

Practice Development Series

Solving CL Fitting Complications Q&A with Clark Chang, OD, MSA, MSc, FAAO An interview with Craig W. Norman, FCLSA



[Craig Norman](#)

Dr. Clark Chang, thank you for getting together with me to answer a few followup questions from the many attendees of the September 17, 2019 Practice Development Educational Series webinar sponsored by ABB Optical. Here's our first question.

“How do you determine which scleral lens to start with? Is it based on K's or some other method?”

[Dr. Clark Chang](#)

Every lens manufacturer suggests a different method to determine that. Some start with K's and you'll match the K's to whatever the K value of the base curve is. Most employ different sagittal depths using those sag values rather than a base curve value, because it's easier to think of the lenses in sag depth.

Some diagnostic sets simply have a specific lens that you start with. For example, for a new fit patient who presents with moderate keratoconus, it might be suggested to start with “Lens B”. Sometimes the lens or lens case may be a different color designating that's where to start. In other cases, if you know the patient is an advanced cone or the amount of corneal irregularity involves a larger area you'd consider starting with a little deeper sag because they'll need a deeper lens.

Each fitting set is unique in its design and fitting capacities. Regardless, the initial diagnostic lens you selected to place on eye will always provide a more accurate assessment of how close you are to the desired fitting relationship. If you put a lens on and there is a thousand microns of clearance, simply subtract seven or eight hundred microns of clearance to determine the initial lens to order. Likewise, if you have a lens that's touching or just grazing the cornea then let's add three hundred microns. So, regardless of what you start with, it's a pretty easy system to know where to go once you put that first lens on.

[Craig Norman](#)

“How do you suggest managing the lens fit for those cases that have small bubbles under the lens?”

[Dr. Clark Chang](#)

There's a couple of potential scenarios that are more commonly applicable to this question. The first is insertion bubble(s) that can be observed as soon as a scleral lens has been applied on to an eye. Often, this situation is a result of not having enough solution inside of the scleral lens at the time of lens insertion. Reinserting the scleral lens with more application solution and/or instructing patient to

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better fixate at the center of the lens during the insertion process can greatly reduce such occurrences.

Another possible scenario is commonly referred as "late forming bubbles". They can be of various sizes and they'll occur over time - despite their absence at the time of lens insertion. Their presence is indicative of area(s) where there is too much edge lift between the lens haptic and the underlying conjunctival tissue. The excessive peripheral edge lift provides open space(s) for air bubbles to sneak in over time.

A typical solution in this scenario is for clinicians to modify the peripheral lens parameters to get the lens haptic closer to the conjunctival plane, which reduce such open gap(s). One of the best ways to detect this clinical issue is to put fluorescein over the top of the lens, preferably right at the edge where you think the gap is present. This way, you'll be able visualize the location(s) where the fluorescein is entering underneath the lens.

[Craig Norman](#)

Excellent tip! The next question refers to the use of OCT. ***"Are you using an anterior segment lens or corneal lens for OCT measurements?"*** I believe this refers to an attachment or mode with the instrument.

[Dr. Clark Chang](#)

Some OCT models do require an attachment lens to capture anterior segment images, which will require you to add the attachment prior to capturing OCT images of a scleral lens on eye.

However, most practices may not have a dedicated anterior segment OCT, but instead have multifunctional instruments. In this case, the corneal versus anterior seg is most likely regarding the new view mode. If you want to look at the center of a scleral lens for apical clearance, then the corneal mode would be better. If you're interested in looking at the landing zone, you'd want to consider using the anterior seg mode.

[Craig Norman](#)

"Here's a common question; should there be 200-300 microns of clearance immediately after application or after waiting twenty to thirty minutes?"

[Dr. Clark Chang](#)

The exact answer may depend on lens design itself and the type of corneal diagnosis present. Generally, I'd like to achieve a post-settling lens fit that maintains approximately one hundred microns of clearance over the corneal cord diameter, which means we probably start with 200-300 microns of apical clearance immediately after a lens application. If you have too much clearance, you may have some concerns about potential long-term hypoxic effects. But if you get too much closer, one may then be concerned about possible corneal bearing after a long day of wear.

So, 200-300 microns, maybe 250-300 given that the average person's lens will settle about a hundred and fifty microns, so that puts you at about a hundred once it's all settled in.

But also keeping in mind, and I'm sure you'll agree Craig, that Patient A's lens is not going to settle the same as Patient B.

Generally, older patients have spongier conjunctivas that'll settle in a little more than an eighteen-year old new cone, although it doesn't always work that way.

[Craig Norman](#)

"You mentioned that possibly there is a difference, from one day to another, on the amount of settling. What would be the reason for that?"

[Dr. Clark Chang](#)

I am not entirely sure. Part of it may be the variable force with which patient insert their lenses each day. i.e., some patients alternate between inserting

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lenses by hand versus with a lens inserter, and patients also may not give the same amount of time during daily lens insertion process. In addition, there have been studies that found conjunctival thickness to fluctuate from day to day, which can potentially affect lens settling.

In any case, this is the reason why it's important to ensure lens clearance is not too low, as I indicated when we discussed my preferred clinical guidelines on lens clearance after insertion.

[Craig Norman](#)

I noticed when you were presenting, you showed OCT images of where the lens edge was sticking into the conjunctiva, and you were drawing that line to demonstrate it was still an okay fit.

It's amazing to me that while it looks like there's a tremendous amount of encroaching on the conjunctiva, if you look at the same kind of image with a soft lens, very often they look almost identical, and we just don't think about that being an issue in a soft lens.

[Dr. Clark Chang](#)

OCT is a great technology to have in clinic, especially when combining slit lamp findings and OCT data to help troubleshooting certain fitting-related complications. However, it is also important to remember that current OCT technologies are not designed to capture images through refractive index change caused by contact lenses. Therefore, artifacts can occur in some cases. Thus, clinicians still need to be mindful of their slit lamp findings to help guide them on when and how much to modify lens haptic, i.e., compression/impingement of blood vessels and conjunctival epithelium, area(s) of vital dye staining...etc.

[Craig Norman](#)

I think OCT, to your point, is much better suited for teaching.

[Dr. Clark Chang](#)

Exactly, and it's great, and I also use it to evaluate subtle areas where I want to make really fine changes. It's great tool to have for advanced fitting cases, and it frequently helps me to evaluate areas where I want to make more subtle fitting changes. However, it's not an absolute necessity for most cases of contact lens fitting.

[Craig Norman](#)

That's why the multifunctional instruments make a lot of sense.

[Dr. Clark Chang](#)

Exactly. If you've got one, good, use it. You can have fun with it, but I don't think it's a necessity specifically.

[Craig Norman](#)

I think we answered most of the questions related to this, except for one and that is, "***Do you have to adjust for lens settling over the limbus zone also?***"

[Dr. Clark Chang](#)

Yes, because the limbal zone curve in a scleral lens drops down in sagittal height, the amount of central clearance seen is not the same as the amount of limbal clearance. This also means that the impact of lens settling are different when comparing the central area and limbal zone area under any given lens. And such settling impacts are different from design to design.

Ultimately, you must look at it and make sure it's not touching, and if it is then you can have the limbal clearance adjusted, and you can do that independently of the other features in just about every lens. Just watch it on every patient and if you need to adjust it, you can adjust it.

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[Craig Norman](#)

These next questions relate to oxygen. Mostly, ECPs want to know what is the best Dk for a scleral lens, and some relate to corneal edema. ***“What is your opinion on tear exchange with scleral lenses?”***

Some practitioners argue that the patient may need to have some tear exchange to avoid debris formation from devitalized corneal epithelium, while others say gentle seal-off with minimum to no tear exchange will avoid tear debris from getting under the lens.

[Dr. Clark Chang](#)

Like most questions, it really depends on your patient's etiology. I prefer a lens fit that once you put fluorescein at the lens edge, you can observe a little bit that trickles in within the first few minutes. You don't want excessive tear exchange because it will increase incidences of tear debris entrapment and corresponding visual issues. But it's also not my personal fitting preference, in most cases, to completely seal off a scleral lens where you'll get accumulations of metabolic waste and cellular debris.

Therefore, the clinical challenge to practitioners is finding that intricate happy medium during the fitting process. In majority of patient cases, I personally believe that we want to see a semi-sealed lens fitting system, so tears mixing beneath the scleral lens is properly regulated. This way, we can greatly reduce lens suction, promote outflow of cellular metabolic waste, and potentially create a secondary route of oxygen delivery under the scleral lens system.

[Craig Norman](#)

That's well said. You don't want total seal-off, and you don't want total flushing of tears with every blink. It must be somewhere in between.

[Craig Norman](#)

“What do you do with corneal swelling above fifty?”

[Dr. Clark Chang](#)

If a patient has corneal swelling above fifty, the first thing I do is look at my lens thickness. Most of the evidence is showing that tear thickness is not so much what matters, mainly because you're getting good mixing of tears. But lens thickness, especially if you have plus power, can get quite thick so I consider the possibility of decreasing thickness? If it's a four-hundred-micron lens, I can go to two fifty or three hundred. That's an easy change to make.

I'll also start increasing the DK, so I order most lenses standard with anywhere from a hundred to one fortyish of DK. Now there are lenses that have higher Dk in the 160s and expect within the year, up to two hundred DK will be readily available.

In general, you want a lens made as thin as possible - usually about 300 microns. So, if thicker than that order it thinner. Next, I consider a toric edge so that I'm encouraging tears to exchange a little bit more if they're not already. I do fluorescein analysis to ensure I'm getting some tears under there. Again, I try to improve tear exchange with that lens edge and make a lens as thin as I can make it and with the highest DK possible.

[Dr. Clark Chang](#)

If the above general guideline doesn't sufficiently reduce corneal swelling, then I would also consider lowering lens clearance while still making sure there is no lens bearing on the cornea during one's wear time. While there is no consensus on the ideal tear lens thickness, most would agree that a thinner tear lens will likely present less resistance to oxygen diffusion.

And, if that still doesn't work, I have patients try to wash themselves out for a couple of days before they try the new lens. I feel they can get stuck in this edematous response where they don't even get back to baseline before you throw another lens on there. So, let their eyes breathe a little bit, introduce the new lens, then see them after six or seven hours of

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wear. You do have to think about whether they have a disease. If they're swelling that much, what's going on with their endothelium? Then, you must talk to them about limiting their lens wear.

That's my last consideration. If we can't fix it, then suggest to the patient to wear the lenses for four hours, take them out for a half an hour, then wear them for four more hours. Usually this is the type of patient who's had a transplant or other unusual situation so they're not strangers to taking specific and careful care of their eyes. And when you talk to the patient it's like "look you got a transplant, you have a diseased eye, this is the best we can do." It's not an issue because that's how we're trying to make sure that they don't have to go in for another transplant.

[Craig Norman](#)

"When you talk in terms of lens thickness, do you go strictly by center thickness or do you look at harmonic thickness, the averaged thickness across a larger zone of the lens."

[Dr. Clark Chang](#)

That's going a little deeper into the analysis, and if you've got that OCT, look at the center thickness and over the limbus, along with at the edge. Talk to the manufacturer and see if you can design a lens that has the thinnest features in each spot. You must be a little bit careful because sometimes if you thin lenses out too much in certain areas, they'll break easier.

[Craig Norman](#)

"Regarding endothelial cell count, how low can it be before you become worried about corneal health?"

[Dr. Clark Chang](#)

I have concerns about corneal health and fitting scleral lenses in a patient whose endothelial cell count is less than 1000 cell/mm². As always, it's important to educate patients about risks and benefits of contact lens wear, and I strongly

emphasize the effects of potential hypoxia related to contact lens wear, when patients present with low endothelial cell count.

Obviously, the lower the endothelial cell count, the more concerned I would be for the patient's corneal health. But that does not mean I would definitely decline to fit the patient, it depends on patient's medical needs, ocular etiology, and if they would agree to be closely monitored in the long run.

[Craig Norman](#)

"Do any of the lenses that you use for diagnostic lenses come with Hydra-PEG?"

[Dr. Clark Chang](#)

No, and the reason, is that Hydra-PEG lenses must be wet. Diagnostic lenses, for quality control and infectious control reasons, should be stored dry. If you stored diagnostic lenses wet, especially in the case of Hydra-PEG coating which is very lubricious, I would be uncomfortable putting a lens on one patient, then taking it off, and putting it on another. Hydra-PEG is good for individual patients, but I would be wary of storing lenses treated in this manner for my diagnostic lenses.

[Craig Norman](#)

"Do patients wearing lenses that have Hydra-PEG treatment have problems with either application or removal?"

[Dr. Clark Chang](#)

Hydra-PEG is a polyethylene glycol coating, which increases the wettability of the material underneath it. Therefore, there's great amount of benefit in some patients, especially those who struggle with heavy deposits on the lens surfaces or reduced wearing comfort. However, since it makes the surface slippery by increasing the lubricity and while it does not affect the handling process of a scleral or corneal GP it will affect soft lenses and hybrids

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Typically, removal of soft lenses is easy and straightforward employing the pinch method. So, although it can make it slightly more difficult, it's mostly not an issue.

While the increased lubricity can enhance lens comfort, the presence of Hydra-PEG can also make hybrid lens removal more challenging. Since hybrid lenses only contain soft lens skirts in its periphery, the reduced soft lens surface area makes hybrid lenses relatively more difficult to remove when compared to soft lenses. Hydra-PEG makes that reduced soft surface area even more slippery, and some patients will experience more difficulty to employ the pinch removal method in the early adaptation period of wearing hybrid lenses.

So, it does and keep in mind doesn't affect insertion of any of the lenses. It's just affecting removal and particularly for hybrid lenses.

[Craig Norman](#)

“Do you recommend presoaking or rubbing the lens with conditioner prior to dispensing?”

[Dr. Clark Chang](#)

Always, yes. Many scleral lenses are received from the manufacturer in fluid, although some of them aren't. So, if you have patients coming in that day for dispensing make sure those lenses are nice and clean, so they'll wet well, and have them in conditioner.

[Craig Norman](#)

Excellent response, thanks. ***“Next, what is your favorite preservative free, artificial tear?”***

[Dr. Clark Chang](#)

If a patient has severe dry eye disease or is experiences fogging due to debris entrapment underneath a scleral lens, then I recommend inserting scleral lenses with preservative-free artificial tear with higher viscosity than your typical preservative-free saline. Often, I will first

recommend Optive Sensitive and potentially even suggest Celluvisc, if needed.

[Craig Norman](#)

We've come a long way as it wasn't that long ago when we attempted to avoid artificial tears completely for application, but it sure does make sense in certain cases.

[Dr. Clark Chang](#)

I agree.

[Craig Norman](#)

Another question is ***“do you have a favorite scleral lens fitting kit?”***

[Dr. Clark Chang](#)

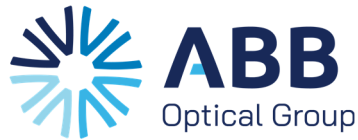
No, because at this point, the market has become quite competitive since we have so many sclerals that are available and if they weren't any good, they would have probably been discontinued by now.

It's important to get one that has a multifocal available. If you find yourself wanting to make lots of little changes and you want to have control of every single curve, find yourself a lens that's got four or five different curves you can change. On the other hand, if you just want a really simple set, where you don't want to think about making a lot of changes, consider one that has fewer parameter changes options. I think ABB Optical truly is great because there are so many brands in the scleral category that are available.

For some patients you may want to use a larger diameter lens, while in another case it may be a smaller diameter. My response is based upon who's your population that you're fitting, and what you want to use it for

[Craig Norman](#)

Today they are for sure. Your point about if they weren't really good products then the market would have driven them out is correct, and the combination of the lens design and fabrication is really fantastic.



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[Craig Norman](#)

One last question. ***“What advice would you give to a patient who loses their removal plunger?”***

[Dr. Clark Chang](#)

Alternatively, if the patient has no plungers at all, one can flip the lens out at the edge of the lens. I advise the patient they should look up and then push their lower lid against the edge of the lens forming an air pocket and although it may be a little uncomfortable it'll get the lens out. Some patients have just done this on their own. It's just like removing a GP lens using the edges of your eyelids to butt up against the edge of the lens and pop the lens out. The reason we don't routinely do that with sclerals is because there is that extra suction property and the plungers just make it easier. It is a method to consider though when the patient is in a bind without their removal plunger.

[Craig Norman](#)

Thank you, Dr. Clark Chang. Your recent webinar was terrific and this Q&A session extremely interesting as well.