DreamLens®
Fitting Guide

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The introduction of the DreamLens™ in 1997 has revolutionized orthokeratology and now made it a viable procedure for the general population. By following this fitting guide you can expect a success rate of over 90%. This high success rate is the end result of extensive clinical research, theory and a sophisticated software system to design the DreamLens. The initial lens is designed simply by transferring the topographical data to the lab but as you follow this guide it will become apparent how many factors have been taken into consideration to make the fitting of the DreamLens as easy and time efficient as possible.

This guide is divided into separate parts that can be viewed either together or separately. Review of the different sections is recommended when a question arises. Understanding the underlying principles of the DreamLens is essential to the successful fitter. Once these concepts have been mastered, fitting the DreamLens is straightforward.

Anatomy of the DreamLens

The DreamLens is composed of four zones, the Central Zone, the Fitting Zone, the Alignment Zone and the Peripheral Zone *(Figure #1 and Figure #2*). Each zone has a precisely designed width and curvature, which has been specifically calculated for each cornea.

The first zone is the **Central Zone**, which is commonly referred to as the *base curve*. The radius of curvature of this zone is calculated to be the flat K minus the desired amount of correction minus the compression factor of 0.75D. The diameter of this zone is 6.0mm. This value has proven to be the most effective diameter and any change can have a negative effect on results. The NaFl pattern will show a dark area indicating minimal clearance.

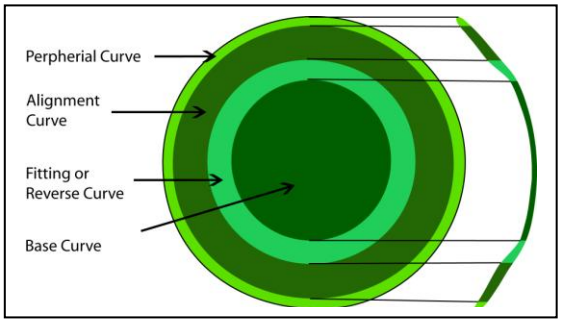


Figure 1

The second zone is called the **Fitting Zone**. This very steep reverse curve is specifically calculated to bring the back surface of the lens into proper alignment with the cornea. The width of this zone is 0.6mm, which allows room for the displaced cornea tissue from the central zone to be redistributed in this area. A wider fitting zone tends to reduce the orthokeratology effect. Any change in this zone will also affect the fitting characteristics of all zones peripheral to the fitting zone. *It is recommended that this zone width not be changed.* The NaFl pattern under this zone will be a thin dark green ring indicating lens clearance in this area.

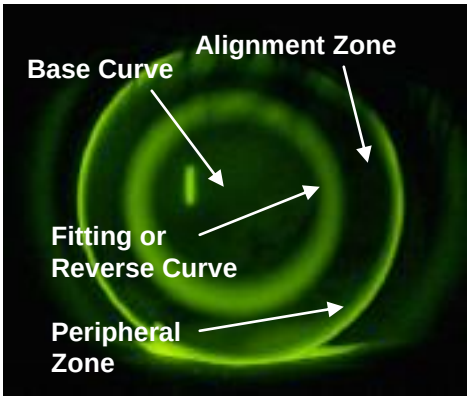


Figure 2

The third zone is the **Alignment Zone**, which has a dual purpose. The first function is alignment to keep the lens centered on the cornea. The second

function is enhancement of the orthokeratological effect. This zone has a width determined from the topographical data and eccentricity of the cornea. Since the alignment zone compresses the cornea, the NaFl pattern will show a dark annular area indicating a lack of NaFl. *Changes can be made in this zone to improve centration but these changes are recommended only if the initial lens needs to be modified.*

The last zone is the **Peripheral Zone**. The sole purpose of this zone is to give the lens lift aiding with removal and tear exchange. This zone is 0.4mm wide with an 11.0 radius.

The DreamLens is based on a dual compression concept. The Central Zone provides the template to mold the central cornea. The Alignment Zone area provides the support. The Fitting Zone acts to control the amount of compression each area provides. The junction between the Fitting Zone and Alignment Zone acts as a fulcrum to control the tightness of the Alignment Zone that controls centration. Each parameter of the DreamLens has been clinically and theoretically validated to give the best results. In the majority of cases, the initial DreamLens will provide excellent results. NaFl patterns should only be used for gross observations. Many fluorescein patterns will look similar but the lenses will produce different results. The NaFl picture is not precise enough to distinguish between clinically significant parameter changes. The combination of the DreamLens design and prudent patient selection will ensure your patient's success.

Patient Selection and Consultation

Patient selection and consultation are among of the most important aspects of a successful DreamLens practice. What the DreamLens is able to provide must be carefully explained and patient expectations must be understood. If these are a good match, then the DreamLens will have over a 90% success rate.

When you identify an interested candidate, determine what their goals are. Is it to see better than the method they currently use, to get rid of their glasses even though they wear bifocals? Or do they just want to see better without the aid of glasses or contact lenses? Many patients have been exposed to conflicting information so it is important to explain to the patient exactly what the DreamLens can do and how that relates to their goals. Explain that the goal of the DreamLens is to put the lens on the eye at night, sleep in the lens, remove it in the morning and not think about their vision the rest of the day. The vision they get might be better or worse than provided by their current correction but the ultimate goal is to be comfortable with the vision they have.

Patients that demand the best vision possible are not the best candidates for any refractive procedure but with the DreamLens the procedure can be tried and if the result is not aligned with patient expectations or demands, then treatment can be terminated and the eye will return to the pre treatment level. This is one of the strengths of the DreamLens---reversibility.

Do not promise more than the procedure can deliver. Exceeding the patient's expectations is much better than not meeting them. Be conservative in your estimates. If you know the vision will be much improved in one night of wear, tell them that it might take a few nights to reach that goal. When it happens overnight, they will be more impressed. Patients are impressed that a contact lens can change the shape of the eye and really do not expect it to happen overnight.

A patient should not be discouraged from trying the DreamLens unless you feel that their expectations are not realistic. Often a patient that you deem has a low chance for success will be successful. What you should have is a written policy that describes what happens if the procedure is discontinued either by the doctor or the patient.

For adolescents, the primary goal might be the reduction of the progression of myopia. Often the child's mother has been a gas permeable or hard contact lens wearer and remembers how her prescription stopped getting worse when she wore the “hard contact lenses.” Explain that rigid contact lenses have been shown to stop the progression of myopia and it appears that the DreamLens has the same effect. Assess the maturity level of the child and explain to the parent how much they will have to be involved in the day-to-day care of the DreamLens.

If a potential patient inquires about the DreamLens, a simple consultation examination can eliminate most patients that are not good candidates. For this examination, a baseline topography (F*igure #3*), refraction, and consultation are required. The topography is used to screen out keratoconus, excessive astigmatism or any abnormities of the cornea. Check the patient's refraction either with an auto refractor or by neutralization of their current glasses to determine if they fall within the DreamLens parameter range. Talk to the patient and find out what his/her goals are and if the DreamLens can provide the expected results. If the results indicate that the patient is a good candidate, schedule a full examination to rule out any other conditions that might preclude them from wearing the DreamLens.

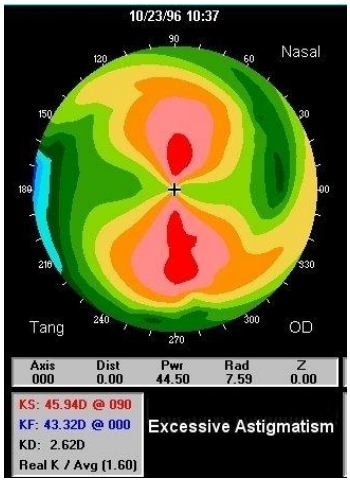


Figure 3

DreamLens Recommended Patient Fitting Parameters

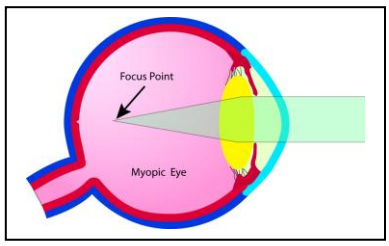
The DreamLens works best for myopia of –4.00 Diopters and below. Higher powers are often successful but might require more lens changes with the results more difficult to obtain. With the rule astigmatism up to –1.50 Diopters and against the rule astigmatism of –0.75 diopters will give good results. Above these limits the amount of residual astigmatism will decrease the patients unaided acuity. Often a toric design will improve the results. Steep corneas above 46.00 can also give less than desirable results. Previous hard or gas permeable contact wearers also tend to give less than ideal results. These patients can be taken after careful discussion that the likelihood of less than optimum results are possible.

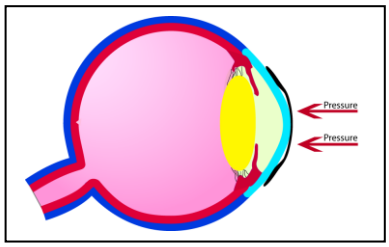
Ocular pathology needs to be ruled out with a careful slit lamp examination. Particular attention needs to be paid to irregular astigmatism especially if there is any indication of keratoconus. Keratoconus is a contraindication for orthoK. Any corneal diseases or degenerations are also a contraindication for orthoK. Corneal scars can alter the OrthoK effect so be aware of a potential problem if the scar is in the treatment area. A soft lens drop out due to a marginal dry eye is an excellent candidate for the DreamLens since there is no lens in the eye during the day,

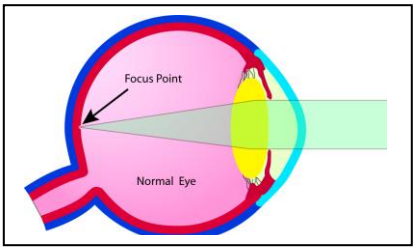
Explaining the Procedure to Patients

Initially, explain what options are available to the patient detailing advantages and disadvantages of each option. Go over spectacles, soft contact lenses, gas permeable contact lenses and refractive surgery. Soft lenses are the most common contact lenses fit today but tend to dry out during the day, can irritate if foreign matter gets under the lens and the prescription tends to increase over time especially with children. Gas permeable contacts give the best acuity, take a little longer for adaptation and tend to stabilize the progression of myopia in children. Refractive surgery is a non-reversible procedure meaning the results are permanent regardless of the outcome. Some Lasik patients will have a dry eye that may require constant wetting drops during the day. With the DreamLens for orthokeratology, the patient is able to be free from glasses most if not all of the day. There is no lens in the eye to dry out or become displaced during activities. The DreamLens also appears to have the same effect as gas permeable contact lenses on stabilization of the progression of myopia in children.

Next, explain how the DreamLens works. Show the base line topography and explain that the DreamLens is specifically designed to reshape their eye. This design will compress the clear front surface of the eye (the cornea) changing its shape. This allows light to again focus on the retina. The use of a camera analogy is helpful. Use an eye graphic or hand drawing of the eye and show how light focuses in front of the retina in a nearsighted eye. Explain how the DreamLens changes the shape of the cornea by flattening the front curve and thereby allowing light to again focus on the retina. Gently press on the patient's arm and show that just like your finger leaves an imprint that recedes over time, the DreamLens also does the same thing to the cornea. With time the eye will go back to its original shape and for this reason they will be wearing the DreamLens on a maintenance schedule designed especially for each patient. How long it takes for the cornea to return to its original shape depends on each patient's eye.







Placing a spectacle trial lens in front of the patient's eye to simulate what they will see after treatment will help answer their questions on what type of vision they can expect. Let the patient know that the process starts as soon as the lens is on their eye. Only a few hours are required to notice improvement in their vision. After the first night of wear they will notice a significant improvement in their vision to the point that additional correction might not be necessary. Typically within three days their vision will be good enough to drive and within one week the eye is generally fully corrected. Future visits are to verify that the vision remains stable.

Stress that orthokeratology is a complete process that requires constant monitoring. Just like any contact lens, complications can arise. Minor problems need to be addressed before they become big problems. As a general rule, when in doubt, take the lens out. Most of the serious problems that have developed with orthokeratology lenses are related to patient non-compliance and/or delay in proper treatment. Cleanliness and good hygiene are important and cannot be over emphasized. Their DreamLens storage case should be cleaned and dried daily. Dirty lenses or cases can cause eye infections that can be dangerous. The lenses should be replaced once a year but no longer than 2 years. Unlike a standard gas permeable contact lens, orthokeratology lenses tend to steepen over time. Follow-up exams should be scheduled at least semiannually. Reinforce to the patient that orthokeratology is a procedure that requires constant ongoing diligence unlike simply buying a pair of contact lenses.

Examination

The only additional test that needs to be administered for the DreamLens is topography. You must have baseline topography for future reference and to order the initial lens. During your examination be aware of the patient's response during refraction. If they notice a very crisp endpoint and –0.25D makes a large difference in their responses, be aware that their endpoint after orthoK will be softer. This can be unacceptable to some patients even if their unaided acuity is 20/20. Measure pupil size. Pupils over 7mm might have unacceptable glare at night. Perform a careful slit lamp examination to rule out any ocular pathology or abnormalities.

Ordering Lens

The DreamLens System software developed by Dr. Thomas Reim makes ordering and trouble shooting very straightforward and easy. The DreamLens software utilizes the K readings and "e"

value from the topographer and reconstructs the corneal surface. The resulting saggital height measurements are then used to design the lens. Just send that information along with the patients Rx, amount of myopia reduction required and any special parameter changes to the lab. The lab's software program will now analyze the data and design the lens. The initial lens will correct approximately 80% of the cases. If a change has to be made, either send the desired changes to the lab or describe the problem and the lab will make the appropriate design change. Over a 90% success rate can now be expected.

Initial Dispensing Visit

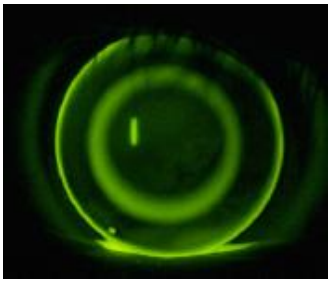


Figure 4

Place lenses on the patients eye. After 5-15 minutes check the VA, fluorescein pattern and over-refraction with the lenses on the eye. This over-refraction should be Plano. Using the Boston® Wratten Yellow Slit Lamp Filter, the NaFl pattern should look approximately like *Figure # 4*. There may be some movement due to initial excessive tearing and the lens may ride somewhat low - this is ideal because the closed lid will center the lens.

Occasionally, an air bubble will form under the lens *(Figure # 5)*, and, at times, can be rather large. This also is acceptable, as the closed lid will work the bubbles out. If the bubble covers more than 30 degrees, have the patient remove the lens, fill the concave surface of the lens with rewetting solution and reinsert. Be sure not to use too much NaFl or you will flood the eye and not get an accurate pattern.

If the NaFl pattern appears normal, instruct the patient to remove the lens and reinsert it just before bedtime. Have the patient put two drops of the rewetting solution in the eye before insertion that will help reduce lens adhesion in the morning. Reinforce that it should be very easy to sleep with the lens until the morning. Have the patient return the next morning with the lenses still in the eye. If that is not possible, then upon awakening, have the patient put two drops of rewetting solution in the eye, wait 5 minutes and remove the lenses at home. Stress that lens removal should not be attempted if the lens is adhered to the eye. It may be necessary to gently digitally massage the eye to break any lens adhesion. It is important to instruct the patient **not** to remove the lens via suction cup if the lens is not moving upon blinking. Continue to add re-wetting drops and digitally massage the eye through the eyelid until the lens is moving.

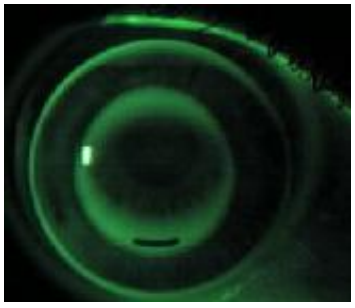
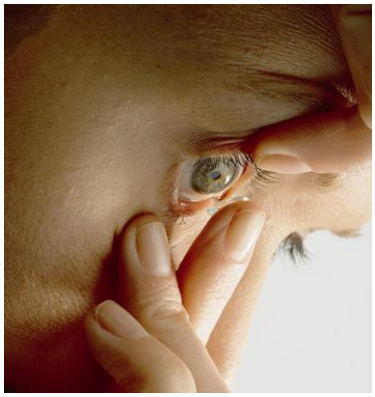


Figure 5



Schedule a follow-up appointment for the next morning. Ensure that the patient fully understands insertion, removal, and lens cleaning procedures. Go over how to re-center the lens in the unlikely circumstance that the lens becomes displaced from the cornea during sleep.

The only additional cleaning procedure needed with the DreamLens is at least once a week, put some cleaning solution on the tip of a cotton swab and gently clean the inner surface of the lens. This will remove all of the debris that is on the back surface that is usually difficult to clean with your fingers.

Solutions

The DreamLens is made from high dK Boston® materials and Boston® solutions are recommended for the care of the DreamLens. Use the Boston® Simplus for the routine cleaning and storage of the DreamLens. Once a week use the Boston® cleaner with a 100% cotton swab to clean the back surface of the lens. Cheaper cotton swabs can contain synthetic fibers that can scratch the lens surface. Before lens insertion and removal put one to two drops of Boston® rewetting drops in the eye. This will give the eye a thicker tear layer for the lens to rest upon and prevent lens adhesion in the morning. If deposits start to pose a problem, add an enzymatic cleaner to the regiment.

Procedure for Next Day and Subsequent Visits

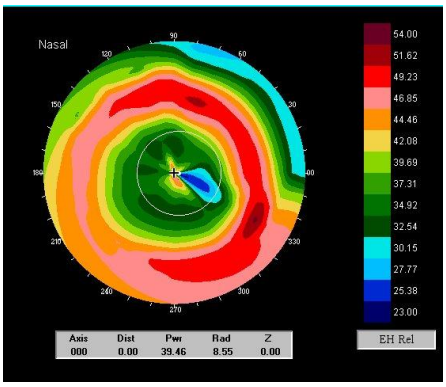


Figure 6

The first follow-up visit will be the next morning. Have the patient return with the DreamLens still in his/her eye. Check the vision and with the slit lamp determine if the lenses are moving. If the lenses are stuck, have the patient blink a few times then add rewetting drops. If the lens is still stuck, then gently take the lower lid and push against the edge of the lens until it moves. Have the patient blink a few times and then remove the lens. A stuck lens can cause corneal abrasions and irritation. The most common cause is not putting enough rewetting solution in the eye before insertion or having the rewetting solution wash out before the lens is inserted.

Once the lens is removed check unaided vision. Isolate the 20/200 line and have the patient read it with both eyes together. Continue to decrease the line size while giving liberal amounts of encouragement. The patient knows what they could see before and the positive reinforcement is amazing. After they have read the smallest line possible, recheck each eye individually and perform a subjective refraction. Do not use an auto refractor, as the readings will not be accurate.

Check the health of the cornea with a slit lamp and fluorescein. Most of the change takes place over the first night of wear so you will see more irritation and secretions at this visit. Lens imprints are common and not a concern unless staining is present. Some punctuate staining is common and will not be visible on subsequent visits.

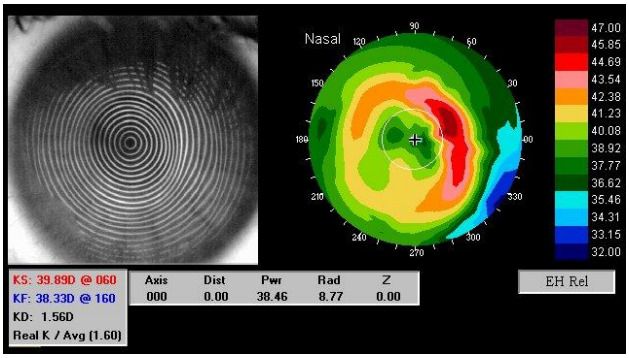


***Figure* 7**

Topography on the first visit can at times be a challenge. Occasionally dry spots will form centrally which cause the placido rings to become distorted resulting in a flawed topography (*Figure #6*). Check the placido image before the image is captured. If the rings are distorted have the patient blink and capture the image when the rings are sharp. On occasion a rewetting drop has to be applied to get the proper surface for an accurate topography.

The topography is the only way to see how the lens was riding during the night. You can often see this from the placido disk pattern. Usually the topography will show a centered image but often it will be off center (*Figure #7*). Do not worry about this on the initial visit. Only in a rare case will a change be made after the first visit. If the result is far worse that anticipated, see the patient in a few days. Otherwise check them again in one week. Often a poor one-day topography pattern will become normal and no change needs to be instituted.

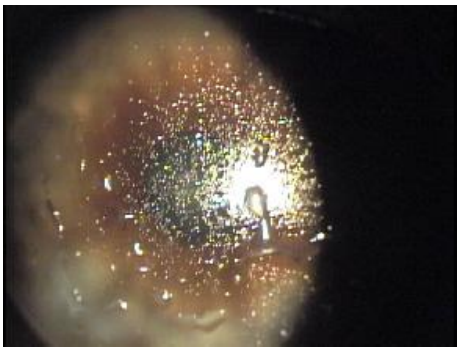


***Figure* 8**

For the one-week and subsequent visits, have the patient return at a later time during the day. This way you will have a better idea of how well the vision is holding after being out all day. First perform topography. Then check uncorrected acuity and do a manual sphero-cylinder refraction. With the slit lamp, check the cornea both with and without sodium fluorescein. Ask if they are having any problems and how long their vision is holding during the day and if it is improving. Put the lens on the eye and check the over refraction and sodium fluorescein pattern. If the lens is decentered or the acuity is not at target power, see the patient again in one or two weeks. If everything is going well, see the patient in one month, two months, three month and then semi-annually. At the three month point the patient should be stable. After three months check lenses at each visit for cleanliness, deposit formation. (*Figures #8 and #9*) and base curve changes.

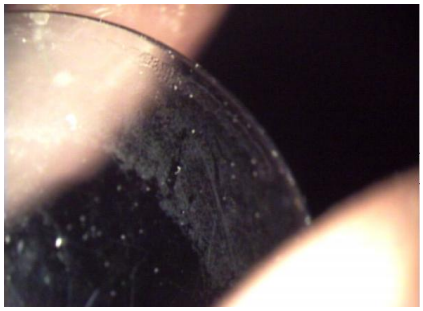


Figure 9

If the lens is decentered or performing at a sub par level, do not make a change in the lens design on the basis of one visit. If after two consecutive visits in which the same results are obtained then that is the time to make a design change.

At each annual visit the lenses should be replaced. Over time the base curve can steepen causing changes in the fit. This problem can be eliminated

by replacing the lenses at one year but in any event no longer than two years. Once the lens has steepened, replacement lenses might not fit the same as the original.

Conclusion

The DreamLens System is simple to use but complex in composition. Only top laboratories utilizing high Dk Boston material and solutions are certified to become DreamLens manufacturers. Sophisticated software designs the DreamLens. Fitting guidelines have been developed in theory but refined in practice. The result: The DreamLens System is the most comprehensive and successful orthokeratology system anywhere. Follow these fitting guidelines and you too can enjoy over a 90% success rate!