedure for both before and after surgery, or some people have used it and not needed surgery.

It has, in some cases, been shown to increase the number of follicles per square centimeter by as much as 19 follicles per square centimeter. So, if you're just at that tipping point right at that 50 follicles per square centimeter or starting to notice hair loss, or if you're a younger man who we don't really want to do surgery on because we don't know how much hair loss you're going to have, these are all really exciting therapies that we can use and avoid surgery. Also, PRP, which is platelet-rich plasma, with or without acellular dermal grafting applied to the PRP has been done in sessions as few as two and as many as six over about a four to six-week break between each session. This has been found to increase hair density as well.

Dr. Ronit Malka:

What are your indications for proceeding to surgical options? What are your main goals and considerations when thinking about surgery?

Dr. Jesse Smith:

The main thing you want to do is make sure that you've got a patient that's old enough to know when their hair loss is at a point where you can help them. Younger men, 18, 25, 26 years old, very hard to predict what's going to happen, so the last thing you want to do is do a hair transplant, put hair forward or in them, and then they'd go on to lose all the remainder of their hair. Now, you've got permanent hair up there that you've taken from the back of their scalp and placed on top, and it's just not enough to cover it, so they wind up either shaving their head or trying to get some type of therapy to remove the hair that they've already put on. So, age and predictability is a really important thing.

We also want to make a natural appearing hairline. We want to increase scalp coverage. We like to do that frontal hairline as the most important and then work our way back. Really, I want to know, do we have enough density in the back of the scalp where we take the hair from to get enough grafts per square centimeter in the area that has hair loss to make sure that it looks good and it looks natural and it doesn't look patchy?

Most of the donor hair in posterior scalp has a graft density or a follicle density of about 80 to 100 follicles per square centimeter. Our ideal patients are dark-skinned patients with dark, curly hair. The reason we like the dark curly hair is because if it's curly, it can usually be in three planes all at one time. So, it's one hair, but it's in three different places at one time. The hardest is our light-skinned patients that have straight hair. Those tend to have the least fullness per look. Even though they can have great density, they don't have the same look as someone with an equal density that has curly or dark hair.

Dr. Ronit Malka:

So, you've decided you want to proceed to surgical management of a patient's alopecia. What are your general approaches here?

Dr. Jesse Smith:

There's two main approaches today, and those are follicular unit transplantation or strip grafting. There are others that have been done in the past, and those are punch grafts as well as scalp reduction surgery

and juri flaps. Those other three have been done as well, but I've personally never seen a punch graft, a scalp reduction surgery or a juri flap in the 20 years that I've been doing this. We have done strip procedures for a long period of time, and then along came the follicular unit transplantation, which has also revolutionized quite a bit of what we do in hair transplants. There are times and places where you choose one over the other.

The strip graft is where we actually go to the back of the head, and we look at what kind of mobility we have in the scalp. You can take anywhere from a one to a two-centimeter width of a strip out. My strips are usually about anywhere between 18 to 22 centimeters long. Depending on the density which you have, you take that out, and then we cut each individual follicle out of that strip. You close this with a small advancement flap in the back of the scalp, and you close it with either PDs or Vicryl sutures, and a Prolene. You leave those sutures in place for about two weeks, and it's really, really hard to find that incision line once they've healed up.

Follicular unit transplantation is where we shave the back of the head, and then, we have a very fancy, what I like to call a drill press with a suction on it. So, there is a one millimeter or 1.2 millimeter drill bit basically that's sharpened, and you basically come in at the exact angulation of the hair, go through the scalp, go through to the papillary dermis and to the reticular dermis, and loosen that hair up. Then, there's a gentle suction on that drill press, and it sucks each individual follicle up. You do that how many ever times that you need to equal the number of grafts that you need. Those put pinpoint small scars. They're hard to see in the scalp, but you get each individual follicle at a time, and then you go under the microscope. You sort those to individuals as in singles and multiples. Then, you go and place your sites in at the scalp. Then, you place each individual graft back into its particular site.

Dr. Ronit Malka:

What considerations are you taking into account when deciding timing, positioning, and sizing of grafts?

Dr. Jesse Smith:

So, your hairline needs to be age appropriate. You definitely don't want to bring a hairline down really low on an elderly man, and you don't want to place one too high on a youthful person. So, we set our hairlines age appropriate. We also measure the hairline from brow to brow to make sure that when we do draw a hairline in, that we make sure that it is even on both sides. At that point, once we have our grafts obtained and we start making our sites, we usually make our finer sites for those singles upfront for that first half at 1.5 centimeters on the frontal hairline. If you look at a natural hairline, it's not just straight across. You want to make it just slightly wavy. We also like to put singles in that first one-half to 1.5 centimeters because that's the way a natural hairline is.

As you fade back into that one to 1.5 centimeter region, then we start to introduce multiples as in grafts that have two or three hairs per graft. Then, as we get even further back, you can start to put your multiples in. Those are the three and four hairs per graft. We mix singles with that, so there's not singles upfront, and it looks less dense. Then, all of a sudden, you get into this really dense hair in the back. So, there's really an artwork to working in singles and multiples, but certainly, singles come in that frontal hairline especially in the temporal tufts in the temporal area.

Dr. Ronit Malka:

What is the expected duration of the results of these different treatments, and what defines a good outcome?

Dr. Jesse Smith:

This is what you really have to talk to your patients about, and you have to tell them several times, I've learned. So, when we first place the grafts, they're going to be fine stubble, and they're going to look great, and the patient's going to be real excited. About 10 to 21 days after, those grafts, many of them will fall out. The patients get really upset about that because they've spent a lot of time and energy to get these grafts, but you have to understand, this is exactly like transplanting a tree. Until that root really gets enough blood supply and enough oxygen to grow the hair, it's all about survival. So, the graft wants to live, and it's just taking its time to get enough blood supply and enough nutrients to then start growing those hairs back out. That usually happens at about four to six months. You really start to see those hairs come through.

Now, there'll be fine, and there'll be vellus almost. They may only grow a certain height and then fall out again, but usually, by that 12 to 18-month mark, you've really got your final result. This is when hair is really thick and lush. The hair follicle goes back to the exact same density and fullness and length that it always has as it came from in the back of the scalp. This is when your patients are really excited about their results.

Dr. Ronit Malka:

Are there any complications you counsel patients about before hair transplant?

Dr. Jesse Smith:

I think you really have to talk to patients about the fact that scarring can happen especially with strip procedures and even with the follicular unit extraction or follicular unit transfer, even with the small one-millimeter drill press or the small one-millimeter extraction technique, some people get little dots in the back of their scalp, and those can last for a prolonged period of time. As with the strip procedure, you are creating a scar that's a horizontal scar in the back of their scalp. I calmly counsel patients and tell them, "Look, if you ever plan on shaving your head, there's a chance that this thing is going to be seen, and so we need to make sure that if that's in your future, that we might consider doing a follicular unit transfer or follicular unit extraction instead of a strip procedure."

You can also have fair to grow hair. It's rare, but I have seen it in a couple of people, and if the grafts are placed too low, they can turn into ingrown hairs, and we have to go through and kind of pick out and unroot each one of those. That can be a real chore for the patient and the physician.

Dr. Ronit Malka:

What do you do to prevent these complications?

Dr. Jesse Smith:

I can't express it enough. One is a good history and physical. If you've got a patient that has horrible scarring on their body from cuts and bruises and scratches and other surgeries, they're probably not going to be a good candidate because no matter what method you use, you are making small wounds on the scalp. So, I look at that primarily. I also ask them, "Do you have any other medical problems?" Patients with uncontrolled diabetes and hypertension aren't a good candidate for hair transplant. I think you have to look at all those things, and you have to listen to the patient about their hair loss pattern. You can't just assume that it's male pattern baldness. That's where we got into the differential diagnosis of what male pattern baldness is.

Also, our complications can occur with poor placement of grafts if the graft is set too high or too low in the scalp when it's placed in. If it's set too low, you're going to get ingrown hairs. If it's set too high, then it'll never get the blood supply that it needs. We always set these grafts just about a half millimeter out of the skin from whence it came. Scarring is a contractile force, and it will pull that hair graft down into the scalp. If it's set dead, even with the scalp, then it will pull it down, and that's where you get your ingrown hairs from.

Dr. Ronit Malka:

What kind of aftercare do you recommend for these patients?

Dr. Jesse Smith:

We also are very meticulous about our aftercare. We don't let our patients shower with shower water or any water hitting the head immediately for at least three to five days afterwards. Then, you have to wear a loose ball cap or a loose surgeon's hat for at least three to five days until those hairs actually start taking hold, and the body is sort of grown into them so that they're not loose. We also use some copper peptide solutions in order to assist with hair growth. The most important thing is while the hairs haven't taken over the first three to five days is we constantly spray the scalp with normal saline in order to keep those grafts hydrated. So, hydration is important to keep the grafts from drying out and then not taking.

Dr. Ronit Malka:

What kind of follow-up do you usually schedule for these patients?

Dr. Jesse Smith:

I usually see my patients back at the first week mark, the second week mark, and then after that, if they're doing well, then we start spacing their appointments out. If they're doing really well, I'll see them at the one-month mark, and then I'll do two months after that, and then three months, and then six months.

Dr. Ronit Malka:

Is there anything else you'd like to add?

Dr. Jesse Smith:

I would say talk to your patients and listen to your patients. A lot of times, they will give you their diagnosis and their problem if you'll just ask the right questions and listen to them. It's easy to point to everyone as common androgenic alopecia, whether that be male or female, but if you really want to catch the people that have different types of alopecia, you really have to just ask the right questions and listen to them and do a really good history and physical exam.

Dr. Ronit Malka:

All right. Well, thank you so much.

Dr. Jesse Smith:

Thank you for having me. I've enjoyed it.

Dr. Ronit Malka:

To briefly summarize, there are a number of etiologies of alopecia. The most common of which is androgenic alopecia. This most frequently presents in men as male pattern baldness beginning with bitemporal recession and progressing to vertex balding but can also affect women. Other hormonal etiology such as hypothyroidism and infectious etiologies such as dermatophytes, demodex, folliculorum, and syphilis can also cause alopecia, but typically present in patchy distributions and can include skin changes.

Alopecia can be graded on the Norwood scale from one to seven for male pattern baldness or on the Ludwig scale from one to three for female androgenic alopecia. When assessing these patients, noting skin to hair color match and hair curl and density is important as assessing a patient's susceptibility to scar formation. Some labs such as TSH, 3T3, T4, iron, and some vitamin levels are important in ruling out other systemic etiologies of hair loss before proceeding with treatment.

Many non-surgical treatment options exist including minoxidil, finasteride, dutasteride, and latanoprost as well as laser therapy to improve blood flow to the scalp, which promote hair growth and can improve results after surgical therapies. When considering surgery, we should consider expected future hair loss patterns and creating an age appropriate, natural appearing hairline. Surgical options can include strip grafting and follicular unit transplantation, which are most common as well as punch grafts and juri flaps, which are much less commonly used. Strip grafting is often used for larger defects and to create the frontal hairline, whereas follicular unit transplantation is more commonly used when there is limited donor hair available or in patients who might shave their head in the future.

It is important to counsel patients on expected post transplantation hair loss, which can be due to initially poor blood flow to follicles as well as telogen effluvium, or the expected hair loss that occurs when transplanted hair appropriately enters the telogen phase and falls out. Other complications can include scarring particularly with strip grafting, ingrown hairs, failure of transplanted hairs to grow, and progression of alopecia to make transplanted hair undesirable. Transplanted follicles are very susceptible to mechanical injury and dehydration and need to be sprayed with water and protected with a loose cap in the immediate post-operative period. It typically takes about 12 to 18 months after transplantation to see the final expected result.

Before we go, we'll wrap up with a couple of review questions. As always, I'll ask the question, pause for a few moments, and then say the answer. Starting off, what are the three phases of follicle growth? The three phases of follicle growth are anagen, catagen and telogen. The anagen phase is the growth phase lasting about three years, and the majority of our follicles are in this phase at any time. Catagen is an involutional phase lasting about three weeks, and telogen is a resting phase lasting about three months.

What is the most common topical medication prescribed for alopecia? Minoxidil, also known as Rogaine, is the most common topical medication prescribed for alopecia. Minoxidil acts by lengthening the anagen phase and increasing blood supply to the follicle. Lastly, as somewhat of a bonus question since we didn't go into it in depth during the episode, describe a juri flap and what it is used for. A juri flap is a temporoparietal rotation flap that is used to treat frontal balding. Its blood supply is the superficial temporal artery, and it should be noted that this is a very uncommon procedure today given advances in strip grafting, follicular unit transplantation and non-surgical treatment options. Thanks so much for listening. We'll see you next time.