Preventive dentistry

Lecture (25)

Identification of High Risk Groups for Dental Caries

Caries is not the consequence of a single event (as is a classical infectious disease for example) but it is rather a sequel of a series of processes happening over a longer period of time.

The etiological factors which can be diagnosed today, that is, the risk of caries, do not necessarily have to be identical with the causative factors which led to the development of a carious lesion.

Assessment of the individual patient's current caries activity and risk of future caries progression is an important part of recent dental practice. The dentist always must remember that treat patients not just individual lesions.

Risk factor: an environmental, behavioral, or biologic factor usually confirmed by temporal sequence in longitudinal studies, which if present, directly increases the probability of a disease occurring, and if absent or removed reduces the probability. Risk factors are part of the causal chain, or expose the host to the causal chain. Once disease occurs, removal of a risk factor may not result in a cure.

Important biological and environmental risk factors include: salivary flow, level of oral hygiene, some dietary aspects and fluoride exposure, all of which are the determinants of the disease.

Identifying of biological and environmental risk factors is a good practice to list the factors thought to be responsible for the individual's caries risk status .This defines what should be modified for that particular individual. It may also define factors that cannot be modified, e.g. a dry mouth consequent to destruction of the salivary glands. Such a patient will always be a high caries risk.

Steps for Diagnosis of High Risk Groups

1. Medical history.
   - Current and past diseases
   - Current medications
   - Xerostomia

2. Dental history.
   - Current activity state of caries lesions.
   - Past history of caries.
   - Current oral hygiene practices and proficiency.
   - Current exposure to topical fluorides from toothpastes rinses or tablets.
   - Current dietary pattern

Goals of caries risks assessment

The goals of caries risk assessment can be summarized as follows:

- Screen out low risk patients (to allow safe recommendation of long recall intervals).
- Identify high risk patients before they become caries-active.
- Monitor changes in disease status in caries-active patients.

The aim is to identify caries-active individuals and to convert them to caries- inactive status, so that they become low risk for the disease.

Caries identification

Caries indicators are clinical observations that tell about the past caries history and activity. The four caries disease indictors are:

(1) Frank cavitation or lesions that radiographically show penetration into dentine.

(2) Proximal radiographic lesions confined to the enamel only.

(3) Visual white spots on smooth surfaces.

(4) Any restorations placed in the last three years.

Caries risk factors

The best indicators for increased risk of dental caries are:

1. Medium or high *mutans streptococcus* and *lactobacillus* counts.
2. Visible heavy plaque on teeth: This indicates poor oral hygiene.
3. Inadequate exposure to fluoride.
4. Frequent (>three times daily) snacking between meals.
5. Deep pits and fissures.
6. Low socioeconomic status.
7. Inadequate salivary flow by observation or measurement: Saliva reducing factors (medications/radiation/systemic)
8. Orthodontic appliances: The presence of fixed or removable appliances in the mouth such as orthodontic brackets or removable partial dentures leads to undue accumulation of plaque and an increase in the percent of cariogenic bacteria.
9. Exposed roots.
10. Any physical or mental illness and any oral application or restoration that compromises the maintenance of optimal oral health.

Caries protective factors

The more severe the risk factors, the higher must be the protective factors to keep the patient in balance or to reverse the caries process.

The protective factors are:

1. Lives/work/school located in a fluoridated community.
2. Fluoridated toothpaste (15 ppm fluoride) at least two times daily.
3. Fluoridated mouth rinse (0.05 percent NaF) daily.
4. Fluoridated varnish during the last six months.
6. Professional topical fluoride during the last six months.
7. Chlorhexidine used two times daily during the last six months.
8. Xylitol gum/lozenges four times daily during the last six months.
9. Calcium and phosphate supplement paste during the last six months.
10. Adequate salivary flow.

Caries Susceptibility

It determines the susceptibility or resistance of a tooth to a caries enhancing environment. The risk of developing a lesion, however, is individual and varies, depending on the tooth, its localization, surfaces, previous fluoride exposure etc.

Caries Activity

It is a measure of the speed of progression of a carious lesion. Retrospectively it can be determined as caries incidence, that is, new carious lesions over time of an individual or population.

Caries-risk

Generally speaking, risk is defined as the probability of incidence of an event within certain period of time. The caries-risk, therefore, is the risk of an individual developing a carious lesion. Increased risk may be the result of several caries-producing factors coinciding or of insufficient defense mechanisms leading to different caries prevalence. By definition,

risk is aimed at assessing developments in the future. It can, however, be assessed only on the basis of symptoms present at, or having manifested themselves by, the time of assessment. 'High caries-risk' group is defined as a sub-group of the population which is at greater risk of acquiring caries than the average population.

1. Low caries risk.
2. Moderate caries-risk group.
3. High caries-risk.

Determination of caries-risk is important for:

- Assessment of the individual etiological factors of existing carious lesions and of the caries risk situation
- Repeated determination of the caries-risk allows an evaluation of the success of, or the need for, modification of preventive measures
- Indications of an increased caries-risk in specific children in community preventive programs will allow selection of an individual preventive program in order to minimize the development of carious lesions.

Factors in caries risk assessment

Children

Low risk

- No new or incipient carious lesions in the past year.

Moderate risk (any of the following)

- One new, incipient or recurrent carious lesion in the past year.
- Deep or non-coalesced pits and fissures.
- High caries experience in siblings.
- History of pit and fissure caries.
- Early childhood caries.

- Frequent sugar exposures.
- Decreased salivary flow.
- Compromised oral hygiene.
- Irregular dental visits.
- Inadequate fluoride exposure.
- Proximal radiolucency.

High risk

- Two or more new incipient or recurrent carious lesions in three or more carious lesions in the past
- Deep or noncoalesced pits and fissures.
- Siblings or parents with high caries rate.
- History of pit and fissure caries.
- Frequent sugar exposures.
- Decreased salivary flow.
- Compromised oral hygiene
- Irregular dental visits.

Adults

Low risk: No new or incipient lesion.

Moderate risk: (any of the following):

- One or two new, incipient or recurrent carious lesions during the past three years.
- History of numerous or severe caries.
- Deep or noncoalesced pits and fissures.
- Frequent sugar exposures.
- Decreased salivary flow.
- Irregular dental visits.
- Inadequate fluoride exposure.

High risk

Three or two of the following:

- History of numerous or severe caries.
- Deep or noncoalesced pits and fissures.
- Frequent sugar exposures.
- Decreased salivary flow.
- Irregular dental visits.
- Inadequate fluoride exposure.
- Compromised oral hygiene.

Caries Risk in Children

a. Early childhood caries

Children in the age group 12-30 months have a special caries pattern that differs from older children. Caries affects the maxillary primary incisors first primary molars in a way that reflects the pattern of eruption. The longer the tooth has been present and exposed to the caries challenge, the more it will be affected. The upper incisors are most vulnerable, while the mandibular incisors are protected by the tongue and saliva from submandibular and sublingual glands.

b. The most consistent predictor of caries risk in children is past caries experience. There is evidence of maternal transmission of mutans streptococci in early childhood. Hence, the presence of caries in the mother and siblings increases risks for the child.

Management in Children

Regular brushing of tooth surfaces using a fluoride-containing dentifrice reduces caries risk. Conversely, inadequate exposure to fluoride confers increased risk.

Conditions that compromise the long-term maintenance of good oral hygiene are also positively associated with caries risk. These include:

1- Certain illnesses.

2- Physical and mental disabilities.

3- The presence of existing restorations or oral appliances.

3- Children with orthodontic treatment (Children undergoing orthodontic treatment with fixed appliances have an additional risk for caries development, especially where there is frequent consumption of sugar-containing soft drinks.

Daily tooth brushing with fluoride-containing toothpaste, combined with use of a fluoride mouth rinse, is also the basic prevention method in this group. Patients with active caries are at special risk and consideration should be given to the use of professional tooth cleaning with fluoride applications during visits. It is also reasonable to suggest that orthodontic treatment is unwise in those where current caries status designates them as high risk.