Evaluating and Recording Soft Contact Lens Fit

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Fitting soft contact lenses is a daily part of the workload of most optometrists. However, the evaluation of soft contact lenses varies greatly between individual practitioners and the record of lenses trialled is often limited to descriptions such as "good". It is acknowledged that practitioners have limited time for evaluating and recording contact lens fit. However, accurate recording fit characteristics is important legally in case of future contact lens complications and to assist in overcoming contact lens discontinuations which are common (Young et al., 2002) and rely on knowledge of previous unsuccessful lens details.

If you look through the common contact lens textbooks there is no consensus on soft contact lens fit evaluation and recording. Most, such as *Contact Lenses* (Editors: AJ Phillips and L Speedwell) and *Essential Contact Lens Practice* by Jane Veys, John Meyler and Ian Davies imply describing movements in terms of millimetres and tightness of push-up (although it is not clear whether this is tightness or recovery speed) as a percentage. This article was developed from a recent paper in the journal *Contact Lens and Anterior Eye* by the author (Wolffsohn et al., 2009) which provides evidence of which are the most important measures of contact lens movement.

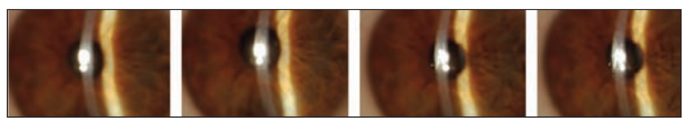

Figure 1: Pre-lens tear film break up showing distortion in the first Purkinje image with increasing time after blink

Lens Details

The stated lens parameters and name should be carefully recorded, particularly with the development of newer generations of the same lens material, eg Fictitious Daily Disposable with Enhanced Comfort 8.5BC: 14.2mm; -3.75D

Settling Time

Most studies have shown a decrease in lens movement over the initial 10 to 15 minutes post-insertion (Schwallie and Bauman, 1998; Brennan et al., 1994; Golding et al., 1995; Maldonado-Codina and Efron, 2004). However, movement increases again during the day's wear, with the movement after eight hours wear equating to the movement measured five minutes after insertion (Schwallie and Bauman, 1998; Brennan et al., 1994). Therefore it would seem appropriate (and perhaps beneficial to the practitioner's limited appointment time) to assess soft lens fit about five minutes after insertion. If there has been a lot of tearing with lens insertion, then the lens can tighten-up dramatically (also the case with wearing lenses when showering or swimming; Little and Bruce, 1995)

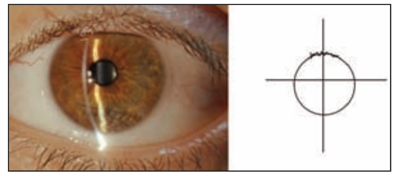

Figure 2: Fitting cross indicating the centre of the cornea with a circle marking the slightly inferior lens position which crosses the limbus with the superior edge

Test order and Illumination

As lens fit can be affected by invasive techniques and stimulated tearing, the examination should be conducted under sufficient, but minimal illumination. Tear film should be evaluated first and the push-up test should be performed last.

Pre-Lens Tear film

Dry eyes, as determined by non-invasive break-up time, tear menisus height and the number of symptoms are an important determinate of comfort wearing contact lenses (Glasson et al., 2003). The tear film on the front surface of the contact lens appears to relate to contact lens comfort, but not to predict those who would remain comfortable in their contact lenses with continued wear (Fonn et al., 1999). Non-invasive break-up time assesses contact lens surface wettability, responsible for limiting the friction with the upper lid and should be recorded as part of the evaluation of lens fit (Figure 1).

Centration and Coverage

Despite the limited published evidence for the proposed damage caused by contact lenses repeatedly crossing the limbal area, as assessed by lens centration and coverage, the change in surface curvature, end of the corneal avascular area and stem cells in this location suggest this is an important aspect of soft contact lens fit (Barramdon, 2007). Some practitioners indicate the

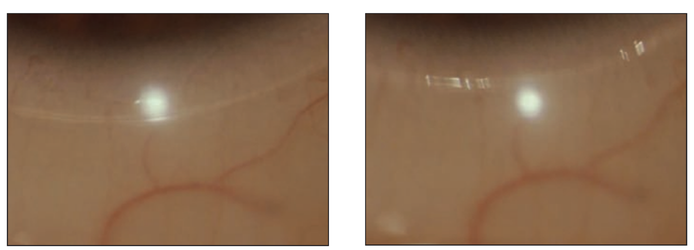

Figure 3: LEFT: A 0.3mm slit beam height placed on the lower contact lens margin with patient looking up. RIGHT: Immediately after the blink the lens appears located above the beam by another third of the beam height (therefore equivalent to 0.4mm)

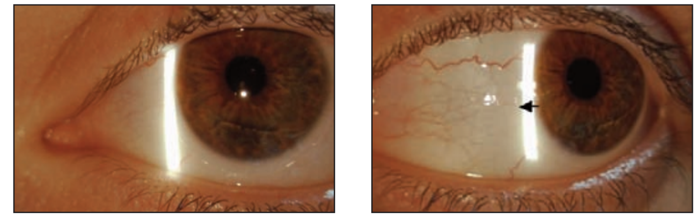

Figure 4: LEFT: Adjusting the slit-lamp beam width to match the lens sclera overlap in primary gaze. RIGHT: Comparison of this beam width to the overlap in temporal gaze

centre of lens with a cross with the centre of the lens marked by a small cross as this is easier to draw accurately rather than a circle. I suggest a cross to indicate the centre of the cornea, with a circle to mark the relative position of the lens, which has better face validity and allows the position of any crossing of the limbus by the lens edge to be marked (Figure 2).

Comfort

Although contact lens comfort and fit are not strongly related (Young, 1996), the prescribed lens must be comfortable for the wearer as discomfort is the major cause of discontinuations (Young et al., 2002). Some record discomfort on a Likert scale such as 0 (need to remove) to five (can't feel), while a yes/no response may be sufficient as one is unlikely to fit an uncomfortable soft lens.

Lens Movement

On Blink

Our research showed that contact lens movement on blink with the patient looking up was more diagnostic of overall lens movement as well as being easier to observe than movement on blink in primary gaze (Wolffsohn et al., 2009). Moderate magnification of 16-25x should be used. The movement of the lens can be estimated compared to the proportion of lens overlap onto the sclera relative to the diameter of the contact lens and patients HVID (eg overlap of well centred 14.2mm total diameter contact lens = 1.1mm if the HVID is 12mm, therefore a movement on blink of 1/3rd of this distance would be 0.3-0.4mm). Alternatively, the height of the slit-lamp beam can be reduced to the smallest setting (e.g. 0.3mm) and this distance used as a comparator to estimate the size of movement (Figure 3).

Lag

Lag refers to the resistance of the lens to move with the eye on excursions away from primary gaze. If the lens is mobile, then the lens will tend to shift centration away from the direction of gaze due to the architecture of the lid anatomy. Our research shows that only horizontal lag is diagnostic of overall lens movement (Wolffsohn et al., 2009). Although some refer to lens sag rather than lag, this describes the distortion or geometry of the shape of the lens, not its movement, although the two are related.

Due to the movement of the eye on changing gaze, the actual movement of the lens is not easy to estimate. Instead, with the patient looking straight ahead, the slit-lamp beam can be adjusted to match the width overlap of the contact lens onto the sclera (Figure 4: left). When the patient looks to the nasal and temporal side, the slit-beam can be relocated to the new overlap, for comparison (Figure 4: right). Presuming the overlap is ~1mm (see above), then an average 50% increase equates to a 0.5mm lag.

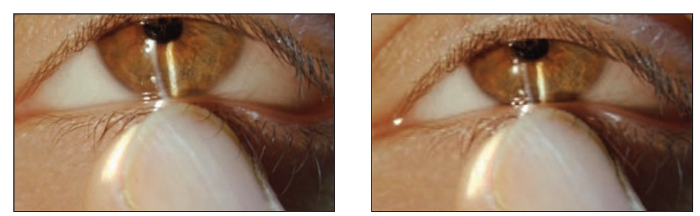

Figure 5: Digital displacement in the push-up test

Push-up Test

The importance of the push-up test in evaluating soft contact lens movement and adequate fit has been previously highlighted (Young, 1996) and was supported by our research (Wolffsohn et al., 2009). However, our findings suggested the speed of recovery was more important than the difficulty in dislodging the lens as has been previously evaluated (Figure 5).

Recording of Contact Lens Movement Parameters

Movement on blink in up-gaze and lag on horizontal excursion can be recorded in millimetres, but the push-up recovery speed is more difficult to assess as it involves both movement and time. Wolffsohn and colleagues showed that a three-point scale was just as descriptive of lens overall movement and recommended (Figure 6):

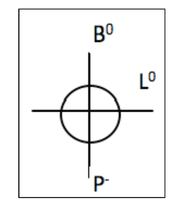

Figure 6: Lens schematic indicating a slightly low lens centration, with no limbal incursion, movement on blink in up-gaze of 0.25-0.50mm, horizontal lag of 0.5-1.0mm, but a sluggish push-up recovery

- if blink movement =0.25-0.50mm (as in this case) then record B0, if less then B- and more B+.
- if the sclera centration overlap increases by on average 0.5-1.0mm between nasal and temporal lag, it should be recorded as L0, if less then L- and more L+.
- an instantaneous drop to the original position on push-up displacement of the contact lens should be recorded as P+, a slow relocation as P- and a steady relocation (2-4mm/s) as P0.

Outcome of Lens Evaluation

The decision on whether contact lenses should be trialled on the eye is based on clinical judgement, and may depend on the lens material and thickness. However, it would not be normal to accept more than two 'minus' grading in movement on blink, lag and push-up, or limbal incursion. Comfort must also be acceptable to the patient and acuity good and stable, with the prescription checked by over-refraction.

Acknowledgements

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References

www.optometry.co.uk/references