Dental White Spots Associated with Gastro-esophageal Reflux in Orthodontic and Orthognathic Surgery Patients

Claudia Corega1, Mihaela Baciut2, Ligia Vaida3, Marius A.Corega1, G. Baciut2

1) Department of Orthodontics; 2) Department of Maxillofacial Surgery, University of Medicine and Pharmacy Cluj-Napoca; 3) Department of Orthodontics, University of Medicine and Pharmacy, Oradea, Romania

Abstract

Gastro-esophageal reflux is a gastrointestinal disorder that might cause irreversible damages to the hard tissues of the teeth. The aim of this article is to report two cases of patients with severe dental demineralization associated with gastro-esophageal reflux during orthodontic and combined orthodontic-orthognathic surgery treatment. Diagnosis and prevention aspects are highlighted and discussed.

Key words


Introduction

Gastro-esophageal reflux disease affects up to 40% of the general population. Whereas toddlers typically outgrow regurgitation by the first year of age, the prevalence of gastro-esophageal reflux disease symptoms in those aged 3 to 18 years ranges from 1.8% to 22% [1]. The most common symptoms are vomiting, retrosternal burning discomfort and oral regurgitation of gastric contents. Aside from these symptoms, gastro-esophageal reflux has been considered as a likely contributor to the detriment of oral health [2, 3].

Gastric contents have a pH between 1 and 3, and several studies have demonstrated that vomiting acidic gastric contents leads to various types of dental erosion [2-5]. It is generally known that all disorders associated with gastric acid reaching the oral cavity can result in demineralization of the hard dental tissues. Physiologic reflux of gastric juice in the esophagus with rapid clearance occurs in both children and adults, and usually has little clinical significance. Reflux is considered pathologic when it occurs more frequently or when complications arise. Consequently, the clinical manifestations of dental demineralization and erosion by intrinsic acids appear to occur only after several years of repeated exposure [6, 7].

Therefore, it is of great importance for health professionals, especially physicians and dentists, to be aware of the clinical implications for the dental health of the gastro-esophageal reflux. Despite the prevalence of this disturbance, its clinical implications related to orthodontic treatment have been practically unexplored. The purpose of this article was to report two cases of patients with severe dental demineralization diagnosed as white spots associated with gastro-esophageal reflux during orthodontic treatment.

Case 1

A 23-year-old female was referred for orthodontic treatment at the Department of Orthodontics in Cluj-Napoca, Romania. Aside from the orthodontic problem, respectively crowding in both upper and lower jaw, she had good dental health, with no caries lesions or white spots and no gingivitis (Fig. 1). She also reported excellent hygiene habits (like brushing 5 times a day and regular use of dental floss). Meanwhile she had healthy eating habits, and her medical history showed no evidence of any remarkable alteration or systemic disease. Eight months after starting orthodontic treatment, the patient developed generalized gingivitis and initial demineralization areas (white spots) (Fig. 2); therefore she was advised to improve her dental hygiene.

After 10 months of treatment, the patient reported to the orthodontist that she had vomited daily “stomach acid,” and was transferred to the hospital after an acute episode. Her medical report stated that two gastric ulcers had been diagnosed by endoscopy and the Helicobacter pylori test has been positive. The clinical examination, the day after the emergency episode, showed generalized demineralization associated with white-spot lesions on the vestibular surfaces of nearly all teeth (Fig. 3). Moreover, the oral mucosa had diffuse erythema. Orthodontic treatment, which was in the final phase, although all objectives were not yet achieved,
was discontinued immediately. Wisdom teeth removal by the maxillofacial surgeon has been postponed due to the high risk of infection at the extraction site. The patient was referred to her dentist for a complete evaluation and therapy for demineralization treatment.

**Discussion**

Despite the high prevalence of gastro-esophageal reflux [3] most people experience only mild reflux symptoms, which are commonly tolerated [4]. The condition often remains undiagnosed and can go untreated for several years [3]. This might explain why this patient did not report symptoms in his medical history during the initial examination. If undiagnosed gastro-esophageal reflux is suspected, the patient should be referred to a physician, because it might cause irreversible damage to dental health. Also physicians should be aware of the side effects related to the oral health and mainly during orthodontic or maxillofacial surgery treatments. Although clinical manifestations occur only after years of repeated exposure, immediate damage can occur

**Case 2**

A 21-year-old male was referred for orthodontic treatment. He was diagnosed with a Class II division 2 malocclusion and scheduled for a multidisciplinary therapy consisting of an orthodontic treatment in conjunction with an orthognathic surgery procedure: a Le Fort I osteotomy for the maxilla and a bilateral mandibular sagittal split osteotomy (BSSO) with mandibular advancement (Fig. 4). He had good oral hygiene and no evidence of any systemic disease. Seven months after starting orthodontic treatment, the patient developed generalized gingivitis and initial demineralization areas (white spots) (Fig. 5) and reported to the orthodontist that he had severe gastric pain and daily oral regurgitation of bitter gastric contents. He sought treatment and was diagnosed with a gastric ulcer. A generalized demineralization, associated with multiple white-spot lesions on the vestibular surfaces of all teeth was noticed together with a severe gingivitis (Fig. 6). Orthodontic treatment, which was in the final presurgical phase was discontinued immediately and the appliance was removed. The orthognathic surgery was cancelled due to the high risk of infection. The patient was referred to a dentist for prosthetic therapy and demineralization treatment.

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**Fig 1.** Before orthodontic treatment, the patient had signs of good oral health.

**Fig 2.** After 10 months of treatment, gingivitis and white spots had appeared.

**Fig 3.** After episodes of gastro-esophageal reflux (vomiting), severe dental white spots were seen on vestibular surfaces of most teeth in both upper and lower jaw.

**Fig 4.** Before orthodontic treatment, the patient had good oral health and was diagnosed with a Class II division 2 malocclusion.

**Fig 5.** After 7 months of treatment, severe gingivitis and white spots had appeared.

**Fig 6.** Multiple dental white spots on vestibular surfaces of most teeth in both upper and lower jaw.
when larger volumes are refluxed. This seems to be the only valid explanation for the extended areas of erosions occurring on the vestibular surfaces of these patients, since they had good oral health before and during orthodontic treatment. Studies documenting the influence of gastric diseases on hard dental tissues suggested a pattern of erosion in which the palatal surfaces of the maxillary anterior teeth are usually first affected, followed by the occlusal surfaces of the molars and premolars and the vestibular surfaces of the maxillary incisors in severe cases [8, 9]. A possible mechanism to explain the high susceptibility of the palatal surfaces is that the force of regurgitation from the pharynx into the mouth propels the gastric juice forward and causes damage to the palatal surfaces of the maxillary teeth [4]. However, the patients had more demineralization areas in the vestibular surfaces, probably because the acidic gastric contents were retained in the orthodontic appliances.

Decalcification that appears as white spot lesions on the vestibular and palatal surfaces and of the teeth are the result of serious complications from treatment with fixed orthodontic appliances. As precursors to caries, the lesions can compromise the biologic and esthetic benefits of orthodontic therapy [10]. When an orthodontic patient has gastro-esophageal reflux, this problem becomes more critical, because the orthodontic appliances make hygiene more difficult. Also orthognathic surgery might not be possible due to the infection risk. In our patients, orthodontic treatment was in the final phase but had not yet achieved all objectives, and had to be followed by surgery in the last case. The interruption of treatment and the removal of the appliances were as frustrating for the patients as they were for the orthodontist.

Considering the damage to oral health that gastro-esophageal reflux can cause, preventive measures should be established, including: (1) stimulation of salivary flow, because saliva has a buffering capacity that resists acid attacks; (2) instruction on the daily use of fluoride mouth rinses, soft toothbrushes, and dentifrices that are low in abrasiveness; (3) professional application of topical fluoride and a fluoride varnish 2 to 4 times a year; and (4) the recommendation that dietary components providing calcium and phosphate be retained in the mouth after an acid attack [11].

Conclusions

Gastroenterologists should consider, when counselling patients with this kind of disorders, the long-term side effects on the hard dental tissues because they might influence the quality of the dental and orthodontic care.

Dental health professionals should be aware of the diverse aspects related to gastro-esophageal reflux and the preventive measures that can improve both oral and general health.

References