



INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

DENTAL ATTRITION: A PUBLIC HEALTH CONCERN

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Abstract

Introduction

Tooth Surface Loss is one of the public health concern to dental practitioners. Dental attrition is a type of tooth wear caused by tooth-to-tooth contact, resulting in loss of tooth tissue, usually starting at the incisal or occlusal surfaces. Excessive wear and tooth surface loss can be defined as pathological in nature, requiring intervention by a dental practitioner.

Examination

To examine the oral health condition, it is important to first diagnose it, identify the type of tooth surface loss, its severity and location.

Assessment

Smith and Knight took Eccles' ideas a stage further, producing the tooth wear index (TWI),¹³ a comprehensive system whereby all four visible surfaces (buccal, cervical, lingual and occlusal-incisal) of all teeth present are scored for wear, irrespective of how it occurred

Conclusion

The causes of tooth surface loss are multi-factorial in nature and hence difficult to eradicate. A public health approach should be adopted though promoting preventive measures by proper communicative and educational methods and thorough assessment should be done by using the index proformas.

Keywords: Oral health, dental attrition, tooth wear, public health

INTRODUCTION

Tooth Surface Loss is one of the public health concern to dental practitioners about its diagnosis, etiological factors involved, preventive strategies, and execution of an proper treatment modality.^{1,2} It is a physiological wear on tooth which occurs as part of the aging process,^{1,3} causing an enamel loss of between 28-30 μm per annum.⁴ In 2013, Bartlett confirmed that dental practitioners are often faced a condition with patients suffering from Tooth Substance Loss (TSL). When it compromises tooth structure or when it is disproportionate to the current age, it is therefore, termed to be as pathological.⁵ One of the major conditions of tooth surface loss is Dental attrition.

Dental attrition is a type of tooth wear caused by tooth-to-tooth contact,⁶ resulting in loss of tooth tissue, usually starting at the incisal or occlusal surfaces. Excessive wear and tooth surface loss can be defined as pathological in nature, requiring intervention by a dental practitioner. The pathological wear of the tooth surface can be caused by bruxism, which is clenching and grinding of the teeth. If the attrition is severe, the enamel can be completely worn away leaving underlying dentin exposed, resulting in an increased risk of dental caries and dentin hypersensitivity.

Attrition is mainly caused by the action of antagonistic teeth such as grinding which further leads to matching facets. There is usually a symmetry with an opposite tooth, which is often seen in one of the border positions and frequently not in their habitual inter-cuspal position. The specific pattern of wear coincides with how and where the patient clenches or rubs their teeth forcibly against one another during their parafunction.

The early conditions of attrition seems to be like a small polished facet on a cusp or ridge, or the slight flattening of an incisal edge; as the lesion progresses, there is a tendency towards the reduction of the cusp height and flattening of the occlusal inclined planes, with concomitant dentine exposure.^{7,8,9}

ETIOLOGY OF DENTAL ATTRITION

1. Deliterious habit- smoking and smokeless tobacco
2. Parafunctional habit such as bruxism or clenching
3. Developmental defects,
4. Hard or rough-textured diet
5. Absence of posterior teeth support.
6. When the natural teeth occlude with ceramics restorations, attrition of the natural teeth is very common.
7. Occlusal factors edge-to-edge relation of incisors, unilateral buccolingual cusp-to-cusp relation have been also identified as factors which are affecting occlusal wear.
8. Anterior cross-bite, unilateral posterior cross-bite, and anterior crowding have been found to be protective factors for high occlusal wear levels.

APPEARANCE AND SYMPTOMS:

1. **Loss of tooth anatomy:** the incisal and occlusal surface gets worn off and becomes attrited. Enamel of molar teeth appears to be thin and flat.
2. **Sensitivity or pain:** there may be dentin hypersensitivity secondary to loss of the enamel layer.
3. **Tooth discolouration:** A yellow appearance of the tooth surface may be due to the enamel being worn away, exposing the darker yellower dentin layer underneath.
4. Altered occlusal height due to loss of vertical dimension of occlusion, which may result in dento-alveolar compensation or an increased inter-occlusal space at rest
5. Compromised periodontal support can result in tooth mobility and drifting of teeth
6. Decreased oral health related quality of life
7. Improper dental aesthetics
8. Wear facets are seen on posterior teeth.
9. Deep bite is common.
10. Pain in the temporo-mandibular joint due to clenching habit or traumatic bite forces.

EXAMINATION

To examine the oral health condition, it is important to first diagnose it, identify the type of tooth surface loss, its severity and location.¹⁰ Early diagnosis is essential to ensure tooth wear has not yet progressed the point of restoration.^{10,11} A thorough examination is required, because it might give explanation to the aetiology of the TSL.¹²

The examination should include assessment of:

- Case history especially habits and practices
- Social history, particularly diet
- Temporomandibular joint function and associated musculature
- Intra oral soft tissue analysis
- Hard tissue analysis
- Location and severity of tooth wear
- Orthodontic examination

ASSESSMENT OF DENTAL ATTRITION

Smith and Knight took Eccles’ ideas a stage further, producing the tooth wear index (TWI),¹³ a comprehensive system whereby all four visible surfaces (buccal, cervical, lingual and occlusal–incisal) of all teeth present are scored for wear, irrespective of how it occurred (Table No.1). This avoids the confusion associated with terminology and translation or differences in opinion for diagnosis of aetiology based on clinical findings. Guidelines for using the criteria were produced in an assessment proforma (Table no.2) and standardisation with other investigators; in cases of doubt, the lowest score is given. Complete enamel loss (score 4) may, however, be misinterpreted, as there is almost always a rim of enamel at the worn surface margins.

Score	Surface	Criteria
0	B/L/O/I	No loss of enamel surface characteristics
	C	No change in contour
1	B/L/O/I	Loss of enamel characteristics
	C	Minimal loss of contour
2	B/L/O	Loss of enamel exposing dentine for less than 1/3 of the surface
	I	Loss of enamel just exposing dentine
	C	Defect less than 1mm deep
3	B/L/O	Loss of enamel exposing dentine for more than 1/3 of the surface
	I	Loss of enamel and substantial loss of dentine but not exposing the pulp or secondary dentine
	C	Defect 1 - 2mm deep
4	B/L/O	Complete loss of enamel or pulp exposure of secondary dentine
	I	Pulp exposure or exposure of secondary dentine
	C	Defect more than 2mm deep or pulp exposure or exposure of secondary dentine

Table no.1 showing scoring criteria of Smith and Knight Tooth Wear Index 1984

		55 54 53 52 51 61 62 63 64 65														Identification n°				
		18 17 16 15 14 13 12 11 21 22 23 24 25 26 27 28																		
Buccal																Primary	Permanent	CONDITIONS		
Incisal/																teeth	teeth	a	0	No evidence of wear
Occlusal																		b	1	Tooth wear into enamel
Palatal																		c	2	Tooth wear into dentine
																		d	3	Tooth wear into pulp or secondary dentine
																		e	4	Tooth restored due to wear
																		-	9	Could not be assessed

		85 84 83 82 81 71 72 73 74 75													
		48 47 46 45 44 43 42 41 31 32 33 34 35 36 37 38													
Buccal															
Incisal/															
Occlusal															
Lingual															

Table no. 2 showing assessment proforma

PREVENTION

- Be sure to visit your dentist biannually
- Avoid wearing jewellery, such as lip or tongue rings for extended periods of time.
- Exercise to help alleviate stress, a major cause of tooth grinding
- Relaxation therapies - yoga, massage, meditation
- Be aware - teeth should only touch when you're chewing or swallowing
- Seek help - talk therapy to reduce severe anxiety/stress
- Take a warm bath before bed to relax jaw muscles
- Wear a protective dental night guard
- Be assessed for sleep apnea which is associated with tooth grinding
- Be assessed and treated for misaligned teeth to even out biting and chewing forces

TREATMENT

- a. The habit breaking appliance is used to break the habit.
- b. If patient clenches the teeth unconsciously in night its advised to wear the night guard.
- c. The wear facets are refilled back to get the normal tooth structure.
- d. If sensitivity is there the patient is advised to use the desensitivity tooth paste.
- e. Use of fluoride varnish or adhesive agents.
- f. Root canal treatment is the other alternative to treat the sensitivity.
- g. Correct the etiology like deepbite or some skeletal discrepancy if there by orthodontic treatment

Many restorative options have been proposed, such as direct composite restorations, bonded cast metal restorations, removable partial dentures, orthodontic treatment, crown lengthening procedures and protective splints. The decision to restore the dentition depends on the wants and needs of the patient, the severity of tooth surface loss and whether tooth surface loss is active. The use of adhesive materials to replace lost tooth structure can be performed as a conservative and cost-effective approach before a more permanent solution of crowns or veneers is considered.

CONCLUSION

The causes of tooth surface loss are multi-factorial in nature and hence difficult to eradicate. A public health approach should be adopted though promoting preventive measures by proper communicative and educational methods and thorough assessment should be done by using the index proformas. Treatment should be planned which would enable the dentist to recover the situation with minimal inconvenience to the patient. When considering possible treatment options for patients, especially those who have exhibited tooth surface loss, they should be made fully aware of the possibility of failure in the future of any restorative procedure carried out. This is a consequence of continued wear and tear, which may cause the failure of even the most clinically and technically acceptable restoration.

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