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REVIEW ARTICLE

Tooth Wear, Etiology, Diagnosis and Its Management in Elderly: A Literature Review

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ABSTRACT

The aim of the review was to present the importance of tooth wear, etiology and its management in elderly patients. The success of rehabilitation of tooth wear in elderly depends up on finding the etiology, correct diagnosis, prevention method and its management. Recognition of the early signs of tooth wear could bring about timely prevention and improve the life span of teeth in elderly.

Keywords: Tooth wear, Attrition, Abrasion, Erosion, Tooth wear management, Elderly, Bruxism.

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INTRODUCTION

An increasing number of people are now living longer and retaining their natural teeth into old age. With growing number of elderly people retaining more of their teeth into old age and the increase in tooth wear with age, this substantial problem is likely to become even greater in the future.[1] Extensive tooth wear is considered a potential threat to functional dentition. The management of tooth wear especially from attrition is becoming a subject of interest in the prosthodontic literature both from a preventive and from a restorative point of view.[2] The resultant challenges in the clinical management of such patients have aroused considerable professional interest concerning tooth wear.[3] It is not always possible to differentiate between erosion, attrition and abrasion, as these condition frequently occur in combination. It is therefore necessary to have a term for the condition in which teeth become worn and tooth wear is a convenient, simple term readily understood by patients. Tooth wear has been defined as loss of tooth substance from abrasion, attrition and erosion acting singly or concurrently.[4] When wear is due to more than one physiological factor, special terms have been suggested to highlight the multiplicity of causes. Abrasion, wear process involving foreign object sliding or rubbing against the tooth surface;[4] abfraction, noncarious cervical lesions caused by tensile stress generated from occlusal loading and microfracture of cervical enamel rods;[5] attrition, wear process of tooth substance by tooth-tooth contact;[6] erosion, loss of dental hard tissue by nonbacterogenic acid etching.[7] The impact of tooth wear can be severe and affect the quality of life in elderly. The aim of this review was to evaluate the literature on tooth wear, its etiology, diagnosis and management in elderly.

LITERATURE REVIEW

History

Extensive tooth wear seems to have been the norm in all ancient, societies and is mainly attributed to factors related to diet.[8,9] The effects of excessive function, including that of wear, on certain dentoalveolar morphological features have been shown to be similar in modern man and his ancestors.[10,11] High proportions of tooth wear as a cause of abscesses have been documented in much later historical materials, such as in medieval Britons and in Icelanders who lived in the 11th century.[12,13] In Egyptian mummies, almost all abscesses in the jaws were ascribed to tooth wear and only a fraction to caries.[14] The wear of anterior teeth in addition to its masticatory role may also reflect the effects of using the teeth as tools.[15] In ancient man, tooth wear was generally believed to be caused by attrition and abrasion with erosion seldom considered or even examined. Today, dental erosion is widely considered to be a major cause of tooth wear.[16]

Epidemiology

A large survey of middle-aged adults showed that increasing tooth wear was observed with age for occlusal and insical surfaces.[17] Epidemiological studies of young adults reported that prevelance of tooth wear was in the range of 6 to 45%.[18,19] Increased levels of wear in the old age groups are reportedly consistent.[20,21] In prevalence of tooth wear of young adults in a United Kingdom study, it was reported that a mean proportions of teeth with some moderate wear increased from a few percent to 9% individuals over 65 years of age.[22]

In older age group, 2% of teeth exhibited severe wear. A population study in a northern Swedish country found advanced wear of maxillary anterior teeth in 14% of 35-year-old and 36% of wear in 65-year-old.[23]

In a 717 randomly selected Swedens of age 20 to 80 years, 41% of individuals showed dentinal exposure.[24]

Etiology

Tooth wear is a multifactorial process which makes it difficult to identify single cause. The term attrition, erosion and abrasion have widespread acceptance; a description of tooth wear specific factors have been implicated as a being etiological and or associated with the process of attrition, erosion and abrasion.

Attrition

Attrition resulting from tooth to tooth contact produces well defined wear facets, parafunction habits, bruxism, clenching,[25] developmental defects,[26] coarse diet, natural teeth opposing porcelain, class III incisal relationship, lack of posterior support.[27]

Erosion

Erosion is loss of dental hard tissues by nonbacteriogenic acid. Dental erosion can be caused by intrinsic and extrinsic causes.

Intrinsic causes are mostly of gastric origin from gastric reflux and include vomiting or rumination, vomiting in case of anorexia, bulimia nervosa, rumination.[28]

Extrinsic causes include dietary soft drinks, citrus fruit and food prickled with vinegar.[29] Medications, vitamin C, aspirin and iron preparation are acidic.[30] Lifestyle active styles cause greater risk of erosion along with use of mood enhancing drugs, such as ecstacy.[31-33]

Abrasion

Abrasion is caused by the intraoral use of objects, such as toothbrush often in combination with abrasive substances. Other habits include pipe smoking, toothpick use, thread biting.[34]

Diagnosis

Based on the history and clinical examination, an attempt should be made to identify the causative factors and the degree to which each may contribute to the deterioration of dentition.

Successful management of different degrees of tooth wear requires early diagnosis of the problem. Diagnosis of tooth wear may not be easy particularly because the patient may not recognize the signs or symptoms themselves.

Evaluation of the family and social history can reveal, if the patient is in the unusual stress which may be related to bruxism, changes in diet and regurgitation. A diet sheet is useful for recording the quantity and frequency of intake of citrus fruits and carbonated drinks.

Clinical examination of the dentition has two primary objectives as follows:

1. To document and record the location, appearance and degree of tooth wear.
2. To evaluate the progress of tooth wear over time.

Tooth wear index and modified tooth wear index (TWI)[35] had been proposed as a tool for quantifying the degree of damage to different tooth surfaces and possible identification of etiological factors.[36] Clinical application is limited as the naked eye can detect only wear of more than 100 microns.

Clinical examination can be supplemented with high dentistry stone casts, intraoral radiographs, photographs and salivary tests. Stone casts allow easier assessment of tooth wear. Intraoral photographs are helpful for identification of areas of dentine/pulp exposure.[27]

Periapical and bitewing radiographs are important for assessment of thickness of remaining enamel and dentine.[27] To quantity the severity and progression of wear different techniques are available ranging from sophisticated optical or laser scanning methods to relatively simple ordinal scales.[37]

Management

After the history has been established and the clinical examination and diagnosis are completed, management should be directed toward elimination of etiologic factors.

The long-term success of rehabilitation is dependent on good oral hygiene and regular maintenance.[41] To protect teeth from further attrition, an occlusal splint made in hard acrylic resin can be prescribed, if most of the teeth are retained. The maxillary splint should have full occlusal contacts on closure and correct anterior guidance.[27] For the elderly, the longer times for which they remain dentate as well as increasing life span imply a risk of advanced tooth wear and need for rehabilitation. In addition to the identification of etiological and modifying/aggravating factors and before any definitive reconstructive procedures are carried out, the rate of progression of wear should be assessed.[38] A total of 0.7% fluoride solution in office is followed by at home application of stannous fluoride gel to active a long-term effect of sensitivity.[39]

Composite may be placed temporarily or overexposed areas, while dentine bonding agents may be effective in reducing sensitivity and preventing further damage.[40] Definitive restorative procedures should not be performed without identification of etiological factors in conjunction with adequate preventive measures.

Extensive wear may result in changes in the occlusal vertical dimension (OVD), possibly with increased interocclusal space. It has been shown that dentoalveolar

compensation may cause the OVD to remain relatively constant or even increased, despite the tooth wear.[41]

In many cases, anterior teeth wear is commonly involved. The complete occlusal reconstruction in restoration of anterior teeth with little available interocclusal space is based on the principles of combined forced intrusion of anterior teeth and supraeruption of posterior teeth was first described by Dahl et al.[42] This method has successfully withstood long-term scrutiny. In generalized wear, it has shown that tooth wear does not necessarily lead to decreased vertical dimension; compensatory eruption generally maintains adequate facial height.[43]

Fixed restoration should be designed as a single unit, whenever possible. Fixed partial denture should be of minimal extension. In elderly patients, fixed prosthesis is expensive and not affordable for many patients who require treatment for tooth wear.

In many countries, RPD is common because of tradition or economic. The use of gold copings on the abutment teeth supporting overdenture may produce good longtime results.[44]

Removable partial dentures with occlusal overlays can also be used to re-establish OVD and to protect worn teeth.[45] In older patient, the availability of increasingly reliable adhesive technologies and material would seem to offer promise as a less invasive option for the treatment of the worn dentition. In addition to fixed adhesive and conventional castings, removable partial dentures or a combination of both fixed and removable prostheses may be considered in the management of generalized tooth wear. Our treatment philosophy is to restore function and esthetics by preserving and protecting the remaining tooth tissue with minimal alteration of the supporting structures and occlusal relationships. Long-term management of tooth wear should start with a sound differential diagnosis, strenuous efforts at prevention, long-term monitoring and proceed to active treatment only when indicated. When treatment is indicated, it should be limited to solving specific problems, although this may well indicate extensive reconstruction in some situations.

CONCLUSION

Recognition of early signs of tooth wear could bring about timely prevention and improve life span of teeth in elderly and successful management of different degrees of tooth wear requires early diagnosis of the problem and an understanding of the different treatment strategies and techniques available.

REFERENCES

1. Hand JS, Hunt RJ, Reinhardt JW. The prevalence and treatment implications of cervical abrasion in the elderly. Gerodontics 1986;2:167-70.
2. Van't Spijker A, Kreulen CM, Creugers, NHJ. Attrition, occlusion, (dys)function and intervention: A systematic review. Clin Oral Impl Res 2007;18(3):117-26.
3. Johansson A, Omar R. Identification and management of tooth wear. Int J Prosthodont 1994;7:506-16.
4. Watson IB, Tulloch EN. Clinical assessment of cases of tooth surface loss. Br Dent J 1985;59:144-48.
5. Rugg-Gunn AJ, Nunn JH. Nutrition, diet and oral health. Oxford: Oxford University Press 1999.
6. Grippo JO. Abfractions: New classifications of hard tissue lesions of teeth. Esthet Dent 1991;3:14-19.
7. Oral health task force. Tooth wear. In: Arens U (Ed). Oral health, diet and other factors: The Report of the British Nutrition Foundation's Task Force. Amsterdam: Elsevier 1999;60-62.
8. Molnar S. Tooth wear and culture. A survey of tooth function among some prehistoric population. Curr Anthropol 1972;13:511-26.
9. Whittaker DK, Davies G, Brown M. Tooth loss, attrition and temporomandibular joint changes in Romano-British population. J Oral Rehabil 1985;12:407-19.
10. Killiaridis S, Johansson A, Haraldson T, Omar R, Carlsson GE. Craniofacial morphology, occlusal traits, and bite force in persons with advanced occlusal tooth wear. Am J Orthod Dentofacial Orthop 1995;107:286-92.
11. Johansson A, Kiliaridis S, Haraldson T, Omar R, Carlsson GE. Covariation of some factors associated with occlusal tooth wear in a selected high wear sample. Scand J Dent Res 1993;101: 398-406.
12. Kerr NW. Dental pain and suffering prior to advent of modern dentistry. Br Dent J 1998;184:397-99.
13. Richter S. Odontological investigation on archaeological human remains from skeljastadir in thjorsardalur.msc thesis. Reykjavik University of Iceland 2005.
14. Marion LR. Dentistry of ancient Egypt. J Hist Dent 1996;44: 15-17.
15. Varella J. Effects of attritive diet on craniofacial morphology: A cephalometric analysis of a finish skull sample. Eur J Orthod 1990;12:219-23.
16. Bartlett DW. The role of erosion in tooth wear aetiology, prevention and management. Int Dent J 2005;559(1):277-84.
17. Donachie MA, Walls AW. The tooth wear index: A flawed epidemiological tool in an ageing population group community. Dent Oral Epidemiol 1996;24:152-58.
18. Dahl BL, Krogstad BS, Ogaatd B, Eckersberg T. Differences in functional variables, fillings, and tooth wear in two groups of 19-year-old individuals. Acta Odontol Scand 1989;47:35-40.
19. Fareed K, Johansson A, Omar R. Prevalence and severity of occlusal wear in young Saudi population. Acta Odontol Scand 1990;48:279-85.
20. Pollman L, Berger F, Pollman B. Age and dental abrasion. Gerodontics 1987;3:94-96.
21. Oilo G, Hatle G, Gad AL, Dahl BL. Wear of teeth in a mentally retarded population. J Oral Rehabil 1990;17:173-77.
22. Nunn J, Morris J, Pine C, Pitts NB, Bradnock G, Steele J. The condition of teeth in the UK in 1998 and implications for the future. Br Dent J 2000;189:639-44.
23. Wanman A, Wigren L. Need and demand for dental treatment a comparison between an evaluation based on an epidemiologic study of 35-, 50- and 65-year-olds and performed dental treatment of matched age groups. Acta Odontol Scand 1995;53:318-24.
24. Solonen L, Heliden l, Carlsson GE. Prevalence of signs and symptoms of dysfunction in the masticatory system: An

epidemiologic study in Swedish population. J Craniomandib Disord Facial Oral Pain 1990;4:241-50.
25. Anderson GC, Pintado MR, Beyer JP, DeLong R, Douglas WH. Clinical enamel wear as related to bruxism and occlusal scheme. J Dent Res 1993;72:303.
26. Licht WS, Leveton EE. Overdentures for treatment of severe attrition. J Prosthet Dent 1980;43:497-500.
27. Chu FCS, Yip HK, Newsome PRH, Chow TW, Roger J. Smales. Restorative management of the worn dentition: I. Aetiology and diagnosis. Dental update 2002;162-68.
28. Proceeding of the International Scientific Symposium on Cyclic Vomiting syndrome. J Pediatr Gastroenterol Nutr 1995;21.
29. Gilmour AG, Beckett HA. The voluntary reflux phenomenon. Br Dent J 1993;175:336-72.
30. Milosevic A, Young PJ, Lennon MA. The prevalence of tooth wear in 14-year-old school children in Liverpool. Comm Dent Health 1995;12:161-66.
31. Giunta JL. Dental erosion resulting from chewable vitamin c tablets. J Am Dent Assoc 1983;107:253-56.
32. Centerwall BS, Aematrong CW, Funkhouser LS, Elzay RP. Erosion of dental enamel among competitive swimmers at a gas-chlorinated swimming pool. Am J Epidemol 1986;123:641-47.
33. Duxbury AJ. Ecstasy dental implications. Br Dent J 1997;175:38.
34. Haugen LK. Biological and physiological changes in the ageing dentition. Int Dent J 1992;42:339-48.
35. Smith BGN, Knight JK. An index for measuring the wear of teeth. Br Dent J 1984;15: 435-38.
36. Gerbo L, Leinfelder KF, Mueninghoff L, Russell C. Use of optical standards for determining wear of posterior composite resins. J Esthetics Dent 1990;2:148-52.
37. Attin T. Methods for assessment of dental erosion. Monogr Oral Sci 2006;20:152-72.
38. Carlsson GE, Johanson A, Lundqvist S. Occlusal wear. A follow-up study of 18 subjects with extremely worn dentitions. Acta Odontol Scan 1985;43:83-90.
39. Thrash WJ, Dodds MW, Jones DL. The effect of stannous fluoride on dentinal hypersensitivity. Int Dent J 1994;1(Suppl 1):107-18.
40. Azzopardi A, Bartlett DW, Watson TF, Sherriff M. The surface effects of erosion and abrasion on dentine with and without a protective layer. Br Dent J 2004;196:351-54.
41. Tallgren A. Changes in adult face height due to ageing, wear and loss of teeth and prosthetic treatment. Acta Odontol Scand 1957;15(Suppl 24).
42. Dahl BI, Krogstad O, Karlsen K. An alternative treatment in cases with advanced localized attrition. J Oral Rehabil 1975;2:209-14.
43. Hylander WI. Morphological changes in human teeth and jaws in a high attrition environment. In: Dahlberg AA, Graber TM (Eds). Orofacial growth and development. Paris, The Hauge: Mouton 1977;301-30.
44. Ettinger RL, Quin F. Abutment tooth loss in patients with overdentures. J Am Dent Assoc 2004;135:739-46.
45. Almog DM, Ganddini MR. Maxillary and mandibular overlay removable partial dentures for restoration of worn teeth. A three-year follow-up. NY State Dent J 2006;72:32-35.

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