

Stain vs Caries

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INTRODUCTION

“Minimally invasive dentistry” has been defined as the maximal preservation of healthy dental tissues.¹ This statement should not be limited to the restorations’ extent and size, but it should include assessment of strength of the remaining tooth. It must be kept in mind that any removal of tooth tissue will weaken the tooth and should be avoided in order to optimally preserve the tooth.

Within cariology, “minimally invasive dentistry” includes everything from the correct diagnosis of primary and secondary caries lesions, the assessment of caries risk, caries prevention and the evaluation of caries progression, as well as the repair of restorations as an alternative to their replacement. These case reports focus on the differentiation of stained dental tissues and caries lesions.

DISCOLORED DENTAL TISSUES

As dentists, we are brought up to believe that enamel should be white, while dentin and cementum should be light yellow in color. In today’s era of esthetic dentistry, much emphasis is placed on the color of dental tissues. For some practitioners and patients, an indiscriminate removal of stained tissues occurs in the name of esthetics. The longevity of the restoration to improve the

esthetic appearance may not be taken into consideration, either by the clinician or the patient. Uncertainty may also exist on the part of the clinician when differentiating between stained and carious tissue.²

Discoloration of dental tissues is an important clinical criterion in the diagnosis of caries lesions, but it is *not* the only criterion. Softening or demineralization of the tissues involved is more important diagnostically; in fact, for enamel caries, the event that may lead to discoloration may have started as a white spot subsurface lesion (Figure 1). Such lesions may become arrested (Figure 2). The initial caries lesion makes the enamel porous and opaque. These lesions tend to pick up dyes from ingested food or drinks. The question that should come up in the discussion with the patient is whether this porous, stained enamel, provided it is not esthetically disturbing to the patient, should be



Figure 1. Note the white spot lesion mesially on the first permanent molar, which became visible after exfoliation of the primary molar. The surface is intact, and the white appearance is due to porosities in the enamel as a result of demineralization. This is characteristic of an active caries lesion.

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Figure 2. The dark, hard, brown defect on the mesial surface of the first molar is typical of an arrested caries lesion.

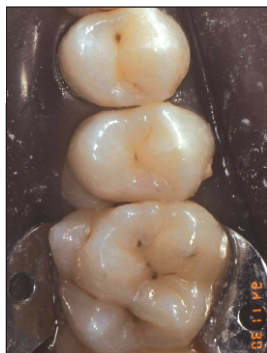


Figure 3. An occlusal view of two premolars and a molar with typically stained pits and fissures. They represent a diagnostic dilemma. The stained pits and fissures in the first premolar and the first molar were opened with a bur, and no soft, discolored, wet dentin was found when the restorations were placed. In hindsight, all the lesions should have been sealed or left for monitoring/observation.



Figure 4. The stained crack in the left central incisor has been present for a number of years. It is non-caries and will unlikely develop caries, but it may represent an esthetic problem for the patient and should then be treated.

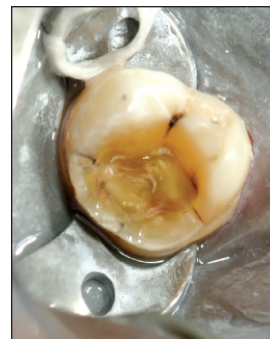


Figure 5. A third molar prepared for a resin inlay. Note that the stain in the fissure was not removed, because the cavity preparation exposed the full depth of the fissure and the adjacent enamel and dentin could be inspected and assured to be caries free. Removal of the stain in the fissure would have weakened the two remaining cusps. Note also the cracks in the enamel of the preparation. Since this is a resin bonded restoration, a Cerec prepared restoration should be placed and the cracks were left in place.

removed and restored or left alone. Its removal may weaken the tooth and compromise the longevity of the tooth. Perhaps stained enamel is more caries-resistant than white enamel and, if so, it should not be removed in order to conform to the principles of minimally invasive dentistry

STAINED PITS AND FISSURES

Pits and fissures on the occlusal surfaces of molars and premolars are often stained (Figure 3), as are cracks in teeth (Figure 4). Are these stained crevices carious or more prone to caries than unstained areas? Provided radiographs, when applicable, do not show any sign of demineralization, it is usually difficult to ascertain whether the crevices are carious or not. The use of an explorer is the “established” diagnostic tool to clinically diagnose caries in these situations, despite the fact that

everyone agrees that an explorer will “stick” in any crevice, pit or fissure, whether it is carious or not.

A relevant consideration in this context is to assess what is stained in the locations illustrated in Figures 3 and 4. Healthy enamel would not be discolored, so the diagnosis of caries is feasible; but without demineralization, it is not caries that led to the porosities that subsequently became discolored.



Figure 6. The restoration for the molar shown in Figure 5 was bonded in place. Note the presence of a stained, non-caries pit mesial to the restoration, which had been acid etched and covered by the bonding material.

The stains in the pits, fissures and cracks are more than likely due to discoloration of protenacious, pellicle-like, material in pits, fissures and cracks. The difficulty clinically is

that one rarely gets the opportunity to inspect the tissues peripheral to the crevices. In some situations, it is possible, in connection with cavity preparation of the tooth (Figure 5). The cross section of the stained fissure in Figure 5 allowed for inspection of the adjacent enamel and dentin. Neither of the tissues was considered as having signs of demineralization and they were judged to be intact. The stain in the fissure on the maxillary second molar did not affect the patient and was left untouched (Figure 6), truly in the spirit of minimally invasive dentistry. Removal of this stain would have weakened the marginal ridge and, therefore, weakened the strength of the cusps. If it makes a clinician feel better, the surface stain may be picked out with a sharp explorer and a fissure sealant applied, but is it possible that the stained fissure is more caries-resistant than the sealed fissure? Nobody knows, but if we routinely drill out these fissures for inclusion in large restorations, we will never know. This is yet another call for clinical research, with the basis being the long-term preservation of the strength of the teeth.

CONCLUSIONS

The intent of these case reports is to emphasize that the practice of minimally invasive dentistry should include an assessment of the strength of the tooth. It

also makes the case that discolored enamel may be more caries-resistant than white enamel. No proof for this statement is presented, but it should be part of the clinical assessment whenever esthetic considerations are the overriding factor.

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