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A caries lesion begins with the introduction of a disease state, likely due to bacterial strains, in the oral cavity. If accompanied or followed by alterations to salivary flow, frequent periods of reduced salivary pH, or frequent intake of refined carbohydrates, the demineralization of tooth structure is likely to begin. The subsequent lesions first will be visible as white spot lesions, which, if ignored, eventually will cavitate. Modern dentistry is capable of testing for the presence of caries lesions before cavitation, and it is suggested that routine testing should be mandatory for all patients who are at risk. If the disease is to be identified and treated before cavitation, it is desirable to adopt a new classification for the recognition and recording of caries lesions.

Association of Diet with Dental Caries in Preschool Children	725
Norman Tinanoff	

This article updates the evidence linking dietary factors to dental caries in preschool children and recommends dietary approaches to reduce caries risk. Along with nutritional factors, a comprehensive approach to preventing dental caries in preschool children must include good oral hygiene, appropriate use of fluorides, and access to preventive and restorative dental care.

Utility of Radiology, Laser Fluorescence, and Transillumination

739

Jie Yang and Vinicius Dutra

This article provides readers with an overview of the latest developments in caries detection using radiology, laser fluorescence, and transillumination. Different imaging techniques, methods to assess diagnostic accuracy, and factors affecting the diagnostic accuracy of imaging in film and digital receptors are discussed. In addition, the DIAGNOdent and DIFOTI devices are introduced as possible supplemental techniques for detecting incipient and hidden carious lesions.

Quantitative Light Fluorescence: A Technology for Early Monitoring of the Caries Process

753

George K. Stookey

Quantitative light fluorescence (QLF) can detect about twice as many demineralized precavitated enamel areas as a conventional visual examination or any other caries detection instrument. This technology has been used in several controlled clinical trials with the consistent observation that it is capable of monitoring and quantifying changes in the mineral content and size of clinically visible noncavitated white spot lesions; therefore, it can be used to assess the impact of preventive measures on the remineralization and reversal of the caries process. The anticipated future use of QLF with dehydration to identify active areas of demineralization will markedly enhance the utility of this technology in clinical dental research and dental practice.

Early Caries Imaging and Monitoring with Near-Infrared Light

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Daniel Fried, John D.B. Featherstone, Cynthia L. Darling,
Robert S. Jones, Patara Ngaotheppitak,
and Christopher M. Bühler

Enamel is highly transparent in the near infrared (NIR); therefore, this region of the electromagnetic spectrum is suited ideally for the development of new optical diagnostic tools for the detection and imaging of early dental caries. This article discusses the NIR optical properties of sound and demineralized dental enamel and the potential use of polarization sensitive optical coherence tomography and NIR transillumination for the imaging of dental caries.

Dental Hygiene Participation in Managing Incipient and Hidden Caries

795

Caren M. Barnes

With the advent of new caries detection devices that allow early detection, dental hygienists can intervene in the demineralization

process and work with the patient toward remineralization through patient self-care procedures and the professional application of topical fluorides. The focus of this article is on caries detection devices, caries risk assessment, agents used to prevent dental caries, and the development of self-care plans for patients that include prevention, intervention, and therapeutic components.

Preventive Resin Restorations and Sealants in Light of Current Evidence

815

Richard J. Simonsen

Pit and fissure sealant should be a treatment option provided to all children, particularly at the age immediately after eruption of the posterior teeth and especially, but not exclusively, the permanent teeth. Preventive resin restoration is a minimally invasive procedure that should be the treatment of choice for small carious lesions in posterior teeth. The Class I amalgam should not be placed as a first-time restorative material to treat incipient or small carious lesions under any circumstances. The amount of tooth structure removal necessary for a Class I Black preparation, which requires sufficient depth of amalgam and extension for prevention, is an unacceptable treatment when minimally-invasive options are available.

Treatment Decisions and Conservation of Tooth Structure

825

Joseph B. Dennison and James C. Hamilton

New technology is becoming available to help establish an early diagnosis of incipient and hidden pit and fissure caries, and micro-dentistry techniques are being developed to follow the principles of minimal intervention. Following the accurate diagnosis of suspected lesions, early intervention can be in the form of chemotherapeutics to promote remineralization or conservative intervention to minimize tooth structure loss. Patient risk factors should have a role in developing an individualized treatment program. The life cycle of a restored molar is used in this article to illustrate the long-term value of early diagnosis, preventive therapy, and conservative intervention to preserve tooth structure and to extend the retention of healthy teeth.

Conservative Operative Management Strategies

847

Dorothy McComb

Operative conservatism, including delayed operative intervention, is recommended to promote tooth longevity. Effective conservative operative strategies for the permanent dentition are the occlusal preventive resin and the proximal only restoration. Conservative strategies for the primary dentition have proved less successful. Conventional and conservative restorations are vulnerable to caries recurrence, material failure, and technical deficiencies. Successful conservatism demands discerning diagnostic decisions, effective

disease management, and technical excellence. The diagnostic accuracy of radiographs and visual criteria is briefly reviewed for proximal and occlusal caries. Improved visual ranking criteria are supported for occlusal caries diagnosis. The use of dyes for occlusal caries diagnosis is not recommended.

Contemporary Treatment of Incipient Caries and the Rationale for Conservative Operative Techniques

867

Howard E. Strassler, Judith Porter, and Cheryl L. Serio

This article provides evidence to support the use of more conservative cavity preparation techniques with adhesive restorative resins. The authors discuss the issue of conservative operative techniques related to hidden or occult caries. The support for contemporary technology also concerns methods of caries detection and the role of magnification, caries risk assessment of the patient, conservative caries management, instrumentation, materials, and techniques.

Bonding and Curing Considerations for Incipient and Hidden Caries

889

Mark A. Latta and William T. Naughton

Contemporary adhesive systems and restorative composite materials can successfully seal and restore teeth and can facilitate the use of a minimally invasive cavity preparation technique. These systems give the operator the potential to reinforce damaged teeth and preserve healthy tooth structure. The adhesion principles rely on strict adherence to excellence in clinical technique. Differences in clinical results may depend more on the operator's adherence to good clinical technique than the specific material selected.

Nonsurgical Treatment of Incipient and Hidden Caries

905

Van P. Thompson and James M. Kaim

Traditionally, dentists have been trained in the surgical model for caries management whereby detection is akin to diagnosis. This model unfortunately has been translated to patient expectations. Nevertheless, a growing body of clinical evidence suggests that non-cavitated lesions, even those extending into dentin, can be managed by nonsurgical means with an expectation for remineralization.

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