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Enhanced Magnification For Clinical And Laboratory Acuity During Prosthetic Restoration Fabrication

As appeared in *Collaborative Techniques*, Spring 2002

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Enhanced visual acuity is paramount to successful diagnosis, treatment planning, fabrication, and the provision of a durable aesthetic restoration. While the use of advanced magnification has traditionally been associated with endodontic procedures, recent developments in the ergonomic design of many operating microscopes (OPMs) have resulted in their increased application for routine clinical and laboratory procedures. In a recent interview, COLLABorative Techniques and Jeffrey C. Hoos, DDS, discussed the application of enhanced magnification devices for clinical and laboratory acuity. The following is a presentation of the interview:



COLLAB: *How have recent developments in the ergonomic design of many OPMs resulted in their increased application for routine laboratory and clinical procedures?*

Hoos: In the beginning of microscopy for dentistry, dental professionals were forced to use other industry's microscopes for applications in dentistry. Therefore, professionals had to compromise their positioning. Now that microscopes are becoming more accepted, companies are understanding that dentistry requires the proper positioning of the patient and - more importantly - the proper positioning of the dentist so that he or she can be in an ergonomic position for comfort.

COLLAB: *Why is enhanced visual acuity paramount to successful fabrication and the placement (ie, seating) of a durable aesthetic restoration?*

"Advanced magnification can be applied for every clinical application - from routine to complex procedures. The use of OPMs increases visualization by providing a series of magnification, from low to high power, so the clinician and technician have a versatile range of acuity, without changing position or loupes."

- Arturo Garcia, DDS

Hoos: As dental professionals mature, they begin to realize that improved visualization will result in their increased ability to provide improved dentistry. Many practitioners generally start out using low levels of magnification (eg, x2.5) and realize that enhanced acuity will only improve the degree of excellence provided. The level of magnification is then gradually increased to X3.5 or X4.5. With the introduction of OPMs, the professional is provided with even more detailed visual acuity. Therefore, the clinician can be assured that the margins are finished correctly and your restorations are fully seated.

COLLAB: *How does enhanced visualization of preparations facilitate accurate restoration?*

Hoos: Ideal preparation designs provide sharp detail, adequate reduction for the bulk of the restorative materials, and smooth contoured margins that are consistent with the gingival architecture. Improved visualization of the interproximal and subgingival regions has resulted in reduced iatrogenic failure of prosthetic restorations, as well as the immediate identification and reparation of surface defects that may

have been caused by carious defects, fractures, bur skipping, diamond grit scratches, or structural irregularities from previous preparations. The use of advanced magnification allows the timely detection of such surface defects that may have otherwise compromised the longevity of a restoration, and these complications can be addressed prior to impression capture.

COLLAB: *What elements of impression taking are improved by enhanced magnification? How is communication between the clinician and technician enhanced by the accurate detail communicated by these impressions?*

Hoos: By utilizing an OPM, the clinician is able to better visualize critical parameters and, because of this enhanced visualization, the professional can now determine if the information communicated by an impression is accurate. Impressions can be inspected once they are captured to accurately communicate critical parameters. Immediate inspection allows the clinician to determine if any preparation inadequacies (eg, unwanted bevels, undercuts, sharp transition line angles, roughness at the margin) exist that may compromise the final restoration, and if these structural imperfections can be rectified prior to the transfer of data to the laboratory technician.

COLLAB: *How is the provisionalization stage enhanced through the use of advanced magnification?*

Hoos: The provisional stage is critical when providing complex restorations because of the need for tissue management and the development of aesthetic contours. By utilizing the microscope, provisional restorations can be placed with the utmost detail, and enhanced tissue management (eg, ovate pontic development, gingival readaptation) can be facilitated. The use of OPMs also allows the clinician to see if the provisional restorations are polished correctly, therefore eliminating gingival irritation.

COLLAB: *How has the use of increased visualization via loupes and advanced magnification devices facilitated the provision of complex, laboratory fabricated restorations?*

Hoos: By working as a team, the laboratory technician and clinician can effectively communicate critical parameters and ensure provision of an accurate, precise restoration. The increase in visual acuity through the use of a microscope in the laboratory assures that the technician can deliver high-quality restorations with precise marginal integrity. Precision handling

"The use of a microscope helps the clinician and technician achieve balance between the ART, SCIENCE, and BUSINESS of dentistry. Having the opportunity to visualize the preparation, fabrication, and placement of restorations fulfills the art. Using science-based principles for design and cementation helps ensure longevity. Providing prosthetic replacements that offer aesthetics and longevity for our patients give our practices important business growth and profit."
- Jeffrey C. Hoos, DDS

of the laboratory fabrication results in fewer redesigns, and the incorporation of magnification will enhance the technician's ability to inspect the final impression, select individual die segments, and trim dies.

COLLAB: *How has the use of advanced magnification facilitated the final laboratory assessment, fabrication, and finishing procedures?*

Hoos: By being able to see the margins in great detail, the laboratory can then finish the margins to its final seating point with the utmost assurance that they've done a magnificent job. Marginal finishing techniques and the removal of refractory materials are also facilitated by the incorporation of advanced magnification, and delicate porcelain margins can be better protected during the polishing procedures by the operator's ability to more clearly visualize small, thin structures.

COLLAB: *How does the use of magnification devices allow precise marginal adaptation of laboratory fabricated restorations?*

Hoos: Being able to see your work in fine detail allows you to be able to finish your work to the utmost detail. By providing a sealed margin (ie, marginal adaptation), the dental professional can be sure that the minimum amount of cement or bonding resin agent is used to ensure an excellent final fit. Therefore, clinicians do not have to worry about marginal breakdown, and prosthesis will last much longer so long as this parameter is addressed.

CONCLUSION

Precise visualization of the restorative interface is essential to the long-term function and success of prosthodontic treatment. Improved marginal adaptation can be achieved through increased magnification and illumination will result in improved hard and soft tissue health and enhanced aesthetics. As microscopes are modified to serve the increasing demands of both the clinician and laboratory technician, their utilization for precise clinical and laboratory procedures will continue to expand.

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