

Improving Visualization and Ergonomics for the Hygienist

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Technological advances and awareness of the benefits of visual enhancement devices have contributed to improved clinical diagnosis, assessment, and treatment. Properly designed visual enhancement devices address ergonomic concerns and enable users to work at safe, comfortable distances, potentially lengthening careers. An increasing number of dental hygiene education programs have also integrated magnification into the curriculum. As a result, graduates are entering the hygiene profession with a heightened understanding of the ergonomic and treatment benefits attainable with magnification devices.

Factors Affecting Performance

Microscopes, endoscopes, loupes, and telescopes all provide visual enhancement through magnification. Loupes and telescopes are most frequently utilized in the dental office.

In addition to magnification device selection, a number of factors affect the performance of visual enhancement instruments:



your physical health

1. Magnification.

Magnification is the visual enhancement provided by a device (eg, 2.0x, 2.5x, 3.5x).

Single-lens magnifiers, also known as "cheaters" or simple loupes, refer to the diopter strength (eg, +2.00), rather than the magnification power. As magnification increases, the field size and depth of field decrease. Several models, therefore, should be evaluated prior to making a final selection. In addition, the dental professional should inquire as to the trade-in or return policy of each manufacturer before deciding on a system.

2. Field Size.

Field size describes the area that can be viewed through a visual enhancement system. Through-the-lens (TTL) telescopes will provide a wider field of view than flip-up telescopes since the telescope is closer to the eye. Systems with lower magnification

TABLE. Magnification System Manufacturers

Product	Company	Website
BDR Loupes	Designs for Vision	www.designsforvision.com
G3, G6 Microscope	Global Surgical	www.globalsurgical.com
Pearls Galilean Loupes	Orascoptic	www.orascoptic.com
Royal Vision Loupes	Royal Dental Group	www.royaldentalgroup.com
2.5x Loupes	SheerVision	www.sheervision.com
Front-Lens-Mounted Telescopes	Surgitel	www.surgitel.com
Vision GF Loupes	Carl Zeiss, Inc.	www.zeiss.com

may provide a wider field, but do not offer the visual acuity and enhanced visualization of more advanced higher magnification devices. A device that affords a minimum of a quadrant of field size should be considered.

3. Focal Length or Working Distance.

Ideally, a manufacturer will measure the user's personal working distance (the distance between the plane of the eye and the surface being treated) and then construct the device to focus at a distance that places the individual in a proper ergonomic position. Some systems offer a range of working distances; however, the correct focal length is the most important feature to ensure an ergonomically beneficial visual enhancement system. The manufacturer should also be consulted concerning their policies for customizing and adjusting the working distance, if needed.

4. Depth of Field.

As magnification increases, the depth of field decreases. Excess depth of field may actually counteract ergonomic goals, since this may result in poor working positions. Hence, magnification devices that provide at least 4" of depth should be selected. In addition, depth of field is affected by the magnification of a device.

5. Peripheral Vision.

The user should be able to maintain eye contact with the patient and visualize the chart without removing or flipping the telescopes. This will also save the time required to decontaminate flip-ups or to replace flip-up paddles for each patient.

6. Weight.

Since the devices will be worn throughout the workday, it is essential to ensure that they are comfortable. TTLs typically weigh less and are more properly balanced than flip-ups. It is worthwhile to evaluate the "feel" of a system without a counterbalance strap in place. In addition to comfort, the telescopes should provide adequate protection from spatter.

Conclusion

The integration of magnification has enabled oral healthcare professionals to more effectively visualize the oral cavity, enhancing clinical performance and improving treatment assessment. It has also allowed clinicians and hygienists to maintain and potentially lengthen their careers by reducing the physical demands often associated with a typical workday. □

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