COMMENTARY

CORRELATION BETWEEN LASER FLUORESCENCE READINGS AND VOLUME OF TOOTH PREPARATION IN INCIPIENT OCCLUSAL CARIES IN VITRO

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The excellent method used in this study corroborates previous work that shows the inadequate sensitivity and specificity of the laser fluorescence device in terms of its ability to predict the depth/extent of pit and fissure caries lesions. Indeed, Bader and Shugars, in a systematic review published in the *Journal of the American Dental Association* in 2004 and referenced in the present study,[1] came to a similar conclusion upon review of many clinical reports.

We live in an era in which dentists are searching for something to assist them in their decision-making in terms of depth of caries lesions. In fact, it seems that the entire dental community wants to try anything possible to assist in the ability to detect caries lesions earlier, and similarly desires to know if deep pits and fissures are in need of restoration. The DIAGNOdent device (KaVo Dental Corporation, Lake Zurich, IL, USA) includes a chart that indicates what steps should be taken based upon the numeric reading of caries lesion depth, which the device detects. Although other reports have corroborated the recommendations printed on this chart, the present study refutes the usefulness of those studies, based upon their methodology or sample size.

A recently published study by Khalife and colleagues[2] reported that "DIAGNOdent readings were weakly correlated with lesion depth" and that an appropriate cutoff point for determining the presence of a lesion requiring treatment was somewhere between a DIAGNOdent reading of 35 and 40. However, their conclusions, as were those of Bader and Shugars in the aforementioned review, were that the DIAGNOdent device could be used as an adjunctive tool but not as a primary means of caries lesion detection.

This latter point is important in considering the findings of the present study, as one must consider whether any single device or technique can provide all of the information needed to determine the need for cutting into the pits and fissures of the occlusal surface. One of the great things about DIAGNOdent is the awareness that it has created in the dental community about early detection, and that caries is indeed a process that occurs over time. The static determination of lesion depth in advance of cavity preparation is probably less important than the actual identification of some cutoff point that would distinguish the need to cut the tooth at all (versus no treatment or sealant alone). This is true because once one makes the decision to cut into the enamel surface with whatever instrument he or she is using, from that point forward, the continued determinations for direction and depth of cutting are made based upon further analysis clinically, not upon the originally selected detection tools that were used to make the decision "to cut."

The introduction to the present study references many other good studies that talk about the variability of sensitivity and specificity of nearly all methods currently employed to detect lesion presence and/or depth within pit and fissure surfaces. Indeed, visual examination, radiographic examination, and other detection methods must also be combined to provide several pieces of information that collectively enable the clinician to make a diagnosis. This diagnosis to cut, versus not cutting, is also likely influenced/biased by the historical experience of the clinician. This historical experience is relied upon by clinicians, as having seen similar-"looking" lesions before; they will make decisions, even without cognitive realization, based upon their experience. If a clinician practices in a high caries rate community as opposed to a low caries rate community, it is possible, although I am not aware of this having been tested, that he or she might be influenced in the direction of cutting sooner rather than later.

Another very important consideration in the midst of any discussion of using whatever form of pit and fissure caries detection one is considering is the rate of progression of caries lesions. Whereas, as noted, caries is a time-dependent process, the prudent clinician must, in addition to mere "detection" and "diagnosis" in the present, make some kind

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of determination regarding the rate at which the identified caries lesion will progress. Hamilton and colleagues[3] published their findings after 2 years of a 5-year study that looked at lesion progression in molars. The control lesions in their study did not require any more tooth structure removal ultimately than did the lesions in the group where a decision was made to cut. This study and others like it provide a basis on which to consider the rate of progression of pit and fissure lesions to perhaps be of even more importance than the static detection of the lesion.

As the authors of the present study conclude, further investigation is needed to position the relative values of every single caries detection tool clinicians use, particularly, given the emergence of newer devices, many of which have had far less testing than DIAGNOdent and other forms of lesion detection.

REFERENCES

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