ÉROSION DENTAIRE

12es Journées de Santé Dentaire Publique du Québec

Daniel Picard, BAA, DMD, M.Sc.

Direction de santé publique de
l'Agence de la santé et
des services sociaux de Montréal

Le 13 et 14 juin 2013
À l'Hôtel Relais Gouverneur
de Saint-Jean-sur-Richelieu

L'érosion dentaire observée en deuxième année … pourquoi s'en soucier ?

PLAN

1. Importance relative du sujet
2. Facteurs de risque
3. Dépistage
   - 3.1 Évolution des cas (stades distinctifs)
   - 3.2 Signes cliniques associés
4. Cas cliniques (écoles de Montréal)
5. Prévention

PLAN

1. Importance relative du sujet
2. Facteurs de risque
3. Dépistage
   - 3.1 Évolution des cas (stades distinctifs)
   - 3.2 Signes cliniques associés
4. Cas cliniques (écoles de Montréal)
5. Prévention

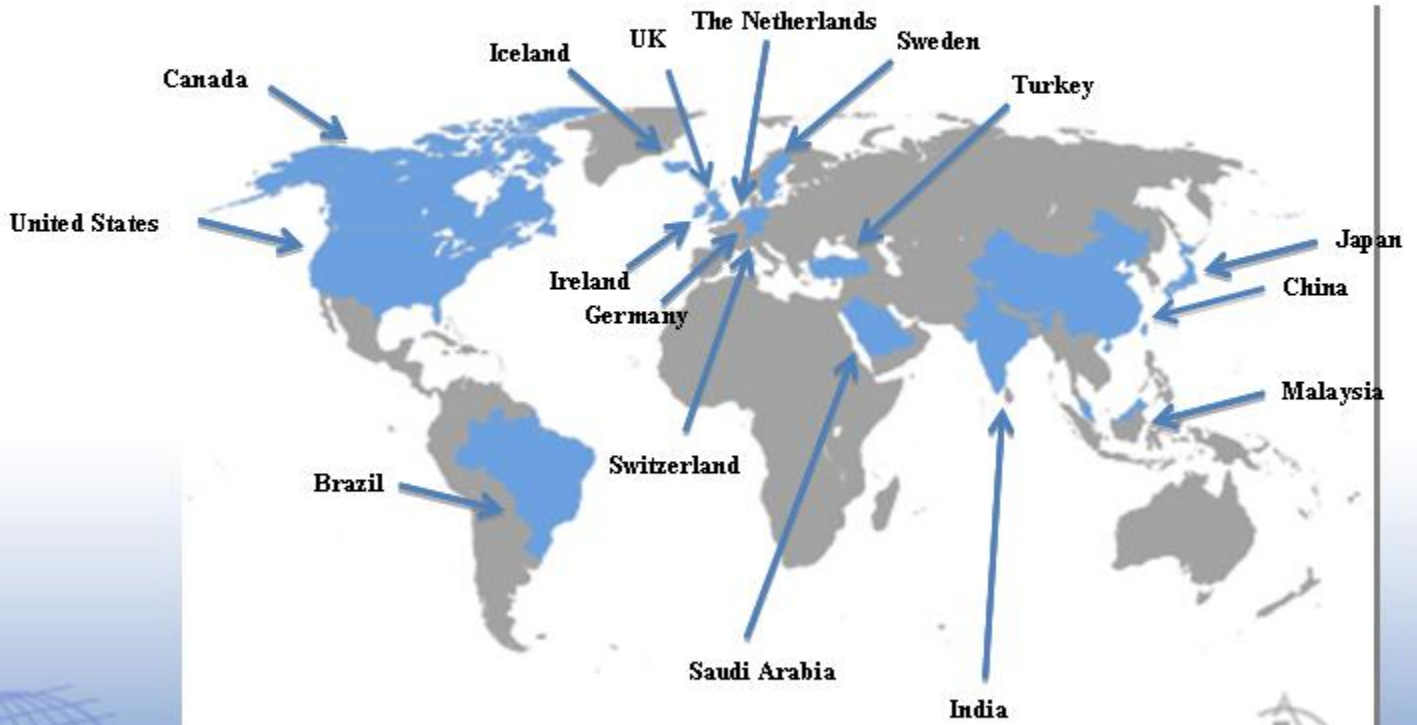
Importance relative du phénomène d'érosion dentaire

- [ ] 1. Prévalence … importance
- [ ] 2. Présence d'érosion dentaire en dentition primaire … prédicteur pour la dentition permanente ?
- [ ] 3. Si oui, quel est l'ampleur de ce lien ?

Dental Erosion: *Epidemiology*

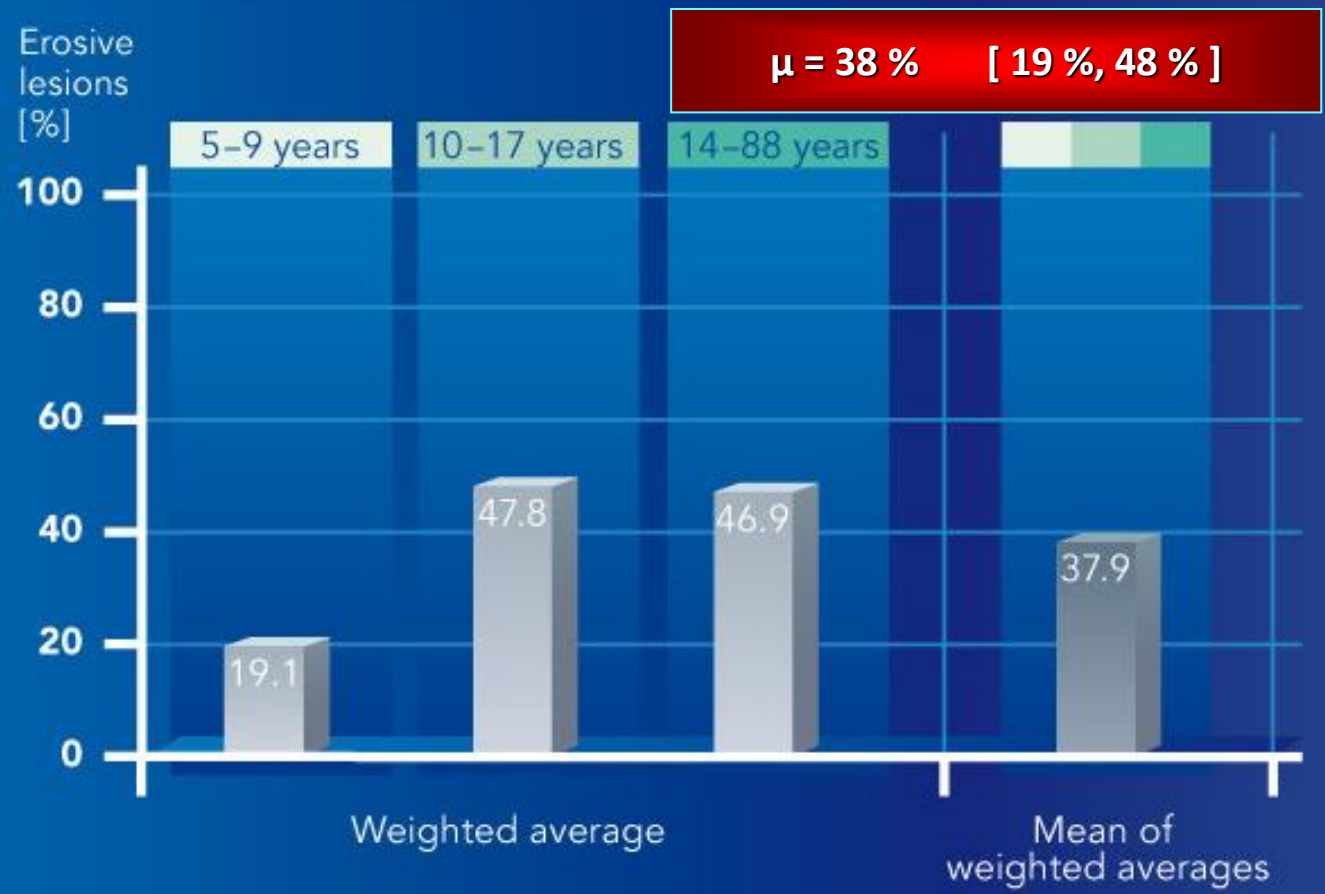
Global Prevalence

Global data on the prevalence of dental erosion is building. "Erosive tooth wear is a common condition in the developed countries."[10]



Prevalence, incidence and distribution of erosion.
Jaeggi T, **Lussi A**. Monogr Oral Sci. 2006;20:44-65.

Prevalence of erosive lesions on enamel in different countries and age groups



- The overall prevalence (mean of weighted averages) of erosion is approximately 30%.
- An increase of prevalence in adults is likely in the future, as the "soft drink generation" will more and more become part of this age group.

http://elearningerosion.com/en/elearning_erosion/scientific-background/erosion-diagnosis/basic-erosive.html

More about erosion epidemiology:

- Evidence of differences in susceptibility to tooth wear between children and adults is not conclusive.
- *In vitro*, deciduous teeth are 1.5 times more susceptible to erosion than permanent teeth (Amaechi et al. 1999). But, according to Jaeggi & Lussi 2006, it is unlikely that this difference translates into a large difference in prevalence of erosive lesions *in vivo*.
- Nevertheless, lesions are more frequently identified in boys and there appears to be a linear increase in lesion number and size with age (Kahn et al. 2001).
- Furthermore, the presence of erosive lesions in deciduous teeth increases the risk of the development of erosive lesions in permanent teeth (Ganss et al. 2001a).

Dental erosion in children and adolescents--a cross-sectional and longitudinal investigation using study models. **Ganss** C, Klimek J, Giese K. Community Dent Oral Epidemiol. **2001** Aug;29(4):264-71.

La présence d'érosion en dentition primaire prédit-elle sa présence en dentition permanente ?

1. Progression of and risk factors for dental erosion and wedge-shaped defects over a 6-year period.
   Lussi A, Schaffner M.
   Caries Res. **2000** Mar-Apr;34(2):182-7. **2000** — OUI

2. Dental erosion in children and adolescents--a cross-sectional and longitudinal investigation using study models.
   Ganss C, Klimek J, Giese K.
   Community Dent Oral Epidemiol. **2001** Aug;29(4):264-71. **2001** — OUI

3. The progression of tooth erosion in a cohort of adolescents of mixed ethnicity.
   Dugmore CR, **Rock WP**.
   Int J Paediatr Dent. **2003** Sep;13(5):295-303. **2003** — OUI

4. Retrospective long term monitoring of tooth wear using study models.
   Bartlett DW.
   Br Dent J. **2003** Feb 22;194(4):211-3; discussion 204. **2003** — OUI

5. A longitudinal study of tooth erosion in adolescents.
   El Aidi H, Bronkhorst EM, **Truin GJ**.
   J Dent Res. **2008** Aug;87(8):731-5. **2008** — OUI

6. Is tooth wear in the primary dentition predictive of tooth wear in the permanent dentition? Report from a longitudinal study.
   Harding MA, Whelton HP, Shirodaria SC, O'Mullane DM, Cronin MS.
   Community Dent Health. 2010 Mar;27(1):41-5. **2010** — OUI

7. The relationship between tooth wear in the primary and permanent dentitions.
   Sales-Peres SH, Sales-Peres AC, Marsicano JA, Carvalho CA, **Carvalho FS**, A.
   Community Dent Health. **2011** Sep;28(3):196-200. **2011** — OUI

À partir de ces 7 études portant sur l'érosion dentaire, on peut penser que :

La prévalence des lésions limitées à l'émail : augmente en moyenne de 4 @ 7 % par année

La prévalence des lésions qui atteignent la dentine : augmente en moyenne de 4 @ 7 % par année

L'incidence de nouveaux cas, i.e. l'augmentation du nombre de sujets qui ont développé de l'érosion dentaire pendant la durée de l'étude est de : 4 @ 16 % par année

L'érosion dentaire observée en 2e année … pourquoi s'en soucier ?

- [ ] 1. Données issues des études transversales (prévalence)
- [ ] 2. Comparaison entre les données transversales
- [ ] 3. Histoire de cas : Suivi de cas avec de l'érosion pendant plusieurs années
- [ ] 4. Données en provenance d'études longitudinales (incidence)
- [ ] 5. Tendance mondiale / impression des cliniciens
- [ ] 6. Aggravation des cas avec le temps / Nouveaux cas – évidence scientifique
- [ ] 7. Importance d'intervenir tôt dans le processus

PLAN

1. Importance relative du sujet
2. Facteurs de risque
3. Dépistage
   - 3.1 Évolution des cas (stades distinctifs)
   - 3.2 Signes cliniques associés
4. Cas cliniques (écoles de Montréal)
5. Prévention

2

Acide citrique

2.6

<

In vitro

2.5

Acide phosphorique

2.6

3

2.6

2.9

2.5

≈

3.1

In vitro

4

3.4

2.5

2.9

>

>

2.6

In vitro

5

>

www.who.int/nutrition/topics/5_population_nutrient/en/index21.html

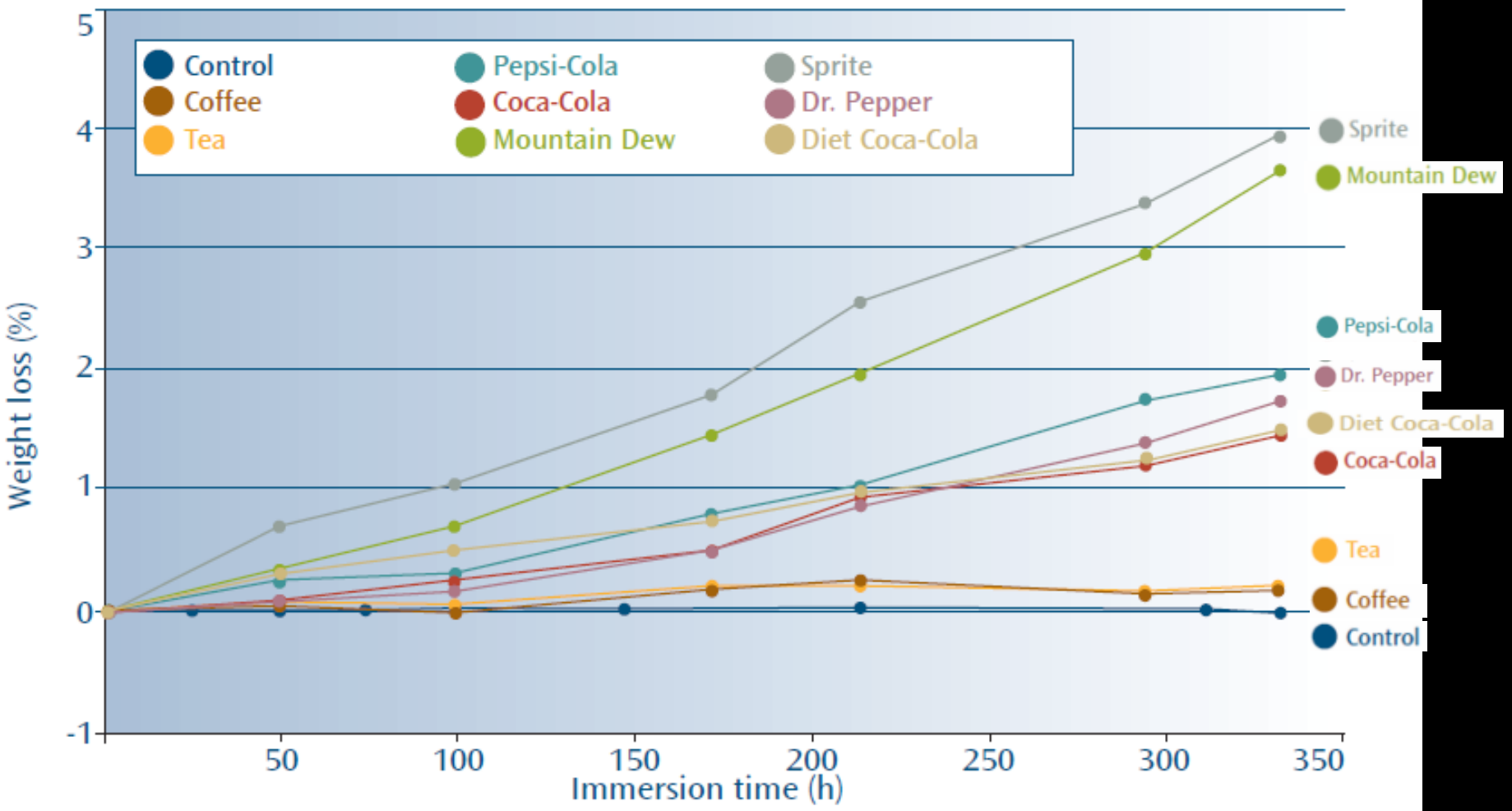


Fig. 1. Enamel dissolution in various beverages (weight loss in %).

In vitro

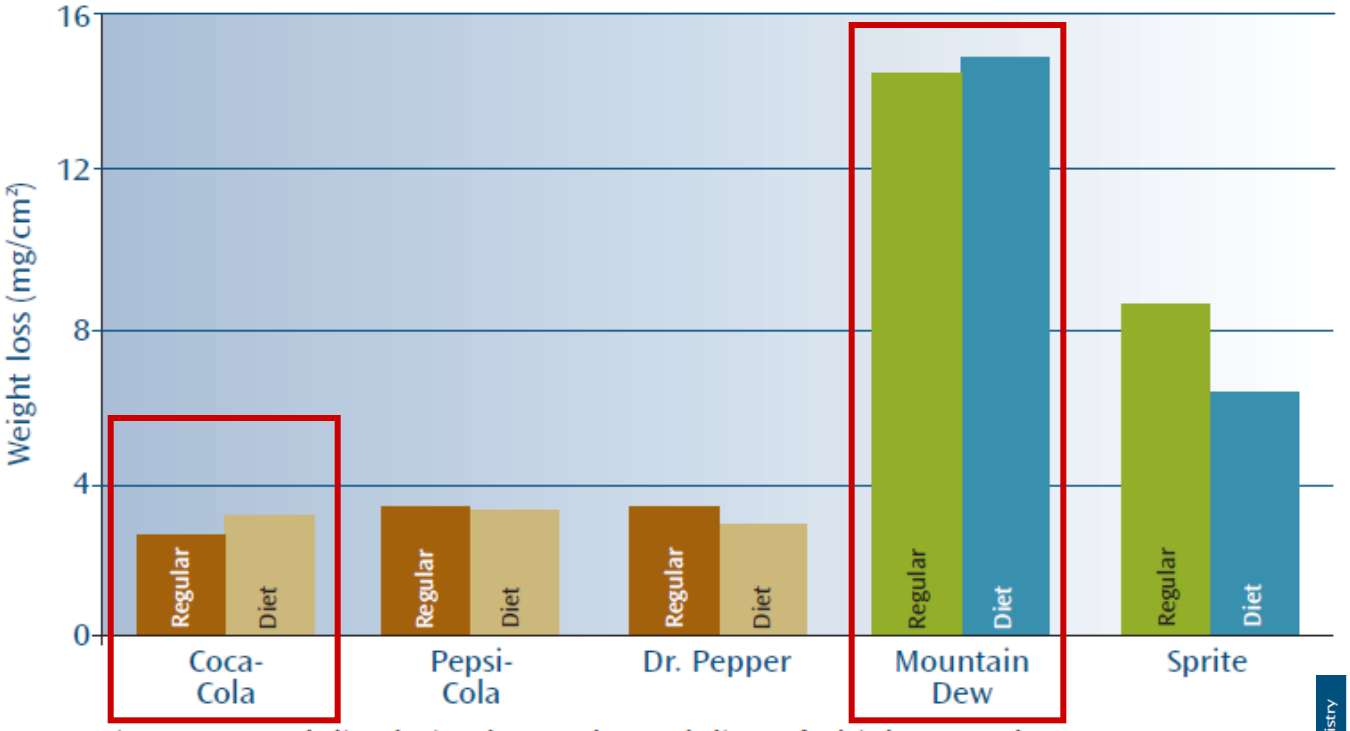


Fig. 4. Enamel dissolution by regular and diet soft drinks at 14 days.

In vitro

Operative Dentistry

Dissolution of dental enamel in soft drinks

J. Anthony von Fraunhofer, MSc, PhD, FADM, FRSC | Matthew M. Rogers, DDS

A high percentage of the population consumes a variety of soft drinks on a daily basis. Many of these soft drinks contain sugar and various additives and have a low pH. This study compares enamel dissolution from both regular and diet beverages.

Received: February 25, 2004 **Accepted:** March 29, 2004

The consumption of soft drinks has increased dramatically over past several decades; the soft drink industry is reported to produce 10 billion 192-ounce cases per year.[1] Over a 50-year period, annual soft drink production appears to have increased fivefold, from 100 12-ounce cans per person in 1947 to nearly 600 12-ounce cans per person in 1997. Looking at it another way, the average person in 1947 consumed approximately two cans of soft drinks per week, while the average person in 1997 consumed approximately 12 cans of soft drinks per week, or nearly two cans *per day*.

The greatest increase in soft drink consumption has occurred among children and adolescents; nearly 40% of preschool children drink more than 250 mL (8.0 ounces) of soft drinks per day.[2] The average consumption of soft drinks in the U.S. in 2002 was approximately 53 gallons per year, or 16 ounces per day, which represents 24% of the recommended daily fluid intake of 67 ounces.[3] Although no distinction is made between regular and diet soft drinks, recent figures (examining the period from 1994–1996) indicate that soft drink consumption among 12-to-19-year-old boys is 28 ounces (800 mL) per day; among 12-to-19-year-old girls, the rate of consumption is 21 ounces (600 mL) per day.[4]

In recent years, diet (that is, reduced-calorie) versions of popular drinks have increased in relation to their regular beverage counterparts (that is, those containing sucrose or fructose). In 1997, artificially-sweetened diet sodas accounted for 24% of soft-drink sales, an increase of 16% since 1970.[5] There also is a growing trend within North America (and perhaps throughout the developed world) toward increased consumption of non-cola drinks and nontraditional beverages (for example, pre-packaged coffees and teas).[3] There also has been an upward trend in the consumption of sports drinks, although these may have a sugar content as high as 20%.[6]

Anecdotal reports of rampant dental caries related to frequent consumption of soft drinks are increasingly common.[3] In 2002, a young man who consumed three to four 32-ounce beverages per day while working at a computer terminal reported a case of rampant dental decay.[5] The induction of dental caries by refined sugars is well-established, although prevalence is affected by numerous factors, including the foodstuff's cariogenicity and frequency of ingestion, the oral levels of cariogenic bacteria (for example, *Streptococcus mutans*), water fluoridation, frequency of toothbrushing and dentifrice use, general dietary variables, and the inherent variability in oral physiology.

Ideally, the pH of saliva lies within the range of 5.5–6.5; a pH of 5.5 generally is accepted as the threshold level for the development of dental caries.[7] While the oral cavity may recover when the pH within the oral cavity drops below this threshold, prolonged exposure to this pH or frequent cycling from the optimal (that is, neutral) pH to a value below the threshold can result in a more rapid demineralization of enamel. Lowered salivary pH often is a consequence of bacterial digestion of sucrose, fructose, and similar carbohydrates, causing acidic byproducts to form in dental plaque. Tooth demineralization, however, also may occur due to dental erosion.

Dental erosion is the irreversible, usually painless, loss of dental hard tissue that occurs due to a chemical process, such as dissolution or chelation, without the involvement of micro-organisms.[8-11] Although susceptibility to dental erosion varies among individuals due to such factors as pH, salivary flow, buffering capacity, and pellicle formation, it appears that the consumption of citrus fruits and soft drinks may be a major factor in the etiology of the disease.[12-15] Soft drinks, which tend to be carbonated, have a low pH, and contain sugar and a variety of other additives, may subject dental enamel to acid dissolution and/or erosion.[14-16]

In the same way that frequency of ingestion is a factor in food cariogenicity, the frequency of soft drink consumption is an important factor in dental erosion.[4,17,18] Typically, soft drinks consumed at meal times are less injurious than those consumed alone and continuous sipping is considered more harmful to dentition than consuming an entire beverage at once.[14] However, it has been reported that certain soft drinks (notably cola beverages) are retained on dental enamel and are less likely than other beverages to be removed by saliva, resulting in an increased cariogenicity.[19]

The underlying acidity of beverages is believed to be the primary factor in the development of dental erosion; this total acid level (known as *titratable acid*), rather than the pH, is thought to be an important factor in erosion because it determines the actual hydrogen ion availability for interaction with the tooth surface.[20,21] The measurement of a beverage's total acid content may be a more realistic and more accurate method for predicting erosive potential.[22,23] Other important factors concerning the erosive quality of beverages include the type of acid and its calcium chelating properties and exposure time and temperature.[18,20]

Most soft drinks contain one or more food acidulants; phosphoric and citric acid are common but malic, tartaric, and other organic acids also may be present.[8] The presence of these polybasic acids in beverages is important because their ability to chelate calcium at higher pHs means they can be very erosive to dental enamel.[20] In addition, polybasic acids exhibit buffering capacity that can maintain the pH below the threshold value (that is, at low or acidic pH values), even with marked dilution.[24]

Pour 3 marques diète est légèrement mieux que non diète

Pour 2 marques non diète est légèrement mieux que diète

… mais la différence est **toujours** négligeable !

In vivo

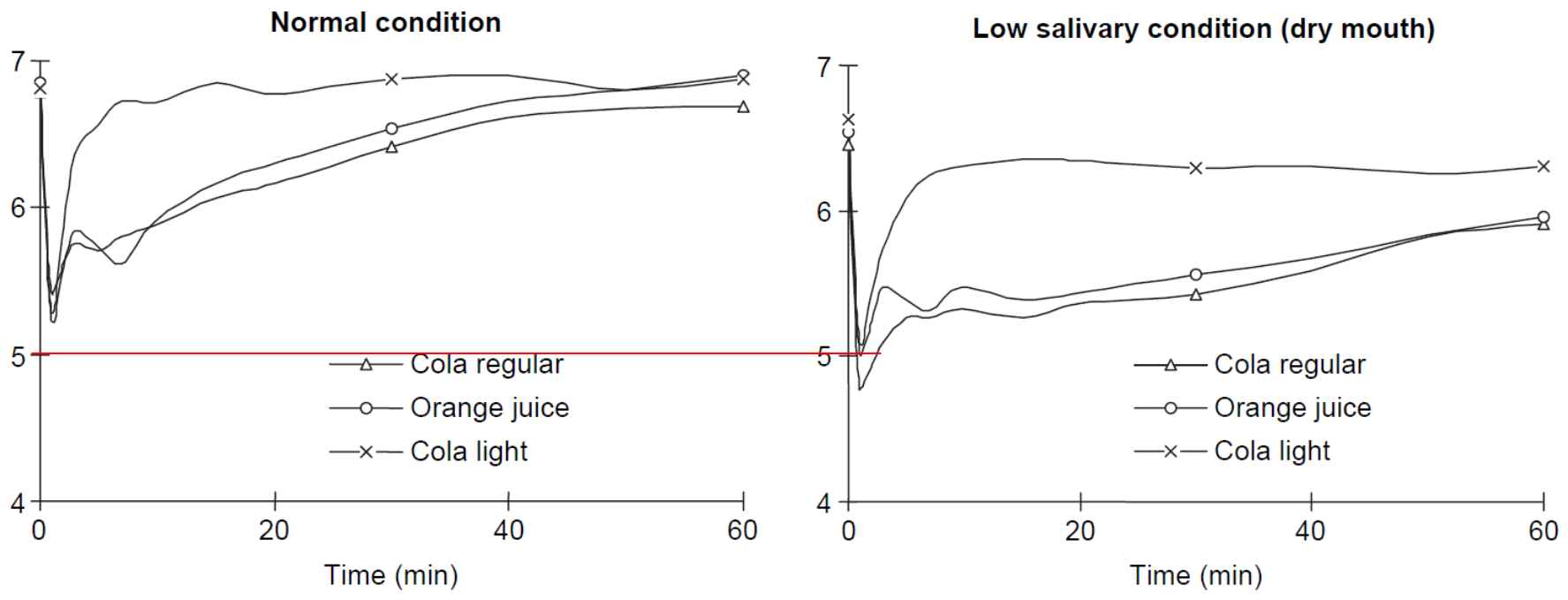


Figure 1. Mean plaque pH of the three sites during normal and low salivary conditions (dry mouth) with Coca-Cola regular ($n = 10$), orange juice ($n = 10$), and Coca-Cola light ($n = 8$).

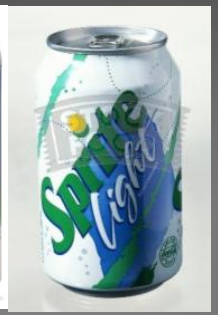
En présence d'hyposalivation, la période « érosive » est plus longue

Effect of soft drinks on proximal plaque pH at normal and low salivary secretion rates.
Johansson AK, Lingström P, Birkhed D. Acta Odontol Scand. **2007** Nov;65(6):352-6.

Plus dangereux

Moins dangereux

In vitro



1	2	3	4	5	6	7	8	9
3.4	2.9	3.0	3.2	2.6	2.9	2.5	3.1	2.6

≈

2 X

8 X

10 X

Today, several Ca-enriched orange juices are on the market which hardly soften the enamel surface (fig. 1). Addition of calcium to a low pH blackcurrant juice drink has been shown to reduce the erosive effect of the drink [26]. In a follow-up study, a blackcurrant drink with added calcium was compared to a conventional orange drink in situ. Servings of 250 ml of each drink were consumed four times per day during 20 working days. Measurements of enamel loss were made by profilometry on enamel samples for up to 20 days. The experimental carbonated blackcurrant drink supplemented with calcium caused significantly less enamel loss than the conventional carbonated orange drink at all time points measured [27].

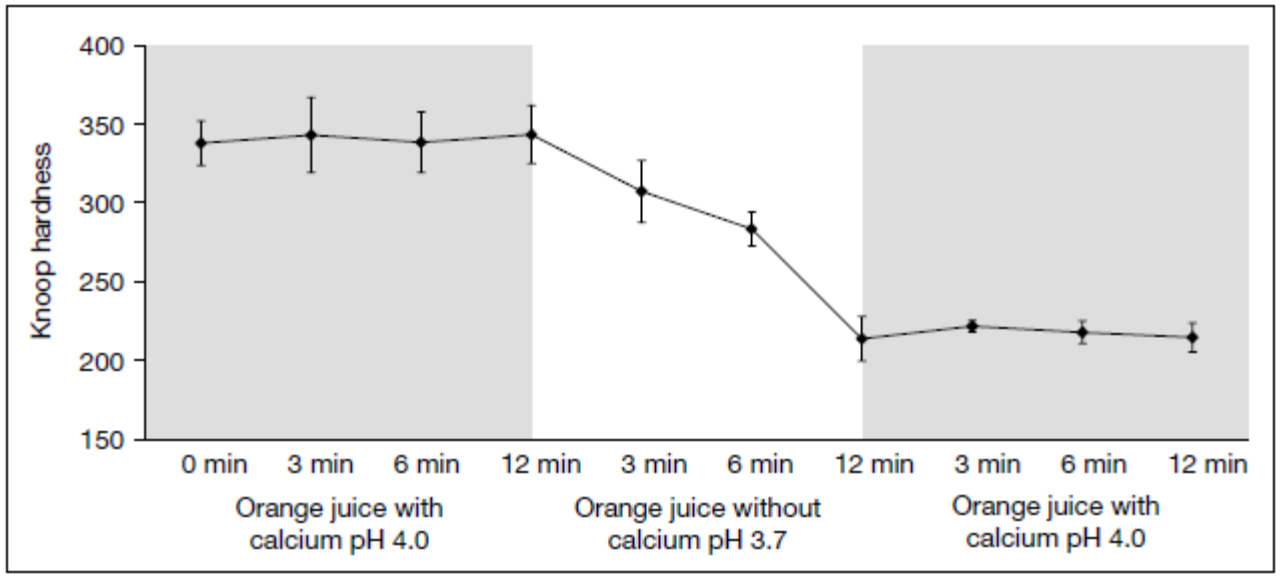
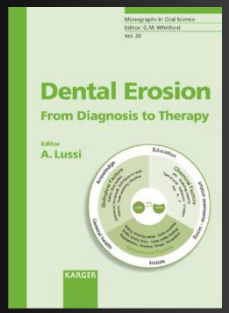


Fig. 1. Impact of a conventional and a Ca-enriched orange juice on softening of enamel.



Pages 79-80

« blackcurrant » (anglais) = cassis (français)

Un mot qui résume le mieux les facteurs de risque pour l'érosion dentaire

M U L T I

1 2 3 4 5

F A C T O R I E L

6 7 8 9 10 11 12 13 14

… et il s'agit d'un un message très important !

1. pH

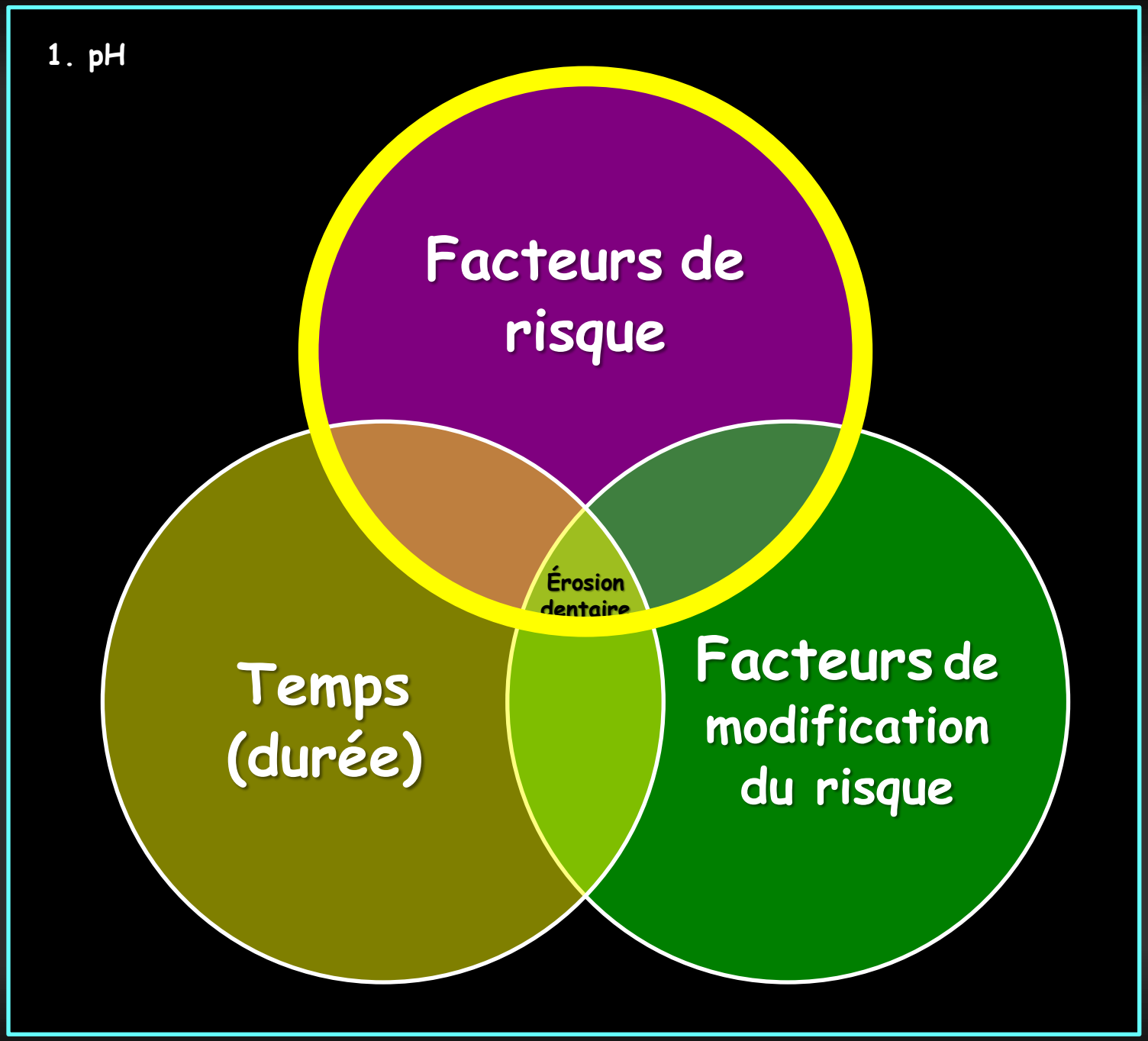

Facteurs de risque
Érosion dentaire
Temps (durée)
Facteurs de modification du risque

TABLE 1

Titratable Acidity and Erosion Potential of Drinks

The effect of nutrition and diet on dental structure integrity.
Ligh RQ, Fridgen J, **Saxton C**.
J Calif Dent Assoc. **2011** Apr;39(4):243-9.

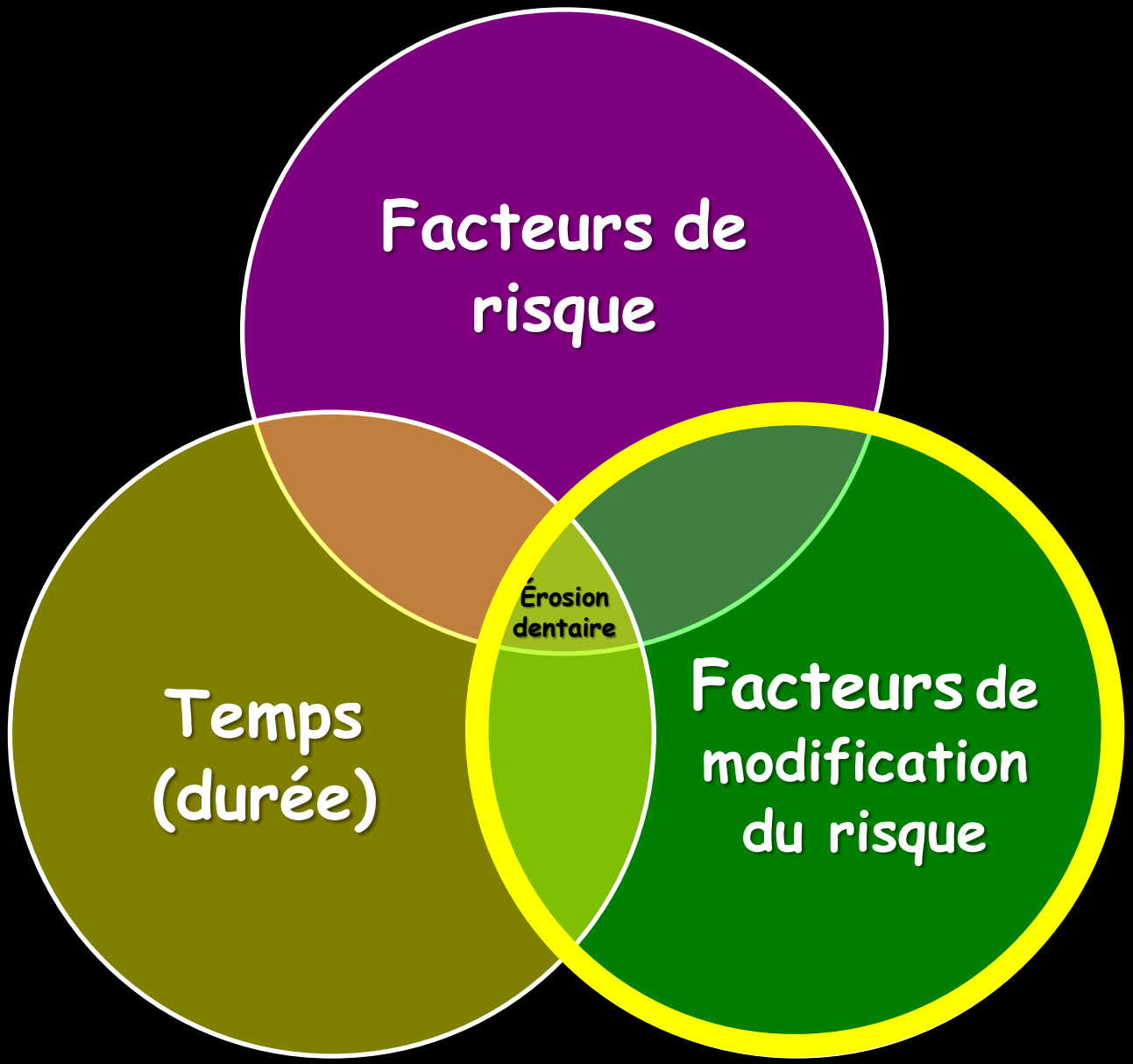
Drinks	pH	Titratable acidity (g/100ml)	Erosion potential
Sparkling water	5.3	0.1	Low
Orange juice	3.8	4.5	High
Apple juice	3.2	4.5	High
Grapefruit juice	3.2	9.3	High
Carbonated orange soda	2.9	2.0	Medium
Cola drinks	2.5	0.7	Medium

Table 4 The pH, titratable acidity and erosion potential of drinks

	pH	Titratable acidity	Erosion potential
Cola drinks	2.5	0.7	Medium
Carbonated orange	2.9	2.0	Medium
Grapefruit juice	3.2	9.3	High
Apple juice	3.3	4.5	High
White wine (Chardonnay)	3.7	2.2	Medium
Orange juice	3.8	4.5	High
Beer – bitter	3.9	0.6	Low
Lager	4.4	0.5	Low
Sparkling water	5.3	0.1	Low

Dental erosion--the problem and some practical solutions.
Shaw L, Smith AJ.
Br Dent J. 1999 Feb 13;186(3):115-8.

1. Salive



www.scielo.br/jaos

Saliva and dental erosion

Marília Afonso Rabelo BUZALAF[1], Angélicas Reis HANNAS[2], Melissa Thiemi KATO[3]

Among the biological factors, saliva is one of the most important parameters in the protection against erosive wear. Objective: This review discusses the role of salivary factors on the development of dental erosion. Material and Methods: A search was undertaken on MEDLINE website for papers from 1969 to 2010.

factors, saliva is one of the most important parameters in the protection against erosive wear. Objective: This review discusses the role of salivary factors on the development of dental erosion. Material and Methods: A search was undertaken on MEDLINE website for papers from 1969 to 2010. The keywords used in the research were "saliva", "acquired

Conclusions: Saliva is the most important biological factor affecting the progression of dental erosion. Knowledge of its components and properties involved in this protective role can drive the development of preventive measures targeting to enhance its known beneficial effects.

development of preventive measures targeting to enhance its known beneficial effects.

Key words: Dental erosion. Enamel. Dentin. Saliva.

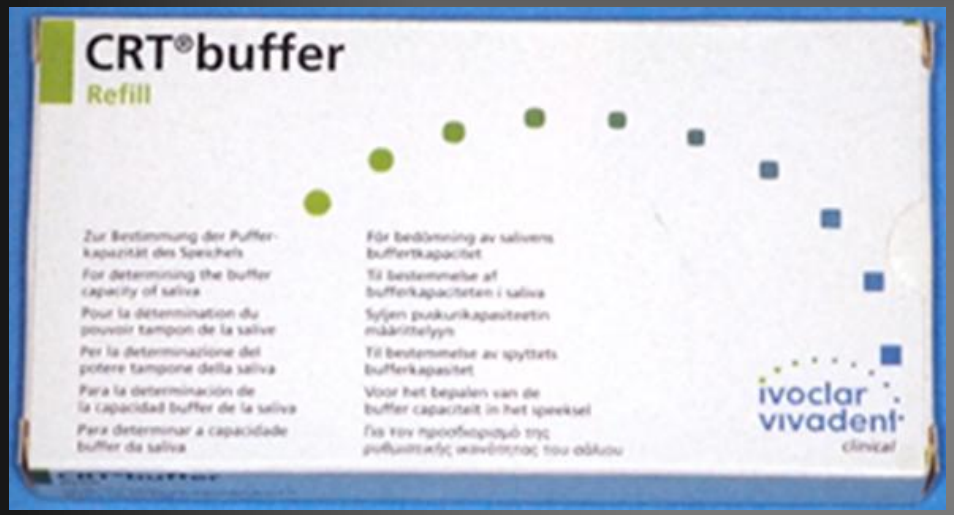
INTRODUCTION

Dental erosion is defined as the loss of dental hard tissue by a chemical process that does not involve bacteria[87]. The continuous erosion process occurs in different stages. Initially, softening of enamel surface occurs and this process can vary according to the immersion time and the type of acids involved. If the erosive challenge persists, dissolution of consecutive layers of enamel crystals takes place, leading to a permanent loss of volume with a softened layer on top of the remaining tissue[69]. Dental erosion can have extrinsic or intrinsic causes. The intrinsic causes comprise recurrent vomiting as in patients suffering from anorexia and bulimia, cytostatic drug treatment or propulsion of gastric contents into the mouth due to gastroesophageal reflux. Extrinsic causes comprise frequent consumption of acidic foods or drinks, the use of acidic hygiene products and acidic medicines. such as effervescent vitamin C or aspirin. Alcohol has been also associated with erosion. Gaseous acids or chemicals breathed during work may also cause erosion[78].

In enamel, the lesion primarily develops in the prism sheath areas, followed by dissolution of prism cores. Eventually, the interprismatic areas are also affected. Bulk mineral is centripetally etched away in enamel erosion leaving a partly demineralized softened surface layer, which is prone to mineral deposits after topical fluoride application[18]. In dentin, erosive demineralization results in the exposure of an outer layer of fully demineralized organic matrix followed by a partly demineralized

FACE À FACE

www.ivoclarvivadent.com/en/products/prevention-care/caries-risk/crt-buffer

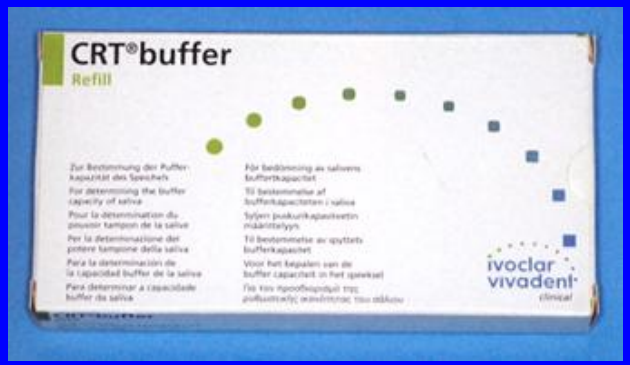


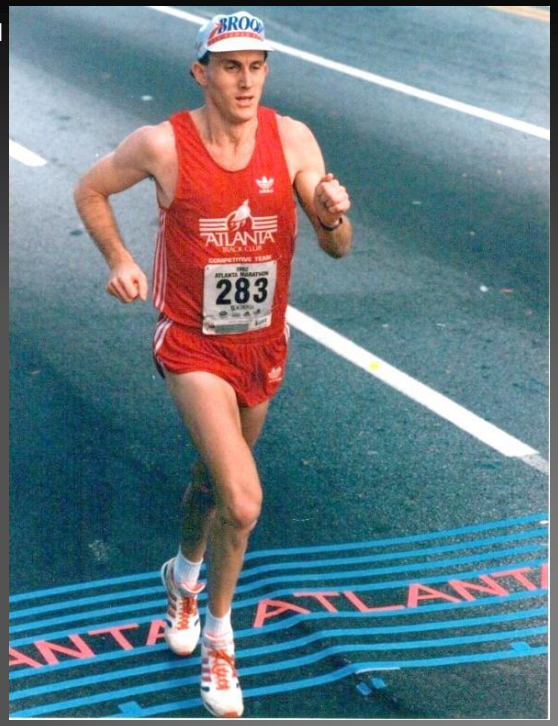
www.gcamerica.com/products/preventive/Saliva_Check_BUFFER/

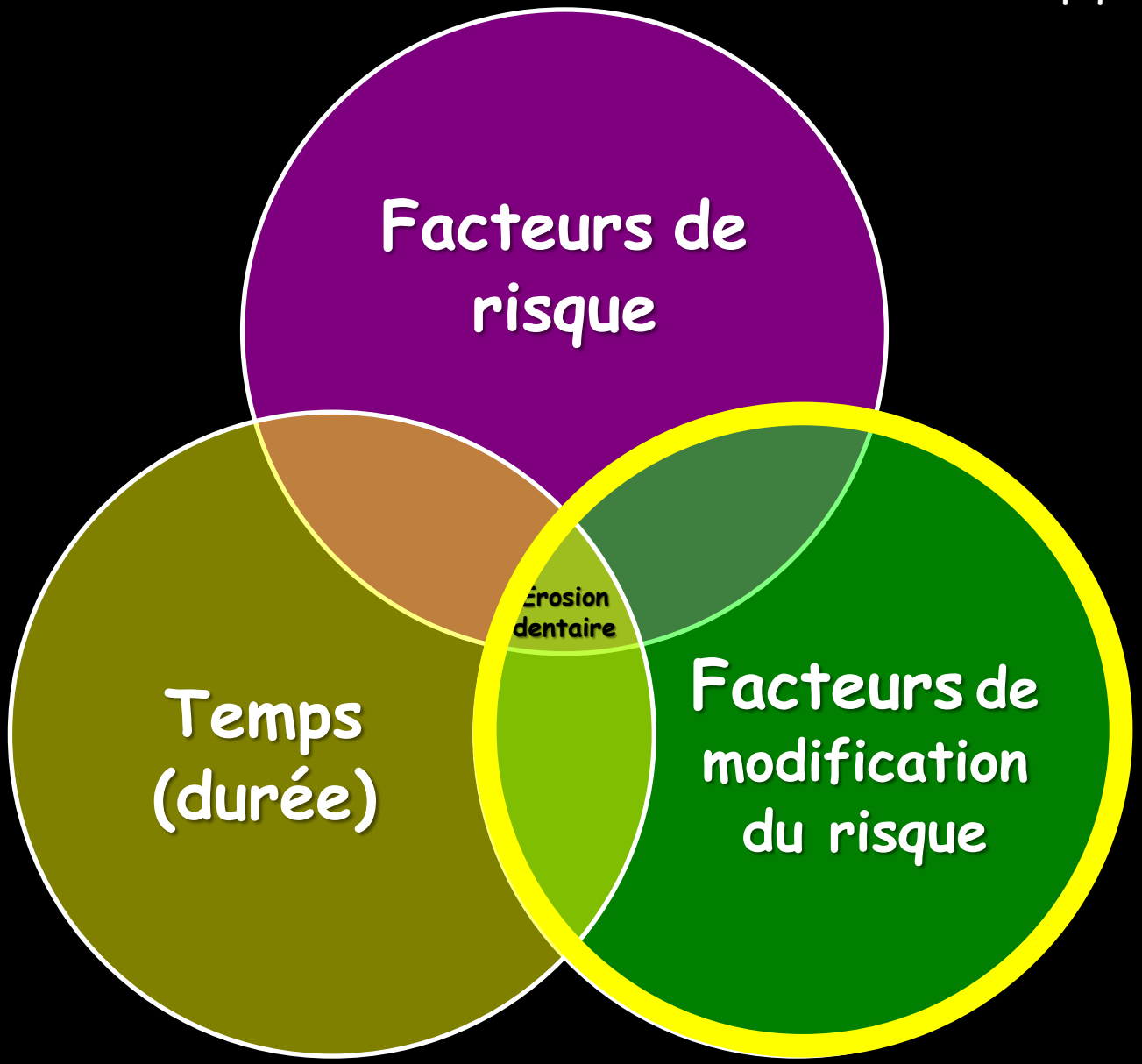
www.horiba.com/scientific/products/water-quality/ph-meters/details/b-211-212-213-twin-compact-ph-meter-416/

Comparative analysis of three commercial saliva testing kits with a standard saliva buffering test.
Kitasako Y, Burrow MF, Stacey M, Huq L, Reynolds EC, Tagami J.
Aust Dent J. **2008** Jun;53(2):140-4.

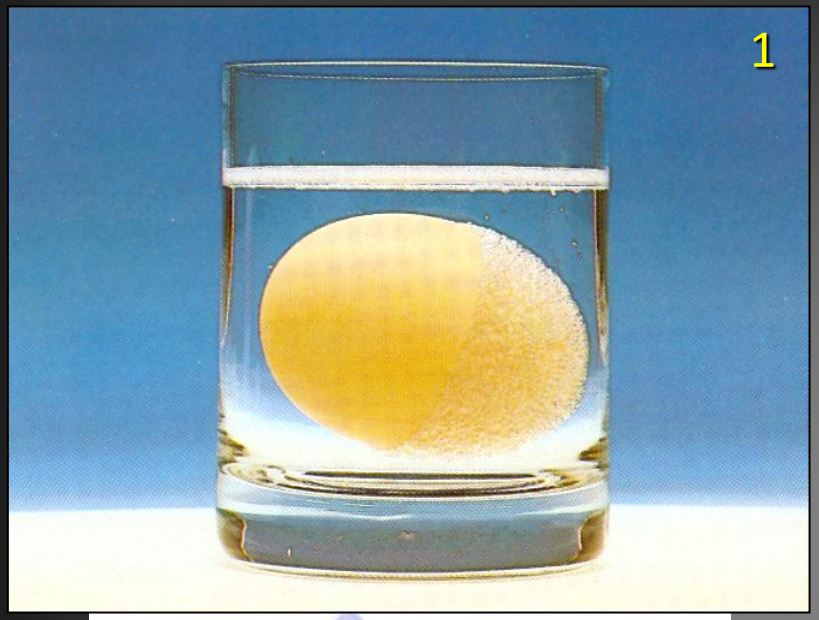
Comparative analysis of CRT Buffer, GC saliva check buffer tests and laboratory titration to evaluate saliva buffering capacity.
Maldupa I, Brinkmane A, Mihailova A.
Stomatologija. 2011;13(2):55-61.

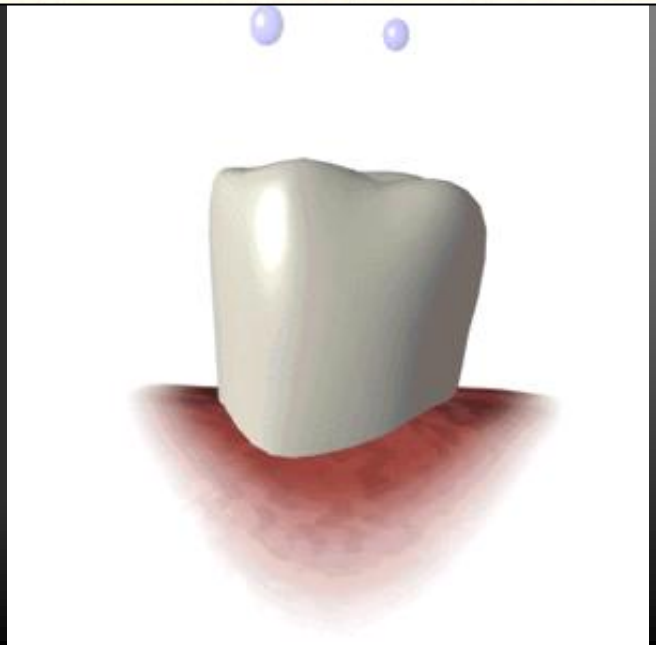
TEST	n	VG	FP	FN
	113	93 %	3 %	4 %
	177	77 %	5 %	18 %
	64	70 %	22 %	8 %





Fluorures topiques





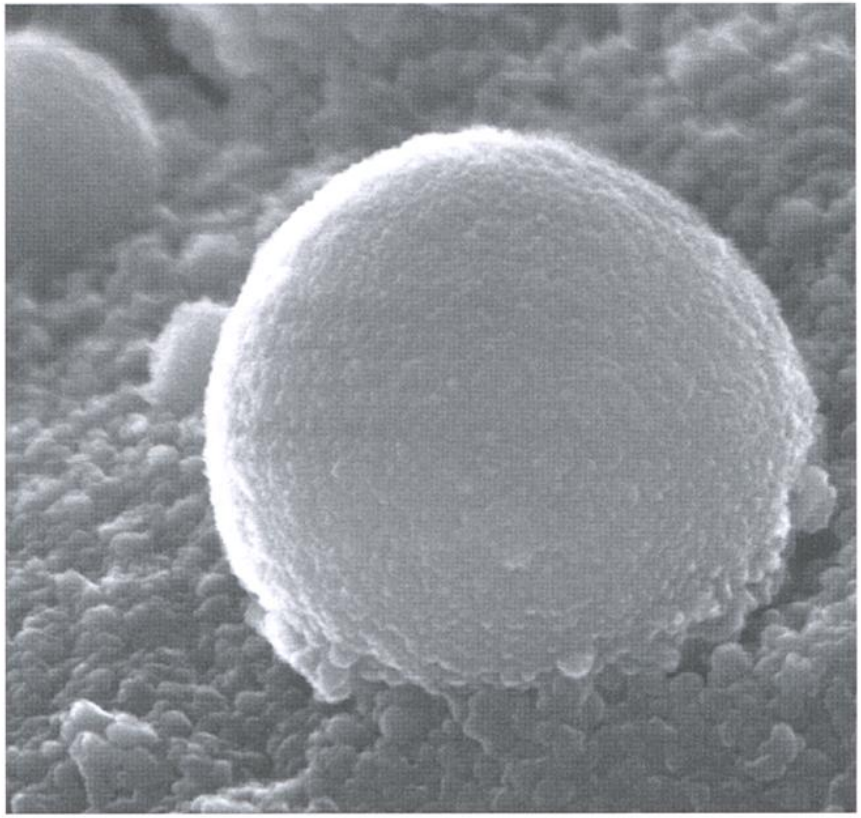
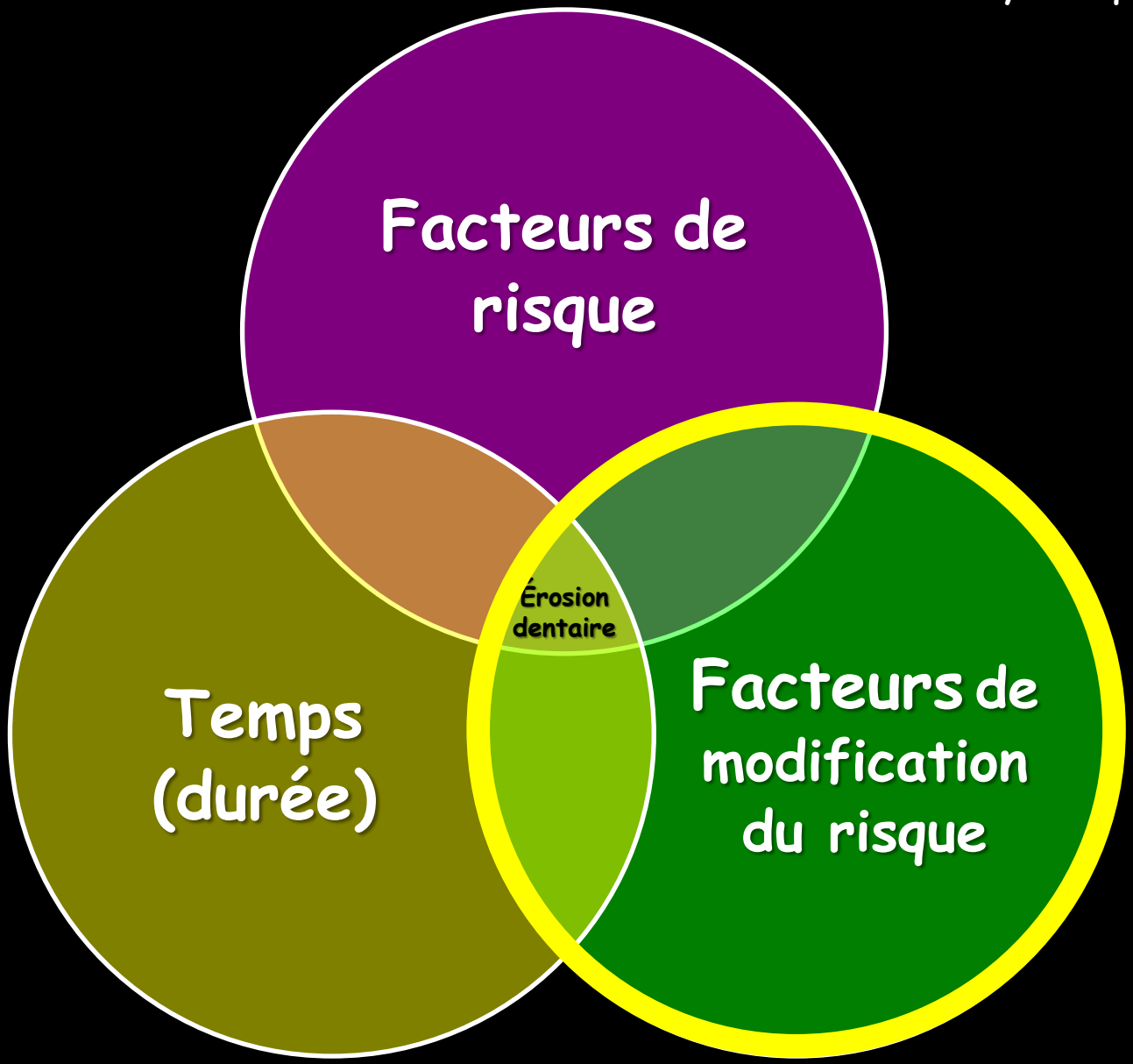


Figure 12.18 Scanning electron micrograph of a calcium fluoride globule (about 0.6 µm in diameter) sitting on the enamel surface. The globule is round with a nodular surface. In transmission electron microscopy the structure of the globule radiates from the center outwards, indicating its growth from a central nidus. (For original figure refer to Petzold, 2001.)



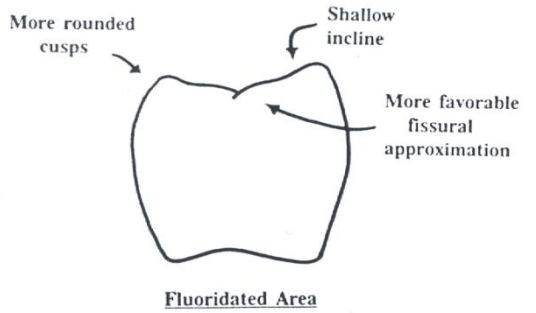
Fluorures par voie systémique

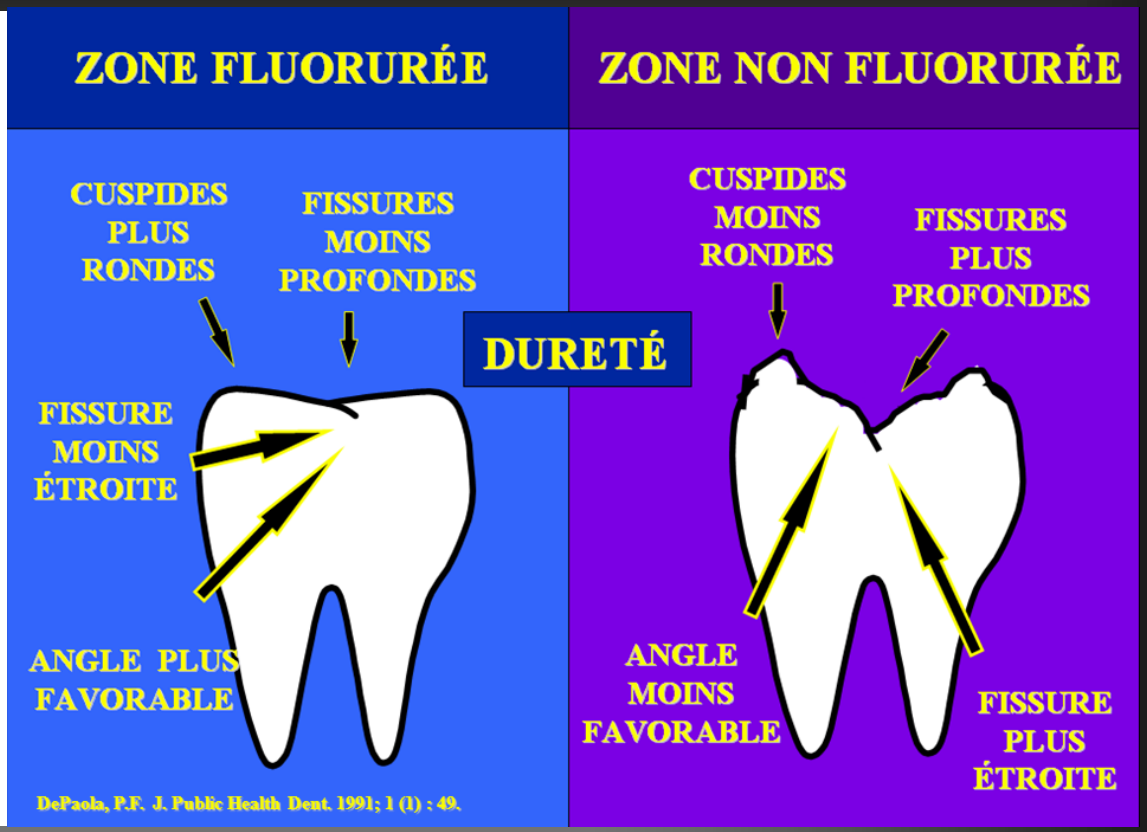
J Public Health Dent. 1991 Winter;51(1):48-52.

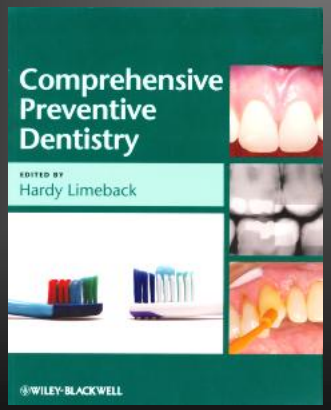
Reaction paper: the use of topical and systemic fluorides in the present era.

DePaola PF.
Department of Clinical Trials and Experimentation, Forsyth Dental Center, Boston, MA 02115.

FIGURE 1
Comparison in Schematic and Exaggerated Form of the Gross Morphology of Posterior Teeth from Fluoridated and Nonfluoridated Areas







- ☐ 1. Forme des cuspides plus arrondies
- ☐ 2. Angle formé par les cuspides plus plat
- ☐ 3. Morphologie des puits et fissures moins à risque
- ☐ 4. Retard d'éruption (résorption osseuse plus lente)

IN BRIEF

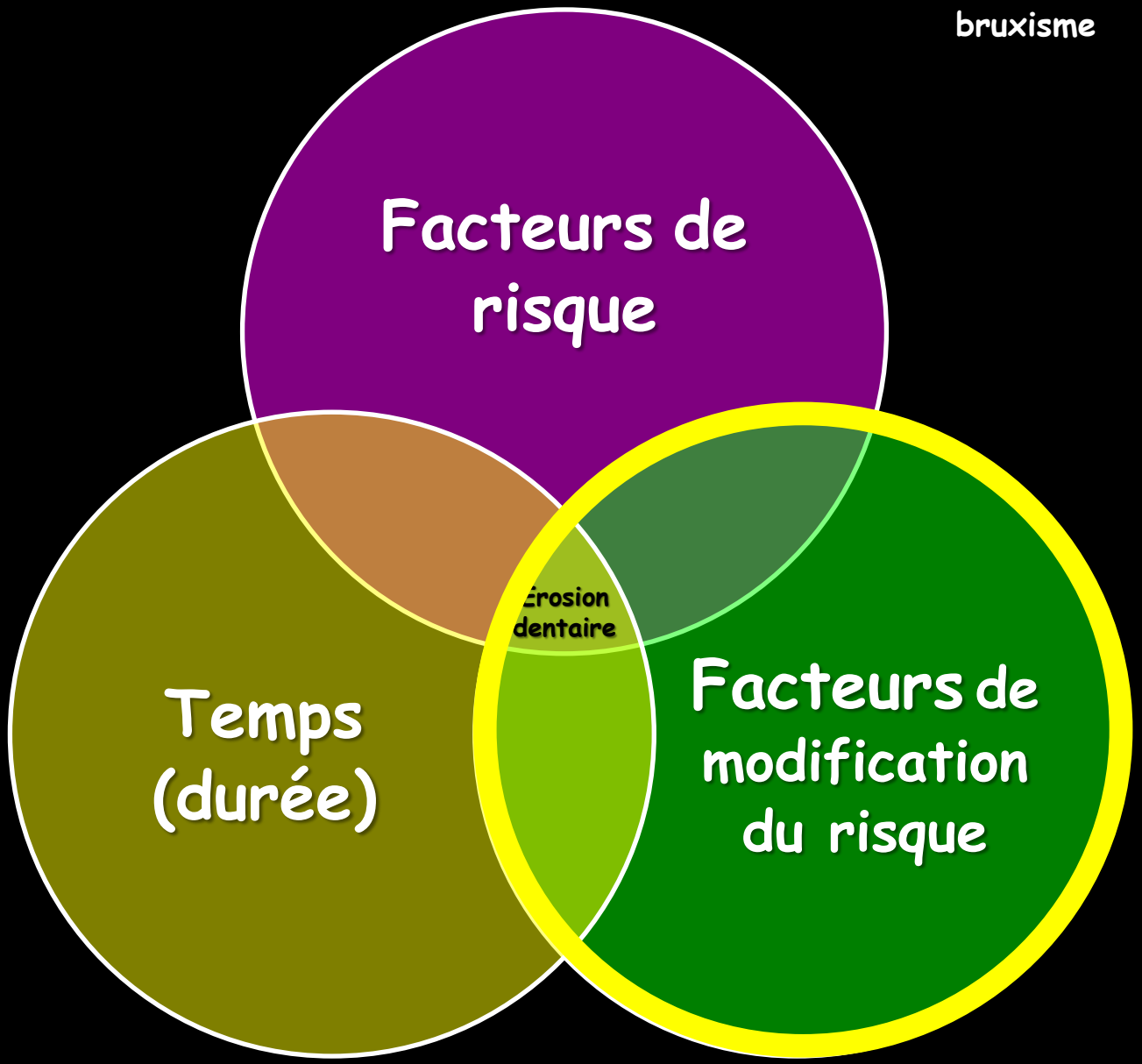
- This is the first study to show that water fluoridation protects from dental erosion/toothwear in 14-year-old children.
- The benefits of water fluoridation as a public health measure is strengthened.
- This particular study shows that dental erosion/toothwear is a 'disorder of affluence'.

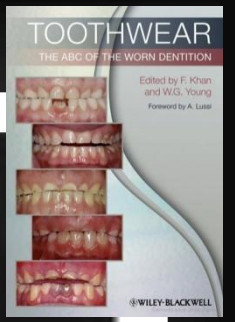
Br Dent J. 2004 Oct 9;197(7):413-6; discussion 399.

Epidemiological studies of tooth wear and dental erosion in 14-year-old children in North West England. Part 1: The relationship with water fluoridation and social deprivation.

Bardsley PF, Taylor S, Milosevic A.

4. Attrition / bruxisme





Attrition avec Érosion

Érosion

F

C_1

BiteStrip miniature EMG device.

www.biosafepanama.com/html/bitestrip.html

MEDICAL DESIGN EXCELLENCE AWARDS℠
2004 WINNER

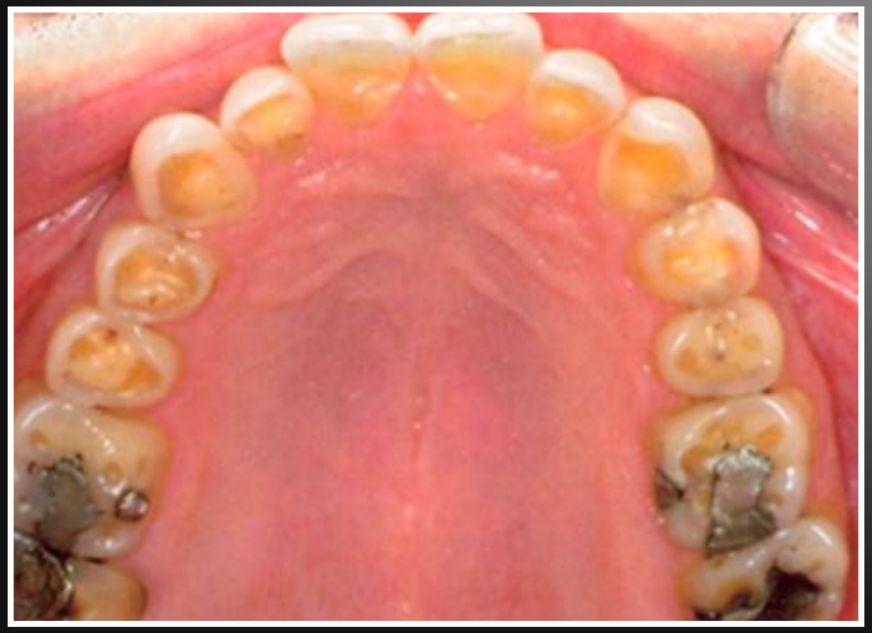
BiteStrip™

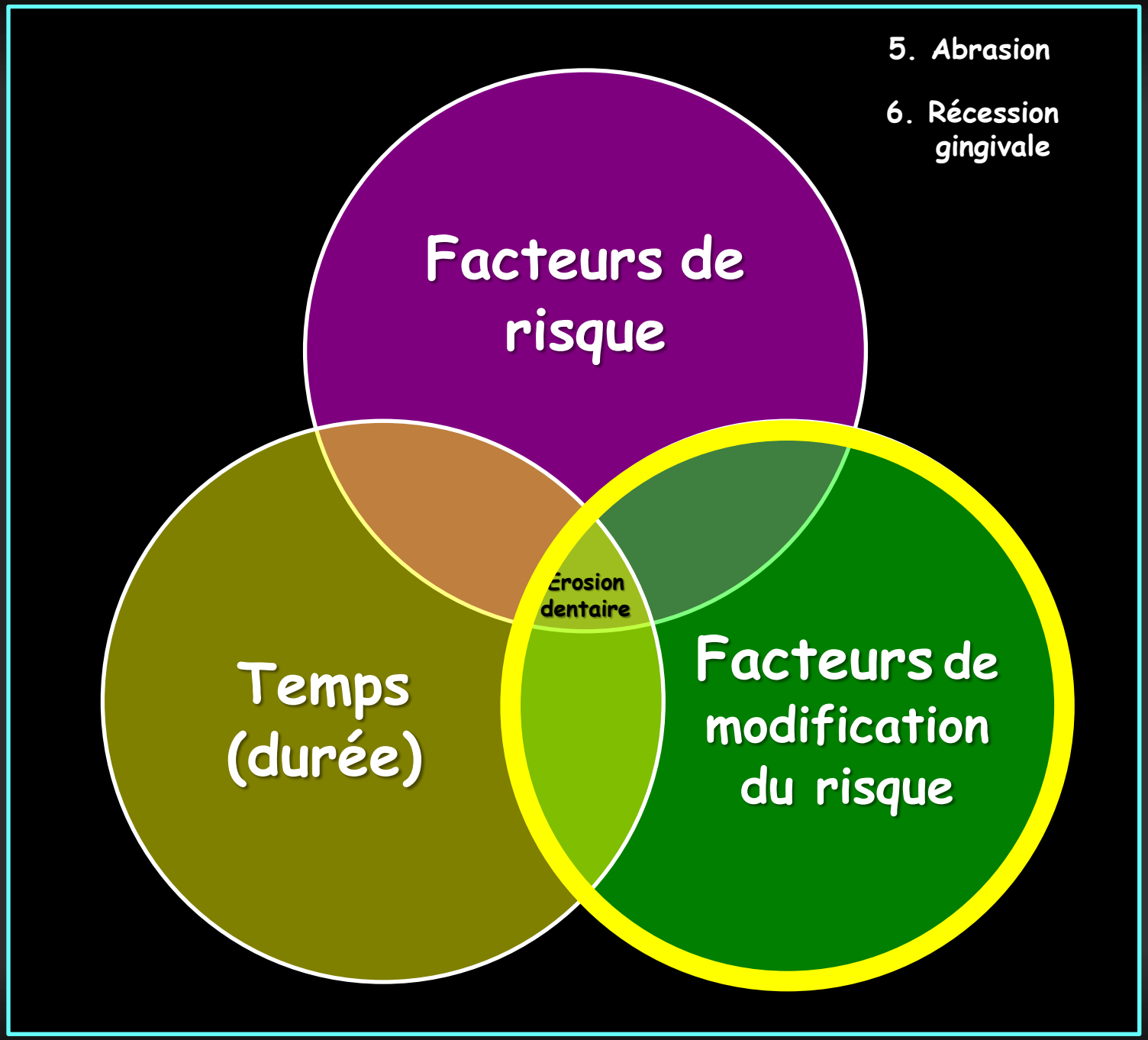
Fig. 4. Centric indentations and lateral excursive indents on splint in mouth less than 1 week.

Fig. 5. Heavier wear on posterior of splint. Marker used for visualization.

A common-sense approach to splint therapy.
Dylina TJ J Prosthet Dent. 2001 Nov;86(5):539-45.

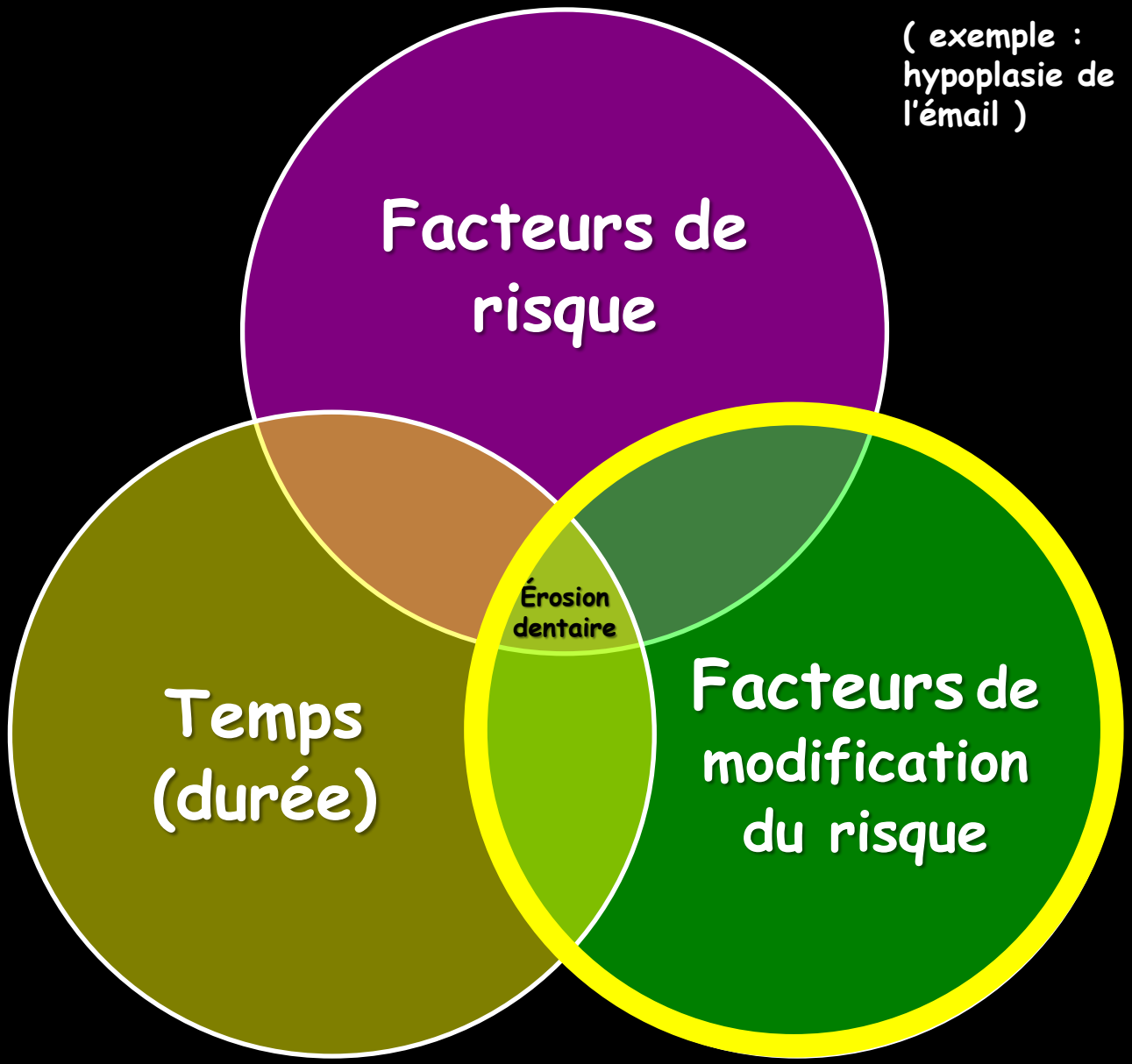
GERD Après 2 années





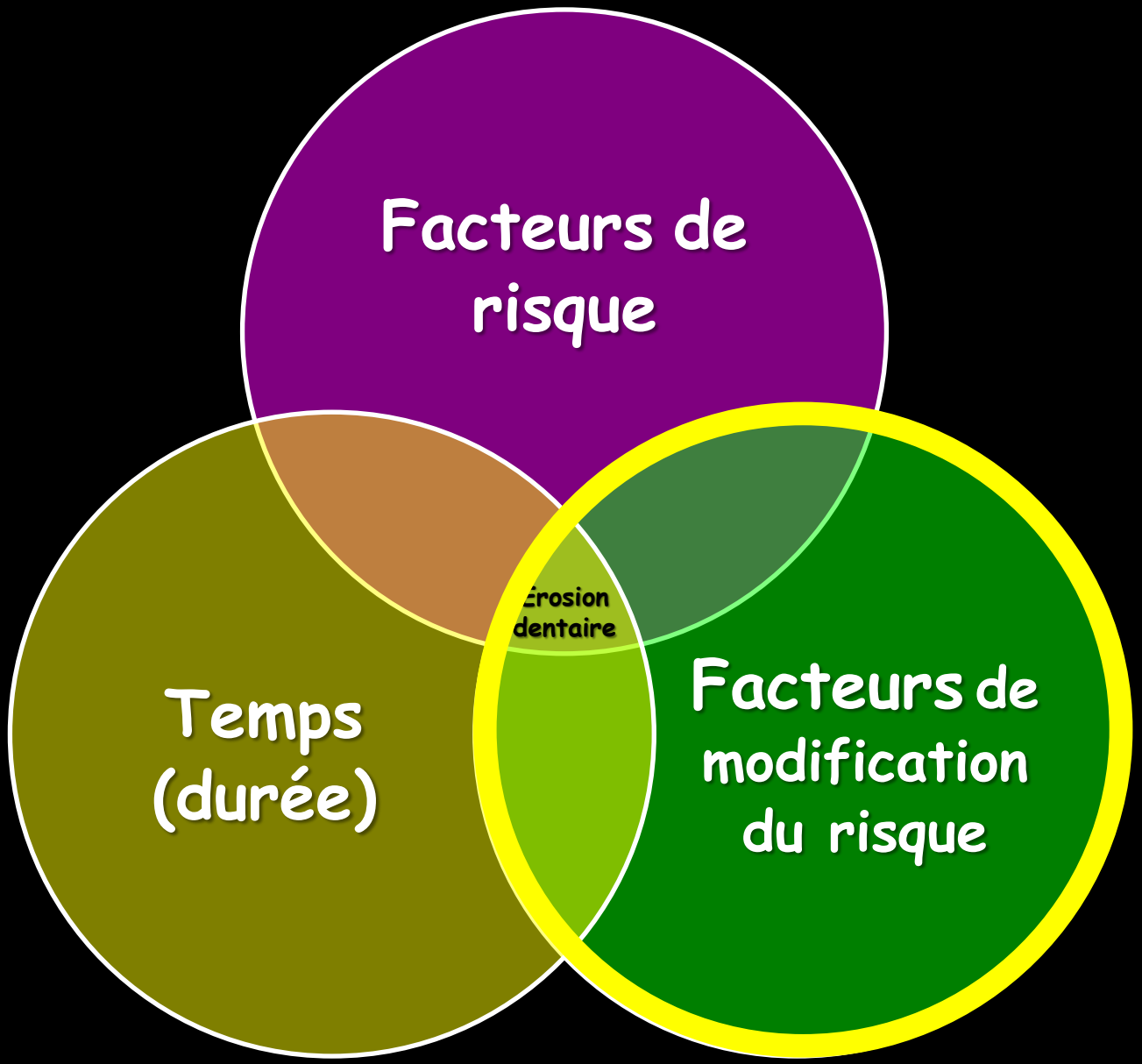
http://cdeworld.com/courses/4496

7. Défaut d'émail
(exemple : hypoplasie de l'émail)



École de Ville St-Laurent, 26 janvier 2010

8. Habitudes de vie



Dental erosions in relation to lactovegetarian diet

EEVA LINKOSALO AND HELENA MARKKANEN

Institute of Dentistry, University of Kuopio, Kuopio, Finland

Linkosalo E, Markkanen H: Dental erosions in relation to lactovegetarian diet. Scand J Dent Res 1985; 93: 436–41.

Abstract – The subjects of this study were 26 lactovegetarians and their age- and sex-matched controls. Clinical and radiologic examinations were made and samples of wax-stimulated whole saliva were collected. Dental erosions were recorded and documented with photographs and plaster models. Incipient, moderate and grave erosive defects were observed in 26.9%, 19.2% and 30.8% of the lactovegetarians, respectively. In controls, however, no erosions were observed. When tested by multiple linear regression analysis, the main factors affecting dental erosions were the rate of flow of saliva, and consumption of vinegar and vinegar conserves, citrus fruits and acidic berries.

Key words: dental erosions; lactovegetarian diet.

Eeva Linkosalo, Institute of Dentistry, University of Kuopio, P.O. Box 6, SF-70211 Kuopio, Finland.

Accepted for publication 26 January 1985.

International Dental Journal (2007) **57**, 184-186

A case report of patient practising yoga leading to dental erosion

Roseline Meshramkar, Sanjayagouda B. Patil and N P Patil
Karnataka, India

The article presents the case of a patient who was practising Yoga (Kunjal kriya) which led to dental erosion. Dental erosion can be due to extrinsic or intrinsic causes. The intrinsic causes include vomiting due to anorexia nervosa, regurgitation due to abnormality in gastro-intestinal tract or rumination. A 38–year-old male patient presented with a rare aetiology of dental erosion. He had practiced kunjal kriya one of the yogic exercises described in ancient India. In kunjal kriya the patient vomits on an empty stomach in order to clean his or her gastro-intestinal tract. The patient had practiced this form of exercise for over 12 years which had led to severe dental erosion. A proper case history should be evaluated for every patient so that they can be counselled for any factors that could be detrimental to dental health. Early diagnosis is paramount in recognising the aetiology of dental erosion so that detrimental effects on the dentition can be prevented.

Key words: Tooth erosion, acid reflux, yoga

Soft Drink, Software and Softening of Teeth – a Case Report of Tooth Wear in the Mixed Dentition Due to a Combination of Dental Erosion and Attrition

The Open Dentistry Journal, 2010, *4*, 198-200

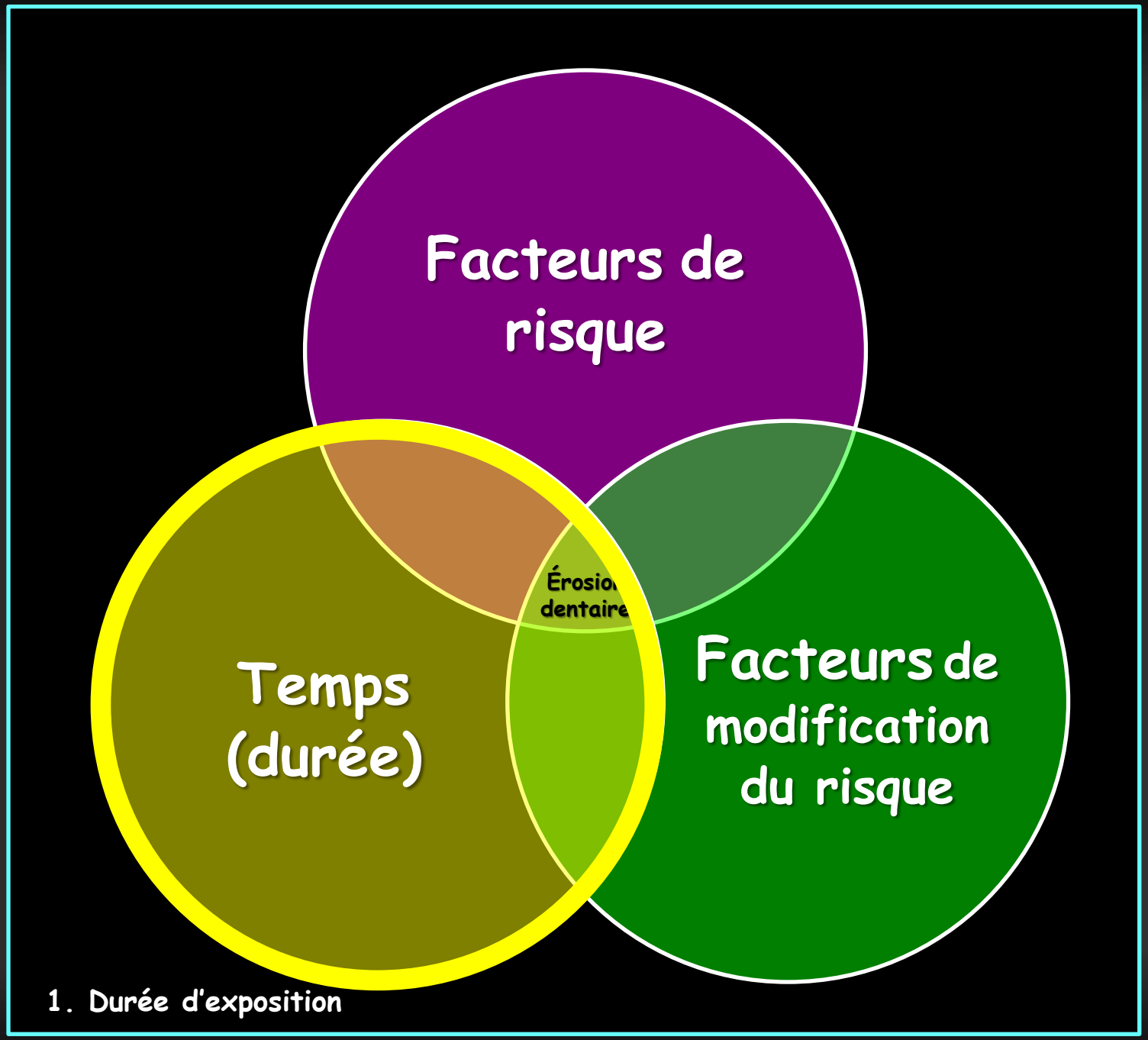
Soft Drink, Software and Softening of Teeth – a Case Report of Tooth Wear in the Mixed Dentition Due to a Combination of Dental Erosion and Attrition

D. L. Gambon[1,*], H. S. Brand[2] and A.V. Nieuw Amerongen[2]

[1]*Bambodino Paediatric Dental Clinic, Rotterdam, the Netherlands.* [2]*Department of Oral Biochemistry. Academic Centre for Dentistry (ACTA), Amsterdam, The Netherlands*

Abstract: This case report describes a 9-year-old boy with severe tooth wear as a result of drinking a single glass of soft drink per day. This soft drink was consumed over a period of one to two hours, while he was gaming intensively on his computer. As a result, a deep bite, enamel cupping, sensitivity of primary teeth and loss of fillings occurred. Therefore, dentists should be aware that in patients who are gaming intensively, the erosive potential of soft drinks can be potentiated by mechanical forces leading to excessive tooth wear.

2 heures pour finir sa boisson gazeuse … jeu vidéo !



1. Durée d'exposition

lentement

rapidement

> 30

Facteurs de risque – Érosion dentaire

1. Connaissances
2. Habitudes de vie
3. Éducation
4. Statut socio-économique
5. Santé générale

1. Facteurs chimiques

1.1 pH

1.2 Pouvoir tampon

1.3 Type d'acide

1.4 Pouvoir d'adhésion

1.5 Accompagné d'une réaction de chélation

1.6 Calcium (Ca^{+2})

1.7 Phosphate (PO_4^{-3})

1.8 Fluoride (F^-)

2. Facteurs comportementaux

2.1 Habitudes alimentaires

2.2 Habitudes pour se désaltérer

2.3 Habitudes de brossage des dents

2.4 Consommation de boissons acides

2.5 Consommation de nourritures acides

2.6 Contenu acide dans un biberon

2.7 Régurgitation

2.8 Vomissement

2.9 Médicaments érosifs

2.10 Risque environnemental lié à l'occupation

3. Facteurs biologiques

3.1 Débit salivaire

3.2 Pouvoir tampon de la salive

3.3 Abrasion et / ou Attrition

3.4 Pellicule acquise

3.5 Anatomie des dents

3.6 Malocclusion

3.7 Qualité de l'émail et de la dentine / structure des dents

PLAN

1. Importance relative du sujet
2. Facteurs de risque
3. **Dépistage**
   - 3.1 Évolution des cas (stades distinctifs)
   - 3.2 Signes cliniques associés
4. Cas cliniques (écoles de Montréal)
5. Prévention

Diagnostic différentiel

Attrition dentaire

Érosion dentaire

Attrition dentaire		Érosion dentaire
Usure localisée seulement aux endroits avec occlusion	Points de contact	Usure également localisée aux endroits sans occlusion
Corrélation avec l'usure observée au niveau de la dent antagoniste (orientation et intensité)	Réciprocité de l'usure	Aucune corrélation …
Apparence spécifique : plat avec bouts aiguisés (lame de couteau)	Apparence	Apparence spécifique … forme plus arrondie, voire émoussée avec ou sans concavité (cupping)

A patient with severe wear on the anterior teeth and minimal wear on the posterior teeth.
Spear F. J Am Dent Assoc. **2008** Oct;139(10):1399-403.

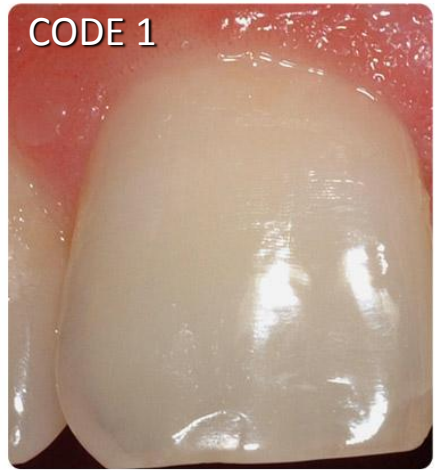
Figure 1. Lateral view of severe anterior wear and minimal posterior wear in a 27-year-old man.

Figure 2. Severe attrition of the mandibular incisors. Note the flat, sharply defined facets.

Attrition dentaire

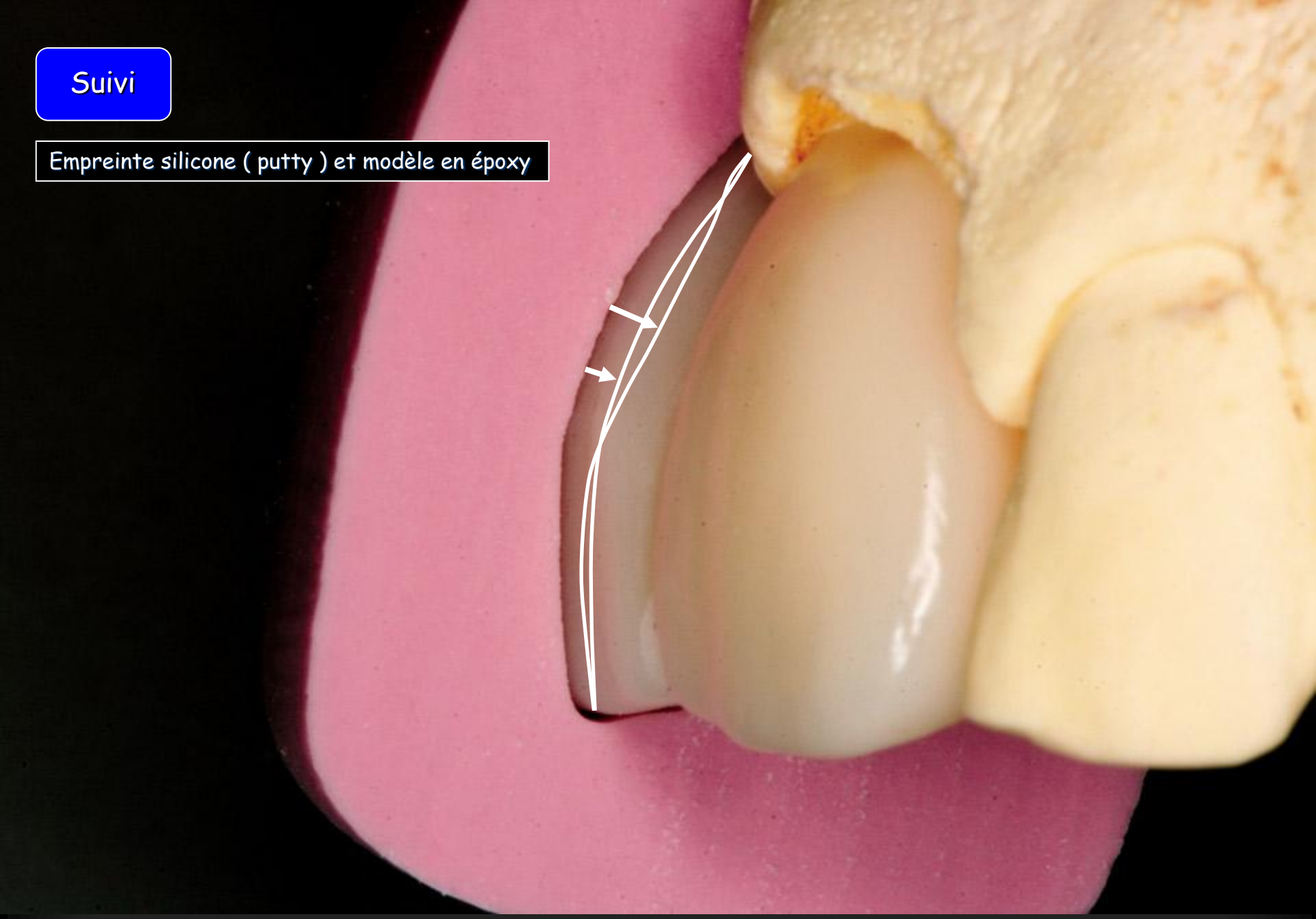
Érosion dentaire

Faces buccales et linguales

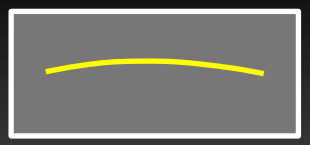


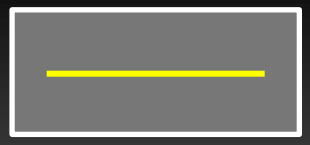
Suivi

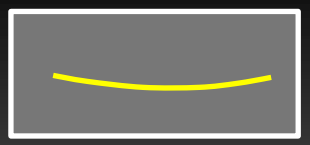
Empreinte silicone (putty) et modèle en époxy

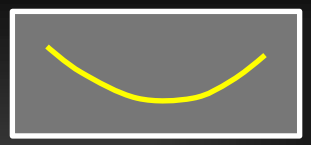


http://www.dentalproductsreport.com/sites/dpr.dev.adv100.com/files/articles/FigH_4.jpg

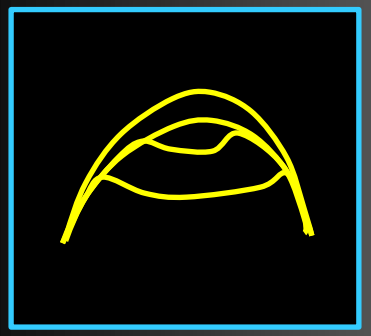




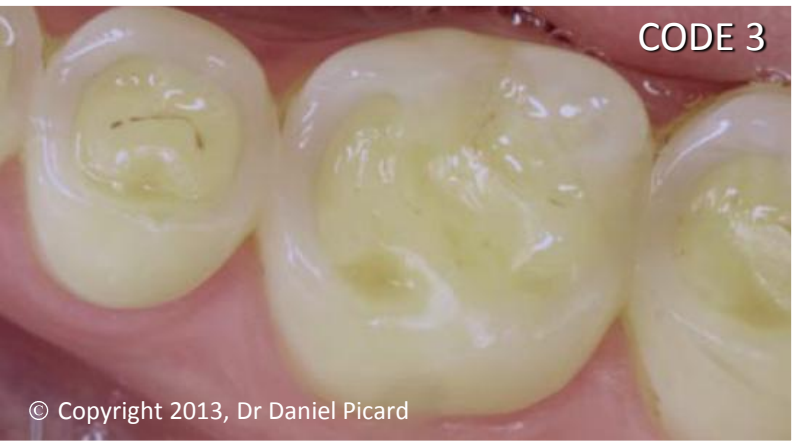




Faces occlusales



http://elearningerosion.com



PLAN

1. Importance relative du sujet
2. Facteurs de risque
3. Dépistage
   - 3.1 Évolution des cas (stades distinctifs)
   - 3.2 Signes cliniques associés
4. Cas cliniques (écoles de Montréal)
5. Prévention

Toutes les surfaces :

1. Perte des caractéristiques de surface d'un émail sain
2. Perte du lustre naturel de l'émail, voire apparence de verre dépoli
3. La surface dentaire apparait soyeuse et brillante
4. Perte de convexité ou formation de concavités aux bords arrondis qui atteint l'émail ou la dentine centrée avec un arrondissement symétrique (« cupping » à « bowl »)
5. Coloration jaunâtre de la dent en raison de l'amincissement de l'émail qui laisse paraître la dentine sous-jacente
6. Hypersensibilité dentinaire
7. Exposition pulpaire

Faces lisses :

8. Persistance d'un mini chanfrein d'émail près de la gencive en raison de la protection offerte par le fluide créviculaire et la plaque dentaire (pH neutre)

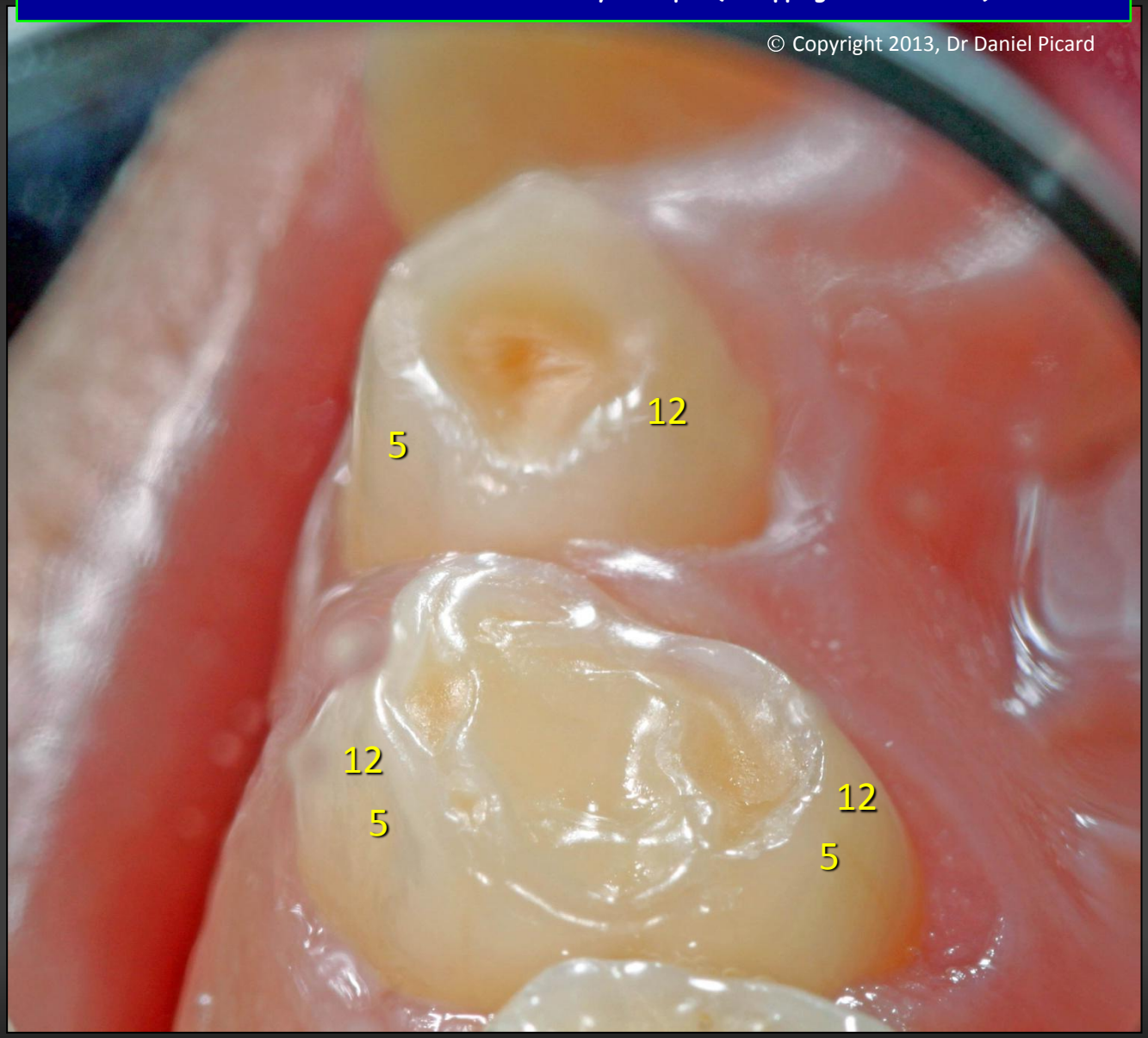
Faces avec puits et fissures :

9. Arrondissement des pointes de cuspide des dents postérieures
10. Les puits et fissures des dents postérieures deviennent moins évidentes à observer
11. Amalgame dentaire non supportée en raison de la disparition de la substance dentaire avoisinante (concavité)

Faces incisives :

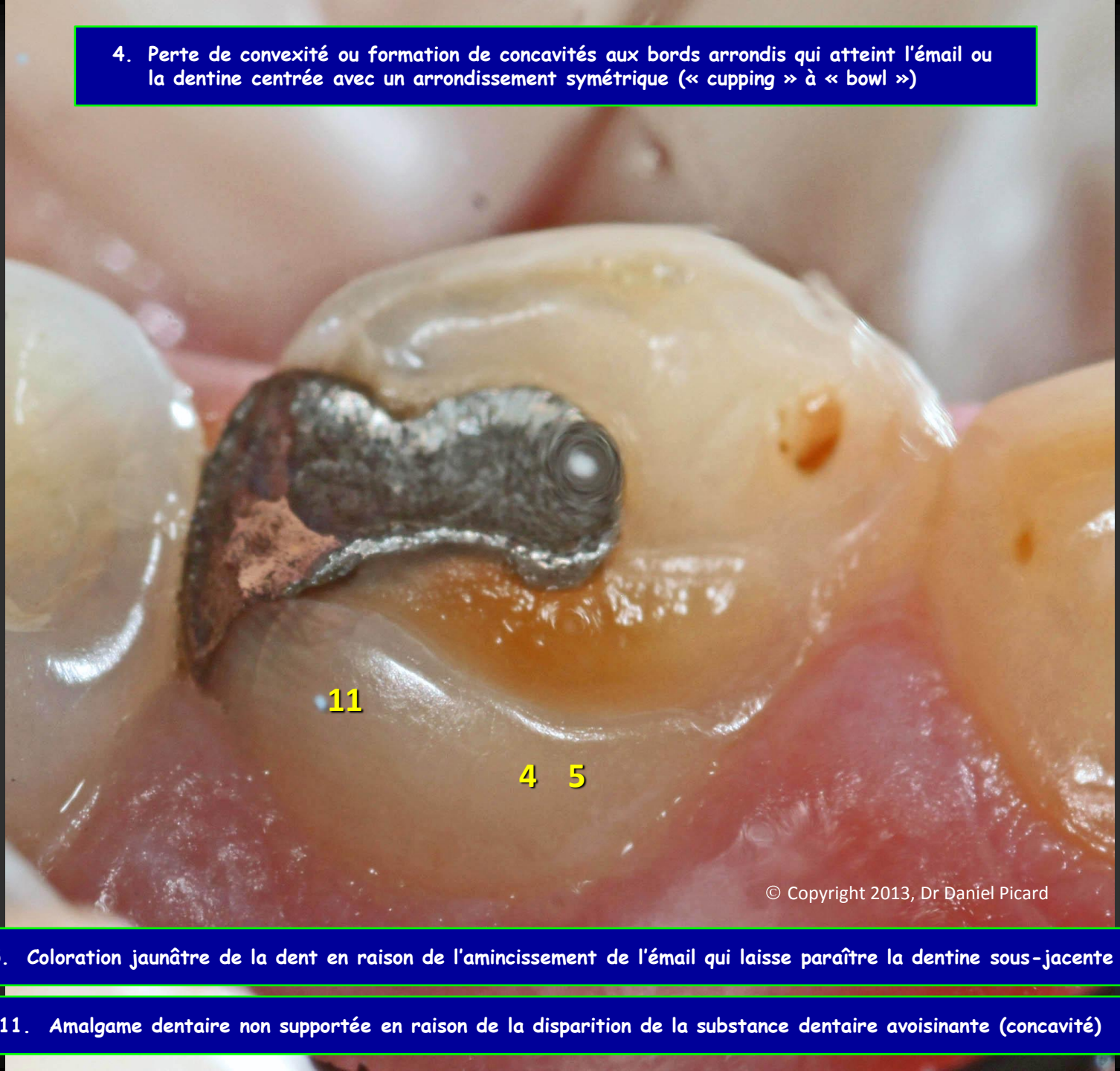
12. Translucidité de l'émail accrue au niveau des incisives en raison de la perte de substance dentaire
13. Émail dentelé au niveau du bout incisif témoignant de la perte de support par la dentine sous-jacente
14. Absence de l'effet de Greaves

4. Perte de convexité ou formation de concavités aux bords arrondis qui atteint l'émail ou la dentine centrée avec un arrondissement symétrique (« cupping » à « bowl »)



5. Coloration jaunâtre de la dent en raison de l'amincissement de l'émail qui laisse paraître la dentine sous-jacente

4. Perte de convexité ou formation de concavités aux bords arrondis qui atteint l'émail ou la dentine centrée avec un arrondissement symétrique (« cupping » à « bowl »)



5. Coloration jaunâtre de la dent en raison de l'amincissement de l'émail qui laisse paraître la dentine sous-jacente

11. Amalgame dentaire non supportée en raison de la disparition de la substance dentaire avoisinante (concavité)

http://id.cdeworld.com/courses/4295

8. Persistance d'un mini chanfrein d'émail près de la gencive en raison de la protection offerte par le fluide créviculaire et la plaque dentaire (pH neutre)

8. Persistance d'un mini chanfrein d'émail près de la gencive en raison de la protection offerte par le fluide créviculaire et la plaque dentaire (pH neutre)

12. Translucidité de l'émail accrue au niveau des incisives en raison de la perte de substance dentaire

13. Émail dentelé au niveau du bout incisif témoignant de la perte de support par la dentine sous-jacente

4 3 4 3 4 4

4 4 4 4 4 4

3. La surface dentaire apparait soyeuse et brillante

4. Perte de convexité ou formation de concavités aux bords arrondis qui atteint l'émail ou la dentine centrée avec un arrondissement symétrique (« cupping » à « bowl »)

4. Perte de convexité ou formation de concavités aux bords arrondis qui atteint l'émail ou la dentine centrée avec un arrondissement symétrique (« cupping » à « bowl »)

5. Coloration jaunâtre de la dent en raison de l'amincissement de l'émail qui laisse paraître la dentine sous-jacente

10. Les puits et fissures des dents postérieures deviennent moins évidentes à observer

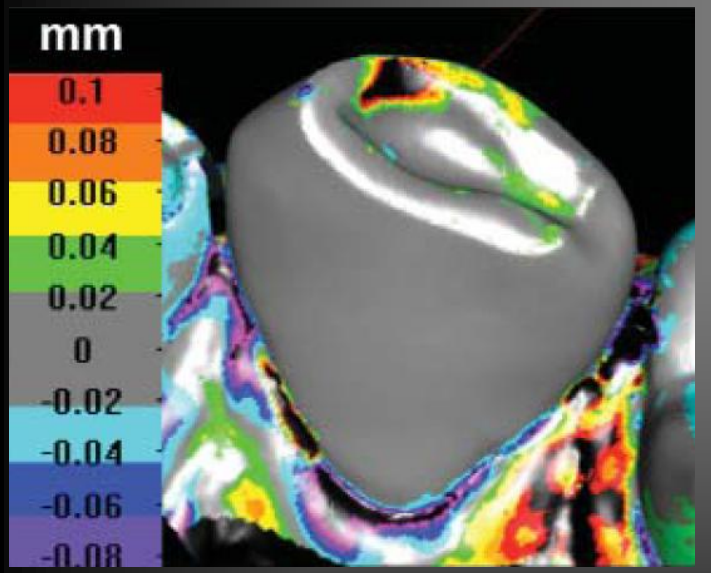
Érosion dentaire au niveau des faces occlusales : Évolution dans le temps

RESEARCH

Quantitative analysis of tooth surface loss associated with gastroesophageal reflux disease

A longitudinal clinical study

Daranee Tantbirojn, DDS, MS, PhD; Maria R. Pintado, MPH; Antheunis Versluis, PhD; Carol Dunn, RDA, CCRP; Ralph Delong, DDS, MS, PhD



ABSTRACT

Background. Acid regurgitation resulting from gastroesophageal reflux disease (GERD) causes dissolution of tooth structure. The authors conducted a longitudinal clinical study to measure tooth surface loss associated with GERD.

Methods. The authors made replicas of dental impressions obtained from 12 participants with GERD and six control participants at baseline and six months. Using an optical scanner, they digitized the tooth surfaces of these replicas. They then analyzed the volume of tooth surface loss and characterized it as noncontact erosion or erosion/attrition.

Results. Mean (standard deviation) volume loss per tooth in participants with GERD (0.18 [0.12] cubic millimeter) was significantly higher than that in control participants (0.06 [0.03] mm^3; *t* test; $P < .013$). Nine participants with GERD exhibited tooth surface loss with characteristics of erosion (noncontact erosion in three participants, erosion/attrition in eight participants).

Conclusions. Tooth surface loss in participants with GERD was significantly greater than that in control participants. The pattern of surface loss was characteristic of erosion in noncontact areas and around contact areas.

Clinical Implications. Anterior and posterior teeth of participants with GERD were affected by erosive tooth wear. In addition, the amount of erosive tooth wear on occlusal surfaces was twice as high when there was evidence of attrition.

Key Words. Tooth wear; erosion; gastroesophageal reflux disease; acid reflux; optical scan.

JADA 2012;143(3):278-285.

JADA CE CONTINUING EDUCATION ARTICLE 4

PLAN

1. Importance relative du sujet
2. Facteurs de risque
3. Dépistage
   - 3.1 Évolution des cas (stades distinctifs)
   - 3.2 Signes cliniques associés
4. **Cas cliniques (écoles de Montréal)**
5. Prévention

2 Pepsi par jour (environ)

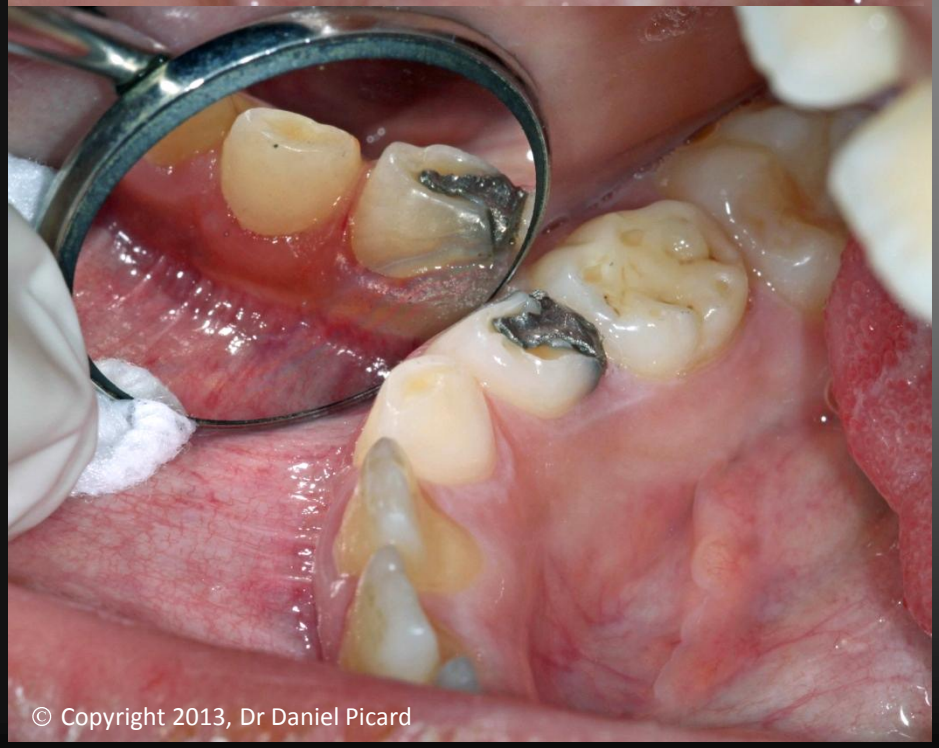
1

Cas No. 1

École Jeanne-Leber

01 mars 2012






Cas No. 2

École St-Jean-de-Brébeuf

10 novembre 2011

Cas No. 3

École Saint-Louis-de-Gonzague, Annexe

23 novembre 2012

Cas numéro 4

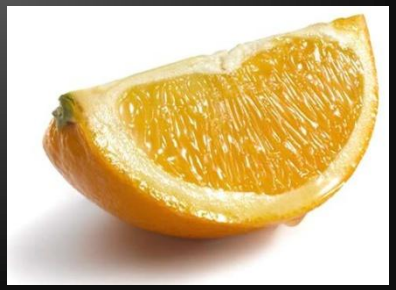
École Wilfrid Pelletier

22 mai 2013

Dental erosion in Cuban children associated with excessive consumption of oranges.
Künzel W, Cruz MS, Fischer T. Eur J Oral Sci. **2000** Apr;108(2):104-9.

Fig. 1 Erosive areas of enamel caused by sucking lemons at a young age in an effort to control weight, showing signs of decay in later life

Access to special care dentistry, part 9. Special care dentistry services for older people.
Dougall A, Fiske J.
Br Dent J. 2008 Oct 25;205(8):421-34. doi: 10.1038/sj.bdj.2008.891.



PLAN

1. Importance relative du sujet
2. Facteurs de risque
3. Dépistage
   - 3.1 Évolution des cas (stades distinctifs)
   - 3.2 Signes cliniques associés
4. Cas cliniques (écoles de Montréal)
5. Prévention

PRÉVENTION

- [ ] 1. $\Delta^{-}\downarrow$ Fréquence, sévérité, temps de contact avec les dents
- [ ] 2. $\Delta^{+}\uparrow$ Mécanismes de défense du corps humain
- [ ] 3. $\Delta^{+}\uparrow$ Résistance des dents à l'érosion dentaire, potentiel de reminéralisation
- [ ] 4. $\Delta^{+}\uparrow$ Protection chimique aux dents
- [ ] 5. $\Delta^{-}\downarrow$ Minimiser les influences abrasives
- [ ] 6. $\Delta^{+}\uparrow$ Protection physique aux dents

PRÉVENTION

EN TOUT TEMPS :

1. Éliminer / Réduire la consommation de produits acides
2. Rx (débit salivaire)
3. Porter une plaque occlusale
4. Augmenter l'exposition aux fluorures
5. Choisir les produits consommés … boissons enrichies de Calcium, de Phosphate ou de Fluor
6. Choisir le moment de consommer un produit acide … en état d'hyposalivation … attendre avant de les consommer (exemple : activité physique intense)
7. Tests diagnostiques : (1) analyse de l'occlusion, (2) tests salivaires

JUSTE AVANT :

8. Diluer le produit avec de l'eau (diminue l'acidité totale)

PENDANT :

9. Limiter la durée d'exposition … avaler rapidement et, si possible, avec une paille

JUSTE APRÈS :

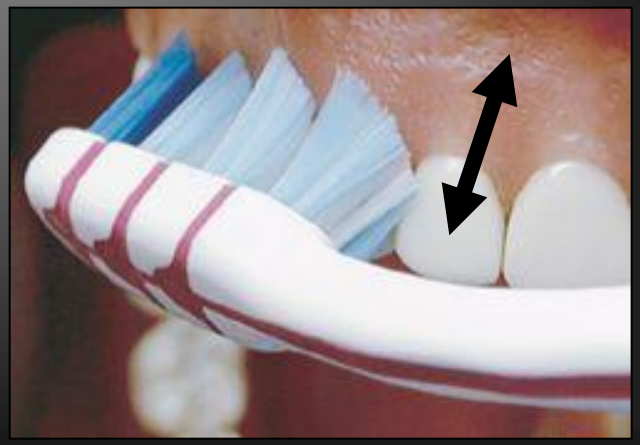
10. Sucer un comprimé antiacide
11. Se rincer la bouche avec un liquide basique, si possible
12. Mâcher de la gomme sans sucre ou du fromage
13. Sucer un losange contenant du xylitol ou du fluor
14. Appliquer sur les dents un dentifrice au fluor au pH basique ou neutre

APRÈS > 30 minutes :

15. Attendre au moins 30 minutes, voire 60 minutes, avant de se brosser les dents
16. Utiliser un dentifrice peu abrasif (RDA – Relative Dentin Abrasivness < 100)
17. Privilégier des mouvements de brossage dans le sens vertical des dents
18. Ajouter de la glycérine au dentifrice ou y mélanger du soda à pâte (bicarbonate de soude)

17

Patients should brush gently, using a vertical rather than a cross brushing technique and apply low or non-abrasive toothpaste (often labelled as "sensitive" by manufacturers) by means of a soft or medium type of brush.



14

4

$ 11.99

Acheté chez Pharmaprix
(Montréal)
le 19 juillet 2011

$ 13.99

39 ml.

100 ml.

European Journal of Oral Sciences

10 11

Eur J Oral Sci 2011; 119: 301–304
DOI: 10.1111/j.1600-0722.2011.00841.x
Printed in Singapore. All rights reserved

European Journal of Oral Sciences

Influence of five neutralizing products on intra-oral pH after rinsing with simulated gastric acid.
Lindquist B, Lingström P, Fändriks L, Birkhed D.
Eur J Oral Sci. 2011 Aug;119(4):301-4. doi: 10.1111/j.1600-0722.2011.00841.x.

Influence of five neutralizing products on intra-oral pH after rinsing with simulated gastric acid

Birgitta Lindquist[1], Peter Lingström[1], Lars Fändriks[2], Dowen Birkhed[1]

[1]Department of Cariology, Institute of Odontology and [2]Department of Gastro Surgical Research and Education, Institute of Clinical Sciences, The Sahlgrenska Academy, University of Gothenburg, Gothenburg, Sweden

Lindquist B, Lingström P, Fändriks L, Birkhed D. Influence of five neutralizing products on intra-oral pH after rinsing with simulated gastric acid.
Eur J Oral Sci 2011; 119: 301–304. © 2011 Eur J Oral Sci

The aetiology of dental erosion may be of both extrinsic and intrinsic origin. The aim of the present study was to test the ability of various neutralizing products to raise the low intra-oral pH after an erosive exposure, in this case to gastric acid, which was simulated using hydrochloric acid (HCl). Eleven adults participated. They rinsed with 10 ml of 10 mM HCl (pH 2) or 10 ml of 100 mM HCl (pH 1) for 1 min, after which the pH was measured intra-orally for up to 30 min at four sites (two approximal, one buccal, and the dorsum of the tongue). After rinsing with the two acid solutions (pH 1 and pH 2), the following products were used: (i) antacid tablet; (ii) gum arabic lozenge; (iii) mineral water; (iv) milk; and (v) tap water (positive control). The negative control was no product use. The five test products were used for 2 min after the erosive challenge. All the products produced an initially higher pH compared with the negative control. The antacid tablet resulted in the greatest and most rapid increase in pH, followed by the lozenge. In dental practice, the use of any of the neutralizing products tested, especially the antacid tablet, could be recommended in order to increase the intra-oral pH after an erosive challenge.

Birgitta Lindquist, Department of Cariology, Institute of Odontology, PO Box 450, SE-405 30 Gothenburg, Sweden

Telefax: +46–31–825733
E-mail: birgitta.lindquist@odontologi.gu.se

Key words: dental erosion; gastric acid; intra-oral pH; neutralizing products

Accepted for publication May 2011

Rincer pendant 1 minute avec 10 ml. de HCl au pH de 1 ou 2

5 produits testés et mesure du pH à 0, 1, 2, 4, 6, 8, 10, 20 et 30 minutes

The registrations were performed in two interproximal spaces in the upper or the lower premolar/molar region, on one buccal site on an incisor in the upper jaw, and on the anterior part of the dorsum of the tongue, making a total of four sites. The three dental sites did not have any restorations.

1. Avec 10 ml. d'eau du robinet (contrôle)

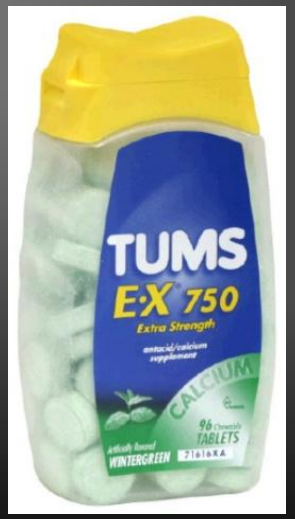
2. Avec 10 ml. de lait 3 %
   pH = 6,6

3. Avec 10 ml. d'eau minérale gazéifiée
   pH = 7.0
   Petite quantité de bicarbonate

4. Mâcher un lozenge de Dentirol (0.75 mg. de NaF)

www.dentirol.se/index.php?page=plus&site=2

5. Mâcher/ sucer un comprimé antiacide qui contient de l'hydroxyde d'aluminium

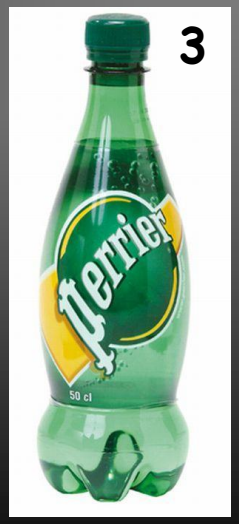


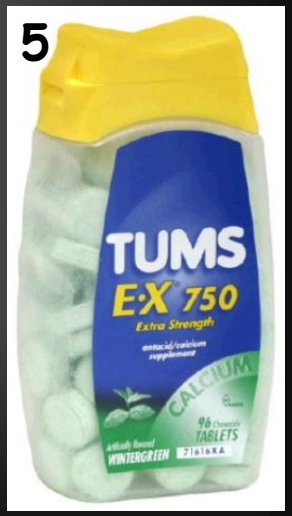
Pendant 2 minutes !

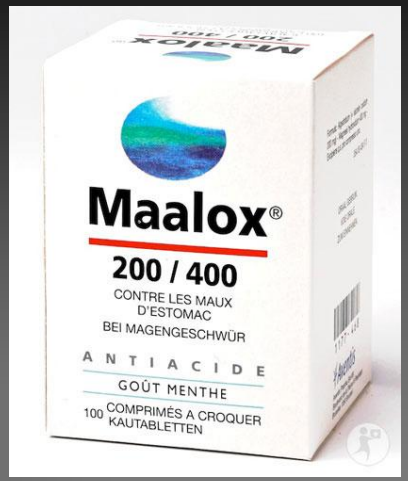
1 2 3 4 5

Meilleur

Pire







Counteractive effect of antacid suspensions on intrinsic dental erosion.
Turssi CP, Vianna LM, Hara AT, do Amaral FL, França FM, Basting RT.
Eur J Oral Sci. **2012** Aug;120(4):349-52.

Dental erosion in gastroesophageal reflux disease.
Barron RP, Carmichael RP, Marcon MA, Sàndor GK.
J Can Dent Assoc. **2003** Feb;69(2):84-9. Review.

L'érosion dentaire observée en 2e année … pourquoi s'en soucier ?

- [ ] 1. L'exemple du reste du monde
- [ ] 2. Les québécois vivent plus vieux
- [ ] 3. Les québécois ont de plus en plus de dents en bouche à un âge avancé
- [ ] 4. La qualité et la quantité de salive tend à diminuer avec l'âge
- [ ] 5. Un pourcentage significatif de la population québécoise pourrait souffrir d'hyposalivation, et ce, sans même le savoir
- [ ] 6. Introduction et popularité de nouvelles boissons à risque élevé pour l'érosion dentaire (Exemples : Gatorade, premix, alcopops, etc…)
- [ ] 7. Les nouvelles habitudes alimentaires des québécois ? ? ?

Acta Odontologica Scandinavica, 2013; Early Online, 1–10

informa
healthcare

ORIGINAL ARTICLE

Findings from the oral health study of the Danish Health Examination Survey 2007–2008

JOHANNE KONGSTAD[1], KIM EKSTRAND[1], VIBEKE QVIST[1], LISA BØGE CHRISTENSEN[1], BIRTHE CORTSEN[2], MORTEN GRØNBÆK[3], POUL HOLM-PEDERSEN[1], PALLE HOLMSTRUP[1], ALLAN BARDOW[1], SVANTE TWETMAN[1] & NILS-ERIK FIEHN[4]

[1]*Department of Odontology, Faculty of Health Sciences, University of Copenhagen, Copenhagen N, Denmark,* [2]*The Danish Institute for Health Services Research, Copenhagen Ø, Denmark,* [3]*National Institute of Public Health, University of Southern Denmark, Copenhagen K, Denmark, and* [4]*Department of International Health, Immunology, and Microbiology, Faculty of Health Sciences, University of Copenhagen, Copenhagen N, Denmark*

Abstract

Objective. The aims of the oral part of the Danish Health Examination Survey (DANHES 2007–2008) were (1) to establish an oral health database for adult Danes and (2) to explore the influence of general diseases and lifestyle on oral health. This paper presents the study population, examination methods, questionnaire and baseline results. ***Materials and methods.*** The study population comprised 4402 subjects, aged 18–96, consecutively enrolled from 18 065 DANHES participants from 13 municipalities in Denmark. The oral part consisted of a validated questionnaire and a clinical examination, carried out in mobile units by three trained and calibrated dental hygienists. The data were processed with descriptive statistics and mono- and bivariate analyses. ***Results.*** The mean age was 54.1 years and 60% were women. The mean number of natural teeth was 26.6; the mean DMFT/DMFS values were 18.9 and 61.0, and varied with age (DMFT 8.7–24.3). A higher proportion of females suffered from dental erosion in the younger age groups. Forty per cent of all subjects had a mean clinical attachment loss ≥ 3 mm, varying from 4% among those aged 18–34 to 80% in those over 75. A sub-optimal saliva secretion rate was more common among females than males (17.7% vs 10.4%) and this was reflected by the reported frequency of dry mouth. ***Conclusion.*** This extensive cross-sectional study provides a platform for obtaining future knowledge of the impact of health- and lifestyle-related factors on oral diseases. The validated questionnaire and the clinical characteristics enable robust analyses, although the conclusions may be hampered by limited external validity.

Key Words: *attachment loss, dental caries, dental erosion, saliva*

Introduction

In 2007–2008 the Danish Health Examination Survey (DANHES 2007–2008) was carried out by the National Institute of Public Health, University of Southern Denmark, Copenhagen, Denmark. The intention was to establish a database with detailed information on health and lifestyle in the adult Danish population and determine risk factors 'to obtain new knowledge on causes of disease and their prevention [1]'. The focus was on diet, smoking, alcohol and physical activity, as these factors play a major role in the development of serious diseases that can lead to premature death [2].

Danish oral health studies with clinical and sociological data and a large number of participants have previously been carried out [3–5]. However, Danish studies looking at the impact of general health and lifestyle factors on oral health do not exist on this scale. Therefore, data from DANHES 2007–2008 merged with oral health data from the same cohort offer unique future opportunities to investigate the links between oral health and symptoms and general diseases. In addition, detailed information on the individuals' lifestyle can be combined with oral health data and may generate new knowledge about the interaction between diseases in the oral cavity and

Correspondence: Johanne Kongstad, Department of Odontology, Faculty of Health Sciences, University of Copenhagen, Nørre Allé 20, DK-2200 Copenhagen N, Denmark. Tel: +45 35 32 66 93. Fax: +45 35 32 66 99. E-mail: jkg@sund.ku.dk

(Received 6 July 2012; accepted 11 February 2013)

ISSN 0001-6357 print/ISSN 1502-3850 online
DOI: 10.3109/00016357.2013.776701

2013

- 13 villes du Danemark
- n = 4,402
- Âges : [18, > 75 ans]
- Mesures : prévalence de l'érosion dentaire et tests salivaires (débit salivaire, salive stimulée)
- Prévalence + élevée chez les jeunes, et ce, pour les deux sexes
- [18 – 34 ans] 3 fois plus que [> 55 ans]
- Groupe d'âge à risque élevé : femmes [18 – 34 ans]
- Débit salivaire problématique : 15 %

- « sub-normal » (< 1.0 ml./min.) : 14.9 % Δ^+ ↑ Avec l'âge

- hyposalivation (≤ 0.5 ml./min.) : 3.2 % Δ^+ ↑ Avec l'âge

- « Dry mouth complaint » : 14.4 % Δ^+ ↑ Avec l'âge

Findings from the oral health study of the Danish Health Examination Survey 2007-2008.

Kongstad J, Ekstrand K, Qvist V, Christensen LB, Cortsen B, Grønbæk M, Holm-Pedersen P, Holmstrup P, Bardow A, **Twetman S**, Fiehn NE.

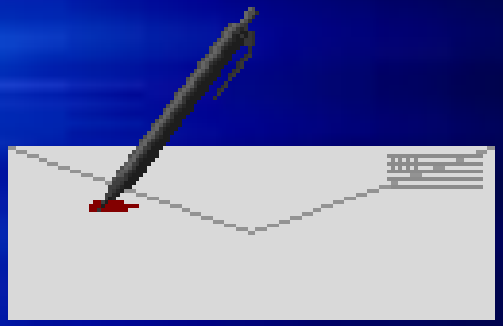
Acta Odontol Scand. **2013** Apr 29. [Epub ahead of print]

Daniel Picard, DMD, M.Sc.
Direction de santé publique de Montréal,
Tél.: (514) 528-2400 poste 3495
Courriel : dpicard@santepub-mtl.qc.ca

MERCI DE

VOTRE ATTENTION

Questions



Agence de la santé et des services sociaux de Montréal
Québec
Santé publique