All over the world, dental caries is one of the most prevalent infectious diseases.
During past decades, medicine had been focusing on treatment: the aim was to cure pathologies. Nowadays prevention is the overall objective to preserve and defend health (1).

Dental caries is a preventable disease. Over the last 30 years epidemiological studies demonstrated a decline in dental decay in children living in Western countries. Since the late 1970s Italian DMFT (the epidemiological index employed to quantify the spreading of decay) decreased of almost 90% in 12 year old children from 6.9 (2) to 1.09 (3). This trend has been observed also in primary dentition (4). It is to underline that despite this reduction, children from low social classes experience higher disease levels (5).

In 2006 a panel of experts of different disciplines elaborate the national Italian guidelines for caries prevention and recommendations in children (6).

Five factors have been identified and considered in order to define the dental caries risk level:
- socioeconomic status
- diet
- medical history and disabilities
- dental plaque and microbiological factors
- oral hygiene habits and use of fluoride

Analyzing each factor:
Oral health is related to social disparities (5) (7): dental caries is more frequent in low socioeconomic status children.

The scientific evidence that sugar is related to dental caries is overwhelming (8): there is a strong correlation between dental caries and fermentable carbohydrates intake, frequency and out of meals sugar consumption.

Medically compromised and disabled children can be more prone to poor oral hygiene and dental caries.

Dental decay is caused by endogenous bacteria: these bacteria in the biofilm produce organic acids inducing hard dental tissues demineralisation (9).

Tooth-brushing removes dental plaque; when associated to fluoride dentifrice it is the most powerful preventive measure for caries prevention (10). Caries reduction among children and adolescents occurred worldwide due to fluorides. Fluoride is an element able to foster the forming of a stronger enamel, capable of opposing bacterial plaque through a peculiar process. Therefore fluoride is essential in order to perceive a healthy tooth growth (11).

Health-oriented lifestyle, correct dietary habits, oral hygiene and regular periodical checkups are essential for a good oral health. Fluoride is an essential protective factor in dental caries prevention and control: in Italy it is administrated through supplements (systemic fluoride) and professionally applied varnish or gel (topical fluoride). Pits and fissure sealant placement is also an effective caries preventive technique (12) (6).

Pits and fissures of cuspidated teeth (that is to say permanent molars and premolars) are the dental surfaces affected by the greatest number of carious lesions in patients between 5 and 17 years of age. The high tendency may be attributed to the complex morphology of pits and fissures: because of their anatomic shape, they represent ideal sites where bacteria can easily hide and proliferate. In these areas caries onset and evolution is extremely fast due to a inadequate mechanism of autocleansing carried out by tongue and cheeks, and to difficulties of reaching such deep ravines while brushing (1).

Another factor responsible for the high incidence of occlusal caries include the lack of salivary access to the fissures as a result of surface tension, effectively preventing remineralization and reducing the effectiveness of fluoride (13).

Individual caries risk can be assessed for every patient. Children and adolescents judged to be at risk for pit and fissure decay should have sealant applied. Nevertheless caries risk may increase in low risk subjects due to changes in patient habits, oral microbiota or physical condition, and unsealed teeth subsequently would benefit from sealant application (12). For this reason, a correct preventive strategy would consider to extend treatment to every child.

The application of sealant has been demonstrated to reduce considerably the incidence of carious lesions (14): it is considered to be the most effective caries preventive measure that may be offered to a patient (13). Within this context, specific activities aiming at caries decrease and prevention in children have been promoted by the Region of Tuscany.

"Dental prevention during age of development" is indeed a program where 7 year-old pupils are involved both at school, through dental care actions, and at those dental offices supporting the project. The National Association of Italian Dentists (ANDI) joined the Region of Tuscany in this program and listed the names of
private practitioners offering to provide children born in 1999, 2000 and 2001 with free sealant applications on first permanent molars throughout 2007, 2008 and 2009. The goal is to reduce 70% of caries incidence. The sealant acts as a barrier protecting enamel against bacterial invasion forming a thin covering over pits and fissures on the occlusal surfaces of molars. The term itself derives from the Latin word “sigillum” which is referred to a mechanism able to preserve what is underneath (15).

Oral health is important for everyone, but specially for children. Primary prevention, with correct oral hygiene, proper diet, use of fluoride and pit and fissure sealants can reduce caries risk, therefore improving patients’ quality of life (13) (16).

REFERENCES


Daniele Francioli CDT, DDS, MS
Postdoctoral degree: Orthodontics.
Qualified as Researcher at University of Siena
Via Luigi Morandi n°106
50141 Firenze - Italy
e-mail: daniele@francioliodontizia.com
internet: http://www.francioliodontizia.com

Sara Arcari DDS
Original manuscript in Italian and English