Management of High Caries Risk Patients: Part 1—Risk Assessment

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The global burden of oral disease and dental caries has been steadily rising even as improved and novel tools for reconstructing the damaged dentition are rapidly evolving. The increased burden of the dental caries worldwide may be attributed to the fact that dentists and dental schools still typically focus on treatment rather than prevention of the disease. The World Health Organization through the 60th World Health Assembly has passed a resolution that advocates integration of prevention and early intervention measures of dental caries for all the member nations. Although the traditional "drill and fill" approach has served well to restore function and esthetics, it has failed to prevent the incidence of new caries lesions. This becomes an even larger challenge in patients who are at a higher risk for developing new lesions.

Evidence-based protocols for risk assessment and management of dental caries have gained momentum within the dental community in recent years. Caries risk assessment now includes a two-pronged approach: evaluating populations and individualized risk assessment. The disproportionate distribution of caries by race, age, geographic area, and socioeconomic status suggests the need for individualized caries risk assessment. A review of microbiological factors concluded that specific bacteria may not be a reliable risk indictor for caries risk for individuals, but might be useful while evaluating high caries risk groups. The known culprits, namely mutans streptococci and lactobacilli counts, may be more predictive in establishing low caries risk more consistently than high caries risk. The past caries experience of a patient is considered the variable with highest predictive value. Due to the multifactorial nature of caries etiology, multivariate approaches rather than the use of single parameters may improve caries risk prediction for individuals as well as groups of subjects.

Various attempts to group the etiological agents of the disease and caries risk predictors have been made to create caries prediction models. The validity of the caries prediction models that exist should be studied in the context of their application within specific populations. All models are typically arithmetic calculations including a combination of the above-mentioned risk factors and indicators. A high specificity for the model is desirable to avoid false positives when the instrument is used for a large population-based survey.

For individual analysis, a high sensitivity to reduce false negatives becomes critical. Based on the assessments, subjects are classified as high, intermediate, and low risk, and the treatment protocols are determined on that basis. "Caries Management by Risk Assessment" (CAMBRA) is an example of one such model that has been validated. The CAMBRA risk assessment model divides risk of developing dental caries into the following subdivisions:

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CARIES RISK INDICATORS

Visible cavities or radiographic penetration of the dentin, radiographic proximal enamel lesions (not in dentin), white spots on smooth surfaces, restorations placed in the last 3 years.

CARIES RISK FACTORS (BIOLOGICAL PREDISPOSING FACTORS)

Medium or high counts (by culture) of mutans streptococcus and lactobacillus, visible heavy plaque on teeth, frequent snacking (>3x daily between meals), deep pits and fissures, recreational drug use, inadequate saliva flow by observation or measurement, saliva-reducing factors (medications/radiation/systemic), exposed roots, orthodontic appliances.

CARIES PROTECTIVE FACTORS

Lives/work/attends school in a fluoridated community, standard fluoride toothpaste at least once or twice daily, 5,000 ppm F fluoride toothpaste daily, fluoride mouthrinse (0.05% NaF) daily, fluoride varnish in the last 6 months, office F topical in the last 6 months, chlorhexidine prescribed/used 1 week each of the last 6 months, xylitol gum/lozenges 4x daily during the last 6 months, calcium and phosphate paste during the last 6 months, adequate saliva flow (>1 mL/minute stimulated).

To obtain meaningful information, dental practitioners have an array of diagnostic instruments available, including clinical and radiographic diagnosis, laboratory salivary analysis evaluating quality and quantity of saliva, resting pH, buffering capacity, bacterial counts, and DNA analysis. Chairside analysis instruments, such as Saliva-Check Buffer and Saliva-Check Mutans kits by GC America (Alsip, IL, USA) and CariFree ATP Bioluminescence test by Oral Biotech (Albany, OR, USA), are helpful in rapid quantification of acid buffering, bacterial loads, and bacterial activity in saliva and plaque samples. Although more evidence is necessary for the validation of these chairside tools, they are useful adjuncts in risk assessment and patient motivation.

Interplay between the various risk factors and protective factors ultimately determines the risk category of the individual. However, no mathematical model can effectively predict the host's response to treatment presently. In essence, while these permutations help direct the practitioner toward accepted management strategies, the ultimate resolution of the disease is based on a combination of specific therapeutic targeting, a tiered restorative plan, and patient compliance.

SUGGESTED READINGS

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EDITOR'S NOTE

If you have a question on any aspect of esthetic dentistry, please direct it to the Associate Editor, Dr. Edward J. Swift, Jr. We will forward questions to appropriate experts and print the answers in this regular feature.

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