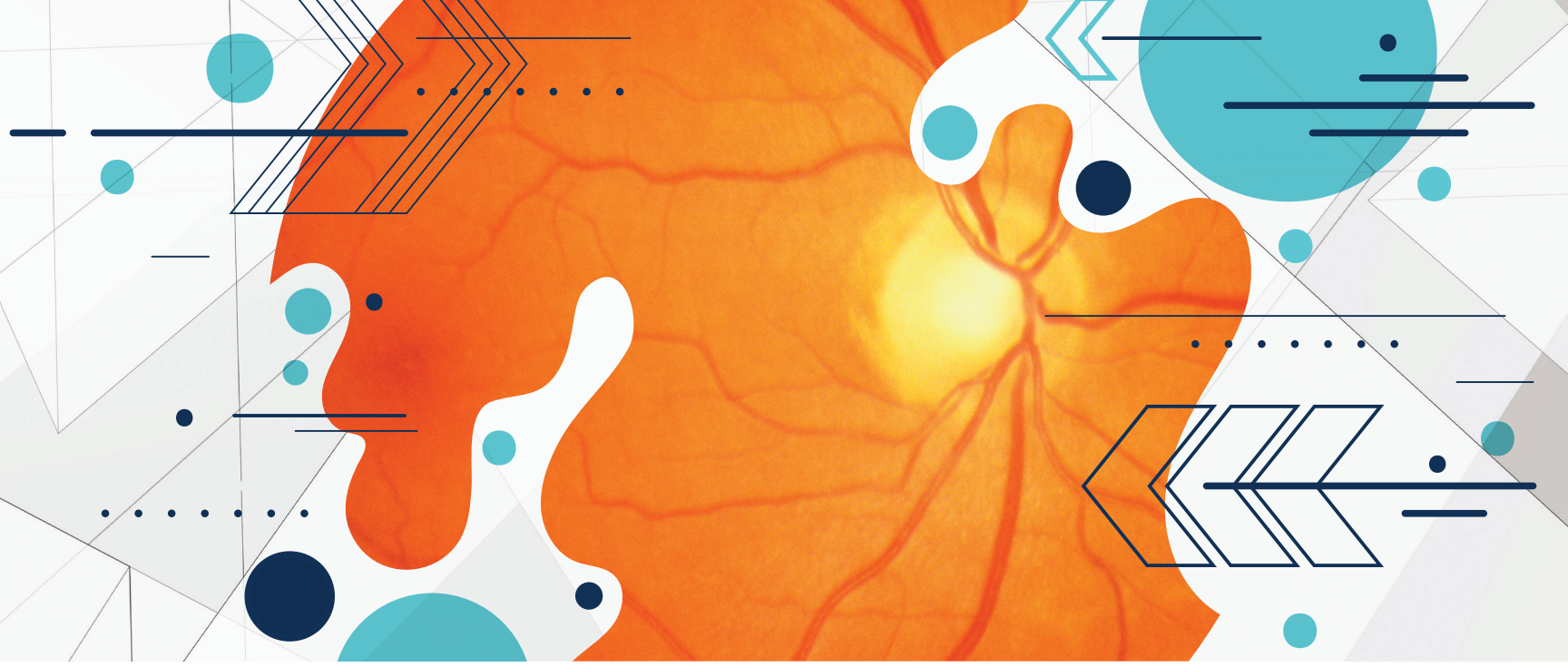

CLINICAL TIPS TO PERFORM EFFECTIVE SCLERAL INDENTATION

Follow these steps for the best clinical outcomes.

BY ELENA Z. BIFFI, OD, MS, FAAO

Scleral depression, also known as scleral indentation or indentation ophthalmoscopy, is a supplemental ophthalmic technique used to examine the peripheral retina. It involves applying gentle pressure to the sclera to displace the vitreous humor, thereby facilitating visualization of peripheral retinal pathologies (Figure 1).[1] This technique is crucial for the early detection of retinal tears, detachments, holes, and other peripheral retinal abnormalities that might otherwise go undetected with conventional binocular indirect ophthalmoscopy (BIO). Studies have highlighted the importance of scleral depression in the early detection of peripheral retinal holes and tears that may lead to retinal detachment, thus ensuring timely treatment and vision preservation.[2,3]

THE CASE FOR SCLERAL DEPRESSION

The main indication for performing scleral depression is when peripheral retinal pathologies (retinal holes, tears, schisis, detachments, etc) are suspected.[4] This technique is also indicated if the patient: 1) experiences symptoms of flashes, floaters, and/or decreased vision; 2) has pathologic myopia and is at risk of peripheral retinal abnormalities; or 3) presents with a history of trauma.[1] Scleral indentation procedures enhance recognition of retinal tears by allowing stereoscopic examination of a suspected lesion from different angles, and by producing darkened subretinal appearance, thus enhancing contrast between a retinal pathology and a normal retina.[5] In addition, scleral depression is crucial in evaluating for the presence and amount of subretinal fluid around the lesion and associated retinal traction.[6]

When performed by a skilled and experienced examiner, scleral depression is a safe technique.[5] Even patients with a vitreous hemorrhage that obscures the posterior pole can be safely and effectively evaluated for peripheral retinal abnormalities by using indirect ophthalmoscopy combined with scleral depression.[2] Because scleral depression temporarily increases IOP, caution should be exercised in patients with ocular hypertension.[7] This procedure should also be avoided in the presence of advanced glaucoma, which causes the eye to be susceptible to damage from increased IOP during indentation. Furthermore, scleral depression is contraindicated

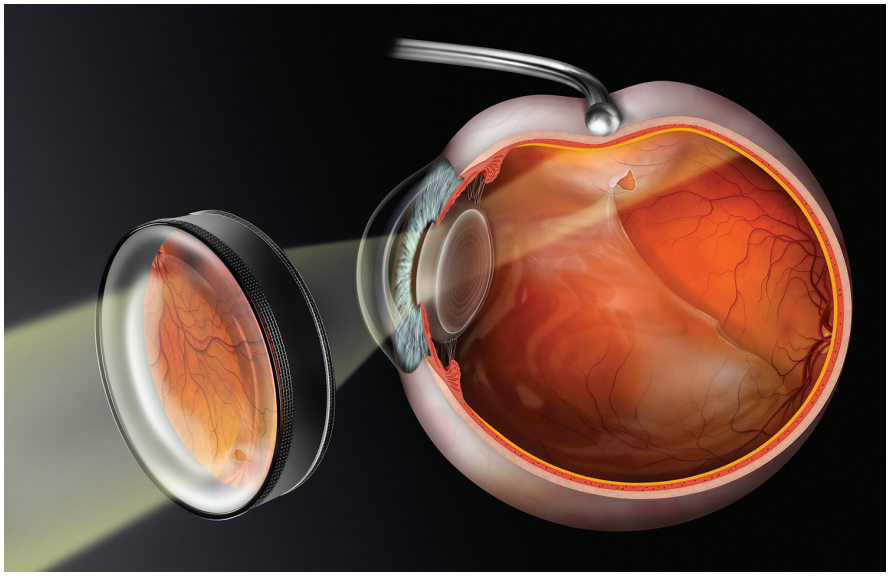

Image courtesy of www.eyeillustrations.com.

Figure 1. Illustration demonstrating the process of scleral depression when gentle pressure from the scleral depressor inwardly displaces the peripheral retina, making it possible to study the lesion of interest from its different angles.

in cases of acute or severe globe trauma, including ruptured globes, as it may exacerbate the injury and cause further harm. Some corneal disorders, such as corneal thinning and active infections, may also pose contraindications due to the risk of further complications. Additionally, because of the need for patient cooperation during the procedure, patients with uncooperative or apprehensive behavior may not be suitable candidates for scleral depression. It is essential for you, the examiner, to carefully consider these contraindications to ensure patient safety and to minimize potential complications.[4]

Scleral depression is a skill that takes time to master, requiring a high level of competency when manipulating the scleral depressor and performing BIO. There are three key factors involved when performing scleral depression: the patient, the scleral indenter, and the examiner. This article provides 20 clinical tips to help successfully incorporate all three of these factors.

AT A GLANCE

- Scleral depression is a supplemental ophthalmic technique used to examine the peripheral retina to facilitate visualization of peripheral retinal pathologies.
- This technique is crucial for the early detection of retinal tears, detachments, holes, and other peripheral retinal abnormalities that might otherwise go undetected when using conventional binocular indirect ophthalmoscopy.
- There are three key factors involved when performing scleral depression: the patient, the scleral indenter, and the examiner, all of which have to be in perfect alignment for successful indentation results.

EQUIPMENT PREPARATION

Clinical Tip No. 1: Choose Your Scleral Indenter

Choose a scleral depressor that feels the most comfortable and gives you the best control.[4] There are different types of scleral depressors: thumb thimble, double-ended pencil type, and cotton tip (Figure 2). The most common type of indenter has an S-curved shaft and a T-shaped tip. Ball-type tips, such as cotton-tip applicators, can be used, but are usually less comfortable for the patient. T-shaped tip indenters can come as a thimble type or a pencil type.

Those with narrower fingers may find that the thimble-style depressors are too loose and may prefer the pencil style for a steadier grip. The flat, T-shaped end of the S-type indenter causes minimal interference with the field of view and is often the instrument of choice for an effective and comfortable indentation. A cotton-tip applicator is a disposable and readily available instrument that can be a good choice for patients with ocular infections, because no sterilization is required. The correct orientation of the depressor is when the most elevated, "bumpy" side of the T-shaped tip is facing toward the patient's skin.

Clinical Tip No. 2: Choose Your Condensing Lens

The best choice of a condensing lens is the one that gives a wide field of view and optimum magnification, such as a +20 D lens or equivalent.[8] If the examiner wants to obtain the widest field of view possible, but with lesser magnification, then +28 D or +30 D lenses are great choices. As with performing BIO without scleral depression, the lenses are held with the most convex side of the condensing

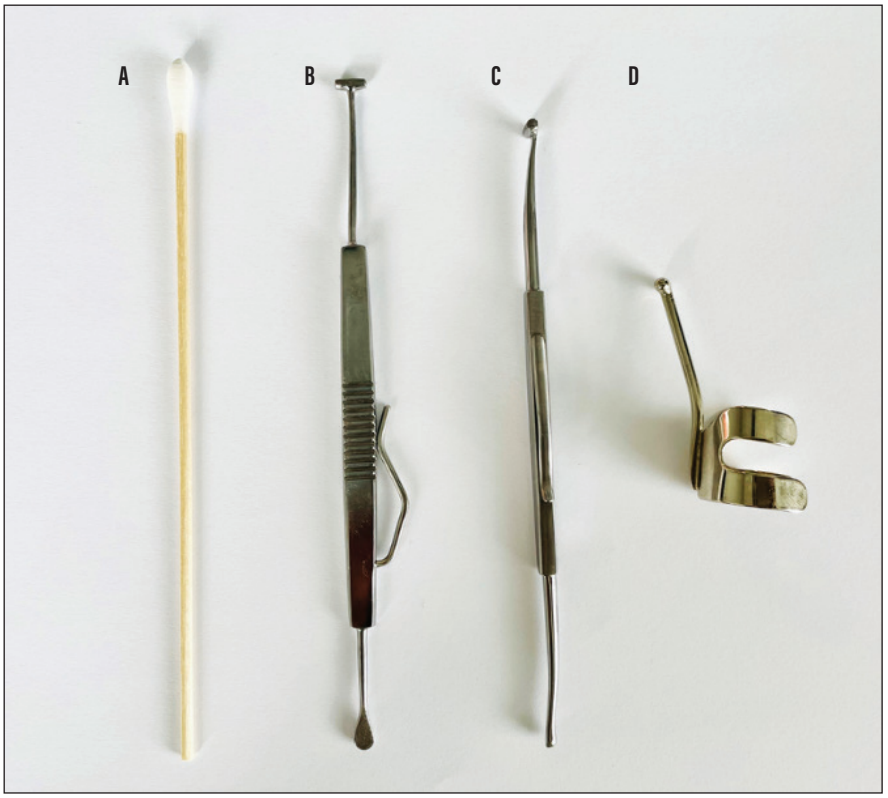

Figure 2. Various types of scleral depressors. Cotton-tip applicator (A), flat view of the double-ended S-type indenter [T-shaped tip at the top and ball-shaped tip at the bottom] (B), side view of the double-ended S-type indenter (C), and thumb thimble design (D).

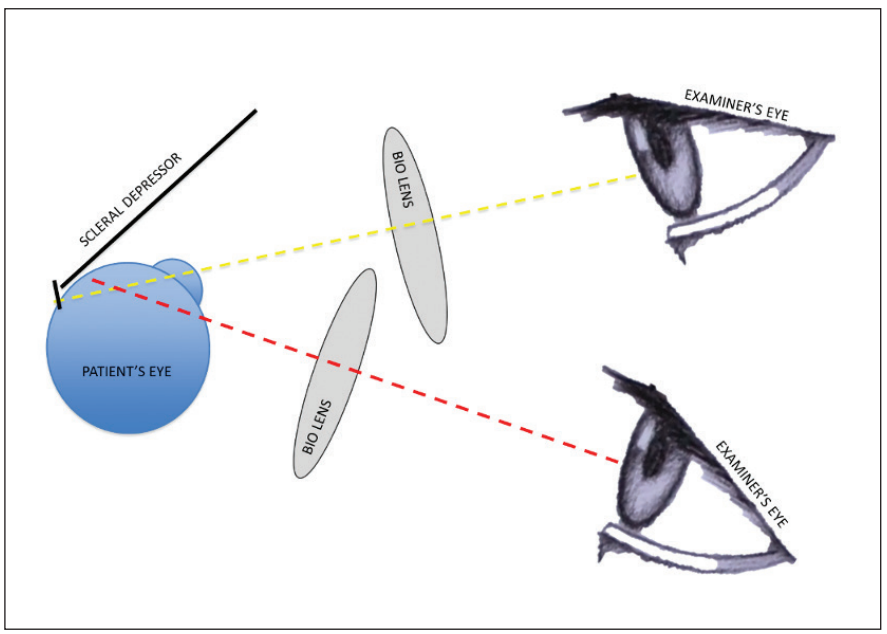

Figure 3. Maintain a straight line between the scleral depressor, patient's fixation, ophthalmic lens, and examiner's eye (yellow). More peripheral views can be achieved as the examiner moves lower and further away from the patient's fixation while maintaining the same straight-line alignment (red).

lens toward the examiner. Note: Most condensing lenses have a colored ring on the side that faces the patient.

Clinical Tip No. 3: Get Ready for BIO

Adjust so that the circle created by the BIO light fully coincides with the circle of the condensing lens held by the examiner. Initially, BIO should be performed under a dimmer light setting. Once the patient is accustomed to the light, it can be gradually turned up to achieve the best visibility of the indented sclera.

Clinical Tip No. 4: Adjust Room Light

To achieve sufficient contrast, the room should be dark, with a minimum amount of ambient lighting to avoid reflections.

PATIENT PREPARATION

Clinical Tip No. 5: Adjust Positioning

Proper patient positioning is critical. Even though scleral depression can be performed with the patient sitting up, examining patients in the supine position will result in more successful BIO views in all positions of gaze.[4] Tilting the patient back in the chair will also allow the examiner to look at the peripheral fundus without having to bend over.

Clinical Tip No. 6: Maximize Dilation

Prior to initiating scleral depression, the patient should be maximally dilated by instilling both 1% tropicamide and 2.5% phenylephrine. Good dilation allows the examiner to achieve better peripheral views.

Clinical Tip No. 7: Control Ocular Dryness

While undergoing scleral depression, the patient cannot blink; this can result in ocular surface dryness. Therefore, the examiner should apply artificial tears prior to and as needed during the procedure.

Clinical Tip No. 8: Consider Anesthetics

Most commonly, scleral depression is done through the eyelids and, if

performed correctly, should not cause sharp pain or significant patient discomfort. It is, therefore, most often performed without an anesthetic agent. However, using a topical anesthetic can make the exam easier and more comfortable for patients, especially those who are sensitive. Anesthetic agents are also required if the examiner performs transconjunctival depression by placing the indenter directly on the conjunctival surface for nasal and/or temporal views. If a topical anesthetic is used, it should be applied once, just before the start of the procedure.

EXAMINER PREPARATION

Clinical Tip No. 9: Practice

BIO in combination with scleral indentation is a fundamental technique in diagnosing peripheral retinal pathologies. Performing this procedure requires a skilled and experienced hand, a lot of dexterity, and a high level of competency.[8] To obtain clear views of the indented retina, a perfect alignment must be achieved between the patient, scleral depressor, condensing lens, and examiner.[8] This involves forming a straight line between the patient's direction of gaze, the placement of the indenter, and the orientation of the condensing lens (Figure 3). Scleral depression is a dynamic technique that involves careful manipulation of the indenter in order to evaluate the lesion of interest from various angles.[5] It is imperative that the examiner maintains proper alignment of this four-point optical system. Practicing this dynamic process consistently will improve examiner confidence, enhance diagnostic capabilities, and help ensure patient comfort during the procedure.

PATIENT CONSIDERATIONS

Clinical Tip No. 10: Guarantee Patient Cooperation

Successful scleral indentation is highly dependent on patient cooperation.[4] To obtain more peripheral views, the patient has to look more peripherally. Giving patients tactile clues by tapping their shoulder or forehead, or clearly verbalizing the direction where they should look can help align the patient with the examiner's line of sight. Examiners should also make sure patients are

TABLE. Indenter, Patient, and Examiner Alignment

LOCATION	POSITION OF INDENTER	PATIENT FIXATION	EXAMINER POSITION
Stationary Views			
Superior	Upper lid	Superior	Inferior
Superior-temporal	Temporal upper lid	Superior-temporal	Inferior-nasal
Superior-nasal	Nasal upper lid	Superior-nasal	Inferior-temporal
Inferior	Lower lid	Inferior	Superior standing behind the patient
Inferior-temporal	Temporal lower lid	Inferior-temporal	Superior-nasally standing behind the patient
Inferior-nasal	Nasal lower lid	Inferior-nasal	Superior-temporally standing behind the patient
Nasal	Nasal conjunctiva or slide indenter nasally from upper or lower lid	Nasally	Standing on temporal side of the patient
Temporal	Temporal conjunctiva or slide indenter temporally from upper or lower lid	Temporally	Standing on nasal side of the patient
Dynamic Views			
More peripheral views	More anterior (closer to the lid margin)	More peripherally	Lower and further away from the patient forming a perfect straight line
Less peripheral views	More posterior (further from the lid margin)	Less peripherally	More upright position, on top of the patient
More right	More left	Same fixation	Same fixation
More left	More right	Same fixation	Same fixation

> EVEN THOUGH SCLERAL DEPRESSION CAN BE PERFORMED WITH THE PATIENT SITTING UP, EXAMINING PATIENTS IN THE SUPINE POSITION WILL RESULT IN MORE SUCCESSFUL BIO VIEWS IN ALL POSITIONS OF GAZE.

comfortable during the procedure by instilling artificial tears and using anesthetic, when appropriate.

Clinical Tip No. 11: Consider Ocular Anatomy

There are anatomic variations between patients. Eyes with narrower palpebral fissure and more subcutaneous and/or pretarsal fat are more challenging to indent, thus requiring the examiner to apply more force, which makes the procedure less comfortable for the patient. There is also variability between a patient's positions of gaze. The resistance offered by the medial canthal ligament may cause indentation through the eyelid to be more challenging, thus often requiring a transconjunctival depression (ie, with the indenter placed directly on the conjunctival surface).[4]

Clinical Tip No. 12: Orient Patient Gaze

To obtain the best view of a retinal lesion and maintain straight-line alignment, the patient should look in the direction of the lesion, and the indenter should be placed in the same location on the patient's eyelid. For example, if the lesion of interest is located superior-temporally, then the patient should look superior-temporally, and the indenter should be placed superior-temporally (on the temporal portion of the upper lid). Thus, patients should always be looking toward the depressor (see Table).

SCLERAL DEPRESSOR CONSIDERATIONS

Clinical Tip No. 13: Place the Depressor

The indenter should be held firmly in the nondominant hand of the examiner and oriented with the "bumpy" side of the T-shaped tip toward the patient's skin. First, the patient should look in the opposite direction of the retina under examination so the indenter can be comfortably placed on the eyelid. Second, the indenter should be positioned on the border of the tarsal plate, about 5 mm to 10 mm away from the lid margin. Then, as the patient slowly shifts fixation toward the retina, the scleral indenter should follow along the eye and gently pull the lid with it.[9] At the end, it is important that the indenter is oriented tangentially to the globe and its tip is fully inserted in the lid fold (the "pocket").

Clinical Tip No. 14: Align Condensing Lens

Once the indenter is positioned in "the pocket," the condensing lens should be held in the dominant hand of the examiner and introduced perpendicularly to the straight-line alignment.

Clinical Tip No. 15: Apply Pressure Perpendicularly

Although the indenter should be oriented tangentially to the globe during scleral depression, pressure should be applied perpendicularly to the globe toward the center of the eye, rather than straight down into the orbital space. Scleral indentation should be performed only when the examiner has clear and steady views of the peripheral retina. Usually, only a small amount of pressure needs to be applied to achieve adequate views.[7] If the depressor is oriented perpendicularly to the globe, instead of tangentially, or if it is pressing on a muscle insertion, the patient will experience discomfort or pain.

Clinical Tip No. 16: Obtain Dynamic Views

Once the indented sclera is visible in the inferior portion of the condensing lens, the examiner can obtain cross-sectional views of the lesion by gently moving the depressor horizontally and vertically. Because the image seen within the BIO condensing lens is upside down and flipped left to right, moving the depressor to the right will move the image to the left, and vice versa. In addition, to indent more peripheral views of the retina (anterior), the depressor should be moved anteriorly toward the examiner and closer to the lid margin. Moving the depressor deeper into the "pocket," posteriorly, and away from the lid margin will indent the retina closer to the posterior pole (posterior). To prevent injury to the eye, the examiner should exercise caution and ensure careful manipulation of the depressor.

Clinical Tip No. 17: Establish a Systematic Approach

To perform a full 360° retinal examination, it is important to

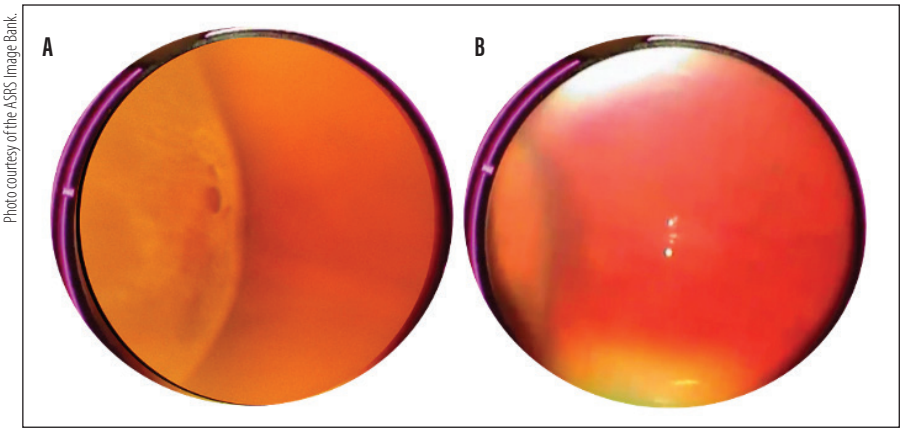

Photo courtesy of the ASRS Image Bank.

Figure 4. Examiner's view of the indented peripheral retina, including a retinal hole (A) and normal retina (B).
Note: Image has been modified from the original.

employ a systematic approach, focusing on one quadrant at a time. It is recommended to start superiorly, then move superior-temporally and superior-nasally. Examiners should then move inferiorly, inferior-temporally, and inferior-nasally. Obtaining views nasally and temporally can be challenging. The examiner may achieve better nasal/temporal views by performing scleral depression through the eyelid and "dragging" the upper lid to the 3:00 and 9:00 clock positions. Alternatively, employing a transconjunctival indenter placement should be considered for nasal/temporal views when the depressor is placed directly on the conjunctival surface.[4]

EXAMINER CONSIDERATIONS

Clinical Tip No. 18: Adjust Positioning

Similar to BIO, during scleral depression, the examiner should be positioned 180° from the retinal quadrant under examination. Adopting a routine, systematic approach will increase procedural efficiency. Because the patient will be placed in the supine position, the examiner will be moving around them. For example, in order to obtain superior views, the examiner should stand in front of the patient; whereas, to obtain inferior views, the examiner should be standing behind the patient. Examiners must always maintain the four-point, straight-line alignment and hold the BIO lens in their dominant hand and the scleral indenter in their nondominant hand. For examiners who are ambidextral and choose to switch between hands depending on the area of the retina to be viewed and the facial anatomy of the patient, it is recommended to practice holding the lens and the depressor in both hands to identify the most comfortable position.

Clinical Tip No. 19: Achieve Peripheral Views

It can be challenging to obtain clear and stable views of the periphery and ora serrata. Achieving these views generally requires coordinated efforts between the patient and the examiner. To obtain more peripheral views, the patient should look as far out to the periphery as possible, and the examiner should bend as low as possible to be in line with the patient and stretch their lens-holding arm further away from the patient. Because views within the condensing lens are flipped upside down, more peripheral retina will be seen in the lower half of the condensing lens. To achieve a wide and unobscured field of view, it is also important to open the nonindented patient's lid during the procedure. This is usually done using the ring or pointer finger of the hand holding the condensing lens. For example, when seeking to acquire superior views, the examiner should perform scleral depression through the upper lid while pulling down the lower lid of the patient.

Clinical Tip No. 20: Recognize Pathology

During scleral depression, the indented retina appears more white, resulting in a "white with pressure" appearance, highlighting the contrast between normal and abnormal retina (Figure 4). Stereoscopic 3D views help to examine retinal pathology from different angles. Subretinal fluid and vitreoretinal traction of a tear become more apparent and easier to diagnose.[5]

TAKEAWAYS

Scleral depression is a valuable clinical skill in ocular examination, facilitating the comprehensive assessment of the peripheral retina. When performed correctly, it is a safe and effective ophthalmic procedure. Mastery of this technique is essential for early diagnosis and effective management of a spectrum of retinal pathologies, which can preserve the visual function of the patient. ■

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