Pediatric Dentistry

4th year



Lec. 8

RAMPANT DENTAL CARIES & ECC

Professor

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RAMPANT DENTAL CARIES

Rampant caries has been defined by Massler as a "suddenly appearing, widespread, rapidly burrowing type of caries, resulting in early involvement of the pulp and affecting those teeth usually regarded as immune to ordinary decay."

There is no evidence that the mechanism of the decay process is different in rampant caries or that it occurs only in teeth that are malformed or inferior in composition. On the contrary, rampant caries can occur suddenly in teeth that were previously sound for many years. The sudden onset of the disease suggests that an overwhelming imbalance of the oral environment has occurred, and some factors in the caries process seem to accelerate it so that it becomes uncontrollable; it is then referred to as rampant caries.

Young teenagers seem to be particularly susceptible to rampant caries, although it has been observed in both children and adults of all ages.

ETIOLOGY:

1. *It is usually due to poor oral hygiene and taking frequent cariogenic snacks and sweet drinks between meals.*
2. *Patient behavioral pattern and/ or parent overindulgence /parent ignorance.*
3. *There is considerable evidence that emotional disturbances may be a causative factor in some cases of rampant caries. Repressed emotions and fears, dissatisfaction with achievement, a traumatic school experience, and continuous general tension and anxiety have been observed in children and adults with rampant caries. An emotional*

disturbance may initiate an unusual craving for sweets or the habit of snacking, which in turn might influence the incidence of dental caries.

4. Additional Factors

A. **SALIVA:** *Any patient with a salivary deficiency, from any cause, is at a higher risk for caries activity. It is generally accepted that the dental caries process is controlled to a large extent by a natural protective mechanism inherent within the saliva. A reduction in the salivary flow may be temporary or permanent. A pronounced reduction or complete absence of saliva, however, results in an acidic environment with rampant caries.*

It has long been suggested that the viscosity of saliva is related to the rate of dental decay. Both thick, ropy saliva and thin, watery saliva have been blamed for rampant dental caries.

B. **SOCIOECONOMIC STATUS:** *children and adolescents living in poverty suffer twice as much tooth decay as their more affluent peers, and that their disease is more likely to go untreated*

C. **ANATOMIC CHARACTERISTICS OF THE TEETH:**

- *Certain teeth of many patients, particularly permanent teeth, seem vulnerable to dental caries as they emerge, and in caries-active mouths, they may show evidence of the attack almost coincident with their eruption into the oral cavity. Because enamel calcification is incomplete at the time of eruption of the teeth and an additional period of about 2 years is required for the calcification process to be completed by exposure to saliva, the teeth are especially susceptible to caries formation during the first 2 years after eruption.*

- *Permanent molars often have incompletely coalesced pits and fissures with or without hypoplasia that allows the dental plaque material to be retained at the base of the defect.*
- *In addition to occlusal surfaces, lingual pits on the maxillary permanent molars, buccal pits on the mandibular permanent molars, and lingual pits on the maxillary permanent lateral incisors are vulnerable areas in which the process of dental caries may proceed rapidly*

CLINICAL FEATURES

Seen in primary and permanent dentition:

• ***In primary teeth*** *features are related to order of tooth eruption. Initial lesions appear on labial surface of maxillary incisors near the gingival margin as a white area/ pitting on enamel surface.*

• ***In permanent teeth***

–Related to the eruption of teeth.

–Buccal and lingual surface of premolar and molar are involved.

– Proximal and labial surface of maxillary incisors and proximal surface of mandibular incisors are involved.

COMPLICATIONS

- *Affects maxillary anteriors which may lead to psychological problem*
- *Minimal trauma can lead to fracture of teeth*
- *Difficulty in speech.*
- *Development of abnormal habits*
- *Orthodontic problems*
- *Multiple abscess formation*

- General health impaired and hospitalization may be required.

EARLY CHILDHOOD CARIES

DEFINITION

The American Academy of Pediatric Dentistry (AAPD) defines early childhood caries (ECC) as the presence of one or more decayed (non-cavitated or cavitated), missing (as a result of caries), or filled tooth surfaces in any primary tooth in a child 71 months of age or younger. **OR** it is the occurrence of any sign of dental caries on any tooth surface during the first 3 years of life.

AAPD also specifies that, in children younger than 3 years of age, any sign of smooth-surface caries is indicative of severe early childhood caries (S-ECC).

Caries affects the maxillary primary incisors and 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. Common terms for rampant caries in infants or preschool children have been 'bottle caries' or 'nursing caries', but the terms ECC, and S-ECC in severe cases, are now more commonly used.

The lesions progress rapidly; they can be extensive and typically affect free smooth surfaces. Often the lesions cover many surfaces in each affected tooth. In severe cases front teeth break down during eruption and parents may associate this with developmental defects rather than caries. The pulp

may be involved and thus a need for extraction in these very young children is the result.

"ECC": WHERE THE NAME CAME FROM AND WHY?

Human breastfeeding in infants has many advantages and has not been epidemiologically associated with caries in the absence of other factors such as poor oral hygiene or a carbohydrate diet. Frequent nighttime bottle feeding with milk is associated with, but not consistently implicated in, S-ECC.

Breastfeeding more than seven times daily after 12 months of age is associated with increased risk for ECC. Bovine milk, milk formulas and human breast milk have all been implicated in nursing caries because of their lactose content. Additional sweeteners in form of juice, honey dipped pacifiers can also cause this type of caries. Nursing bottle can effectively block the salivary access to the tooth surface, thereby increasing the cariogenicity of oral flora.

Nighttime bottle feeding with juice, repeated use of a sippy or no-spill cup, and frequent between-meal consumption of sugar-containing snacks or drinks (e.g., juice, formula, and soda) will increase the risk of caries.

The child falls asleep, and the liquid becomes pooled around the teeth (the lower anterior teeth tend to be protected by the tongue). The carbohydrate-containing liquid provides an excellent culture medium for acidogenic microorganisms. Salivary flow is also decreased during sleep, and clearance of the liquid from the oral cavity is slowed.

ETIOLOGY

- *Exposure for long periods of time to cariogenic substrates (usually sugary drinks, sweetened or fruit-based drink) in nursing bottles and/or feeder cups given as pacifiers or dinky feeder.*
- *Nursing bottle given at bedtime.*
- *Low salivary rates at night.*
- *Reduced buffering capacity.*
- *Parental history of caries (especially mother).*
- *Associated with low socio-economic status , low educational level of parents and ethnic minorities*
- *Enamel defects and malnutrition may also play a role.*
- *Overindulgence of parents, and crowded homes.*
- *Malnutrition and low-birth weight infants (less than 2500 g)*
- *Recently, it has been seen that salivary gland function is impaired by iron deficiency, excess of lead exposure, which makes the oral environment more caries susceptible.*

Some of the key biologic correlates of ECC

1. Breast-feeding and bottle-feeding

What is clear from the literature is that some children nurse in ways that either correlate with or lead directly to ECC, while the majority of breast-fed children do not experience ECC. Similarly, the majority of children who present with the nursing habit–associated pattern have a positive history of inappropriate bottle or sippy cup usage while the converse (that the majority of children who have a positive history of inappropriate bottle or sippy cup usage have ECC) is not true.

2. Diet

Children in a "high-carbohydrate soft drink" group had higher caries experience than children in a high-juice group, high-water group, and high-milk group, with the last having the least caries experience.

Other indicators of poor diet and nutrition have also been correlated with cavities in young children. For example, not eating breakfast on a daily basis and not consuming the recommended five fruits and vegetables daily are associated with overall ECC experience.

3. Salivary mutans streptococci levels and visible plaque

As with high-sugar diets; the associations between mutans streptococci, plaque, and caries are very well established. Multiple studies since the mid-1970s relate mutans levels in children to mutans levels in the mouths of their primary caregivers, suggesting that managing adult reservoirs and interfering with transmission may hold strong promise to reduce disease onset and experience.

PROGRESSION OF LESION

- *Initially a demineralized dull, white area is seen along gum line on the labial aspect of maxillary incisors, which is undetected by parents.*
- *These white lesions become cavities which involve the neck of tooth in a ring-like lesion.*
- *Finally, the whole crown of incisors is destroyed leaving behind brown black root stumps.*

This unique pattern and unequal severity of the lesion is due to three factors

- *Chronology of primary tooth eruption*
- *Duration of deleterious habits of feeding*
- *Muscular pattern of infant sucking.*

IMPLICATIONS

- *The child who has nursing caries has an increased risk of caries in permanent dentition*
- *Children with caries are susceptible to other health hazards*
- *The treatment of nursing caries may be a financial burden to some parents.*
- *Loss of the upper primary incisors does not result in space loss.*
- *Speech develops normally.*
- *Loss of primary molars may lead to space loss and a space analysis should be performed to determine whether a space maintainer is needed. This is especially the case for the second primary molars whose early loss can lead to mesial positioning of the first permanent molars.*

DIFFERENTIAL DIAGNOSIS

- *Rampant caries*
- *Radiation caries*
- *Enamel hypoplasia.*

MANAGEMENT

Aims

- *Management of existing emergency*
- *Arrest and control of caries process*

- *Institution of preventive procedures*
- *Restoration and rehabilitation.*

Factors Affecting Management

- *Extent of lesion*
- *Age of patient and its related behavioral problems of child*

i. Prevention:

- *The main strategies for prevention is to aware and alert the parents, prospective new parents about the condition and its cause*
- *Information on nursing caries can be distributed to new parents through; obstetricians or gynecologists, pediatrics, paramedical staff, health workers, maternal and child health care centers*
- *Sealing of all caries free pits and fissures*
- *Topical fluoride application and antimicrobial therapy*
- *Water fluoridation in suboptimal fluoride water level areas*
- *Supervised home care should be taught*
- *Broad committees at government level to address the issue of caries and risk factors in young children and how to recognize the early signs of the condition and promote early intervention.*
- *Caries vaccine: A vaccine to prevent the disease of dental caries has been an anticipated scientific breakthrough since at least the early 1940s. Research efforts assume that MS is the principal etiologic organism of dental caries, and the development of a method of immunization specifically targeted at neutralizing MS has been a major thrust of caries vaccine research. Bowen reported that monkeys remained caries-free for more than 6 years after the animals received intraoral injections of killed*

MS, even though the monkeys were fed highly cariogenic diets and had severe malocclusion that would predispose them to caries. The route of administration of the vaccine is usually mucosal absorption by intraoral or intranasal tissues.

ii. Proper treatment: *Divided into 3 visits*

First Visit

This phase of treatment constitutes treatment of the lesion, identification of cause for counseling of parents.

All lesions should be excavated and restored

- *Assess cooperation of child and decide on whether treatment will be conducted using local anaesthesia, sedation or general anaesthesia.*
- *If abscess is present it is treated through drainage*
- *Restoration of primary molars depending on extent of caries and cooperation of child with either composite, glass ionomer cement, pulpotomy, pulpectomy and preformed metal crowns (SSCs).*
- *Antibiotics should be prescribed where acute soft tissue swelling or signs of systemic involvement (e.g. pyrexia) are present.*
- *X-rays are advised to assess the condition of succedaneous teeth*
- *Collection of saliva for determining salivary flow and viscosity*

Parent Counseling

- *The parents are questioned about the child's feeding habit, especially regarding the use of noctural bottles*
- *The parent should be asked to try weaning the child from using the bottle as pacifier while in bed*

- *In case, considerable emotional dependence on bottle, suggest the use of plain or fluoridated water*
- *The parent should be instructed to clean child's teeth after every feed.*
- *Parents are advised to maintain a diet record of the child for one week which include time, amount of food given, the type of food, number of sugar exposure.*

Second Visit

It should be scheduled one week after the first visit.

- *Analysis of diet chart and explanation of disease process of child's teeth should be undertaken by simple equation*
- *Isolate the sugar factors from diet charts and control sugar exposure by intelligent use*
- *Reassess the restoration or redo if needed*
- *Caries activity test can be started and repeated at monthly interval to monitor the success of treatment.*

Third and Subsequent Visits

- *Restoring all grossly decayed tooth and Endodontic treatment*
- *Crowns can be done for grossly destructed teeth or endodontically treated teeth*
- *Extraction of unrestorable teeth, followed by space maintainers are used*
- *Review and recall after 3 months.*

Rampant caries vs. early childhood caries

	Rampant caries	**Early childhood caries**
1	*Acute, burrowing type of caries and showed early involvement of pulp. Involving those surfaces which are usually immune to decay.*	*It is a specific form of rampant caries*
2	*It occurs in all age group including adolescence*	*It occurs in infants toddler or preschoolers*
3	*It occurs in both primary and permanent dentition*	*Affect the primary dentition only*
4	*Mandibular incisors are Usually, affected*	*mandibular incisors are not affected*
5	*Multifactorial etiology like frequent snacking excessive sticky refined carbohydrate intake, decrease, salivary flow and genetic background.*	*Primarily associated to improper feeding practice such as bottle feeding or breast feeding or pacifier feeding during sleep.*
6	*If pulp is exposed, it requires pulp therapy or RCT*	*If diagnosed in early stage it can be managed by topical fluoride application and dental education.*