

Dr. Ronit Malka:

Hi there. Welcome back to another episode of ENT in a Nutshell. My name is Ronit Malka and I'm joined Dr. Jeffrey Teixeira, facial plastic and reconstructive surgeon, to talk about facial resurfacing.

Dr. Ronit Malka:

Thanks so much for joining us, Dr. Teixeira.

Dr. Jeffrey Teixeira:

Thank you. I want to thank you guys for having me on. I think podcasts are a great tool for learning and I hope the listeners find this topic useful.

Dr. Ronit Malka:

I'm sure we definitely all will. So starting off, what is the typical presentation of someone coming to clinic for a facial resurfacing?

Dr. Jeffrey Teixeira:

So patients that present to clinic for facial resurfacing really come in a couple of different flavors. The most common is for cosmetic reasons, so they're concerned about either having wrinkles or skin laxity. A lot of them also come in for concerns for pigmentation, such as sun aging. Acne is a big one, we can actually use lasers for active, as well as for scars as a result of acne. They come in for, some patients will have skin cancer history, so dermatologists will commonly use lasers for remove of superficial cancers, and then another really big one is hair removal.

Dr. Ronit Malka:

Great. Starting from just normal physiology, can we very briefly review skin and hair growth cycles, and what is targeted from various resurfacing techniques?

Dr. Jeffrey Teixeira:

Yeah, I think this is a great topic. I mean, using lasers what you're really targeting is the skin, so it's important to understand the normal physiology of it. Skin really has three layers, classically; the epidermis, dermis, and hypodermis. The epidermis, which is the layer that we see on top is really full of keratinocytes that need to be broken through. It normally composes of five layers. We have the stratum corneum, which is normally the thickest layer. We also have the stratum lucidum, this is actually interesting, it's normally only found on thick skin such as the palms and soles. The stratum granulosum, spinosum basale, this is really where the cells originally start to grow and basically push their way up.

Dr. Jeffrey Teixeira:

Ablative lasers remove the epidermis as well as superficial peels. So when we're talking about an ablative laser, we're talking about removing the entire top part of the epidermis, and that's normally the same thing with any type of chemical peel that you're doing. The epidermal junction isn't really a layer of the skin, but it is a blueprint for overlying skin and we normally classically talk about if it's significantly damaged, it can lead to scar.

Dr. Jeffrey Teixeira:

The dermis is broken up into the papillary, as well as the reticular layers. Here's really where you have your fibroblasts that produce that collagen and elastin that gives skin its structure and youthfulness. The papillary layer is more loose connective tissue with some small blood vessels and nerve endings, while the reticular layer is denser and normally will have bigger blood vessels. And this is also where you'll find hair follicles and sebaceous glands. Most non-ablative lasers deposit energy and heat in the dermis, as well as medium and deep chemical peels.

Dr. Jeffrey Teixeira:

Lastly, we have the hypodermis. Here's really where you have fat and fibrous tissue. Pretty rarely do any type of resurfacing laser get down to this level. It's also important when we talk about physiology that we talk about wound healing, because what we're doing with lasers is we're allowing for a controlled thermal injury, that allows the skin to heal.

Dr. Jeffrey Teixeira:

So when we talk about wound healing, we really break it down into a couple of phases. The first phase is pretty much inflammation that's going on the first week. Here we have polymorphonuclear leukocytes, which are allowing for cleanup of any dead tissue and debris. Fiber blast will also start to move in, laying down some collagen and elastin, which leads into the proliferation phase that lasts about three weeks.

Dr. Jeffrey Teixeira:

We normally like to say that skin will re-epithelialize completely in about two weeks, and you also have some neovascularization going on. It's important to remember that the first type of collagen that's normally laid down is Type III collagen, and then in remodeling, which occurs between three weeks to 12 weeks, we'll really replace collagen from type III to type I. It's also important to remember that skin normally will not achieve its tensile strength it had pre-injury, and normally will get to about 80% at six months.

Dr. Jeffrey Teixeira:

Now, since we talked about using laser hair removal, it's important to also understand the phases of hair growth. Specifically, there are three phases. We have anagen, catagen and telogen, but the timeline for each is different based on where the hair is located. And what I mean by this is, say for antigen phase, which normally makes up about 90% of all hair follicles, it might take a little bit longer in this phase, say two to seven years in the scalp, compared to somewhere else such as the face. Catagen, which is a transition phase, is actually the shortest and it has the least amount of follicles in this phase, usually lasting anywhere between two to three weeks. And lastly, we have telogen, which we call the resting phase. This can last anywhere from six to 12 weeks, and it's for this reason that laser hair removal requires multiple sessions. Because what you're trying to do is capture hair as it's transitioning from telogen into the anagen phase with multiple treatments.

Dr. Ronit Malka:

So what are you looking for on physical exam in these patients?

Dr. Jeffrey Teixeira:

When these patients come in, what you're really having first and foremost is a conversation with them. You really want to understand their treatment goals, but there really are some standards and some

measurements we use so that we can communicate with other surgeons on the type of photo damage that the patient has and the type of skin type that the patient has.

Dr. Jeffrey Teixeira:

The classic scales that we talk about are Glogau scale. This scale comes one through four. One is normally minimal wrinkles with mild pigment changes, two is wrinkles in motion with increase in pigment changes, three is wrinkles at rest with obvious skin discoloration, and there might be some capillaries or telangiectasias coming through. And then four is what you classically think of really wrinkly skin.

Dr. Jeffrey Teixeira:

Fitzpatrick skin type, which is more common to most providers, is based on the ability of the skin to acquire a tan or burn after ultraviolet light exposure. So classically we say Fitzpatrick one are very fair, blue eyes freckles, these patients will always burn and they never tan. Fitzpatrick two, very similar to one in skin color, but here they're usually burn, but they can tan with significant difficulty. Fitzpatrick three are classically white to light brown skin, sometimes they'll have a mild burn, but they can gradually tan. Fours are classically Mediterranean skin color, we really describe them as brown, these patients will rarely burn and tan with ease. Five is dark brown skin, middle Eastern, very rarely burns and tans very easily. And then six, we consider to be black skin color, which never burns, tans very easily.

Dr. Jeffrey Teixeira:

And it's really important to distinguish between these, specifically four through six, because when we're talking about laser resurfacing, these patients are at a greater risk of complications. It's also important to realize that sometimes, especially between two, threes and fours, you really just have to ask the patient "How easy do you tan? Do you burn often?", and that gives you a gauge.

Dr. Jeffrey Teixeira:

If I resurface under the eyes, I also want to assess the laxity of the lower eyelids. The reason is patients that have a poor canthal support system are at increased risk of having ectropion. And lastly, even though lasers can be used for precancerous lesions and some cancerous lesions, anytime I see a suspicious lesion, I always have a dermatologist biopsy done because what you don't want is to be resurfacing a melanoma.

Dr. Ronit Malka:

What is your typical workup for patients presenting for facial resurfacing?

Dr. Jeffrey Teixeira:

Usually it starts off with a really long discussion on patient treatment goals, to ensure that we can safely meet what they are looking for. We also want to rule out any contraindications. Big absolute contraindications we classically talk about are hepatorenal disease, HIV immunosuppression, collagen vascular disorder, and isotretinoin treatment within the last six months. But I would like to add that this is controversial. Classically we would want to wait, as you know, isotretinoin can reduce the amount of sebaceous gland subunits, which are part of healing. And so there was concerns that there would be delayed wound healing. However, there was a big consensus statement that came out of 2017, that for light-based hair removal, there really is no delay needed. And that you probably only need a delay if you're going to do a fully ablative laser treatment.

Dr. Jeffrey Teixeira:

Relative contraindications can range anywhere from Fitzpatrick four to six, because the increased risk of hypo and hyper pigmentation, but again, this is provider based. Keloid history, HSV history, this is a big one, patients have a history of Herpes Simplex Virus run the risk of having reactivation. And then when we talk about chemical peels, we really want to make sure patients don't have a history of cardiac abnormalities. Also, we want to make sure patients don't have a history of having radiation therapy and lastly, high occupational sun exposure. So patients that are going to be outside all the time, they're probably not as great of a candidate for a laser therapy.

Dr. Jeffrey Teixeira:

Pre-treatment is also huge, which we'll talk about later in the podcast. And lastly, we go over photographs as with anything else in facial plastic surgery, it is really important from a medical legal standpoint to have pre-treatment photo documentation, as well as so you can track your results.

Dr. Ronit Malka:

So when considering facial resurfacing, what are our treatment options and how does each work?

Dr. Jeffrey Teixeira:

So we are lucky that we have many more treatment options today than we did 20 years ago. First of all, the first option that we can offer patients is dermabrasion. Dermabrasion is really good for deep scars and fine wrinkles, and really allows predominantly just superficial penetration. The goal is to change the depth of the scar to blend with the tissue around it, as well as to stimulate some collagen. When you're doing dermabrasion, you're basically abrading down to the level of the papillary dermis. One way you know you're at this level is you'll get pinpoint bleeding, which is a classic sign.

Dr. Jeffrey Teixeira:

Next we have chemical peels. Chemical peels have actually been increasing in favor among some providers after having a little bit of a period where they fell out of favor, but the goal here is to promote regrowth of photo damaged skin. It's really only appropriate for patients with mild facial rhytids and minimal dyschromias, and it's remembered that patient selection expectations are really important. It's classified based on the depth of the peel, including superficial, medium and deep peels.

Dr. Jeffrey Teixeira:

When we talk about superficial peels, we're only going through the epidermis with no dermal involvement. Classically these peels include salicylic acid between five and 15%, glycolic acid between 40 and 70%, trichloroacetic acid between 10 and 25%, and Jessner's solution. Medium peels on the other hand, go down to the superficial reticular dermis. These include a TCA 35% peel, glycolic acid 70% peel, and Jessner's solution. The last type of peels that are less commonly performed these days are deep peels which go to the mid reticular dermis. And these include Baker solution, which is predominantly composed of phenol.

Dr. Jeffrey Teixeira:

It's important to remember that with all chemical peels, you start off with cleaning of the skin with alcohol and then acetone to degrease the face. With any peel your end point is visually determined and it must be uniformed throughout. A common guide that is used is one developed by Dr. Obagi. When

you're trying to do a superficial peel limited to the epidermis, your end point will be a cloudy white frost on a pink background. When you're trying to go into the papillary dermis, you'll have a uniform white co-frosting with some erythema. And lastly, when you want to go through the papillary dermis, you'll have a nice layer of solid, intense white with no erythema.

Dr. Jeffrey Teixeira:

When we talk about laser therapies, it's important to always remember to pretreat patients who are Fitzpatrick three through six, and any patient that has a history of hyperpigmentation. Lasers really fall into two categories, ablative and non ablative modalities, and the terms basically mean if the epidermis is left intact or not. So with ablative lasers, the epidermis is completely removed. It's also important to remember that most of these lasers work by photothermal effect, meaning that heat causes direct damage to adjacent tissues. When we talk about ablative lasers, they're most commonly used for scar reduction, as well as for significant photo aging, so your Glogau threes and fours.

Dr. Jeffrey Teixeira:

Ablative lasers come in fractionated versus non fractionated. Fractionated results in vertical columns of thermal injury that destroy tissue in a polka dotted type pattern. These are commonly referred to as microthermal zones of injury and this results in uninjured skin around where the laser beam penetrated the skin, which acts as a sink for heat and a reservoir for wound healing.

Dr. Jeffrey Teixeira:

The common lasers we talk about are CO2 lasers, which it's important to remember that the wavelength is 10,600 nanometers. And then we also have an Erbium YAG laser, which is 2940 nanometers. It's also important to remember that the core chromophore for both of these is water.

Dr. Jeffrey Teixeira:

Non ablative lasers focus on altering pigmentation, such as tattoos, hyperpigmentation, erythema, but they can also be used for some collagen and elastin stimulation. Classic lasers in this category are the KTP laser, which is 532 nanometers, the chromophore here is hemoglobin, and it's also used for some red tattoos. Pulsed dye laser, which is 585 to 595 nanometers also targets hemoglobin.

Dr. Jeffrey Teixeira:

When we're looking at melanin or blues, greens, blacks, the two common lasers are alexandrite 755 nanometers and Nd:YAG, which is 1064 nanometers. It's also interesting that these lasers can be used for hair removal, and unlike IPL or BBL, an Nd:YAG can actually be used in all skin types. It's also important to point out here that patients that have light, fair skin with very fair hair on their body, they're less likely to get results from laser hair removal, because again, the laser is being taken up by the pigment and actually the follicle.

Dr. Jeffrey Teixeira:

Lastly, we have intense pulse light and broadband light. While these are not true lasers because the emitted light is you see the spectrum of 400 to 1200 nanometers, you can use these various cutoff filters to selectively filter out shorter wavelengths of light that targeted a specific chromophore.

Dr. Ronit Malka:

Great. Thank you so much for that pretty comprehensive review. You were talking about lasers and how they're acting, and we hear a lot about lasers. Can you actually take a little bit of a deeper dive into the physics behind lasers?

Dr. Jeffrey Teixeira:

Yes, I think that's a great question. It's important whenever you're going to use a tool that you understand how it works. So laser is actually an acronym, it stands for light amplification by stimulated emissions of radiations and they've really come a long way over the years. All laser devices are fundamentally composed of an energy source, what is used initially move the electrons into excited state, and an optical resonator, the medium that is enclosed within the tube that has two mirrors.

Dr. Jeffrey Teixeira:

In basic terms, the energy drives the electrons in the medium to an excited state, causing the emission of photons that exit the optical resonator through the partially transmitting mirror, making the beam. Lasers have several characteristics that's important to remember: they're collimated, monochromatic and coherent waves. When we talk about monochromatic, what we're talking about is that all the photons have the same wavelength, unlike a flashlight that emits photons of all wave wavelengths. When we mentioned them being coherent, all the waves are in phase in terms of both space and time. And collimated means that all the photons are parallel to each other. This is what allows the beam to travel long distance with minimal distortion.

Dr. Jeffrey Teixeira:

We also talk about absorption. Here is where we really see the end effect of the laser. Where absorption is the conversion of the energy of the laser to heat in the tissue when the photons strike a specific chromophore. Usually we think of water, melanin, hemoglobin and fat. There are a lot of other properties, but in a nutshell, that's how a laser works.

Dr. Ronit Malka:

Great. And are there any factors that you take into consideration when choosing which treatment modalities to use on a patient?

Dr. Jeffrey Teixeira:

This is a great question. That's usually based on a couple of factors. Patient treatment concern and downtime considerations are a big one. If a patient can only have, say five days downtime, you're not going to do an aggressive ablative laser. What's the patient's treatment goal, and of course the availability of the different modalities. There's very... a large selection of systems out there. And you may have access to one and not another one.

Dr. Jeffrey Teixeira:

But here are a couple of examples just to get an idea of what type of laser I would use based on a specific treatment zone. So with laser hair removal, especially on predominantly Fitzpatrick one through three, I would predominantly treat them with intense pulse light or broadband light. A patient with significant rhytids and skin laxity who can benefit from, say two weeks of downtime, would do extremely well with the CO2 laser. This can be done in either ablative, and normally it's done in a fractionated manner.

Dr. Jeffrey Teixeira:

Fine wrinkles can be treated with chemical peels or fractionated ablative lasers. And then patients with pigment concerns are more likely to be treated with intense pulsed light or broadband light, and these normally will require multiple treatments.

Dr. Ronit Malka:

Great. Are there any treatments you would consider for a patient before starting facial resurfacing?

Dr. Jeffrey Teixeira:

The short answer, yes. But the really big answer is pre-treatment here is huge component of how successful your results will be, and can really reduce the chances of some of the complications. So that's a big one that we'll talk about.

Dr. Jeffrey Teixeira:

Another big one is avoiding sun exposure, especially four to six weeks prior to any type of laser ablative procedure, and especially if you're going to do IPL or BBL. Tretinoin or retinoic acid is a standard when we talk about evidence-based retinoid skincare, patients will commonly ask how retinoic acid is different than retinol, which is commonly found in over the counter skincare products. And the way I answer this is that retinol must be broken down in a two step process into retinoic acid. Therefore, the results take longer, but the side effects are less. So one easy way to think of it is that retinoic acid is about 100 times stronger.

Dr. Jeffrey Teixeira:

Retinoic acid pre-treatment routines, the way I normally tell patients to use this is we'll start off at 0.5% or 0.1% and they'll use it on a daily basis for four to six weeks prior to treatment and then they'll normally stop a week before their actual treatment. Normally they're limited though by what's called a retinoid reaction, which can include some erythema, scaling and pruritus, and it's as a result of the skin basically reacting to the retinoic acid.

Dr. Jeffrey Teixeira:

What it does is it actually compacts the stratum corneum, so you get a more uniform frosting if you're using chemical peels, as well as more uniform absorption of light when using laser. Hydroquinone, which is a deep pigmented agent acts on melanocytes with active tyrosinase, this is also commonly used starting four to six weeks before on a daily basis, and normally comes with a 4% concentration.

Dr. Jeffrey Teixeira:

While some providers will use it in all patients, it's really important to use this in Fitzpatrick greater than three, as well as patients with a history of pigmentary dyschromias.

Dr. Jeffrey Teixeira:

Lastly, we talk about HSV prophylaxis, specifically Valacyclovir. While this is controversial if you should be using this on every patient, it's important to remember that many patients have a history of herpetic outbreaks and some patients might not know that they have a history. If you ask them if they've ever had a herpetic lesion, they'll say no, but they'll say they get sun blisters and sometimes it's hard for them

to know the difference. So I like to start this on everyone, and basically they started two days before the procedure and continue for seven to nine days until the skin is completely re-epithelialized.

Dr. Ronit Malka:

Great. And in a similar vein, are there any treatments you would consider for patients after performing facial resurfacing?

Dr. Jeffrey Teixeira:

Aftercare is also really important and it really ... Just like selecting the appropriate patient, aftercare also increases your chances of having a successful outcome. I personally normally do not prescribe antibiotics, but what I normally do do is after any type of ablative procedure, I like to a patient to wear an occlusive dressing for basically about two weeks until epithelization is done, and that's normally petroleum-based. Also, after epithelialization, we've then used a non occlusive moisturizer and the big one is after the two week mark, we start having them use sunscreen, but for the first two weeks, I want them to completely avoid sun at all costs.

Dr. Ronit Malka:

All right. So now we've really covered patient presentation, workup and treatment for undergoing facial resurfacing, as well as a lot of the pathophysiology and mechanisms behind many of these treatments.

Dr. Ronit Malka:

Moving on to outcomes and expectations, what is the expected duration of the results of these different treatments and what are some indications for multiple or repeated treatments?

Dr. Jeffrey Teixeira:

We normally like to tell patients that the results' duration is really dependent on two factors, how much collagen and elastin they're able to make, and two how good they are at avoiding further photo damage.

Dr. Jeffrey Teixeira:

So normally we like to say, say for an ablative laser, pretty aggressive laser, it can last up to two to three years and normally most patients won't have a very aggressive laser procedure done more often than say once every two years. But if you're using a less aggressive laser, such as a Fraxel or Halo, a lot of times patients will have a couple of treatments per year.

Dr. Jeffrey Teixeira:

When we talk about laser hair removal, that always requires several treatments, normally space six weeks in between to target all the follicles that may have been in telogen. And then when we talk about IPL and BBL, especially for treating pigments, that also will require multiple treatments and again, they'll normally be six weeks apart. We normally like to say that any pigment that we remove, as long as the patient doesn't get any more photo damage, that result is normally permanent.

Dr. Ronit Malka:

And are there any complications you counsel patients about before facial resurfacing? And what do you typically do to treat or prevent these complications?

Dr. Jeffrey Teixeira:

I think as providers, we always want to avoid complication. So it's important that you counsel patients on exactly what can and cannot happen. So the big ones that I normally talk to patients about are erythema. Erythema can basically last for about two to three weeks, but with a really aggressive laser, it can last even longer. Normally it will resolve about three months, but if it's persistent after that, you can treat it at times with an IPL laser.

Dr. Jeffrey Teixeira:

The big ones we talk about are hypopigmentation and hyperpigmentation. Hypopigmentation is more common, but it also is a little bit harder to treat and it can be permanent. The only really treatment we have is blue light filter on an IPL, and what you're really trying to do is stimulate some of that UV exposure. Hyperpigmentation is normally temporary in nature, but it normally does need to be treated aggressively, so at the first sign of it I treat it with hydroquinone, pretty aggressively and for up to six weeks in order to reduce that risk.

Dr. Jeffrey Teixeira:

Milia can happen, those are pretty easy to treat, you just basically unroof them. Like I said, I don't put patients on antibiotics after these procedures, but infections can happen. If it's a fungal infection, we're normally talking about candida, while bacterial infections are normally staph and any of those agents that cover staph are appropriate.

Dr. Jeffrey Teixeira:

HSV reactivation is a big concern, like we talked about, we use Valacyclovir prophylaxis, but it's important to remember that if a patient does start having an HSV activation, you do need to change their dosing, since prophylactic and treatment dosing are different. It's important to see these patients back quite often, and if they have any eye complaints to get them to an ophthalmologist, rarely will they require hospitalization for IV antiviral medications.

Dr. Jeffrey Teixeira:

Facial scarring is almost a result of inappropriate laser settings, but it can happen in some patients who have a history of poor wound healing. Topical steroids can be used in these patients, as well as intralesional steroids. Some providers will use intralesional 5-fluorouracil. And in really bad hypertrophic scarring, you can actually later on try to use a fractionated laser.

Dr. Jeffrey Teixeira:

Telangiectasias are an interesting one. Some patients will come in and say, "I'm really happy with my sun spots being gone, but now I have all these little blood vessels, do the laser caused them?" Well, no, the laser didn't cause them, what happened was they were underneath that sun damage. And when you remove that photo pigment, what you then see as those blood vessels, and that's pretty easy to treat with a vascular laser.

Dr. Jeffrey Teixeira:

Ectropion is extremely rare, but results from the raise or resurfacing in patients with a weak canthal support system. So it's important, like we mentioned in the workup, to test with the Snap test. Rarely this ectropion may need canthal support surgery, such as a lateral tarsal strip.

Dr. Jeffrey Teixeira:

Less common with chemical peels, but commonly tested, and providers need to be aware of is arrhythmias, renal failure, laryngeal edema, and toxic shock. And so for deep peels, IV hydration is almost always warranted and it's important to have cardiac monitor in these patients. It's also important that with full face phenol peels, they need to be performed over about 60 to 90 minutes, with 15 minute intervals between cosmetics zones to reduce the risk of such cardiac arrhythmias. It's important though, to have a cardiac monitor, as we mentioned, and you should be prepared to provide ACLS if needed.

Dr. Ronit Malka:

So a strong theme here has been the adverse effect of photo aging. What sun precautions should patients take after facial resurfacing?

Dr. Jeffrey Teixeira:

This is a great question and one too often missed. The number one source of aging, as you mentioned, is the result of you is UV exposure, the sun. So what I like to do is to make sure that the patient understands how important sun avoidance and sunblock use is. For the first two weeks, while the skin is undergoing rapid idealization, we recommend complete sun avoidance. At the two week mark, they can start wearing a physical barrier sunscreen with avoidance of direct and prolonged sun exposure for 12 weeks.

Dr. Ronit Malka:

And finally, what kind of followup do you typically schedule for these patients?

Dr. Jeffrey Teixeira:

We typically see these patients back at the two week mark, when they have undergone re epithelialization, and then again at the three month mark. At that point, we'll normally retake photos and we like to reanalyze them with the patient and come up with any possible further treatments they may require.

Dr. Ronit Malka:

So to briefly summarize what we've talked about today, facial resurfacing encompasses primarily dermabrasion, chemical peels and laser therapy, and is typically used to minimize deep, fine wrinkles, tighten skin, decrease hyperpigmentation, remove some skin lesions, such as actinic keratosis, hair removal, or treatment of both active acne and acne scars.

Dr. Ronit Malka:

When considering how facial resurfacing works, it's important to remember the layers of the skin, particularly the difference between the papillary dermis with looser connective tissues and smaller vasculature nerves, from reticular dermis, with denser connective tissues, larger vessels and nerves, and adnexal structures such as hair follicles, sweat and sebaceous glands, and lymphatics.

Dr. Ronit Malka:

Dermabrasion, ablative lasers, and more superficial peels only penetrate the epidermis up to the superficial papillary dermis to promote regrowth of damaged skin through uniform reepithelialization

and fibroblasts induce collagen deposition, while deeper peels penetrate into the deeper papillary dermis or superficial reticular dermis for deeper scars, lesions, or wrinkles.

Dr. Ronit Malka:

Lasers act by stimulating heat production within a particular chromophore to induce damage, and in the case of hair removal, follicle destruction, but need to be absorbed by the follicle during the anagen phase and thus require multiple treatments in order to catch all the follicles at various stages in the hair growth cycle.

Dr. Ronit Malka:

When examining these patients, it's important to note the patient's Fitzpatrick skin tone as patients with Fitzpatrick four or higher have a greater risk of undesired hyperpigmentation, as well as noting other characteristics, such as degree of wrinkling or lower lid laxity if the patient is having periorbital resurfacing, and of course, including pre and post treatment photo documentation.

Dr. Ronit Malka:

When working these patients up care should be taken to assess for certain absolute contraindications for chemical peels, such as hepatorenal disease, immunosuppressed status, a history of collagen vascular disorders, or a recent history of oral isotretinoin that this is controversial. We should also be assessing for relative contraindications, such as skin tone of Fitzpatrick four or greater, history of keloid formation, HSV reactivation, or cardiac abnormalities, as well as any history of significant radiation or sun exposure.

Dr. Ronit Malka:

Pre-treatments in patients undergoing facial resurfacing is very important, minimizing sun exposure for four to six weeks and topical retinoid acid pre-treatment to compact the stratum corneum and provide more uniform resurfacing. Many patients are also given hydroquinone typically as a deep pigmented agent to prevent hyperpigmentation and antiviral HSV prophylaxis to prevent reactivation.

Dr. Ronit Malka:

When considering treatment options, dermabrasion is a relatively consistent procedure involving mechanical abrasion of the epidermis down to the superficial papillary dermis heralded by seeing pinpoint bleeding. Chemical peels and lasers are more flexible, and can have various properties such as solution concentration or pulse duration and density varied to provide different degrees of tissue damage.

Dr. Ronit Malka:

We reviewed a number of chemical peels, including salicylic acid, glycolic acid, trichloroacetic acid and Jessner's solution peels, which are used in superficial or medium depth peels, as well as Baker solution, which is a mixture of phenol [inaudible 00:33:07] agent, croton oil, [inaudible 00:33:08] and sepiisol and it's used for deeper peels.

Dr. Ronit Malka:

Laser therapy is largely categorized into ablative therapy, focusing on thermal injury to water containing tissues, leading to tissue retraction or scar reduction, and non ablative focusing on thermal injury to

pigment molecules and removing tattoos. Reducing hyperpigmentation in tissues are targeting melanin and hair follicles for hair removal. CO2 and Erbium YAG lasers have water as a chromophore and thus result in ablative of laser therapy, while KTP, pulse dye and Nd:YAG lasers, among others, have various pigment chromophore including hemoglobin.

Dr. Ronit Malka:

Patients who undergo facial resurfacing are usually provided an occlusive dressing until reepithelialization is complete and should avoid sun exposure with good use of sunblock to avoid hyperpigmentation. Other complications after resurfacing include erythema, hypopigmentation, milia, infection and facial scarring, as well as ectropion.

Dr. Ronit Malka:

Rare, but more serious complications can include laryngeal edema, arrhythmia renal failure, or even toxic shock. Multiple treatments are needed often, particularly with laser hair removal, typically spaced four to six weeks apart and treatment for hyperpigmentation, typically spaced about six weeks apart. Duration of effect can vary depending largely on how much collagen and elastin a patient's skin lays down, and on patient avoidance of further photo aging.

Dr. Ronit Malka:

Dr. Teixeira, did you have anything else you wanted to add?

Dr. Jeffrey Teixera:

No, I think that was a great summary, and I really want to thank you guys for having me on. Lasers are really great, I really like using them in my practice. It's just important again, to choose the appropriate patient, have a good treatment regimen leading up to their patient's treatment and know the different settings of what type of treatment you want to do in order to reduce your risk of having complications.

Dr. Ronit Malka:

Great. Thank you so much.

Dr. Ronit Malka:

We're almost done with our episode, but before we end we'll wrap up with a few review questions. As usual, I'll ask the question, pause for a few moments to give you time to think of the answer or pause the episode, and then I'll give the answer.

Dr. Ronit Malka:

First up, what type of cell synthesizes collagen during wound healing and what type of collagen is laid down primarily in early wound healing?

Dr. Ronit Malka:

Fibroblasts synthesize collagen in the skin and produce mainly type three collagen in early wound healing. This is converted to type one collagen as the wound matures.

Dr. Ronit Malka:

What is hydroquinone used for in facial resurfacing and what's its mechanism of action?

Dr. Ronit Malka:

Hydroquinone is a tyrosinase inhibitor, which prevents melanin precursors from being synthesized in the skin. This is used to prevent hyperpigmentation in response to tissue damage induced during facial resurfacing.

Dr. Ronit Malka:

And finally, which surgical lasers have water as a chromophore?

Dr. Ronit Malka:

CO₂ and Erbium YAG lasers have water as a chromophore, and are used in ablative laser therapy. Remember that KTP, PDL and Nd:YAG lasers have hemoglobin as a chromophore and Nd:YAG and alexandrite have blue, black pigment as chromophore as well.

Dr. Ronit Malka:

Thanks again for listening and we'll see you next time.