CLeYeSoft

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CLeYe Soft is an informative guide to fitting soft contact lenses. It was created by Clayton G. Skrzypczak as a senior project for the graduation year of 2001. If errors are found or you wish to order a copy of CLeYe Soft you can e-mail Clay at cleyesoft@yahoo.com.

Please do not make copies of CLeYe Soft

Outline

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General Information

All perspective contact lens wearers should have a comprehensive eye examination prior to being fit with contact lenses. This includes a detailed medical history, visual acuity, pupils, muscles, confrontations, keratometry, refraction, biomicroscopy, and a dilated fundus exam. This information will help you determine if your patient is a contact lens candidate. The patient also needs to have a clear understanding of the fees involved in fitting them with contact lenses, follow-up care, and the long-term cost of properly maintaining their lenses.

Considerations:

Medical history

- Does your patient have any medical or physical condition that will prohibit them from wearing contact lenses successfully?
- Is your patient taking any medications that will cause dry eye?
- Has your patient ever been diagnosed with dry eye in the past?

What does your patient do for a living?

- Do they stay home?
- Do they work in a dirty, dusty environment?
- Do they play sports?
- Do they need reading glasses?

How do they use their eyes?

- Do they do a lot of detailed work?
- Do they read a lot?
- Do they need sharp, crisp vision?

What kind of Rx do they have?

- Do they have myopia or hyperopia?
- Do they have astigmatism?
  - Is it Corneal?
  - Is it Lenticular?
- Would you need to adjust the power of the contact lens to compensate for vertex distance?

What kind of ocular anatomy do they have?

- What is their lid position?
- What is there aperture size?

Biomicroscopy

- Do they have any scleral or corneal pathology that would keep the lens from fitting properly?
- What size pupil do they have?
- Do they have any conditions under their lids that would prohibit a proper fit?
- Are there any ocular conditions that should be treated prior to fitting the contact lenses?

If the patient has astigmatism, should it be correct with a toric lens or can the patient get by with the spherical equivalent?

- How much residual astigmatism is present after the lens is placed on the eye?
- Does the patient notice the residual astigmatism and can they adapt to it?

Hyperopia:

Hyperopes experience a smaller increase in retinal image size and an increased field of view with their contacts than with their spectacles. This is more noticeable with higher powers.

Hyperopes must converge and accommodate less with their contact lenses than with their spectacles.

Myopia:

Myopes perceive an improvement in vision often with no measurable improvement in visual acuity: There is less of a decrease in retinal image size than with spectacles, which is more noticeable in higher powers. There are fewer optical aberrations because the wearer is always looking through the optical center of the contact lens.
Myopes must converge and accommodated more with their contact lenses than with their spectacles.

Choosing the correct power:

If the manifest refraction is greater than +/-4.00D, you need to adjust the power of the contact lens to compensate for vertex distance. If the refraction has a cylinder component, you must adjust for vertex distance in each meridian before figuring the final prescription. This can be done using a chart such as the one included on this CD or by using the formula:

Fc=Fs/1-dFs

Fc: power at the cornea in diopters
Fs: power of spectacle correction in diopters
d: vertex distance

Oxygen Transmission (EOP & DK/L):

You must consider overall eye health when choosing a lens for your patients. Many contact lens related problems can be traced to the interference of normal corneal metabolism. Reduced oxygen can cause edema resulting in corneal haze. This can cause cloudy vision, halos, discomfort, abrasion and contact lens intolerance.
The normal atmospheric oxygen content is 21% of which the cornea needs 5%-10% to function normally. If the oxygen reaching the cornea falls below 8%, the cornea may swell about 1%. If the oxygen reaching the cornea falls below 5%, the cornea may swell about 2%.
The tear pump and permeability of the lens material provides most of the oxygen required by the cornea during contact lens wear.
Equivalent Oxygen Percentage (EOP): the percentage of oxygen delivered to the cornea during contact lens wear equal to a certain percentage of atmospheric oxygen.

EOP During Sleep:	7.0 EOP
Daily Wear EOP:	9.0 EOP
Acceptable Extended Wear EOP:	12.1 EOP
Ideal Extended Wear EOP:	17.9 EOP

Dk: permeability of the material disregarding lens thickness

Dk	Permeability
5-13	Very Low
13-25	Low
25-50	Medium
50-100	High
100-250	Very High

Dk/L: transmissibility of the lens, which includes Dk and lens thickness. The higher the Dk/L, the better the oxygen transmission of the lens.

Dk/L	Lens Type	EOP
87	Desirable for extended wear	18 EOP
34	Minimum for extended wear	12 EOP
10	Minimum for daily wear	10 EOP

Dk/L= Dk/(10t), where t is lens thickness in mm

When to use a Toric Contact Lens:

You need to use a toric contact lens when there is at least 1.00D of With The Rule (**WTR**) astigmatism or if there is at least 0.75D of Against The Rule (**ATR**) astigmatism.

WTR: the axis of the astigmatism is 180 degrees
ATR: the axis of the astigmatism is 90 degrees

Problems & Modification:

If the lens is centered with proper movement = good fit
If the lens is centered but is too loose = steepen base curve
If the lens is centered but is too tight = flatten base curve
If the lens is not centered but moves properly = you may need a larger lens
If the lens is not centered and is too loose = you may need a larger lens &/or a steeper base curve
If the lens is not centered and is too tight = you may need a larger lens &/or a flatter base curve

To tighten a loose fitting lens:
Increase diameter
Steepen base curve
Decease thickness

To loosen a tight fitting lens:
Decrease diameter
Flatten base curve
Increase thickness

What is a Good Fit?

Centration-0.5mm of limbal overlap
Movement with blink-0.5mm to 1.0mm, observed at the inferior nasal edge. It is also helpful to view the inferior temporal edge as well as the inferior edge while the patient is looking up.
Movement of the contact lens facilitates tear exchange beneath the lens.
Minimum rotation of a toric lens, (5 degrees or less).
Good visual acuity.

Hydrogel or Soft Contact Lenses

Fitting the Spherical Soft Contact Lens:

1. Choose a lens that is as close to the necessary power as possible. Adjust for vertex distance if necessary.
2. Choose a base curve that is 0.3mm to 1.5mm flatter than the flattest K

reading.

3. Apply the lens and wait 1-2 minutes for the lens to settle.
4. Observe the lens under the slit lamp looking for proper centration and movement.
5. Wait at least 10 minutes for the final assessment.
6. If the lens is not centered properly or moves too much, you need to choose a tighter fitting lens.
7. If the lens does not move 0.5mm to 1.0mm you need to choose a looser fitting lens.
8. Check Visual Acuity
9. Do an over-refraction
10. Make any power adjustments necessary and recheck the fit and visual acuity.
11. When the lens power and fit are accurate, and the patient's vision is best corrected, you or your technician can train the patient to insert, remove, and care for the lenses.
12. Before you let your patient wear their new contact lenses home, they must have a clear understanding of how to care for the lenses. They must be able to insert and remove their contacts, and be aware of the warning signs related to contact lens wear. Have them wear the lenses for one week before returning to the clinic.
13. Upon the one-week follow up, inquire about any problems they may have encountered during the week. If no problems occurred, their corneas appear healthy and no power or base curve adjustments are needed, the fit is complete.

Fitting a soft toric contact lens:

1. After adjusting for vertex distance, choose a lens that is as close to the necessary power and axis as possible.
2. Choose a base curve that is 0.3mm to 1.5mm flatter than the flattest K reading.
2. Apply the lens and wait 5-10 minutes for the lens to settle.
3. Observe the lens under the slit lamp looking for proper centration, movement and rotation.
4. Wait at least 10 minutes for the final assessment.
5. If the lens is not centered properly or moves too much, you need to choose a tighter fitting lens.
6. If the lens does not move 0.5mm to 1.0mm you need to choose a looser fitting lens.
7. If the lens rotates, apply LARS (Left Add, Right Subtract) to the spectacle prescription. You can also use a cross cylinder calculator to get the resultant power and axis of the new contact lens. Use the base of the lens as the reference point. There are hash marks on a toric contact lens at the 6 o'clock position or at 3 and 9 o'clock position depending on the brand.
8. Check Visual Acuity
9. Do an over-refraction
10. Make any power adjustments to the sphere or cylinder component. Check visual acuity. You may need to order trial lenses at this point and have the patient return at a later date.
11. When the lens power and fit are accurate, and the patient's vision is best corrected, you or your technician can train the patient to insert, remove, and care for the lenses.

12. Before you let your patient wear their new contact lenses home, they must have a clear understanding of how to care for the lenses. They must be able to insert and remove their contacts, and be aware of the warning signs related to contact lens wear. Have them wear the lenses for one week before returning to the clinic.
13. Upon the one-week follow up, inquire about any problems that they may have encountered during the week. If no problems occurred, their corneas appear healthy and no power, base curve or rotation adjustments are needed, the fit is complete.
14. If the cylinder power and/or axis are not available, you may be able to get by with a lens that is close to the required parameters. Also, you may not need to correct all of the astigmatism. Some astigmatism may be masked. This is especially true for thicker lenses. If their vision is not adequate, you may consider fitting your patient with a rigid contact lens or keep them in their glasses.

Insertion and Removal by the Doctor:

1. Wash your hands thoroughly with a mild soap and water. Use a lint free towel to dry your hands.
2. Carefully place the contact lens on your index finger of your dominant hand.
3. Have the patient look down. With your free hand pin the upper lid up against the superior orbital bone.
4. Have the patient look up. Using your middle finger of the hand containing the contact lens, pull the lower lid down.
5. With the lids controlled and the patient looking up, gently place the contact lens onto the lower conjunctiva.
6. Have the patient look down and gently release the lower lid and then the upper lid. Have the patient gently close their eyes. You may need to massage the outside of the lid to squeeze the air from beneath the contact lens.
7. If you are using a toric lens, place it on the eye with the base of the lens facing down to facilitate proper lens orientation.
8. To remove the lens, have the patient look up. Gently pin their lower lid down using the middle finger of the hand you will be removing the lens with. Slide the lens off of the cornea with your index finger. Next grasp the lens between your index finger and your thumb and pull the lens away from their eye.

Patient Education on Insertion of a Soft Contact Lens:

Inserting the Lens:

1. Wash your hands thoroughly with a mild soap, rinse completely, and dry with a lint-free towel.
2. Make sure you are in a quiet area with a mirror and good lighting.
3. Always start with your right eye first when you put the lens in and take then

lens out.

4. Remove the contact lens from the case. Inspect it for nicks or tears. If you find any, DO NOT put the lens into the eye. Make sure the lens is not inside out.
5. Place the lens on the right index finger. With the left hand, firmly grasp your upper lid applying firm pressure to the brow. With the right middle finger, pull down your lower lid applying firm pressure to your cheek.
6. Place the lens directly on the center of the eye. Do not peck at the eye! Go straight in and straight out. Once the lens is on the eye, look down and then up.
7. Gently let go of the bottom lid, and then the upper lid. Blink gently. Cover the left eye and look at something in the distance to see if it is clear. This will help you make sure the contact is in place.
8. Repeat steps 4-7 for the left eye.

Removing the Lens:

1. Wash your hands thoroughly with a mild soap, rinse completely, and dry with a lint-free towel.
2. Look up and slowly pull down your lower lid with the middle finger of your right hand. Place your index finger on the lower edge of the lens and pull the lens down onto the white of the eye. Keeping the index finger on the lens, squeeze the lens lightly between the thumb and index finger to remove it.
3. Clean your lenses with the contact lens cleaning system according to its instructions.

Wearing Schedule:

1. During your first day with your new contact lenses, you are to wear them no more than 5 hours. Each day you will add 1 to 2 hours, until you are up to a full day of wearing them.
2. DO NOT SLEEP or SWIM in your contact lenses.
3. Apply hair sprays BEFORE putting in your lenses. Apply makeup, lotions and sunscreens AFTER putting in your lenses.
4. Throw away your contact lenses after the allowed amount of time according to your doctor's instructions.

Warning Signs:

Redness, Pain, Blurry Vision

If you notice any of these three symptoms do the following:

1. Remove your lens.
2. Clean and inspect the lenses for any rips or tears.
3. Check of the lens is inside out.
4. If the pain is gone, it is okay to place the lens back on your eye and continue wearing.
5. If after inserting the lens and the warning signs continue, take the lens out of your eye and contact the office for an appointment.

Fitting the presbyopic patient:

When fitting the presbyopic patient with contact lenses the most important element of the examination is the case history. This will tell you how the patient uses their eyes and what their expectations are. It is important to find out what the patient knows about bifocal contacts and monovision. They may have some unrealistic expectations and/or preconceived notions that they have developed from listening to

others that have had experience with bifocal contact lenses or monovision. This information will help guide your thought process in finding the best solution for their contact lens needs.

Eye dominance:

1. It is important to establish eye dominance to maximize patient comfort when using a monovision or modified monovision philosophy of fitting.
2. Have the patient place one hand over the other at arms length with both palms facing out.
3. Make sure that their pointer, middle, and ring finger of the hand closest to them is touching the pinky finger of the other hand. The thumbs should be lying on top of one another. There should be a small triangle formed by the two thumbs and the edges of the two hands. The triangle should no bigger than a penny.
4. Have your patient fixate on a distant object such as a doorknob or a light switch.
5. Now have them fixate the object through the small triangle made by their outstretched hands.
6. Cover their right eye and ask them of the object is still visible. If so, they are left eye dominant. If it disappears, they are right eye dominant. Now cover the left eye and ask the same questions to reaffirm your findings.
7. If you are not sure of the results, repeat steps 1 through 5. Do this as many times as it takes for you to be confident of which eye is dominant.

Monovision:

1. Determine which eye is your patient's dominant eye.
2. Fit the contact lenses the same way you would fit any other contact lens. Look for proper centration, and movement. Also look for proper rotation if you are fitting a toric contact lens. Make any necessary adjustments to the fit of the contact lenses.
3. You will want to fully correct their dominant eye for distance for maximum comfort. This works most of the time. You may find that the opposite is true for some patients.
4. Fully correct their non-dominant eye for near. This requires that you to build their add power into the prescription of the contact lens.
5. Check visual acuity monocularly first. Check the dominant eye acuity for distance and the non-dominant eye for near.
6. Make any power adjustments necessary to maximize their acuities at distance and at near.
7. Check visual acuity binocularly at distance and near. They may or may not like what they see. Things may seem distorted, shadowed and uncomfortable. Explain to them that their brain will adapt with enough time.
8. Depending on their needs, you may wish to adjust the near power or the distance power to maximize their visual comfort.
9. Teach your patient insertion, removal and lens care if they do not know how to do it already.
10. Have your patient wear the lens/lenses for one week before returning to the office.
11. Upon their return ask them how they did. If they liked the monovision have them order a six-month supply. This will enable them to try the monovision for an extended period of time without spending a lot of

money on lenses. If after six months they wish to order more, have them call the order into your office.

12. If they are not happy with the monovision at that point you may adjust the powers of the lenses or consider a modified monovision philosophy or trying bifocal contact lenses.

If your patient is complaining of poor vision while they are using both of their eyes it may be helpful to adjust the power of one or both of the contact lenses, depending on their visual needs. If they wish to maximize their near vision, over plus the distance eye by +0.25D to +0.50D. This will blur the distance a bit but it will help the near vision. If they wish to maximize their distance vision, over minus the near eye by −0.25D to -0.50D. This will reduce their near vision a bit but enhance their distance vision.

You may also wish to try over plusing their distance eye and over minusing their near eye by +/-0.25D. This may give them adequate distance and near visual acuity.

Once your patient is fit, you should explain to them that they may wish to purchase reading glasses for long term near work or another distance lens for the non-dominant eye for prolonged activities where distance vision is more important than near vision.

Bifocal Contact Lenses:

At present, toric bifocal contact lenses are of limited availability. There are also not a lot of base curve options for bifocal contact lenses. Keep these issues in mind when choosing your fitting philosophy.

Available Bifocal Contact Lens Designs:

Simultaneous designs:

1. Concentric Center Near: Multiple near zone sizes, pupil constricts for near. Problem-night driving with on coming headlights.
2. Concentric Center Distance: When pupils are large, flare from peripheral near zones may cause problems. Pupil constricting for near work may also be a problem.
3. Aspheric Center Near (maximum plus center): Front surface aspherics- normal prolate aspheric. Fit with maximum plus in non-dominant eye.
4. Aspheric Center Distance (minimum plus center): Back surface aspherics-normal prolate aspheric. Good distance vision.
5. Multi-Zone: alternating concentric rings of near and distance power. Less pupil size and centration dependant.
6. Diffraction: Concentric surface zones (eschelets, eschelettes). Eschelets are a few milimocrons deep and are located on the posterior surface. The more eschelets on the lens, the higher the add power. Can get flare and halos at night. They are less pupil dependant

The lens you choose depends on your fitting preference and the needs of your patients. It may be helpful to have more than one design on hand.

1. Choose a distance/near contact lens that best suits your patient's needs.
2. Fit the bifocal contact lenses as you would fit any sphere or toric contact lens. Look for proper movement and centration and possibly rotation. If the lens does not fit properly and the brand you are using is not made with different parameters, you may need to switch to another brand.
3. Check their distance and near acuity.
4. Make any necessary power adjustments to maximize both their distance

and near vision. You may consider adding +0.25D to +0.50D to the distance prescription to help their near vision, knowing that it may compromise their distance visual acuity. You may also consider adding −0.25D to −0.50D to the near prescription to enhance their distance vision, knowing that it may compromise their near visual acuity.

5. Teach your patient insertion, removal and lens care if they do not know how to do it already.
6. Have your patient wear the lenses for one week before returning to the office.
7. Upon their return ask them how they did. If they liked the bifocal lenses, have them order a six-month supply. This will enable them to try the bifocal contact lenses for an extended period of time without spending a lot of money on lenses. If after six months they wish to order more, have them call the order into your office.

Modified Monovision:

This can be a combination of the monovision and bifocal contact lens fitting philosophy.

One option is to fit their dominant eye with a single vision sphere or toric contract lens. Then fit their non-dominant eye with a bifocal contact lens. Make any necessary power adjustments to either lens to maximize the distance or near acuity depending on their needs.

Another option is to fit them with two bifocal contact lenses with a monovision philosophy. You can do this by adding some plus to the distance portion of the bifocal lens on the dominant eye. This can enhance the near acuity. You also may wish to reduce the bifocal power in the non-dominant eye to enhance the distance acuity. Another approach is to add plus to the distance portion of the dominant eye and reduce the add power of the non-dominant eye.

As you can see, this is not an exact science. Your fitting philosophy will depend on your patient's needs and abilities. Some patients will not be able to adapt to the bifocal, monovision, or modified monovision philosophies. They may be best served by wearing distance contact lenses and reading glasses, or just a standard progressive or lined bifocal glasses.

Soft Lens Cleaning Systems:

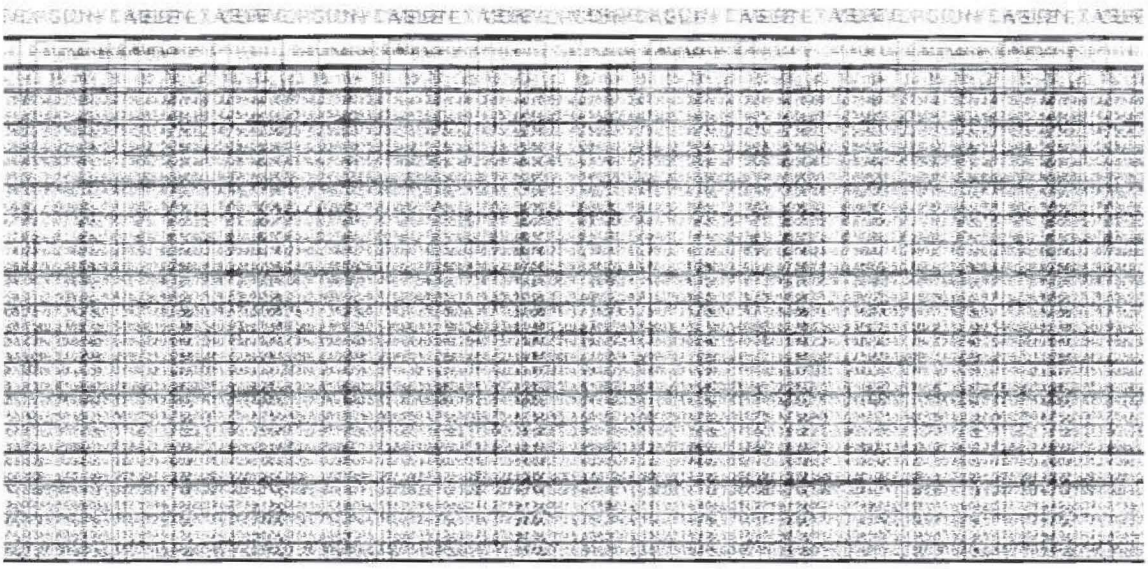
There are many types of soft contact lens cleaning products on the market. It is important to choose the best cleaning product for your patients. Not all eyes are the same, which means that they may react differently to different products.

Most of the soft lens cleaning products available today are in solution form. They are usually packaged in large containers, which means that they need to have preservatives to prevent contamination. Some of these preservatives can and do affect patient comfort. For this reason, you should make sure that your patients are aware of the warning signs associated with contact lens related problems. You should also have alternative cleaning products available in case your patient develops a hypersensitivity to a particular product.

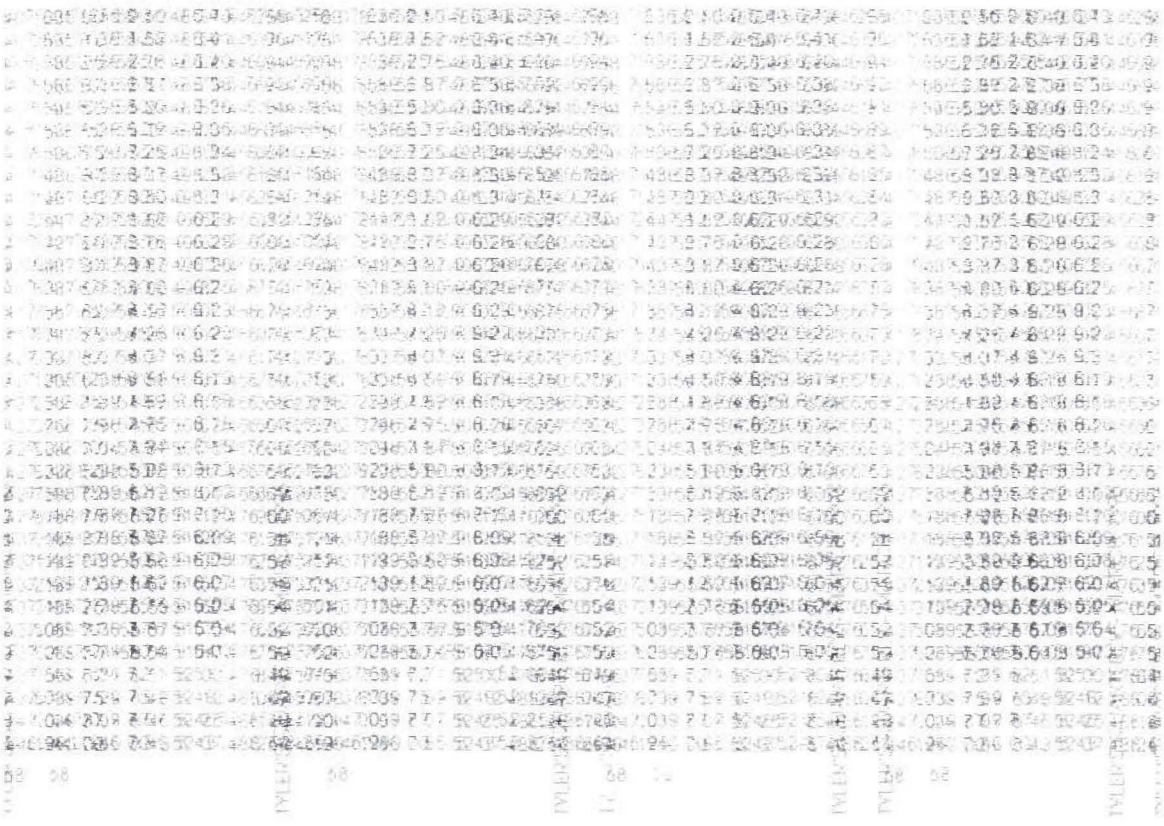
Other cleaning products that are available are of the hydrogen peroxide variety. These solutions do not require preservatives to reduce contamination. If a patient develops a contact lens irritation, a hydrogen

peroxide system should be implemented to rule out preservative hypersensitivity.
Other care systems that do not require preservatives are care systems that use a combination of sonic agitation and ultraviolet light. They are not as common but are available.
If your patient is not interested in cleaning products, or only wears their contact lenses occasionally, a daily disposable contact lens may be the best choice.
Your patient should have a clear understanding of how to use their cleaning system. Make sure you review the directions thoroughly before sending them home with their new lenses. Also encourage your patients not to mix components of different cleaning systems. This may cause undesirable chemical reactions.
Teach your patient how to clean their lenses according to the directions provided by the cleaning system's manufacturer. Choose a solution that will best clean the lenses for that particular patient. Some solutions will work better than others will. Some solutions can damage a particular brand of contact lens. Be sure that the solution you recommend is not going to harm the lenses of your patients.

Vertex Conversion Table:



Diopter Conversion Table:



References:

Much of the information in CLeYe Soft can be found in the lecture notes of John J. Pole, O.D. and James E. Paramore, O.D., which was provided to the class of 2001.