

# Extensive Tooth Wear: A Case Report

## SUMMARY

*This article presents an extensive tooth wear in a 25 year old female patient with congenital adrenal hyperplasia. Detailed history, dietary investigation, oral examination, and gastric evaluation revealed that severe tooth wear was a result of gastroesophageal reflux, dietary habits and bad habit of chewing nails, and not of a systemic disease.*

**Keywords:** Tooth Wear; Tooth Abrasion; Tooth Erosion; GERD

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**CASE REPORT (CR)**

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## Introduction

Non-carious loss of dental hard tissue, generically termed as tooth wear, is caused by combine processes of erosion, abrasion and attrition. Clinically, dental erosion is used to describe the physical results of a pathologic, chronic, localised, painless loss of dental hard tissue chemically etched away from the tooth surface by acid, without bacterial involvement<sup>5,13,19</sup>. On the other hand, abrasion is used to describe the pathological wearing away of dental hard tissue through abnormal mechanical processes involving foreign objects or substances repeatedly introduced in the mouth and contacting the teeth, while attrition represents physiological wearing away of hard tissue as a result of tooth-to-tooth contact with no foreign substance intervening<sup>5,8</sup>.

This report presents a 25 year old female patient with clinical manifestations of a severe tooth wear caused by several reasons.

## A Case Report

A 25-year-old female patient referred to the Department of Operative Dentistry, Faculty of Medicine, University of East Sarajevo for conservative treatment due to a severe tooth wear. Her chief complaint was related to shortening of her maxillary frontal teeth that had started nine years ago. The past dental history revealed that patient as well as dentists hadn't noticed changes on other teeth.

Detailed discussion with patient about dietary habits revealed that she used to consume one piece of fresh fruits daily (apple, orange), and a glass of soft drinks - lemonade or cola beverages at least 3 times a week. She also used to drink 2 coups of herbal tea and coffee twice a day. Patient did not sip or hold beverages over a long period of time in the mouth. However, she admitted a habit to drink salad dressing from time to time. She denied smoking and drinking alcohol.

Concerning gastric disturbances, patient reported that, during past 5 years, she had been experiencing hart-burn, once or twice a month, usually after certain spicy meals, but she denied any complaints about sour mouth or any gastric pain early in the morning, and gave no history of vomiting or bulimia. She has not been exposed to acidic environments and had no history of bruxism or any history of jaw para-function, but she has had a bad habit of chewing nails since childhood.

Data about oral hygiene habits showed that patient regularly brushed her teeth twice a day and usually after meals, with a medium toothbrush and non-abrasive fluoride toothpaste, predominantly using horizontal motion. Brushing teeth lasted from 2 to 3 minutes. She did not use dental floss or mouthwash, but she chewed gum regularly.

The patient's medically history revealed that, when she was 20, she consulted medical practitioner for treatment of menstrual irregularity when congenital adrenal hyperplasia was diagnosed. Since than, the patient has been on corticosteroid therapy (dexamethasone, 1mg per day) and oral contraceptive drugs. Osteopenia was diagnosed 2 years ago when densitometry (DEXA) revealed T-score-2.1 (L1-L4 region). Calcium and vitamin D were also prescribed.

### Clinical Examination

The patient's oral hygiene was good, with some pigmented plaque on mandibular molars. No calculus was present. The gingiva and oral mucosa were normal.

For clinical assessment of tooth wear we used Tooth Wear Index (TWI) developed by Smith and Knight<sup>15</sup> - with scores from 0 to 4, as well as index for erosive lesion proposed by Lussi<sup>11</sup>, with grading of facial surfaces from 0 to 3, and oral and occlusal surfaces from 0 to 2. For presenting distribution and severity of tooth wear, using TWI, teeth were subdivided into 4 zones: anterior maxillary, posterior maxillary, anterior mandibular and posterior mandibular. The anterior teeth included central and lateral incisors and canines, whereas the posterior included the first and second premolars and first, second, and third molars.

The maxillary central incisors showed facial, incisal and palatal enamel and dentine loss, restored with composite resin (Figs. 1-3). All of patient's maxillary incisors and canines showed loss of enamel and dentin from their incisal surfaces to the palatal surfaces (Figs. 2 and 3). Oral surfaces of these maxillary teeth were smooth, shiny and hard, while buccal-oral teeth diameter was smaller. According to the index proposed by Lussi, only grade II severe lesions were found on palatal surfaces, while score 4 was found for the Smith & Knight index (Tab. 1). Shallow cervical lesions were present on facial aspects of anterior maxillary teeth (Lussi index-grade 1; TWI mean score 0.8). Moderate enamel loss was seen on oral and occlusal surfaces of first and second maxillary premolar and first and second maxillary molars (Figs. 2 and 3). Whole occlusal morphology disappeared on premolars, while rounding of the cusps and grooves occurred on molars. Grade II (Lussi index) was found for occlusal surfaces of these posterior teeth, whereas the highest score of TWI (2.0) was for oral and occlusal surfaces.



Figure 1. Tooth wear of facial and incisal surfaces of maxillary central incisors restored with composite resin; loss of incisal edges and facial tooth wear of maxillary second incisors and canines



Figure 2. Loss of incisal/occlusal and palatal enamel from right maxillary incisors, canines, premolars and molars



Figure 3. Loss of incisal/occlusal and palatal enamel from left maxillary incisors, canines, premolars and molars

Table 1. Tooth wear index (TWI) score

Groups of teeth	cervical (mean $\pm$ SD)	buccal (mean $\pm$ SD)	lingual (mean $\pm$ SD)	occlusal/incisal (mean $\pm$ SD)
anterior maxillary	0.83 $\pm$ 0.75	1.00 $\pm$ 0.89	4.00 $\pm$ 0.00	1.67 $\pm$ 1.03
posterior maxillary	0.50 $\pm$ 0.53	0.00 $\pm$ 0.00	2.00 $\pm$ 1.69	2.00 $\pm$ 1.69
anterior mandibular	1.67 $\pm$ 1.21	0.50 $\pm$ 0.83	0.00 $\pm$ 0.00	0.33 $\pm$ 0.81
posterior mandibular	1.86 $\pm$ 1.77	1.00 $\pm$ 0.81	0.43 $\pm$ 0.53	1.14 $\pm$ 1.07

anterior teeth - incisors and canines,  
posterior teeth - premolars and molars



Figure 4. Loss of enamel from incisal edge of left central incisor, cervical third of facial surfaces of mandibular teeth, and occlusal surfaces of mandibular posterior teeth

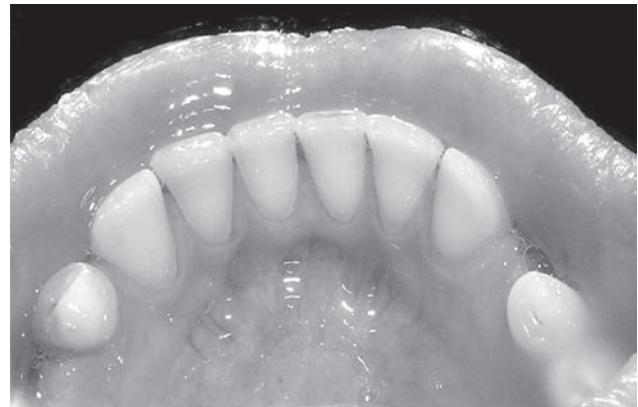


Figure 5. Initial loss of enamel in cervical third of lingual surfaces of mandibular anterior teeth (33, 41, 42, 43)

Dentin was exposed on incisal edge of mandibular central incisor (Fig. 4). More or less enamel loss in cervical third of facial surfaces was present in almost all mandibular teeth (Fig. 4). Lingual cervical tooth wear was present on mandibular anterior teeth and first premolars (Fig. 5). For cervical third, TWI score was 1.67 for mandibular anterior, and 1.86 for mandibular posterior teeth, and grade 2 was found for index proposed by Lussi. Dentin was exposed on occlusal surfaces on left second premolar and mandibular molars (Fig. 4). For these surfaces, TWI score was 1.14, while grade 2 was assessed for Lussi index.

During oral examination, it was also observed that amalgams restorations had raised margins. Carious lesions were observed on approximal surfaces of maxillary canine and incisors. For further observing and managing of tooth wear, the models of the patient's teeth were also made.

Clinical examination also included a determination of salivary flow rate. A non-stimulated and paraffin-chewing stimulated whole saliva were collected by the spitting method and salivary flow rate were 0.22 ml/min and 0.80 ml/min (low flow rate according to Ericsson and Hardwick)<sup>6</sup>, respectively.

We referred the patient to a gastroenterologist for evaluation of gastroesophageal reflux disease (GERD).

The report from the medical evaluation confirmed pathological reflux and the gastroenterologist prescribed the appropriate therapy to the patient.

## Discussion

In the present case, according to patient description, tooth changes started as wear of the incisal edges and labial surfaces of frontal maxillary teeth 9 years ago. Concerning the fact that the patient's dietary habits included frequent consumption of acid salad dressing, it is possible that this acid was initial factor for wearing of her frontal teeth. It is well known that patients exposed to acids from an extrinsic source mostly exhibit a damage of the labial or incisal surfaces of the upper anterior teeth<sup>10</sup> with severity decreasing posteriorly, which was in accordance with our findings. Also, it can be supposed that acid from salad dressing caused superficial demineralization of dental hard tissue of other teeth, but these sub-clinical erosive lesions had been probably overlooked by dentists (facts from a case history). Having in mind the patient's long term bad habit of chewing nails, it could be supposed that abrasion of incisal edges



induced by this habit aggravated erosions induced by acid consumption. It is in accordance with findings that extrinsic acids, as well as intrinsic acids, decrease the wear resistance of dental hard tissue<sup>4</sup>.

Clinical examination revealed that the most severe tooth wear was observed on palatal and incisal/occlusal surfaces of anterior and posterior maxillary teeth, while the most affected surfaces in the mandible were cervical thirds of facial and lingual surfaces of anterior and cervical thirds of buccal, and occlusal surfaces of posterior teeth. The distribution of the tooth wear, essentially incisal and palatal on maxillary anterior teeth and occlusal and buccal cervical on mandibular posterior teeth is the most common dental sign of the effects of gastric acids due to GERD or frequent vomiting<sup>18</sup>. Erosion of lingual aspect of mandibular anterior teeth, observed in our patient, is the rarest form of dental erosion, and it is found uniquely in chronic gastroesophageal reflux and in older bulimic patients<sup>16</sup>. Clinical finding of tooth wear pattern in our patient indicated that gastric acid, but not vomiting and bulimia, was most likely the main cause of wear since patient complained only about heart-burn, and medical diagnosis of GERD was established. The association of GERD with dental erosion has been established in a number of studies, and moreover, dental erosion may serve as a diagnostic sign of acid reflux<sup>7,9,12</sup>. Majority of people experience only mild reflux symptoms, which are commonly tolerated<sup>2</sup>, or experience no GERD symptoms at all. Bartlett et al<sup>2</sup> introduced the term "silent reflux" to describe such patients, and suggested that in the absence of reflux symptoms, the oral manifestations of GERD may be the only clinical sign of pathological reflux. In one dental study, up to 25% of subjects presenting with dental erosion were observed to have pathological levels of reflux despite not having any symptoms of GERD<sup>1</sup>. Moreover, development of erosive lesion, especially lingual erosion of mandibular teeth, depends on the reduced salivary flow<sup>16</sup>. In connection with this is the fact that in our patient we estimated low flow rate for non-stimulated and stimulated whole saliva.

Loss of dental hard tissue observed in cervical third of buccal surfaces of almost all mandibular teeth was caused by action of acids, but probably aggravated by patient's oral hygiene habit. Namely, according to the dental history, patient frequently used toothpastes with horizontal tooth-brushing technique after meals. Several studies have shown that the loss of tooth substance after ingestion of erosive food stuffs is accelerated by tooth-brushing<sup>4</sup>.

Having in mind that patient has a medical history of non-classic form of congenital adrenal hyperplasia (CAH), we analyzed possible association with the

observed tooth wear. The disease is characterized by increased circulating levels of androgens. Androgen excess in adulthood may result in an increased bone mineral density and in a reduced fat mass percentage<sup>17</sup>. Since the data concerning the influence of CAH on teeth is very rare and related only to faster development of dentition<sup>3,14</sup>, it seems that there is no relationship between CAH and tooth wear in our patient.

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