

# Dental Erosion: One of the Main Diagnostic Symptoms of Gastric Oesophageal Reflux Disease

## SUMMARY

*Passage of the gastric contents into the oesophagus (gastric oesophageal reflux - GER) can be manifested by changes of tooth hard tissues. Tooth erosions that are consequence of GER are known as gastric oesophageal reflux disease (GERD). GERD is the complication of GER status. Furthermore, tooth erosion is one of the main symptoms that gives evidence of the digestive disorders, being present in early stages of the disorder.*

*Every acid content that is found in the mouth area, with a  $pH < 5.5$ , may cause melting of the enamel hydroxyapatite crystals. Gastric juice in GERD has a  $pH$  value under 2.0. So it is very important to make the right differential diagnosis promptly, as well as the decision.*

**Keywords:** GERD; Gastric Juice

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## Introduction

Many systemic diseases and pathologic conditions are manifested with oral changes too, which makes dentists to be the first health care professional to find out these diseases due to their primary manifestations. Tooth erosion is defined as a loss of the tooth hard tissues as the result of interaction of several chemical, non-bacterial, factors in the mouth region. Dental erosion is one of the intra-oral symptoms that defines disorders of gastric-oesophageal origin. gastro-oesophageal reflux (GER) is the passage of the gastric contents into the oesophagus and gastro-oesophageal reflux disease (GERD) is the complication status of GER, being manifested with changes of tooth hard tissues.

Erosion begins as demineralization of the enamel surface that causes melting of the surface stratum and loss of the tooth structure. Tooth erosion risk factors could be: intrinsic and extrinsic causes<sup>1,2</sup>.

Clinically, the tooth erosion in patients with GERD is characterized with:

1. Wide concavities on the enamel smooth surface;
2. Cupping of the occlusal surfaces (incisal whooling) with dentine exposure;
3. Increasing of the transparency in the incisal margin;
4. Wearing of the non-occluding surfaces;
5. Amalgam fillings on the enamel smooth surface;
6. Wearing of the enamel surface in the gingival/cervical area of teeth;

7. Hypersensitivity to hot and cold agents.
8. Symptoms or history of GERD;
9. Excessive attrition;
10. Vomiting (weekly or more often), chronic and excessive vomits;
11. Sports drinks intake (weekly or more often);
12. Citrus fruits intake (more than twice daily) and soft acidic and alcoholic drinks consumed (4-6 or more per week);
13. Bruxism habit and salivary changes;
14. Gastric acids regurgitation into mouth or oesophagus;
15. Eating disorders, like anorexia nervosa or bulimia;
16. Hiatus hernia;
17. Gastrointestinal disorders, such as peptic ulcers or gastritis, pregnancy, side effects of some medicaments, diabetes or nervous system disorders.

It is generally accepted that there are 3 erosion grades:

- 0 - no detectable erosion;
- 1 - small pots and lightly rounded cuspids, flat fissures, alterations in the occlusal surface (moderated grooving);
- 2 - ruining of cuspids with heavy grooving, fillings margins are erased over the tooth level, flattening of the occlusal surface morphology.

It is very important to make the right differential diagnosis and to decide about the relation of the dental erosion process and other possible pathology of tooth structure loss, such as attrition or abrasion.

## Material and Methods

We examined 60 out-patients, aged 25-38 years, at the gastroenterology ward of the University Hospital Centre in Tirana. 13 of them had evident dental erosions. Medical and dental control performed in these patients followed special protocols, such as: taking medical, dental and dietary history, and performed oral hygiene methods, as to define the disease etiological factors.

The procedure comprised:

Making diagnosis based on the GERD symptoms, signs and fibroscopic tests;

Measuring pH of the gastric juice based on a 24 hours monitoring. The pH was monitored before breakfast and lunch;

Defining grades of dental erosions.

Diagnostic protocol for dental erosion comprised:

1. Medical History (excessive vomiting, rumination, eating disorder, GERD, symptoms of reflux, frequent use of antacids, alcoholism, auto-immune disease such as Sjogren Syndrome, oral and/or eye dryness, medication that causes salivary hypo-function, acidic medication);

2. Dental History (history of bruxism, grinding or clenching, grinding sounds during sleep noted by bed

partner, morning masticatory muscle fatigue or pain, the use of occlusal guard);

3. Dietary History (acidic food and beverage frequency, the way of ingestion - swish or swallow, oral hygiene methods, tooth-brushing method and frequency).

The data were analyzed statistically using Kendal's correlation coefficient in determining the relationship between the change in pH and the change in the oral status ( $r = 0.685$ ;  $p = 0.013$ ). SPSS 10.0 programme was used in data analysis.

## Results

Results are presented in table 1. From the results it can be seen that the difference is significant enough (data were considered to be significant enough if difference was  $p \leq 0.05$ ).

A t-test was performed on the data received from the 2 sample groups ( $t = 0.45$ ,  $p = 0.63$ ). These results were not considered to be significant.

Table 1. Evaluation of the gastric juice pH, localization of the dental erosion and the disease time

Case	pH 1	pH 2	Oral Status	GERD Period
1	3.74	3.69	+ Erosion of 6 teeth, especially the M sides and lower	2 years
2	2.87	2.37	+ Erosion of 6 teeth, especially the M sides, tubercles and lower teeth	2.5 years
3	3.58	3.17	+ Erosion of all teeth, fillings raised up to the eroded occlusal surface, the majority of teeth extracted	4 years
4	4.2	3.38	+Erosion still in its 0 Grade	5-6 months
5	3.40	3.34	+ Erosion of all teeth, teeth extracted	5 years
6	2.49	2.27	+ Erosion of all teeth, teeth extracted	4-5 years
7	3.64	3.47	+ Erosion of all teeth, teeth extracted	6 years
8	4.52	4.42	+ Erosion still in its 1 Grade	4 months
9	7.12	6.62	+ Erosion still in its 1 Grade	7 months
10	2.87	2.75	+ Erosion of 6 teeth, Grade 2; especially the M sides, tubercles and lower teeth	1.7 months
11	3.58	3.17	Erosion Grade2 of mandibular premolars	6 months
12	7.52	6.42	Erosion Grade1 Maxilar centrals	4 months
13	8.0	5.7	Erosion Grade 1 Mandibular molars	5-6 months

## Discussion

When dentists diagnose tooth erosive lesions, they have to consider the possibility of their systematic origin. Especially patients that suffer from GERD have to be examined continually to prevent erosive lesions. They should keep a good hygiene of their oral cavity and they should also use local fluoride paste.

In the short term the goal in the treatment of dental erosion resulting from GERD is making differential diagnosis between GERD, other mechanical forces effects (attrition, abrasion) and etiopathogenetic factors. However, it is always advisable to decrease abrasive forces (the use of soft toothbrushes and dentifrices low in abrasiveness in a gentle manner, not to brush teeth immediately after an acidic challenge to the mouth, as the teeth will abrade easily, and rinse with water immediately after an acidic challenge), provide mechanical protection (application of composites and direct bonding where appropriate to protect exposed dentin, construction of an occlusal guard is recommended if a bruxism habit is present), and monitor stability (regular recall examinations should be done to review diet, oral hygiene methods, compliance with medications, topical fluoride and splint usage).

GERD is an important etiologic factor in the erosive lesion of teeth hard tissue. Our studies are consistent with other studies carried in other countries<sup>1-10</sup>. Mandibular molars had the highest wear out and damage in our cases. The part of the teeth that had been affected the most was the mesio-lingual surface.

Exposure of the dentinal tubules results in hypersensitivity to hot, cold, sweet and tactile stimuli. We have to emphasize that the demineralization occurs faster in dentin than it does in enamel

In diagnosing and curing erosion cases caused by GERD, a tight collaboration between several specialists, especially dentists and gastroenterologists, is required.

Further examination and studies would help to get better understanding of GERD and its relation to teeth erosive lesion.

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