

Demystifying Magnification

Cathy G. Richardson, RDH, MBA

Technology continues to change the shape of dentistry and clinical dental hygiene. Not surprisingly, magnification systems are now the standard for dental hygienists rather than an option. With the introduction of any new procedure, material, or equipment, professionals expect to hear the pros and cons regarding effectiveness and overall feasibility. New technology brings positive changes—and challenges—to clinical dental hygiene practice.

The current trend of using magnification in dental hygiene practice brings significant positive change. While incorporating the use of optical loupes into your practice will significantly improve visual acuity and ergonomics, thereby reducing eye-strain and musculoskeletal injuries, it also presents the challenges of adapting to a new way of seeing and learning how to use optical loupes effectively.

As a 20-year dental hygiene veteran (now working full-time helping dental hygiene students and practicing dental hygienists incorporate magnification into their school programs and clinical dental hygiene practices), I frequently encounter some misconceptions about magnification. Let's dispel these common

myths and get to the facts.

Myth 1: Using Magnification Will Harm Vision

Dental hygiene skills require an exceptional level of precision and accuracy. Viewing and evaluating small details of teeth, soft tissue, and instruments requires a high level of visual acuity. Normal vision may

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seem adequate to some, but it promotes poor posture when a dental hygienist leans in to focus better. On the other hand, wearing optical loupes significantly increases image size and provides improved visual acuity at a greater focal distance, allowing for an ergonomically correct body position, less strain, and fewer repetitive-use injuries.¹

Although the benefits of optical

loupes are clear, some clinicians still fear that after wearing magnification loupes over time, their natural vision will be harmed. However, rather than adding strain and stress to the eyes, magnification serves to enhance detail and reduce strain. The ciliary muscle surrounding the eye must continually constrict and expand to accommodate distance and clarity. Incorporating magnification reduces the strain that this eye muscle experiences. Eyes easily and naturally readjust between normal vision and magnification, just as eyes readjust to normal vision after having been dormant during sleep.²

Myth 2: Through-the-Lens or Fixed Loupe Systems Are Better

Many advantages and disadvantages of fixed lens or through-the-lens (TTL), as well as flip-up designs, have been published.^{3,5} Until recently, product weight has been the primary advantage of TTL over flip-up designs. However, according to the latest selection guide provided for dental hygienists, the weight issue has been addressed and there are flip-up design loupe systems now available that are actually equal in weight to most fixed lens or TTL designs.⁶ Frame material and size, as well as

prescription lens thickness, also should be considered within the context of system weight so that you are comparing apples to apples between different loupe systems.⁶

Angle of declination refers to the angle of the declined eye when viewing the patient's mouth through magnification loupes. This particular concept should be heavily considered because it has a direct effect on the user's posture. Surveys and interviews report that dental hygienists most commonly complain of pain in the neck, shoulders, and lower back.⁷ With this in mind, the angle of declination provided by a loupe system should be flexible and allow the clinician to work from his or her optimal working posture at all times with regard to balanced posture.

Problems that can eventually result from using a magnification system with an inappropriate angle of declination are eye strain and/or strain in the musculature of the head, neck, and/or back, and from placing the eyes in a position unprotected from flying debris.⁴ An improper angle of declination with any loupe system can result in the clinician tipping his or her head up or down to see the working field. The angle of declination with a TTL loupe system is fixed based on preset distances and angle ranges, while a flip-up loupe system allows the clinician to adjust the angle of declination along with changes in patient or operator seating position.

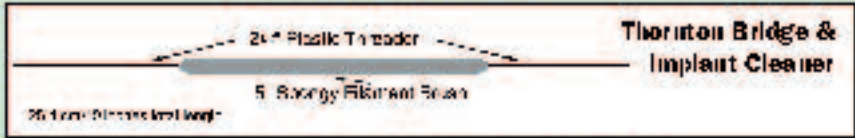
Another consideration of a loupe system is overall cost and convenience. A TTL magnification loupe typically costs more because of the specifications in the mounting of the optics.^{6,8} Any prescription changes with TTL loupes must be returned to

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Cathy is a dedicated professional with a diverse track record in the dental industry. She currently serves as southeast regional sales manager for the dental hygiene division of Sheervision. Cathy's professional experience includes clinical hygiene practice and education and practice management consulting. She is a member of the American Dental Hygienists' Association and serves as an ADHA delegate and past president of the Atlanta Dental Hygienists' Society in Georgia. Cathy welcomes comments at (770) 622-0659 or cathyrdhmba@aol.com.

the manufacturer for refabrication and remounting of the new lenses. The flip-up design allows the user to have prescription changes performed at his or her convenience through a local vision center. Most flip-up loupe prescriptions can be replaced in an hour or overnight, eliminating the need to go without magnification.

Asepsis and the likelihood of cross

contamination also must be considered. Not all procedures are performed with magnification, but still require some form of eye protection. Communicating with patients, writing up treatment charts, choosing tooth shades, and taking radiographs and diagnostic casts are a few of the procedures not requiring magnification. Flip-up magnification loupes

allow the clinician to safely move the optics out of the line of vision with a removable, sterilizable flip handle. This prevents unnecessary removal of eye protection and avoids breaking the aseptic chain.^{1,8} With TTL or fixed lens systems, some clinicians are not opposed to replacing their loupes with corrective prescription lenses or other eye protection when magnifica-

tion is not necessary.

Magnification system choice should be based on the ability of the loupes to meet the clinician's needs rather than forcing the clinician to make compromises to fit the optics. It is not simply a matter of accepting one person's choice or opinion as "the best" but, rather, evaluating several loupe systems and making the choice based on personal requirements and preferences.

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Myth 3: Loupe Systems Are Only for Older Dental Hygienists and Those with Visual Impairments

Many dental hygienists assume that enhanced vision is the only benefit of magnification. I have overheard several students and practicing dental hygienists make the remark that "my vision is 20/20 and I'll look into using loupes when I get older." Unfortunately, they perceive the use of magnification as a sign of aging. Contrary to this belief, magnification loupes make an immediate and permanent improvement in a clinician's technical abilities by providing better imaging and visualization and less physical stress, regardless of age.^{1,2,5}

Even dental hygienists without vision restrictions can suffer from severe eye strain as a result of working in a small, confined area with limited lighting over long periods of time. For these clinicians, magnification will enable them to see fine detail with more clarity.

Ergonomically correct posture is another benefit that younger clinicians tend to overlook. Despite their 20/20 vision and the idea that dental hygienists only work through tactile sensitivity, dental hygienists will constantly find themselves contorting their bodies into uncomfortable positions to access hard to reach areas of the mouth. At this point, it is no longer a question of age or visual ability—prolonged, awkward working positions can develop into work-related musculoskeletal disorders for dental hygienists of any age.⁷

Myth 4: Wearing Magnification Loupes Will Slow Down Clinical Procedures

Magnifying loupes assist dental professionals by producing higher quality dentistry while actually decreasing operating time.² As with any new procedure, there is a learning curve to using magnification in

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the clinical setting. So, yes, there will be a minimal period of time in which one feels intimidated and insecure, but this time frame does not support the elimination of loupes from daily use.

Loupes can enhance diagnostic and treatment procedures, and boost production because of less eye, neck, and back strain. Many dental hygiene

schools have already responded to the visual and ergonomic benefits of magnification by strongly encouraging, and even adopting, policies requiring students to wear optical loupes. It is important to note that a study of dental students performing fixed prosthodontic procedures while using magnification were found to have committed half as many errors

as students who performed the same procedures without the aid of magnification.⁹ Another study concluded that routine users of magnification have a more positive view of magnification than nonusers.¹⁰ In other words, routine use of magnification was found to increase as the practitioner gained more experience.¹⁰

Results of these independent stud-

ies confirm that the adjustment period for using a magnification system is rewarded with reduced stress, improved visual acuity, fewer posture related injuries, and a higher quality, more efficient, and more effective standard of patient care.

Myth 5: To Get a Quality Loupe, Pay More Money

Although many clinicians believe that good loupes have to be expensive, it is absolutely untrue. The quality of a loupe system is determined by the materials used, design, and quality of the optic itself. Magnification loupes are not a standardized product—each loupe system is not identical or an exact substitute for another.² Not all optical lenses are ground and inspected to the same levels of quality.¹ Attention should be given to several determining factors of quality when selecting a magnification system. Plastic or acrylic lenses cannot reproduce the same distortion-free, corrected image that a glass optic provides. Purchasing a glass optic that is consistently and finely ground with a specialized lens coating is important to minimize light scatter and reflection. Lens correction for chromatic and spherical aberrations is necessary to attain clarity and high image resolution. Not all loupe manufacturers display these features in their products.^{2,5,10}

Magnification power is only one of the features that determine the field of view. Because there are no standards for labeling image size, be aware that different loupes may not offer the same field of view based on magnification power. The field of view also depends on the size of the barrel openings at either end and may not produce the same field of view as another similarly labeled product. The magnifying loupe that offers clear resolution with the widest field of view for the desired level of magnification is the best choice.

The depth of field is another feature that is important to evaluate. Each loupe system may have a different depth of field than another system, even at the same magnification power, because of manufacturing processes and lens design. The product that provides the greatest depth of field is always preferred.

Based on my business perspective, merely addressing the features of a quality loupe should not end your search. Many dental hygienists assume that all loupe companies offer

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the same standard benefits. Dental hygienists must consider the quality of the warranty and continued customer support offered by the manufacturer. Magnification systems are a career investment. Evaluate customer service and technical support as you would when you make other large purchases:

- Does the company offer educated dental hygiene consultants to assist you in your learning curve and beyond?
- Who will you contact with dental hygiene related questions?
- What is their response time?
- Are they genuinely motivated to provide superior support and product satisfaction?
- Does the warranty meet the needs of a career investment?
- What is the trial period and are there hidden costs, such as restocking fees, associated with returns?
- Will you be charged for additional accessories?

As previously addressed, magnification systems are now the standard for dental hygiene care. In response to this demand for loupes, we've seen an incredible increase in the number of loupe companies targeting their

products to dental hygienists. This is one of the basic fundamentals of our supply-and-demand-driven economy.¹¹

In the absence of competition, some publicly owned companies may have positioned their products at higher prices to accommodate their stockholders and management-centered company structures. Now that the playing field has changed, they may no longer be able to compete in the marketplace with their current product and pricing. To increase their market share with dental hygienists, some companies may offer a different version of a loupe system, often of a different quality, to the dental hygiene target market at a lower cost.

Dental hygienists are known for being detail-oriented and asking lots of questions, so, don't stop now. Ask questions about dental hygiene loupes to determine if these are the same quality optics that the company sells to dentists, surgeons, and other health care professionals. Because the market has taken this new direction with regard to dental hygienists, direct manufacturers and distributors are able to bring quality magnification systems into the marketplace at lower prices than once offered by

large, publicly owned companies. This business model of selling directly to the end-user reduces the middleman and the associated costs, thereby reducing the price to the dental hygiene consumer.

In essence, one shouldn't always confuse the lower price as a direct sign of inferior product quality. Using this direct business model and simplified distribution channels enables a loupe company to sell a top-quality product at a price far below its competitors.

Look Beyond the Myths to Get the Facts

Clearing up misconceptions about magnification allows the practitioner to choose a quality optical loupe for its optical purity, ergonomic benefits, and comfort. Just as you would educate your patients to dispel unfounded beliefs about dental treatment, prepare yourself with all of the facts regarding magnification systems before drawing conclusions. Your ability to offer the best quality dental hygiene care while improving the longevity of your career may depend on incorporating a quality loupe system into your practice. **COH**

Disclosure

The author is an employee of Sheervision.

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COH Columnist Receives 2005 ADHA Distinguished Service Award

Kristy Menage Bernie, RDH, BS, is a recipient of the American Dental Hygienists' Association's (ADHA) 2005 ADHA Distinguished Service Award. The award recognizes outstanding achievement and dedication to the dental hygiene profession. Kristy has more than 20 years of professional experience and she is *COH's* Politics of Independence columnist.

Kristy has had a long relationship with the ADHA and its affiliates—she is a past president of the California Dental Hygienists' Association (CDHA), a CDHA delegate to the ADHA, a member of the ADHA Council on Public Re-

lations, and she has served as the Student American Dental Hygienists' Association council chair.

According to the application submitted by the CDHA, here are a few of the many reasons why Kristy was nominated for and received the 2005 ADHA Distinguished Service Award:

- "Our constituent would not be where it is today without the dedicated and committed leadership of our nominee."
- "Community service continues to be a hallmark of our nominee's dental hygiene career."
- "Our nominee is dedicated to advancing the art and science of dental hygiene." Finally,



Figure—Kristy Menage Bernie, RDH, BS, proudly displays her 2005 ADHA Distinguished Service Award. To her left is Lin Sarfaraz, RDH, president of the CDHA; to her right is Michelle Hurlbutt, RDH, BS, immediate past president of the CDHA.

- "Our nominee works for the preservation and progression of our profession...across the country..."
Congratulations on your award, Kristy!