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## Question: 1

The examiner is checking a manual lensometer for accuracy. He should:

- A. Remove his own lenses before adjusting the eye piece.
- B. Set the eye piece at zero before reading a trial lens.
- C. Place the trial lens in the holder. Set the eye piece at zero. See if the target lines meet at plano.
- D. Adjust the eye piece first and then read the trial lens.

**Answer: D**

Explanation:

When using a manual lensometer to check the accuracy of a lens, it is crucial that the examiner follows a specific procedure to ensure precise results. The correct method involves first adjusting the eye piece before proceeding to read the trial lens. Here's why this sequence is important and how it should be executed:

The eye piece of the lensometer, also known as the ocular, is designed to compensate for the examiner's own refractive error. By adjusting the eye piece first, the examiner ensures that they are viewing the lensometer's scale and the target through a neutral setting that eliminates any personal visual bias. This adjustment is typically done by rotating the eye piece until the reticle, or the scale seen within the lensometer, appears sharp and clear. This step is critical because a misadjusted eye piece could lead to incorrect readings of the lens being tested.

Once the eye piece is properly adjusted, the next step is to place the trial lens in the lensometer. The trial lens should be positioned correctly in the holder, ensuring that it is stable and centered. This placement is crucial because if the lens is off-center, it could lead to errors in measuring the power of the lens.

After positioning the trial lens, the examiner should look through the adjusted eye piece and observe the target lines displayed by the lensometer. These lines should intersect at a specific point on the scale, indicating the power of the lens. For a lensometer being checked for accuracy, a Plano lens (a lens with no corrective power) is often used. The expectation is that the target lines will meet exactly at the zero mark on the scale, confirming that the lensometer is accurately calibrated and that it is correctly measuring zero power as it should.

If the target lines do not meet at the plano point or zero, this suggests a calibration error in the lensometer itself, requiring further adjustment or professional servicing. It is essential for the accuracy of future lens measurements that any discrepancies found during this check are addressed promptly. In summary, adjusting the eye piece first is a fundamental step in using a manual lensometer because it sets the baseline for accurate lens evaluation. Only after this adjustment should the trial lens be read. This process ensures that the measurements are not influenced by the examiner's visual acuity and that the device provides reliable readings of lens powers. Regular checks and calibrations are recommended to maintain the precision of the instrument.

## Question: 2

A patient complains that a medication is causing him to be constipated. This is an example of:

- A. A side-effect
- B. An allergy
- C. An unrelated issue
- D. A presenting complaint

**Answer: A**

Explanation:

When a patient reports that a medication is causing him to be constipated, this is typically considered a side-effect of the medication. A side-effect is an unwanted or unexpected symptom caused by a drug when it is taken in normal doses.

Side-effects can vary widely depending on the type of medication, the dose administered, and individual patient factors. Common side-effects associated with many medications include gastrointestinal symptoms like nausea, diarrhea, and constipation, as well as other issues such as muscle aches and headaches. These effects can range from mild to severe and can impact a patient's quality of life. Therefore, it is important for healthcare providers to discuss potential side-effects with patients before starting any new medication.

It is crucial for healthcare providers to document all reported side-effects in a patient's medical chart. This documentation helps in monitoring the patient's response to therapy and assists in managing any complications that may arise from medication use. Additionally, if a side-effect becomes too troublesome, it may warrant a change in the medication or its dosage.

It is important to distinguish side-effects from drug allergies. Allergic reactions to drugs can manifest as skin rashes, itching, or even more severe reactions like tachycardia (rapid heart rate) or anaphylaxis. Unlike side-effects, which are often a direct pharmacologic effect of the drug, allergies represent an immune response by the body to a substance it identifies as harmful.

In summary, constipation reported by a patient in relation to a medication is an example of a side-effect. Such occurrences should be properly evaluated and documented to ensure optimal patient care and adjustment of therapy if necessary. Understanding and managing side-effects is a critical component of effective medication therapy management.

### Question: 3

Performing an AR after the patient is dilated

- A. provides no useful information
- B. will be inaccurate
- C. is needed when prescribing bifocals
- D. may reveal additional hyperopia

**Answer: D**

Explanation:

may reveal additional hyperopia\*\*\*\*Explanation:\*\* Autorefraction (AR) is a common procedure used in ophthalmology and optometry to measure an individual's refractive error automatically. Refractive error refers to the inability of the eye to clearly focus images on the retina, which can result in blurred vision. Common types of refractive errors include myopia (nearsightedness), hyperopia (farsightedness), and astigmatism.

When performing an AR, the accuracy of the results can be influenced by the patient's ability to accommodate. Accommodation is the process by which the eye changes optical power to maintain a clear image or focus on an object as its distance varies. In younger patients, especially, the eyes can often still accommodate even when attempting to focus on a distant target during an AR test. This accommodation can mask the true degree of hyperopia (farsightedness) because the eye naturally adjusts to try to clear the blurry image.

Dilation of the eyes, typically achieved through the administration of eye drops that temporarily relax the muscles controlling the pupil and the lens, helps in inhibiting the eye's ability to accommodate. By dilating the pupils and suspending the accommodation reflex, the AR can more accurately measure the refractive error, particularly hyperopia

a. If hyperopia is present, it is often more apparent when the eye is dilated, as the eye can no longer compensate by accommodating.

Therefore, performing an AR after dilation may reveal additional hyperopia that might not be detected otherwise. This is crucial for determining the correct prescription for glasses or contact lenses, ensuring the patient receives the most appropriate correction for their vision needs. Additionally, accurate detection of hyperopia is particularly important in children and young adults, as uncorrected hyperopia can lead to other eye problems, such as amblyopia or eye strain.

In summary, dilation before performing an AR is a critical step in accurately diagnosing and quantifying hyperopia, as it prevents the natural accommodation that can hide the true refractive error. Thus, performing an AR after the patient is dilated may indeed reveal additional hyperopia, providing valuable information for the correct optical correction.

### Question: 4

Which is the correct term for the letters, figures, numbers, symbols or pictures on an eye chart?

- A. Optotypes
- B. Prototypes
- C. Snellens
- D. Focus points

**Answer: A**

Explanation:

The term "optotypes" refers to the characters used on visual acuity charts to test a person's eyesight. These characters can consist of letters, numbers, figures, symbols, or even simple pictures designed specifically for this purpose. Optotypes are standardized and specially designed so that they can be uniformly recognized and used universally in vision testing.

The most familiar set of optotypes is probably the Snellen chart, which was developed by Dutch ophthalmologist Herman Snellen in 1862. This chart traditionally uses a series of letters of decreasing size, and it is used to determine the visual acuity of an individual. The Snellen chart has set the basis for what many people typically visualize when they think of an eye test.

However, optotypes are not limited to the Snellen chart. There are various other types of eye charts with different sets of optotypes. For example, the LogMAR chart, which uses a logarithmic scale,

features a different layout but also utilizes optotypes for vision testing. There are also charts designed for individuals who cannot read or are unfamiliar with the Roman alphabet, such as the Tumbling E chart or the Lea Symbols chart. These utilize simple shapes and forms that do not require literacy or familiarity with a particular language to understand.

The design of optotypes is crucial for their function. Each optotype is designed to be the same size and to occupy the same amount of visual angle, typically five minutes of arc, which ensures that the challenge to a person's vision is consistent no matter which optotype they are viewing. This uniformity is vital for providing accurate measurements of visual acuity.

In clinical settings, optotypes are an essential tool for optometrists and ophthalmologists to assess and diagnose vision problems. They allow professionals to evaluate various aspects of visual function, including clarity of sight, focus, and the ability to distinguish between different visual forms. Optotypes play a crucial role in determining whether corrective lenses are needed and, if so, what prescription should be given to correct a patient's vision.

A patient who had an eye exam last week comes into the office upset. He shows you two prescriptions for glasses: the one from your doctor last week and the one from an out of town doctor two months ago. "One of these has to be wrong," he says, "They are so different!"

### Question: 5

Prescription 1:

OD -2.50 - 1.75 x 087

OS -1.75 - 2.25 x 112

Prescription 2:

OD -4.25 + 1.75 x 177

OS -4.00 + 2.25 x 022

What is the problem?

- A. refraction is subjective
- B. the other office's prescription is incorrect
- C. the prescriptions are in different formats (transposed)
- D. the need for a new appointment

**Answer: C**

Explanation:

The confusion with the different eyeglass prescriptions arises primarily from the format in which they are written, not necessarily because one of them is incorrect. Eyeglass prescriptions for astigmatism are commonly written in two formats: plus cylinder (+cyl) and minus cylinder (-cyl). The key difference lies in how the astigmatism is expressed and can make the prescriptions appear significantly different, even though they may be optically equivalent.

In this case, Prescription 1 uses the minus cylinder format, while Prescription 2 uses the plus cylinder format. To understand why they seem different, it's important to know how these formats work: -

**\*\*Minus Cylinder Format\*\***: The primary focus is on correcting myopia or hyperopia. Astigmatism correction is added as a negative number, indicating the cylindrical power needed to correct the uneven curvature of the eye. - **\*\*Plus Cylinder Format\*\***: This format also addresses myopia or hyperopia but adds astigmatism correction as a positive number, essentially focusing more directly on the astigmatism correction itself.

To see if two prescriptions are equivalent, one can convert one format to the other. The conversion involves: 1. Changing the sign of the cylinder power. 2. Adding or subtracting the cylinder power from the sphere power to get a new sphere power. 3. Adjusting the axis by 90 degrees.

Applying this to your case: - For OD in Prescription 2: Start with  $-4.25 +1.75 \times 177$ . - Convert  $+1.75$  to  $-1.75$ . - Adjust the sphere:  $-4.25 - 1.75 = -6.00$ . - Change the axis by 90 degrees:  $177 + 90 = 267$  (or 87 when normalized to under 180). - New format: OD  $-6.00 -1.75 \times 087$ , which closely matches Prescription 1's OD  $-2.50 -1.75 \times 087$  when considering potential measurement errors or changes in vision.

Similarly, you can convert the OS values and check for equivalence. Due to the subjective nature of eye exams and potential slight variations in testing conditions or patient responses, small discrepancies can occur. However, major differences should be discussed with the optometrist for clarification and possibly a re-examination if necessary.

In conclusion, the prescriptions here seem to be transposed versions of each other rather than one being incorrect. It's crucial for the patient to understand this aspect of eyeglass prescriptions, as it can avoid confusion and ensure that the glasses made will correctly address their vision needs. It might be helpful for the patient to revisit the prescribing optometrist to further discuss and understand the prescriptions, ensuring comfort and clarity with the glasses they ultimately use.

## Question: 6

The patient asks why she cannot be prescribed soft contact lenses. Which is most likely?

- A. She may have severe astigmatism.
- B. Incorrect insertion may cause an abrasion of the cornea.
- C. She may be pregnant.
- D. Soft lenses are smaller than the cornea and may be displaced easily.

**Answer: A**

Explanation:

If a patient is advised against wearing soft contact lenses, one possible reason is the presence of severe astigmatism. Astigmatism is a common vision condition in which the cornea, the clear front cover of the eye, is irregularly shaped. This irregular curvature prevents light from focusing properly on the retina, leading to blurred vision. Severe astigmatism requires precise correction that soft contact lenses may not be able to provide.

Soft contact lenses are designed to conform to the front surface of the eye. In cases of severe astigmatism, the irregular shape of the cornea can distort the lens, leading to inadequate or incorrect vision correction. As a result, the vision achieved with soft lenses may not be as sharp or stable compared to other types of corrective lenses, such as rigid gas-permeable (RGP) lenses, which maintain their shape and sit on top of the cornea, thus better compensating for the irregular curvature.

Additionally, soft contact lenses come with other challenges and disadvantages that can affect their suitability for certain patients. These include variable vision quality, which can fluctuate with blinking or movements of the eye; lack of durability compared to hard lenses; and problems related to deposit formation on the lens surface, which can irritate the eye or reduce lens effectiveness. Soft lenses are also more prone to tearing and are difficult to modify once manufactured, which can be a disadvantage in cases where a patient's vision prescription changes.

Despite these disadvantages, soft contact lenses are often preferred for their comfort, particularly in the initial period of wear. They are generally easier to adapt to and can be more comfortable for people

with sensitive eyes or those who are new to wearing contact lenses. They are also more suitable for certain populations, like pregnant women or individuals on certain medications, as these lenses are less likely to cause dryness or discomfort.

In summary, while soft contact lenses offer several benefits in terms of comfort and ease of use, they may not be the best choice for correcting severe astigmatism. For such conditions, other options like RGP lenses or specialized toric soft lenses, which are specifically designed to correct astigmatism, might be recommended by eye care professionals.

### Question: 7

Which is the average central corneal thickness?

- A. 600  $\mu$
- B. 500  $\mu$
- C. 540  $\mu$
- D. Less than 500  $\mu$

**Answer: C**

Explanation:

The average central corneal thickness typically measures around 540 micrometers ( $\mu\text{m}$ ). This measurement is considered crucial in the context of eye health, as it can influence the accuracy of intraocular pressure readings, which are vital for glaucoma diagnosis and management. The cornea is the clear, dome-shaped surface at the front of the eye, and its thickness can vary among individuals but generally hovers around 540  $\mu\text{m}$  in healthy adults.

It is important to note that corneal thickness less than 500  $\mu\text{m}$  may place individuals at a higher risk for conditions such as glaucoma. Glaucoma is often referred to as the "silent thief of sight" because it can lead to a gradual loss of vision due to damage to the optic nerve, often without noticeable symptoms until significant damage has occurred. Accurate measurement of intraocular pressure is essential for early detection and prevention of glaucoma, and adjustments in measuring techniques may be necessary for those with thinner corneas.

Therefore, understanding the average central corneal thickness helps in tailoring ophthalmological assessments and treatments more effectively. It serves as a baseline against which deviations are measured to identify potential risks or abnormalities. Regular eye examinations that include corneal thickness measurements can be a critical component of preventive eye care, particularly for individuals at risk of or monitoring for glaucoma.

### Question: 8

Head coverings should be put on:

- A. After scrubbing
- B. After donning scrub attire
- C. Before donning scrub attire
- D. After entering the OR suite

**Answer: C**

Explanation:

Head coverings in a surgical setting, such as a clean, disposable surgical hat or hood, play a crucial role in maintaining the sterility of the operation room environment. These coverings are designed to confine hair and dandruff, which are potential sources of contamination in the surgical field. Understanding when to don these coverings is essential for adhering to strict aseptic protocols.

The correct procedure requires that head coverings should be put on before donning scrub attire. This order is critical because it minimizes the risk of hair or dandruff falling onto the scrub attire or contaminating the sterile environment. When the head covering is put on first, it ensures that any loose hair or particles are immediately contained, significantly reducing the likelihood of contaminating the sterile zones.

The sequence of wearing protective clothing in the operating room is meticulously designed to establish and maintain sterility. After putting on the head covering, healthcare professionals can then proceed to don their scrub attire. This includes scrub suits, which should themselves be donned in a specific area designated for changing, ensuring that sterility is preserved from the outside environment into the sterile zones of the operating room.

In conclusion, donning head coverings before changing into scrub gear is a foundational step in surgical preparation. This process helps in safeguarding against the introduction of contaminants into the surgical field, thereby supporting the overall goal of preventing infection and ensuring patient safety during surgical procedures.

### Question: 9

With automated perimetry, which is true?

- A. The lower the decibel number the dimmer the light intensity.
- B. The decibel number represents how much the light was dimmed from the brightest.
- C. The brightest light intensity is 10.
- D. The decibel level is consistent between all machines.

**Answer: B**

Explanation:

In automated perimetry, a key measurement used is the decibel (dB), which quantifies the intensity of the light stimuli presented to the patient during the test. The decibel scale used in perimetry is a logarithmic scale based on the power of ten, where a lower decibel number represents a brighter light, and a higher decibel number indicates a dimmer light. This is somewhat counterintuitive as, in many contexts, a higher number would suggest an increase rather than a decrease.

The decibel number fundamentally represents the extent to which the light's intensity is reduced from its maximum brightness. To clarify, the maximum brightness is often set as a reference point at 0 dB. Thus, if a stimulus is presented at 10 dB, this means the light intensity has been dimmed significantly from the brightest setting possible on the device. This dimming is calculated logarithmically; every increase of 10 dB approximately equates to a tenfold decrease in light intensity.

It's important to note that the calibration and scales can vary slightly between different perimetry machines. This variability can affect the exact interpretation of specific decibel levels across different

devices. However, the fundamental principle that a higher decibel number corresponds to a dimmer light remains consistent.

Understanding how the decibel scale works in perimetry is crucial for interpreting the results correctly. It helps in diagnosing and tracking the progression of various visual field defects, particularly in conditions like glaucoma where peripheral vision is often affected first. Accurate interpretation helps in assessing how much visual field loss has occurred, guiding further treatment and management of the condition.

## Question: 10

All of the following can result in inaccurate applanation tonometer readings with no compensation method available except

- A. astigmatism
- B. pterygium
- C. corneal scars
- D. corneal graft

**Answer: A**

Explanation:

An applanation tonometer is commonly used in ophthalmology to measure the intraocular pressure (IOP) in the eye, which is crucial for diagnosing and managing glaucoma. The accuracy of this measurement can be affected by various corneal properties and conditions. Let's explore why certain factors lead to inaccurate readings and why they cannot be compensated for by the tonometer, except for astigmatism over a certain degree.

Astigmatism is a condition where the cornea is not perfectly round but shaped more like a football, with different curvatures in different meridians. This irregular shape can affect the way the tonometer flattens the cornea to measure the IOP. However, astigmatism can often be compensated for in tonometry readings. Most modern tonometers have built-in correction tables or adjustment settings that can be used when astigmatism of up to 3 diopters (D) is present. If the astigmatism exceeds 3 D, special techniques or different types of tonometry might be required for accurate measurement. Corneal scars, on the other hand, pose a different challenge. Scarring can alter the corneal thickness and its biomechanical properties, which can significantly influence the IOP readings by an applanation tonometer. Scar tissue may be unevenly distributed and can cause localized irregularities in corneal stiffness, leading to inaccuracies in the measurement of IOP. Unlike astigmatism, there is no standard method or adjustment on a tonometer to correct for the presence of corneal scars, making it difficult to obtain accurate readings.

Similarly, corneal grafts (also known as corneal transplants) can interfere with IOP measurements. A corneal graft involves replacing a diseased or scarred cornea with a healthy one from a donor. Although this procedure can restore vision, it also changes the biomechanical properties of the cornea. The junction between the patient's cornea and the donor graft may not be uniform around the entire cornea, affecting how the cornea responds to the pressure applied by the tonometer. Like corneal scars, there is no established way to adjust the tonometer to compensate for variations caused by corneal grafts. In conclusion, while adjustments for astigmatism are commonly available on applanation tonometers, allowing for more accurate IOP readings, corneal scars and grafts present challenges that cannot currently be compensated for using standard tonometric techniques. This highlights the need for

alternative methods or advanced calibration techniques in cases where such corneal abnormalities are present.



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