Dental erosion and severe tooth decay related to soft drinks: a case report and literature review*

Ran CHENG, Hui YANG, Mei-ying SHAO, Tao HU†‡, Xue-dong ZHOU
(Department of Operative Dentistry and Endodontics, West China College of Stomatology, Sichuan University, Chengdu 610041, China)

†E-mail: acomnet@263.net

Received Aug. 13, 2008; Revision accepted Dec. 1, 2008; Crosschecked Mar. 24, 2009

Abstract: Soft drinks have many potential health problems. The inherent acids and sugars have both acidogenic and cariogenic potential, resulting in dental caries and potential enamel erosion. In this report we present a 25-year-old man complaining with the severe worn-out of the front teeth during the past 3 years. He had a history of drinking cola for more than 7 years and had a poor oral hygiene. Severe decays were present in the incisors and the canines, while less severe lesions were noted on the premolars and the molars. The review is to show the relationship between dental erosion and caries and soft drinks. Some efforts have been taken to reduce the harmful effect of soft drinks.

Key words: Dental erosion, Caries, Soft drinks, Toothbrushing


INTRODUCTION

Dental erosion (erosive tooth wear) is the situation of a chronic loss of dental hard tissue that is chemically etched away from the tooth surface by acid and/or chelation without bacterial involvement. Acids of intrinsic (gastrointestinal) and extrinsic (dietary and environmental) origins are the main etiologic factors (ten Cate and Imfeld, 1996; Hefferren, 2004). Rampant caries is defined as quickly spreading caries that affecting at least two of the upper incisors (Winter et al., 1966). In epidemiologic studies, rampant caries is defined as a decayed, missed and filled teeth (DMFT) value of 5 or more, and labial caries is regarded as a specific entity (Cleaton-Jones et al., 1978). Soft drinks containing inherent acids and sugars have both acidogenic and cariogenic potential. Many studies showed a positive relationship between caries and dental erosion and the consumption of soft drinks (Sayegh et al., 2002; Johansson et al., 1996; Harding et al., 2003; Al-Majed et al., 2002; Luo et al., 2005). Accordingly, the clinical manifestations and diagnosis of diseases caused by soft drinks should be regarded as a combination of erosion and caries, and clinicians should pay more attention to it. In this paper, we report a case of dental erosion and rampant caries caused by extensive consumption of soft drinks. A review of the literature on the etiology and the related factors was presented.

CLINICAL DATA

A 25-year-old man presented with the severe worn-out of the front teeth during the past 3 years. The patient reported that he had a history of drinking cola for more than 7 years and had a poor oral hygiene. In the first 3 years, he drank 0.5~0.75 L cola a day and toothbrushed once a day. During the period of 4~5 months into the 4th year, he drank 1.5 L cola a day and some fruit juices (especially grape and citric...
juices), and he brushed his tooth or gargled with water once a day, mostly in the morning. In the latest 3 years, he continued drinking 1.5 L cola a day and toothbrushed once or twice daily.

He described his job as a bank worker with no exposure to acid substances. The patient recalled a busy-working period of about 4 to 5 months 3 years ago when he started consuming cola much more frequently (a total of 1.5 L a day). He likes holding the drink in the mouth for several seconds and tasting before swallowing. He denied anything unusual in his diet, medical history, allergic history, and family history of dental problems. He also denied symptoms of gastroesophageal reflux, odontalgia, xerostomia, and bruxism.

Dental examination found that crescent-shaped lesions were present on the cervical region of the buccal and labial surfaces of the teeth of this patient (Figs.1a–1c). No lesions were found in the palatal and lingual surfaces (Fig.1d). Different stages of lesions could be seen on the teeth. Severe decays (caries cavities shown by arrows in Figs.1b and 1c) were present in the incisors and the canines, while less severe lesions (white spot lesions shown by arrowheads in Figs.1b and 1c) were noted on the premolars and the molars. The pulpal surfaces of erosive lesions contained brown-colored, leathery, carious dentin. None of the pulp cavities were involved. The patient did not report pain or sensitivity associated with any of the affected teeth. A comprehensive periodontal examination revealed no signs of attachment loss, and plaque deposits and calculus were only found on the mandibular incisors, with minimal bleeding on probing. The maxillary front teeth remained asymptomatic on percussion, palpation, and cold testing.

Buccal caries had also impacted teeth 17 and 27. And more extensive buccal and occlusal caries were seen in teeth 18 and 28. Caries of tooth 27 had impacted the pulp, above which there were lots of grey debris. The patient reported no pain on cold testing and percussion, but a severe pain when probing into the pulp cavity.

The oral mucosa was moist, pink, and without lesions. There was no salivary gland enlargement bilaterally. The saliva was clear and flowed freely from salivary ducts bilaterally. Normal pooling of saliva was noted on the floor of the mouth. The remainder of the soft-tissue examination was normal.

Finally, the history and the symptoms of this patient confirmed the complex diagnosis of dental erosion and dental caries. On one hand, dental erosion is defined as the physical result of acid without bacterial involvement. Early stage of dental erosion includes a smooth surface. Advanced stages include developing enamel concavities, lesions with longer depth than width, undulating borders, and an intact border of enamel along the facial gingival margin. In severe cases of dental erosion, the entire occlusal morphology of the tooth disappears (Lussi et al., 1993; 2004; 2006). The pattern of erosion is related to the frequency the dental tissue is exposed to acidic fluid. In this case, the patient likes holding the drink in