CHAPTER 8

GAS PERMEABLE LENS MODIFICATION COURTESY OF THE CONTACT LENS LABORATORY OF SOUTH AFRICA [87]

In-office modification of RGP lenses provide a valuable service to the patient by saving time, reducing the number of visits and increasing patient satisfaction. Sending a lens to the laboratory for modification can be inconvenient and interrupts the patient's wearing schedule. By developing lens finishing and modification skills, contact lens practitioners can optimise the fit of RGP lenses in the practice. This allows the practitioner to correlate applied lens modifications with the desired fitting results which enhances patient satisfaction.

Modification units consist of a motor driven spindle or shaft that rotates about a vertical axis. The unit may have one or more spindles and may have a variable or fixed speed. Other basic equipment or accessories that are required include lens suction holders ("greenies"), radius tools, polishing pads or sponges and polish. However, other equipment such as a radius scope, vertometer, lens loupe or graticule and a diameter rule should be available to verify lens parameters prior to lens modification. This will help determine the effect of your modifications and are useful if you need to replace the lens if the lens breaks or distorts during the modification process. Lens material should always be considered before attempting modifications. Higher Dk/t materials usually "respond" faster and can be easily ruined. Therefore, as a general rule, lower spindle speeds should be used for higher Dk/t materials. Common in-office procedures include; lens polishing, edge modification, peripheral curve modification, blending and power changes.

Each modification technique has its advantages and disadvantages. The techniques of choice appear to develop according to the needs, experiences and skills of the practitioner. Different lap materials can be used on the spindle of the lens modification unit. In order of effectiveness they include; stone laps, diamond laps, silk covered laps, moleskin laps, velveteen laps and sponges. Keep in mind the more coarse or hard the modification lap, the more quickly it will modify or ruin a contact lens.

LENS PARAMETERS THAT CAN BE MODIFIED

- Lens diameter
- Secondary curve radius and width
- Peripheral curve radius and width (cannot make steeper)
- Blending curves
- Optic zone diameter
- Edge contour, finish and thickness
- Surface finish
- Lens power (within small limits)

LENS PARAMETERS THAT CANNOT BE MODIFIED AND THEREFORE REQUIRE ORDERING A NEW LENS

- Base curve
- Significant change to lens power
- Increased lens thickness
- Increase in optic zone or lens diameter

Lens Polishing or Surface Finishing

This is most commonly performed in office modification to remove surface scratches and deposits.

Polishing the Convex or Anterior Surface

This surface contains most of the scratches and deposits

1. Use a flat sponge lap
2. Wet the sponge. Check to make sure the sponge is smooth. Old or dried polish can accumulate on the surface and may scratch the lens
3. Apply wet polish
4. Attach the "greenie" to the concave surface of the lens
5. Apply the lens to the rotating sponge to evenly distribute the polish. The lens is placed half way between the centre and edge of sponge. Hold the lens at a 45-degree angle and rotate in a direction opposite the rotation of the tool
6. To polish the very centre of the lens, hold the lens perpendicular to the sponge and depress in and out of the centre of the sponge for 1–2 seconds, approximately 10 times

To avoid altering the optical quality of the lens it is important to

- Keep lens and sponge wet and moist with water and polish
- Do not use excessive pressure
- Do not use excessive spindle speed

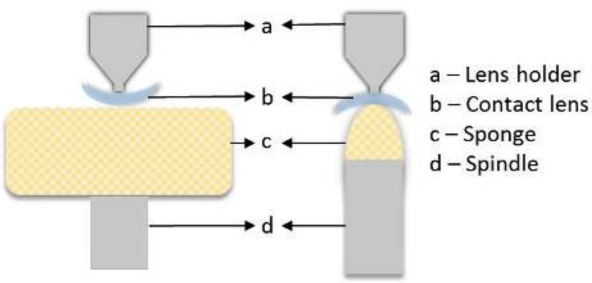

Figure 33: Contact lens modification tools

Polishing the Concave or Posterior Surface

1. Use cone shaped sponge
2. Attach "greenie" to convex surface of the lens
3. Wet sponge and apply polish
4. Apply the lens to the rotating sponge and rotate the "greenie" opposite to the rotation of the spindle for 10–15 seconds

LENS POWER

The power of the lens can be altered by adding up to -0.75 D and +0.50 D. Improper technique readily produces distorted optics. This is most often noted by the patient rather than the practitioner who must look for distorted mires using the vertometer. Check the power frequently to monitor the power change and to ensure that the lens is rotated to a different position that will help minimise distortion.

Increasing Minus

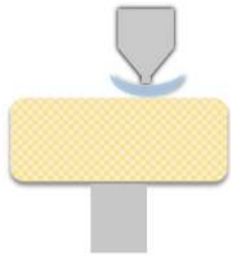

Figure 34: Adding minus power

It is more common to add minus power due to patients' symptoms of reduced vision. The periphery of the tool spins faster than the centre. By holding the lens near periphery of the pad (Figure 34), more material is removed from the centre of the lens creating a flatter front surface and more minus power.

1. Use a flat velveteen covered lap or sponge. Velveteen will work faster, but it is also easier to ruin a lens
2. Attach "greenie" to the concave surface
3. Apply polish
4. Place the lens close to the peripheral edge of the pad
5. Move the lens around the pad in a counter-clockwise direction, opposite to the rotation of the pad. Or hold the lens in position for a few seconds, lift and rotate the "greenie" and place the lens down on pad again

Increasing Plus Power

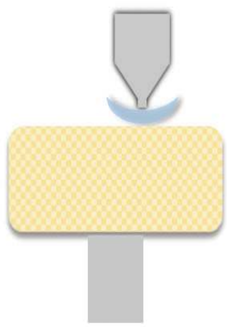

Figure 35: Adding plus power

It is easier to distort optics when adding plus power. By holding the lens near or in the centre (Figure 35), more lens material is removed from the lens edge. Thereby, adding more plus power.

1. Follow steps 1–3 above for adding minus power
2. Place lens near the centre of the lap. Rotate lens opposite to direction of spindle spin

PERIPHERAL CURVE MODIFICATIONS

Peripheral curve modifications and blending may be necessary to improve lens fit and performance. This can alter the lens to cornea bearing relationship

1. Attach the “greenie” to the convex side of the lens
2. Select appropriate radius tool. Be sure to compensate for the thickness of the pad. Velveteen is approximately 0.4 mm thick. If a 9.0 mm curve is needed, use an 8.6 mm tool
3. Apply polish to the tool. Be sure to check that the surface is smooth (no dried polish) to avoid scratching the lens
4. Wet the lens
5. Hold lens lightly against the tool. Rotate the greenie between your fingers in the opposite direction of the spindle rotation
6. Lift the lens off the tool every 10 to 15 seconds. Wet the lens frequently, continue to add polish
7. Check the width periodically

BLENDING CURVES

The junction between curves can trap debris and inhibit tear exchange. Blending the transition zone between the curves is necessary for patient comfort and lens performance.

Select a tool with a radius curvature halfway between the radii of the adjacent curves. The procedure for blending is similar to that of peripheral curve modifications

EDGE MODIFICATIONS

The edge profile is an important component of both patient comfort and lens fit. Both the anterior and posterior edges should be rolled and tapered. There are several ways to accomplish this. Practice and determine which technique works best in your hands. The most commonly used technique is as follows:

1. Attach the “greenie” to the concave side of the contact lens
2. Starting at the edge of the pad and working towards the centre of the pad, position the contact lens holding device at about 45 degrees and rotate the lens clockwise. Slowly decrease the angle until the greenie is nearly horizontal
3. Polish posterior surface by placing the “greenie” on the convex surface of the contact lens. Hold at 45 to 60 degrees from horizontal. Position contact lens on pad so rotation of the pad is perpendicular to the lens surface
4. A Sponge tool with central hole can also be used
   - Attach the “greenie” to the convex surface to the lens
   - Moisten sponge with water and polish
   - As the sponge rotates, hold lens vertically and push into the centre hole of the sponge
   - Move the lens up and down for 4 to 5 times or for 30 to 60 seconds