

Dr. Ronit Malka:

Hey, everybody, and welcome back to another episode of ENT in a Nutshell. My name is Ronit Malka and I'm joined today by Dr. Jeffrey Teixeira, facial plastic and reconstructive surgeon, to talk about facial injectables and fillers. Welcome back, Dr. Teixeira.

Dr. Jeffrey Teixeira:

Thanks so much for having me on again. Like I said before, I think podcasts are a great tool for learning, and I really hope that the listeners find this topic useful and get some useful information from it.

Dr. Ronit Malka:

Thank you so much. So, starting off, what is the typical presentation of somebody coming into your clinic seeking injectable treatments?

Dr. Jeffrey Teixeira:

So, in my clinic, most patients that are coming in are coming in for cosmetic reasons, but it's important to remember that fillers can also be used for non cosmetic patients, such as cleft lip patients, cleft nose patients, as well as patients with HIV, with a history of lipoatrophy, but predominantly I'm looking at patients that have wrinkles or frown lines, that they don't like, both static and dynamic, and they want those treated with what they classically call Botox. They'll also come in, saying, "My face is just not as full as it used to be," or, "I have these things near the corner of my mouth that are driving me crazy." What we classically call jowls. As was mentioned by Dr. Hohman and his great presentation under the facial paralysis, Botox can also be used for facial paralysis, as well as filler, so if you're interested in that, I definitely recommend that you check out his podcast, and lastly, they could be used for scars, particularly depressed scars, even though, as we mentioned in the facial resurfacing, lasers have really become the go to for scar treatment.

Dr. Ronit Malka:

And, again, briefly reviewing the pathophysiology behind facial fillers and injectables, what exactly are these made of and what are they doing once they're injected into the skin?

Dr. Jeffrey Teixeira:

Yeah. Again, I'd like to briefly just talk about the layers of the skin, because I think that's important when you're injecting fillers, to know exactly which level that you're going to be at. Again, the skin has three layers, the epidermis, dermis and hypodermis. The epidermis is the top layer of skin and consists of five layers called the corneum, lucidum, granulosum, spinosum and basale, and it's important, again, to remember that the lucidum layer is only found on thick skin, such as palms and soles. The dermis is predominantly composed of fibroblasts, where collagen and elastin is made and it consists of a papillary and a reticular layer. The papillary layer is composed of loose connective tissue and small blood vessels, as well as some nerve endings, and the reticular layer is denser, has bigger blood vessels, and this is where you're going to find the hair follicles and sebaceous glands. Beyond that is the hypodermis, and unlike lasers, where we normally weren't treating in the hypodermis, the hypodermis consisting of fat and fibrous tissue is commonly treated with injectables.

Dr. Jeffrey Teixeira:

When we talk about injectables, we're really talking about two different types of products. Products that are chemodenervation in nature, and then actual fillers. Chemodenervation, the way that these products work, is basically they cleave various proteins in the SNARE complex, which blocks the release of acetylcholine at the presynaptic junction. Classically we think of Botox or botulinum toxin. There are different serotypes, including botulinum A and E, and these are involved with the SNAP-25 cleavage, botulinum B, D and F, which is the VAMP cleavage, and botulinum C, which is a syntax cleavage. When we talk about fillers, fillers work in three ways. They provide dermal support, provide volumization and some of them actually stimulate collagen and elastin production. Fillers can be injected dermally, subdermally or subperiosteal, depending on what your treatment goal is, and fillers really come in a couple of different flavors.

Dr. Jeffrey Teixeira:

We talk about autologous fillers, such as fat. This is usually harvested from the abdomen and can be used for lip or malar cheek augmentation. Biologic fillers, such as collagen, those have really fallen out of favor, human or bovine in nature, and the reason is that the synthetics have become really good. One important point to remember with any type of collagen product, is that you require pre-testing on the patient, prior to actually using the product, to avoid a hypersensitivity reaction. I'd also like to mention here, which has become more popular, platelet rich plasma and platelet rich fibrin. Even though these are not classically a filler, they're basically used from the patient's blood, spun down, and then the PRP or the PRF is injected into certain areas, to stimulate collagen and elastin.

Dr. Jeffrey Teixeira:

Synthetic fillers are the most commonly used today. The most common ones are calcium hydroxylapatite, brand name for this product is Radiesse, and this can be injected in the deep dermis, and what it does is it induces a fibrous ingrowth, and there are some reports that it can actually stimulate collagen production. Currently off-label FDA uses include for cellulite and some providers are injecting it into the neck in a hyper dilute solution, in the subdermal plane, to improve neck laxity. Polyelectrolyte acid, which is Sculptra, is injected into the deep dermal or subperiosteal, and this is one of the few products we have on the market that can actually stimulate collagen. It's particularly used for lipoatrophy, and as mentioned before, was originally approved for HIV lipoatrophy. One of the problems with Sculptra is it does require multiple treatments and the results are not immediate. Polymethyl methacrylate, I'm going to mention it, but not used very often. It's a permanent filler, and for that reason, it's fallen out of favor.

Dr. Jeffrey Teixeira:

And then the big one on the market that we use a lot of is hyaluronic acid based fillers. These are the most commonly used, and brand names include Restylane and Juvederm. Hyaluronic acid is naturally occurring in the body, and the way we use these products, is there a gel-like material, that once injected into your body, absorb water and can last anywhere from six to 18 months, as our body naturally clears the product. What's great about the hyaluronic acid fillers is that they're reversible and they can be used in different layers. One other product I'd like to mention, that is not predominantly used anymore, is silicone. This is an off label use. It was actually previously banned. The way it works is liquid silicone droplets cause fibroblasts to deposit collagen capsule around the material, but they have been associated with granuloma formation and infection, and therefore are not predominantly used.

Dr. Ronit Malka:

Great, and what are you looking for, on history and on physical exam, in these patients?

Dr. Jeffrey Teixeira:

So, on physical exam, the first part we really talk about is the patient, what are their treatment goals? And then we move into a facial analysis. What we're looking for is to see how much photo damage they have, look at the level of rhytids they have, and then we really want the patient to animate, to assess musculature. Do they use their frontalis for eyebrow elevation while looking up? This might be a contraindication for Botox in the frontalis muscle. Or do they have an asymmetric smile at rest? Most patients will have some level of asymmetry or some form of what we call hemifacial microsomia on one side, and it's important that you point this out prior to treatment. We also want to know if they have a history of any prior therapies, some examples would be developing tolerance to prior chemodenervation agents or have they had a reaction to a previous injection.

Dr. Jeffrey Teixeira:

I definitely want to know if they've ever had a history of a previous vascular occlusion, and when we're talking about any type of filler product, we also want to know if they've had dental work or dental infections in the past two weeks, which may increase their risk of having an infection from the filler. Lastly, and it might sound counterintuitive, but if the patient has a big event coming up, I normally will tell them not to get their Botox or filler treatment, as bruising and swelling are very common and sometimes can last up to two weeks.

Dr. Ronit Malka:

All right, and what is your typical workup for patients presenting for injectables? Are there any big contraindications you're looking for?

Dr. Jeffrey Teixeira:

So, the workup, again, like we talked about, is basically getting an idea of what the patient is looking for and understanding if you can actually achieve that goal. Photo documentation is very important. Many times patients will say, "Well, I don't notice a difference," but when you show their before and afters, they're like, "Oh, I do see a difference." Again, it's important to remember, if you're going to use collagen, that you must pre-treat before. Like you mentioned, you have to assess for contraindications, and the big ones that I like to talk about are Botox in pregnant patients or patients who are breastfeeding, and then again, fillers in patients with recent dental procedures or infections in the past two weeks. Those are the really big ones. The other one we talk about is if a patient is interested in having some form of facial resurfacing procedure, we normally want them to have that done and then we'll do their injection, say, four weeks later.

Dr. Jeffrey Teixeira:

Patient counseling on risks and benefits is very important. With chemodenervation, we talk about the risks of ptosis reaction, bruising and undertreatment, as well as asymmetries that can happen, and the same for fillers, the big ones we worry about are vascular occlusion or blindness. Most of the times, when I first see these patients, we actually do not treat at the first appointment. The reason is we also talk about pretreatment. Pretreatment in these patients include stopping all NSAIDs or blood thinners, if possible, as well as supplements, such as fish oil, ginkgo biloba, ginseng, ginger, turmeric. All that can thin the blood and increase bruising and I tell patients to stop these seven to 10 days before treatment. I also like for patients to start Arnica montana caps, so it's three days before treatment, which can help

with bruising. We advise patients to avoid alcohol 48 hours prior to injection and 24 hours afterwards. Lastly, patients with a history of HSV infection should start Valaciclovir one day before lip augmentation, in order to reduce the risk of reactivation, and many patients benefit from taking an antihistamine on the day of procedure, as it reduces the risk of swelling.

Dr. Ronit Malka:

Great, so now that we've covered patient presentation and workup and some of the relevant pathophysiology, now we'll move onto treatment. When considering injectables, can you outline some of the different treatment options for both fillers and chemodenervation, and how each one works, and which factors you would take into consideration when choosing a modality?

Dr. Jeffrey Teixeira:

Yeah, this is a great question and it's really important. You don't want to use, say, a Vycross, product such as Voluma, in the lips. Not only is it not FDA approved, it's just not going to look good, and in the United States, we're actually limited. So, Europe and Canada have much more filler options than we do. But if we look at chemodenervation, there are seven varieties of botulinum toxin, like we talked about, A through G. It's important to remember that cosmetic Botox, such as brand names, Botox, Dysport, Xeomin, are all botulinum toxin type A. The difference is actually in the accessory protein attached to the botulinum molecule. So, with the Xeomin, it has no accessory proteins, so its size is about 150 kilodaltons, while Botox has the most accessory protein and is the largest at 900 kilodaltons. Dysport can actually vary, but it's roughly around 800 kilodaltons.

Dr. Jeffrey Teixeira:

The choice of toxin that you want to use is normally provider preference, but you will have patients who prefer one over the other. The other consideration is that if a patient is a Botox non-responder, and by that I mean brand name Botox, or has developed tolerance, then you can normally switch to Dysport or Xeomin, and they will normally respond to those treatments. What we're trying to do with the botulinum toxin, in effect, is we are trying to prevent the muscles from contracting, in order to prevent the sequelae of agents, such as facial rhytids.

Dr. Jeffrey Teixeira:

The way I explain this to patients is that your skin is like a brand new bed sheet and the muscles we are targeting are the mattress. When the sheet is new and young, you can crinkle it up, but when you stretch it back out, it lays flat. With time though, the sheet does not lay completely flat. That is what is happening with the skin. The muscles are constantly pulling on the skin and with time and photo aging, the skin loses elastin and collagen, and deep rhytids start to develop, such as the classic [inaudible 00:12:57] in the glabella, or the crow's feet around the eyes. With fillers, the choice of the product I use really depends on what I'm trying to treat, as well as sometimes patient preference and many times costs. Hyaluronic acid fillers have become the workforce of injectables, with the most common brands being Juvederm or Restylane. Juvederm is interesting, in that it has a Vycross and Hylacross technology. Vycross include Voluma, Vollure, Volbella, and Hylacross include Juvederm Ultra as well as Ultra Plus.

Dr. Jeffrey Teixeira:

If I am trying to restore volume to the mid face, I'll go for a thicker product, with a greater G prime, such as Voluma or Vollure. The way I like to think of the G prime is if you made a pyramid out of the product, products with higher G prime will keep their shape and their [inaudible 00:13:46] more support. On the

other hand, if I want fuller lips, I'll use Juvederm, which is a Hylacross product and absorbs more water, therefore not as much support, but significant volume. Sculptra is a great product for patients who have significant fat atrophy of the face, unlike hyaluronic acid products, will stimulate collagen and elastin production. The downside to this product, as mentioned before, is that the results are not immediate. Radiesse, which is a calcium hydroxylapatite, is also commonly used for jaw contouring, and again, can stimulate some collagen. The problem with Radiesse is, unlike hyaluronic acid, it's not reversible.

Dr. Ronit Malka:

Great, and what are the surgeon's main targets, when giving patients fillers or injectables?

Dr. Jeffrey Teixeira:

So that's what I really like about using chemodenervation or fillers, is that it's a very pretty precise science. The muscle you're injecting is the muscle you're going to deactivate, and with fillers, where you're put in it, is you're going to see some pretty immediate results, especially if you're using hyaluronic acid based products. So, with chemodenervation, classically the muscles we inject, to give some examples, include the corrugator and the procerus. Here, we're targeting the glabella lines. It's important to remember, when injecting the corrugator, that the injector remember that the medial belly of the muscle is actually pretty deep, while the lateral belly is superficial, and attaches to the skin. So, the best way to know where to inject is to have the patient frown, and you can see the muscle belly contracting, and you can just pinch it between your fingers and inject the muscle directly. We also inject mentalities for dimpled chins.

Dr. Jeffrey Teixeira:

The frontalis is a commonly injected muscle for forehead lines. Orbicularis oculi for what we call the crow's feet. Interesting enough, you can also get a little bit of a brow lift. Levator labii superioris, for where we classically call the gummy smile. Depressor anguli oris, or the DAO, can also be injected to give a smile little more cephalad position, but it's important here not to go too medial, or you will also get the depressor labii superioris, which will cause an asymmetric smile. Platysmal bands can also be injected, as well as in synkinetic muscles. With fillers, what we're trying to do is provide dermal support and volumization, so wrinkles can actually be injected directly into the dermis to smooth them out, such as nasolabial folds.

Dr. Jeffrey Teixeira:

The mid face can be volumized with boluses of 0.1 to 0.2 CCs, along the zygoma the zygomatic arch. A common one we see you as patients get older is hollowing in the temporal area, so the temporal fossa can be augmented, as well as jaw contouring. The biggest one you see, based on Instagram and the stars, is lip augmentation, and that has become quite popular, as well as other regions of lipoatrophy, such as the lower face.

Dr. Ronit Malka:

Great, and what is the expected duration of the results of these different treatments, and as a followup question, what are some indications for multiple or repeated treatments?

Dr. Jeffrey Teixeira:

This is a great question. It's probably the number one question patients will ask you. Normally they don't care about complications. What they want to know is how long will it last, and it really depends on what

type of product you're using. Classically, we say between six and 18 months. Hyaluronic acid based products that are Hylacross in nature, such as Juvederm, will normally last about eight months, while Vycross products, such as Voluma, can last anywhere up to about 18 months, and that's the same for calcium hydroxylapatite. Obviously permanent filler, such as polymethyl methacrylate, and fat are permanent, normally in nature, however, autologous fat can have variable resorption rates, and one of the reasons a lot of don't like to use it is that it's very unpredictable. Sculptra, on the other hand, we normally like to say that whatever collagen or elastin you build, that will normally last quite a bit, but again, since the effects are not immediate, I tell patients, they're not going to see the benefit from the treatment for about 12 months.

Dr. Jeffrey Teixeira:

With chemodenervation, no matter what product you're using, either Botox, Dysport or Xeomin, they normally take about one to two weeks to reach maximum effects and lasts anywhere from three to four months. There is the risk of develop antibody tolerance, but if this tolerance develops, then you can normally switch to a different product. It's important to note here though, that in cosmetic treatments, we're normally not using doses greater than 100 units, so tolerance is less likely, as we think it might be related to the number of units you're getting in one treatment. You can have longer duration effect with lower doses over time, so some patients prefer to come in more often and not get full treatment doses, and there is some evidence that the different serotypes may have different duration of effects. Some reports report that Dysport might have a little bit longer duration than say Botox and Xeomin, as the actual toxin concentration is greater per treatment area.

Dr. Ronit Malka:

Are there any complications that you counsel patients about before using injectables?

Dr. Jeffrey Teixeira:

Absolutely. It's really important to counsel patients, because especially with fillers, they're not benign and they can have some pretty significant complications. The big one we really are concerned about always is vascular occlusion, and this could be from compression or actually true embolization into the vessel. That can lead to tissue necrosis, and in pretty rare instances, can actually even lead to blindness. Some providers will counsel a patient on filler migration. I think that's less likely to happen, especially if you're putting the filler in the appropriate layer of the skin. Granuloma formation is very unlikely with hyaluronic acid based products, but can happen with Sculptra, as well as some of the more off-label products, such as silicone. Patients can have a hypersensitivity to a reaction to the filler, especially with, say, the Vycross products. What's interesting is I have had patients have a reaction to the filler even months after being treated, and it might be something insidious like a bug bite. Normally those patients will respond to a steroid burst.

Dr. Jeffrey Teixeira:

Bruising and infection can also happen. Again, infection is more common if a patient has a history of recent dental work, and with chemodenervation, the most complication is bruising, but you always have to worry about ptosis as a result of toxin infiltrating the levator muscle of the upper eyelid, and I always counsel patients on this.

Dr. Ronit Malka:

And what do facial plastic surgeons usually do to prevent or treat these complications?

Dr. Jeffrey Teixeira:

This is a great question. Most of the times, you can avoid some of these complications by just knowing your anatomy, knowing where you're injecting and knowing exactly which plane you're putting the filler in. With the Botox, Botox works, like we talked about, the pre-synaptic junction, so you really want to be injecting the muscle, but the complication we really worry are vascular occlusion with fillers, and any injector needs to be prepared to deal with this complication, as it is a true emergency. Ways to reduce the risk, as we mentioned before, is know exactly where you are and the critical vessels in that area. I always aspirate when I place in a bolus of filler, to ensure that I'm not in a blood vessel, and I'm always looking for signs of occlusion, including significant immediate pain and blanching of the skin. If I ever encounter this, I always would stop immediately injection, and if it's a hyaluronic acid based filler, and I'm pretty confident that I might have an occlusion, I'll immediately begin to flood the area with hyaluronidase.

Dr. Jeffrey Teixeira:

It's important to remember that several hundred units may be needed. If you have a vascular occlusion, it's also not a bad idea to have the patient take an aspirin. You could try some nitroglycerin paste and warm compresses, but again, you really want to flood the area first with hyaluronidase, in order to be able to start breaking up that hyaluronic acid. In cases of delayed necrosis, wound care is paramount. Sculptra does have a history of causing some small granuloma type deposits. These have become less common with a different hydration protocol, as well as having the patient massage where you inject five times per day, for five minutes, for five days. Triamcinolone injections can be used for irregular lumps or bumps, however, most hyaluronic acid fillers can be easily massaged into surrounding tissue in the first two weeks.

Dr. Jeffrey Teixeira:

Lastly, ptosis with chemodenevation is best prevented with proper placement of the toxin into the muscle belly. However, it can happen to even the most experienced injectors. In these situations, apraclonidine can be prescribed, which stimulates Muller's muscle to contract, to cause one to two millimeters of eyelid opening. The good news is that ptosis will normally resolve by six weeks, instead of the typical three to four months that botulinum toxin will normally last.

Dr. Ronit Malka:

And what kind of followup do you usually schedule for these patients post-treatment?

Dr. Jeffrey Teixeira:

I always like to see these patients back, especially my Botox patients. I want to see them back at the two week mark, especially if it's their first time having an injection. The reason is you might have a patient that's really happy with their results, but they're sparking with their eyebrows, and that's pretty easy to treat, or they might have one specific little rhytid that's still present, and with one or two units, you can really knock it out and give them the great result that they're looking for.

Dr. Jeffrey Teixeira:

The same is true with fillers. Fillers take about two weeks to settle out, so I normally like to see first time filler injection patients at two weeks, just to make sure everything is looking okay, and I always tell patients that Botox will start normally working at three days, but the reason we wait two weeks is because, again, like we mentioned, some patients it can take up to two weeks, so normally the two

week mark is where I'll see them back. Most Botox patients will come every three to four months for re-treatment and most filler patients will come in probably one to two times per year for a treatment.

Dr. Ronit Malka:

Great. Thank you so much. Finally, as a short summary, when we talk about facial injectables and fillers, we're mainly referring to chemodenervation agents, such as botulinum toxin derivatives, which cleave various proteins in the SNARE complex, to prevent acetylcholine release at the pre-synaptic junction, and bulking agents, which provide dermal support and promote collagen and elastin production, and can be [inaudible 00:24:48], biologic or synthetic. These are used to reverse volume loss within the face, for instance, with lipoatrophy or scarring, facial deformity, facial paralysis, and to minimize wrinkling, and notably are able to treat both static and dynamic wrinkles. When assessing a patient in clinic, it is important to assess dynamic facial movements and to elicit any history of prior therapy or facial injectable or filler treatment, history of vascular occlusions or recent dental work, in addition to typical static facial analysis and photo documentation. Pre-treatments, such as stopping blood thinners, to include supplements and aspirin, as well as HSV prophylaxis, and an antihistamine used day of treatment to prevent swelling are commonly used.

Dr. Ronit Malka:

When using chemodenervation agents, agent selection is often patient and provider preference driven, but another factor in agent selection is whether the patient has developed a tolerance to a particular subtype, through antibody production. The main targets for chemodenervation agents are the corrugator supercilii and procerus for glabella lines, the mentalis for a dimpled or [inaudible 00:26:04] chin, the frontalis for forehead lines, the orbicularis oculi for crow's feet, the levator labii superioris for a gummy smile, the DAO and Platysmal banding and any synkinetic muscle and facial paralysis. Fillers are often chosen based on location of injection, patient preference and cost, with hyaluronic acid currently the most commonly used. Fillers are typically aimed at the nasolabial folds or other deep wrinkles, along the zygoma for mid-face volumization, the temporalis fossa for hollowing, or along the jaw or lip for contouring, augmentation or lipoatrophy. Complications from filler agents include bruising, filler migration, granuloma formation, or hypersensitivity reactions, though a more serious filler related complication is vascular occlusion, that can lead to tissue necrosis or blindness.

Dr. Ronit Malka:

Vascular occlusion risk can be reduced with careful injectable placement, aspiration before injection and careful monitoring for blanching or pain and hyaluronidase can be used to reverse occlusion, with hyaluronic acid. Other treatments can include aspirin, administration and warm compress application. Chemodenervation commonly causes minimal bruising, though other complications can include unintended ptosis. Ptosis can be treated with topical apraclonidine to stimulate Muller's muscle and reverse the levator infiltration of the chemodenervation agent. Duration of effect of injectables varies, with most chemodenervation agents lasting for approximately three to four months and fillers lasting anywhere from six to 18 months, to lasting permanently, depending on the product used. Dr. Teixeira, is there anything you wanted to add?

Dr. Jeffrey Teixeira:

I think that was a great summary. I really enjoy injecting fillers. They bring a lot of joy to patients, and unlike surgery, the results are normally immediate. The things I would really want to touch upon again, are that you have to know your anatomy. You have to know the different layers and plane sets you're in.



You don't just want to be putting boluses in areas that you're not sure of, and then the thing I would really want to reiterate, is that any provider that is doing any type of hyaluronic acid based injections really needs to be prepared to deal with a vascular occlusion, and that includes having hyaluronidase at their disposal immediately.

Dr. Ronit Malka:

Great. Well, thank you so much for being with us today.

Dr. Jeffrey Teixeira:

Thanks so much for having me.

Dr. Ronit Malka:

Before we go, we'll finish up with a few questions. Per usual, I'll ask the question, pause for a few seconds to give you time to think of the answer or pause the episode, and then I'll give the answer. To start, how do chemodenervation agents work and what is the specific mechanism of action of Botox? Chemodenervation agents work broadly to prevent pre-synaptic acetylcholine release at the neuromuscular junction, by interfering with various proteins within the SNARE complex, a protein complex that enables fusion of acetylcholine containing vesicles to the pre-synaptic membrane for release. Botox specifically cleaves SNAP-25, one of the protein sub-units of SNARE.

Dr. Ronit Malka:

What are some synthetic facial fillers used? See if you can name at least two. Examples of synthetic facial fillers include calcium hydroxylapatite, polylactic acid, polymethylmethacrylate and hyaluronic acid. Silicone is beginning to be used off-label for facial fillers as well, in spite of a previous ban on its use. And lastly, how does tolerance to chemodenervation agents develop? With repeated exposure, patients can develop neutralizing antibodies to a particular chemodenervating agent, creating tolerance and necessitating the use of a new agent for desired effect. Thanks again for listening, and we'll see you next time.