A revised classification of carious lesions by site and size

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Abstract

The present classification used by the profession for the identification of carious lesions was devised by Black about 100 years ago. It was based, in part, on the location of the lesion but was modified to take into account the materials that were available for restoration. Over the last 20 years, there has been considerable modification of these materials; adhesion between the restoration and tooth structure is now possible, and the understanding of the relevance of fluoride and other ions in the prevention and repair of caries has improved. It would be logical at this time to adopt a new classification based on the site of the carious lesion and the extent to which it has progressed. More relevant detail could be recorded for each restoration, and this would be of value both for personal records and epidemiologic studies. The proposal is a simple digital system that is compatible with the use of computers for record keeping. (Quintessence Int 1997;28:301-303.)

Clinical relevance

The proposed classification allows the operator to define the extent and complexity of a cavity and at the same time, in the presence of adhesive restorative materials, encourages a conservative approach to the preservation of natural tooth structure.

Introduction

For almost 100 years, Black's classification of carious lesions by site has given guidance to the profession for their restorative management. The development of the classification was dictated, at least in part, by the cavity preparation equipment and restorative materials available at that time.1

Over the last 20 years, there has been considerable modification of the understanding of the initiation and progress of caries and the significance of fluoride and other ions in the demineralization-remineralization process. The instrumentation available for cavity preparation has changed, and there are now restorative materials that are capable of long-term adhesion to tooth structure, both enamel and dentin, in spite of the relatively hostile oral environment.

Black's classification is no longer a useful guide to management of dental disease. There have already been attempts to modify the system, but it remains more complex than necessary to accurately describe the location of a diseased area, and it does not take into account the size and complexity of the lesion. It is therefore suggested that the profession adopt a new classification, based on the site and size of a lesion, and that the two descriptors be used together.

Proposed classification

Site

The site description is simple, accurate, and comprehensive.

Site 1 describes all lesions originating in pits, fissures, and other defects on otherwise smooth surfaces of the enamel of the crown of a tooth. It includes buccal pits on mandibular molars, lingual grooves on maxillary molars, and similar defects, as well as erosion lesions on incisal edges of anterior
Table 1  Proposed classification of carious lesions

<table>
<thead>
<tr>
<th>Site</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Minimal (1)</td>
</tr>
<tr>
<td>Pit/fissure (1)</td>
<td>1.1</td>
</tr>
<tr>
<td>Contact area (2)</td>
<td>2.1</td>
</tr>
<tr>
<td>Cervical (3)</td>
<td>3.1</td>
</tr>
</tbody>
</table>

Teeth and occlusal surfaces of posterior teeth. It includes all lesions identified in Black's Class I classification but also encompasses other smooth surfaces.

Site 2 describes all lesions associated with contact areas and includes both anterior teeth and posterior teeth. This includes all of Black's Class II, Class III, and Class IV lesions.

Site 3 describes all lesions originating close to the gingival margin, in either enamel or dentin, around the full circumference of a tooth. This includes Black's Class V cavity and also extends to root surface lesions occurring on the mesial or distal tooth surfaces following gingival recession.

Size

The size description gives guidance for the management of any site. It is now accepted that, under certain circumstances, it is possible to heal an initial lesion through remineralization and surgical intervention may be avoided. However, there will come a point where clinical judgment dictates the need to prepare a cavity. With modern preparation techniques and equipment, it is possible to prepare very limited access to the lesion with preservation of much natural tooth structure. In addition, the availability of adhesive materials, as well as some with an ongoing fluoride release, means that the original concept of “extension for prevention,” as suggested by Black, is no longer applicable. Neither is it necessary to extend a cavity simply to make room for the restorative material or to provide mechanical interlocks for retention.

The four stages in the extension of a lesion can be defined as follows:

Size 1 (minimal) is a lesion that has progressed to the point where it is just beyond remineralization so that surgical intervention is indicated.

Size 2 (moderate) is a larger lesion, but there is still sufficient sound tooth structure remaining to support the restoration without further modification of the cavity beyond caries removal.

Size 3 (enlarged) is a more extensive lesion that leaves remaining tooth structure at risk of further bulk failure, through the development of a split at the base of a cusp or loss of an incisal corner. The cavity design will have to be modified and enlarged to the extent that the restoration will take the main occlusal load so that remaining tooth structure can be protected from undue stress.

Size 4 (extensive) is a lesion in which there has already been serious loss of tooth structure, such as the loss of a cusp from a posterior tooth or involvement of the incisal edge of an anterior tooth.

Discussion

It is suggested that the classification would include the use of the two descriptors as shown in Table 1. For example, a site 1, size 3 (1.3) lesion could be an occlusal lesion on a mandibular molar in which the lingual cusps are severely undermined by caries to the extent that they need to be protected from further occlusal load. A small proximal lesion on a premolar that is considered to be just beyond remineralization would be classified as a site 2, size 1 (2.1) lesion and may be restored with a “tunnel,” a “slot,” or a similar minimal cavity preparation designed to maintain the maximum of natural tooth structure.

The classification is linked to the stage of progression of the lesion and is not related to cavity design. The size 1 lesion is just beyond remineralization; prior to this point, the lesion can presumably be healed and should therefore only be recorded in the case notes and not classified. Each lesion would be recorded separately, so that multiple lesions on one tooth would be identified individually. Restoration would then be carried out according to the clinical judgment of the operator. The use of terminology such as mesio-occlusal or disto-occlusal would not be precluded and would presumably remain in common use.

There are several advantages to be gained from the use of the proposed classification. It overcomes any need for further modification to the Black classification. In recent years, there have been attempts to include recognition of a Class VI, and there have been subclassifications offered in an attempt to define such minimal cavity designs as “tunnels,” “slots,” and combination Class I and fissure sealants.
The system is simple and uncomplicated and allows clear communication between dentists as well as more accurate and descriptive record keeping. As a digital system, it is fully compatible with computers. It would also be useful for the storage of data on the nature and severity of disease and treatment patterns for individual patients, as well as in epidemiologic studies of larger groups.

Conclusion

Changes in both restorative materials and techniques have been so extensive in the last 20 years that the profession should think again about the identification of the caries process. Knowledge and understanding have changed so much that acceptance of a new classification is warranted. This alone could help in modifying attitudes toward conservation of natural tooth structure and away from the rather technical approach to cavity design demanded by G.V. Black's system.

Acknowledgment

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References