

# Clinical implications of educational shortcomings in oral health

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## ABSTRACT

**Purpose.** To present the clinical implications evolution of educational shortcomings in young adults who are long-term consumers of acidified beverages.

**Cases description.** The cases of three long term acidified bevarages cosumer pacients were reported. The patients were asked about general condition, eating habits and oral hygiene used methods, were examined and illustrative photos were taken. Case 1 is of a 18 year old male (5 years consumer) presenting typical erosions for acidified beverage consumers on the vestibular surface of the teeth. Case 2 is of a 24 year old male (10 years consumer) presentig a particular pattern of cavity grafted on pre-existing erosion zones. Case 3 is of a 25 year old female (15 years consumer) presentig severe damage to the whole dento-maxilar apparatus.

**Results.** The common elements of the three cases point towards the lack of instruction in maintaining an optimal oral health level, the prolonged daily consumption of carbonated beverages in appreciable amounts and poor oral hygiene.

Prolonged consumption of carbonated beverages and poor oral hygiene cause irreversible dental damage from localized erosions of several teeth to caries grafting on eroded surfaces and finally to the massive coronary destruction involving damage to the whole dento-maxilar apparatus.

**Discussion.** Introducing a national educational program would lead to patients becoming aware of the need for a proactive, sanogenic attitude as well as to an improvement in the level of oral health with important benefits for the pacient as well as for the healthcare system.

**Keywords:** dental erosion, acidified beverages, health education

## INTRODUCTION

The consumption of acidic beverages is widespread across the globe, regardless of age, education, or social status. The popularity of these beverages, the social habits and the “wellbeing” they induce, have led to an increase in their use without an awareness of the negative effects they have on both a local and general level.

Diseases associated with the prolonged consumption of these beverages are manifested locally by dental erosions that are often grafted into a particular pattern of caries and more generally: type 2 diabetes (1,2,3), myocardial infarction (4,5), gout (6,7), obesity and diseases associated with obesity (8), bone damage (9,10).

The purpose of this article is to present the clinical implications of educational shortcomings in

young adults who are long-term consumers of acidified beverages. The cases presented are of some patients who presented themselves at a private dental surgery in Bucharest, Romania.

## CASES REPORT

The cases of three long term acidified beverages cosumer pacients were reported. They presented themselves to a private dental surgery in Bucharest, Romania. The patients were asked about general condition, eating habits and oral hygiene used methods. They were examined and illustrative photos were taken.

### Clinical case 1

Patient C.A., male, 18 years old, presents himself at the surgery for oral rehabilitation of the up-

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*Article History:*

Received: 24 November 2019

Accepted: 3 December 2019

per frontal area, the patient being dissatisfied with the aesthetic appearance of the upper frontal teeth. Hereditary collateral antecedents are irrelevant. Based on his records, the patient is a carbonated drinks consumer since the age of 13. On average, he consumes 1 liter of acidic beverages per day from a glass or bottle, not through a straw.

He performs dental brushing 5 times a week on average. Evening dental brushing is not performed regularly, at least once a week, only in the morning, not in the evening. Does not use ancillary means of oral hygiene.

The clinical examination reveals the presence of typical erosions for acidified beverage consumers. Erosions are present on the vestibular surface of the teeth: 1.4, 1.3, 1.2, 1.1, 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 3.7, 3.7.

In the case of the upper incisor group the erosion affects the cervical half of the vestibular face and manifests itself in a worsened form with a lack of substance in the form of large excavations in cases 1.1 and 2.1. In the case of the other teeth affected by erosion (1.4, 1.3, 2.3, 2.4, 2.5, 2.6, 3.7, 4.7), this manifests itself as a matte cervical band without a lack of substance. 1.6, 1.5, 2.6, 2.7 have simple non-cavitated occlusal caries, 3.7, 4.7 exhibit simple cavities, and 3.6 and 4.6 have secondary occlusal caries.

Vitality tests are positive for all teeth present on the arcade.

Axis percussion is negative for the teeth present on the arcade.



**FIGURE 1.** Clinical aspect of C.A. patient

The patient was instructed relative to:

- establishing a rigorous day-to-day hygiene program both in the morning and in the evening with the use of ancillary hygiene (mouthwash, oral irrigator, dental floss)



**FIGURE 2.** Clinical aspect of C.A. patient

- correcting the diet by removing acidified, sweetened or acidic beverages (e.g. citric acid)
- in the case of acidified, sweetened or acidic beverages consumption, it should be done through a straw, not from the glass, the bottle or the can so that the liquid does not come in contact with the dental surfaces
- immediately rinse with water in case of acidified, sweetened or acidic beverages, avoid dental brushing in the first hour after the consumption of such beverages
- recommendation of a strict monitoring program with regular check-ups every 6 months

He was presented with a treatment plan aimed at eliminating areas affected by erosion and coronary restoration by composite obturation. It has also been recommended that the patient regularly apply locally a remineralizing topical cream releasing recalcant casein phosphopeptide – amorphous calcium phosphate and fluoride.

### Clinical case 2

Patient T.A., male, 24 years of age, presents himself to the surgery for oral rehabilitation of the upper frontal area, the patient being dissatisfied with the appearance of the upper frontal teeth. Hereditary collateral antecedents are irrelevant.

From his records, it results that the patient consumes on average 2 liters of acidified beverages per day from the age of 14. The consumption of these beverages is done from a glass, bottle or can, not through a straw. He accomplishes oral hygiene only 3-4 times a week, often in the morning, without being able to specify whether he uses a fluoridated or non-fluoridated paste for dental brushing. Does not

use ancillary hygiene. He does not follow a regular monitoring program. The patient states that he did not have oral health training, was not aware of the possible negative effects of prolonged consumption of acidified beverages.

The clinical examination reveals a particular pattern of cavity in the cervical area grafted on pre-existing erosion zones. These caries mainly affect the vestibular surface of the lateral teeth (both upper and lower) (1.6, 1.5, 1.4, 3.8, 3.7, 3.6, 4.6, 4.7). From the frontal group 1.3 and 2.2 there are vestibular caries. 2.3, 3.5, 3.4, 3.3 present secondary vestibular caries.

Also, there are observed caries on the palatal surface of several upper teeth (particular caries localization in the case of acid drinkers): 1.4, 1.2, 1.1, 2.2, 2.3.

Caries on the approximate mesial surfaces are observed at the level: 1.3, 1.2, 1.1, 2.1, 2.5 and 2.6 show erosions in the cervical area on the vestibular face.

Vitality tests are positive for all teeth with the exception of 1.7 and 1.5 which are in the form of root remnants. Axis percussion is negative for all teeth.



**FIGURE 3.** Clinical aspect of patient T.A.



**FIGURE 4.** Clinical aspect of patient T.A.

The patient was instructed relative to:

- establishing a rigorous day-to-day hygiene program both in the morning and in the evening with the use of ancillary hygiene (mouthwash, oral irrigator, dental floss)
- correcting the diet by removing acidified, sweetened or acidic beverages (e.g. citric acid)
- in the case of acidified, sweetened or acidic beverages consumption, it should be done through a straw, not from the glass, the bottle or the can so that the liquid does not come in contact with the dental surfaces
- immediately rinse with water in case of acidified, sweetened or acidic beverages, avoid dental brushing in the first hour after the consumption of such beverages
- recommendation of a strict monitoring program with regular check-ups every 6 months

He was presented with a treatment plan aimed at the extraction of root remnants, the oral rehabilitation of the edentulous space resulting from the extraction of 1.5 through a dental bridge with posts 1.4 and 1.6, as well as the treatment of caries that affect almost all the teeth present on the arch, with an application of photopolymerizable composite obturations in the cavities resulting from the removal of carious lesions.

It has also been recommended to the patient to regularly apply locally a remineralizing topical cream releasing recalcitrant casein phosphopeptide - amorphous calcium phosphate and fluoride.

### Clinical case 3

Female patient, L.A., 25 years old, presents herself at the dental surgery with pain at level 4.7.

Hereditary collateral antecedents are irrelevant. Based on her records, the patient has been consuming acidified beverages from the age of 10. In the last decade, she has consumed an average of 1.5 liters of acidified drinks per day, drinks acidified beverages straight from the glass, bottle or can, not through a straw, and keeps them in the mouth for a few seconds before swallowing.

Dental brushing is performed 4-5 times a week, the evening brushing is not done daily. She could not tell if she was using a fluoridated or non-fluoridated toothpaste. Does not use ancillary hygiene. She does not follow a regular monitoring program.

The patient states that she did not have oral health training, was not informed of the possible negative effects of prolonged consumption of acidified beverages.

At the clinical examination, a particular pattern of cavity in the cervical area is observed at the level of preexisting erosions, affecting all teeth in the arch except for the upper and lower incisor group.

Higher incisors (1.2, 1.1, 2.1, 2.2) reveal obturations on the vestibular face, the patient reporting that before they were filled, they had presented caries similar to those present on the other teeth.

Cavity damage to the cervical area is of a circular type in the upper and lower molar areas, 3.7 and 4.7 being completely destroyed, in the form of root remnants.

Most teeth in the lateral area have cavities on the occlusal surface, with the only exceptions of 2.4 and 4.4 and 2.6, the latter showing a metal-ceramic crown.



**FIGURE 5.** Clinical aspect of patient L.A.



**FIGURE 6.** Clinical aspect of patient L.A.

Vitality tests are positive in all teeth except for 2.6, 3.7, 3.6, 4.7.

Percussion in the spindle is positive only for 4.7, the rest of the teeth presenting a negative percussion in the spindle.

The patient was instructed relative to:

- establishing a rigorous daily program of hygiene both in the morning and in the evening, with the use of ancillary hygiene (mouthwash, oral irrigator, toothpaste)
- correcting the diet by removing acidified, sweetened or acidic beverages from food (e.g. citric acid)
- in the case of acidic, sweetened or acidified beverage consumption, it should be done through a straw, not from the glass, bottle or can so that the liquid does not come in contact with the dental surfaces
- immediately rinse with water in case of consumption of acidified, sweetened or acidic beverages, avoid dental brushing in the first hour after the consumption of such beverages
- recommendation of a strict monitoring program, with regular check-ups once every 6 months

There was also proposed to the patient a treatment plan for the oral rehabilitation of both arches by means of prosthetic works, given the high degree of damage to most of the teeth present.

## DISCUSSION

In this paper we presented three clinically suggestive cases for the correlation between the lack of health education and the clinical implications in the oral cavity. The common elements of the three cases point towards the lack of instruction in maintaining an optimal oral health level, the prolonged daily consumption of carbonated beverages (15, 10 and 5 years respectively) in appreciable amounts (1.5 l, 2 l, 1 l) and poor oral hygiene.

Prolonged consumption of carbonated beverages and poor oral hygiene cause irreversible dental damage from localized erosions of several teeth (often teeth in the upper front group) (case 1) to caries grafting on eroded surfaces (case 2) and finally to the massive coronary destruction involving damage to the whole dento-maxilar apparatus (case 3).

The treatment schemes of the clinical cases presented were punctually adapted to the symptomatology present in each of the three situations. In the less severe cases (case 1 and case 2), the solution chosen was to remove the tissues affected by caries

or erosion and resort to coronary reconstruction with composite obturations. In case 3, displaying massive coronary destruction of most of the teeth on the arcade, the patient was presented with a complex plan of oral rehabilitation of both arches by covering the teeth with dental crowns.

In the absence of a national health education program on oral health, the affliction of the dento-maxillary apparatus is present in increasingly younger age groups with increasingly complex treatment needs (11).

In this paper we presented three clinically suggestive cases for the correlation between the lack of health education and the clinical implications in the oral cavity. The common elements of the three cases point towards the lack of instruction in maintaining an optimal oral health level, the prolonged daily consumption of carbonated beverages (5, 10 and 15 years respectively) in appreciable amounts (1 l, 2 l, 1.5 l) and poor oral hygiene.

Prolonged consumption of carbonated beverages and poor oral hygiene cause irreversible dental damage from localized erosions of several teeth (often teeth in the upper front group) (case 1) to caries grafting on eroded surfaces (case 2) and finally to the massive coronary destruction involving damage to the whole dento-maxillary apparatus (case 3).

The three patients were instructed to improve oral health and were made aware of the negative

effects of prolonged drinking of carbonated beverages and poor oral hygiene.

The treatment schemes of the clinical cases presented above were punctually adapted to the symptomatology present in each of the three situations. In the less severe cases (case 1 and case 2), the solution chosen was to remove the tissues affected by caries or erosion and resort to coronary reconstruction with composite obturations. In case 3, displaying massive coronary destruction of most of the teeth on the arcade, the patient was presented with a complex plan of oral rehabilitation of both arches by covering the teeth with dental crowns.

## CONCLUSIONS

The clinical cases presented reveal that progressive dental tissue damage increases as patients consume acidic beverages as a habit, for a long period of time (5 to 15 years) in combination with poor oral hygiene.

Introducing a national educational program adapted to different age groups would lead to patients becoming aware of the need for a proactive, sanogenic attitude as well as to an improvement in the level of oral health with important benefits for the patient as well as for the healthcare system.

## REFERENCES

1. Malik VS, Popkin BM, Bray GA, Despres JP, Willett WC, Hu FB. Sugar-sweetened beverages and risk of metabolic syndrome and type 2 diabetes: A meta-analysis. *Diabetes Care* 2010;33:2477-2483.
2. Palmer JR, Boggs DA, Krishnan S, Hu FB, Singer M, Rosenberg L. Sugar-sweetened beverages and incidence of type 2 diabetes mellitus in African American women. *Arch Intern Med* 2008;168:1487-1492.
3. Schulze MB, Manson JE, Ludwig DS, et al. Sugar-sweetened beverages, weight gain, and incidence of type 2 diabetes in young and middle-aged women. *JAMA* 2004;292:927-934.
4. de Koning L, Malik VS, Kellogg MD, Rimm EB, Willett WC, Hu FB. Sweetened beverage consumption, incident coronary heart disease, and biomarkers of risk in men. *Circulation* 2012;125:1735-1741, S1.
5. Fung TT, Malik V, Rexrode KM, Manson JE, Willett WC, Hu FB. Sweetened beverage consumption and risk of coronary heart disease in women. *Am J Clin Nutr* 2009;89:1037-1042.
6. Choi HK, Curhan G. Soft drinks, fructose consumption, and the risk of gout in men: prospective cohort study. *BMJ* 2008;336:309-312.
7. Choi HK, Willett W, Curhan G. Fructose-rich beverages and risk of gout in women. *JAMA* 2010;304:2270-2278.
8. Hu FB. Resolved: There is sufficient scientific evidence that decreasing sugar-sweetened beverage consumption will reduce the prevalence of obesity and obesity-related diseases. *Obes Rev* 2013;14:606-619.
9. Malik VS, Schulze MB, Hu FB. Intake of sugar-sweetened beverages and weight gain: a systematic review. *Am J Clin Nutr* 2006;84:274-288.
10. Vartanian LR, Schwartz MB, Brownell KD. Effects of soft drink consumption on nutrition and health: A systematic review and meta-analysis. *Am J Public Health* 2007;97:667-675.
11. Skalsky Jarkander M, Grindejford M, Carlstedt K. Dental erosion, prevalence and risk factors among a group of adolescents in Stockholm County. *Eur Arch Paediatr Dent* 2018;19(1):23-31.