Review Article

Indian Journal of Dental Education
Volume 16 Number 4 October - December 2023
DOI: https://dx.doi.org/10.21088/ijde.0974.6099.16423.3

Regressive Alterations in the Elderly Dentition and its Management: An Overview

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How to cite this article:
Anusha Kolur, Sangamesha A. Bevinagidad/Regressive Alterations in the Elderly Dentition and its Management: An Overview/ Indian J Dent Educ. 2023;16(4):181 - 186.

Abstract

Regressive alteration like erosion, abrasion, abfraction, attrition are multifactorial conditions causing loss of enamel and dentin, especially in the elderly population. Prevention is better than cure. Hence efforts should be made to preserve the remaining tooth structure. A prosthodontist should have complete knowledge of the regressive alterations affecting the teeth and their management. This article provides an overview of factors affecting the structure of teeth and their treatment.

Keywords: Regressive alteration; Elderly; Erosion; Abrasion; Abfraction; Attrition.

INTRODUCTION

In 2022, the average life expectancy of the world was 70 years for males and 75 years for females. Depending on continent the life expectancy can change heavily. The average life expectancy in India is 69. 4 years[1] with the increasing life expectancy of today's population, there is a surge in the number of old age population. At present, 8% of the Indian population is old age and going to increase 12% by 2025.[2] However, with this the demand for oral and medical healthcare are also exponentially increasing. For a developing country like India, it is very difficult to meet with the needs of these patients with limited resources.[3,4] Dental treatment, especially restorative in elderly is similar to that in the young patients. Now a days, with increasing dental awareness, more patients are opting for restorative treatment rather than extraction of the diseased teeth. However, when an elderly patient comes for treatment, one important consideration is their dentition would have experienced the disease process over a very long period of time rendering it irreversible. This interplay of increased pathology and higher expectations from the patient is a challenge for an endodontist. Especially regressive alterations like attrition, abrasion render the dentition difficult to treat. None the less, advances in treatment modalities and patient management renders a successful restorative treatment in many.[5] 6-45% population has signs of tooth wear as eary as in adulthood.[6,7] This article aims to provide an overview of endodontic management of regressive alterations in the elderly dentition.

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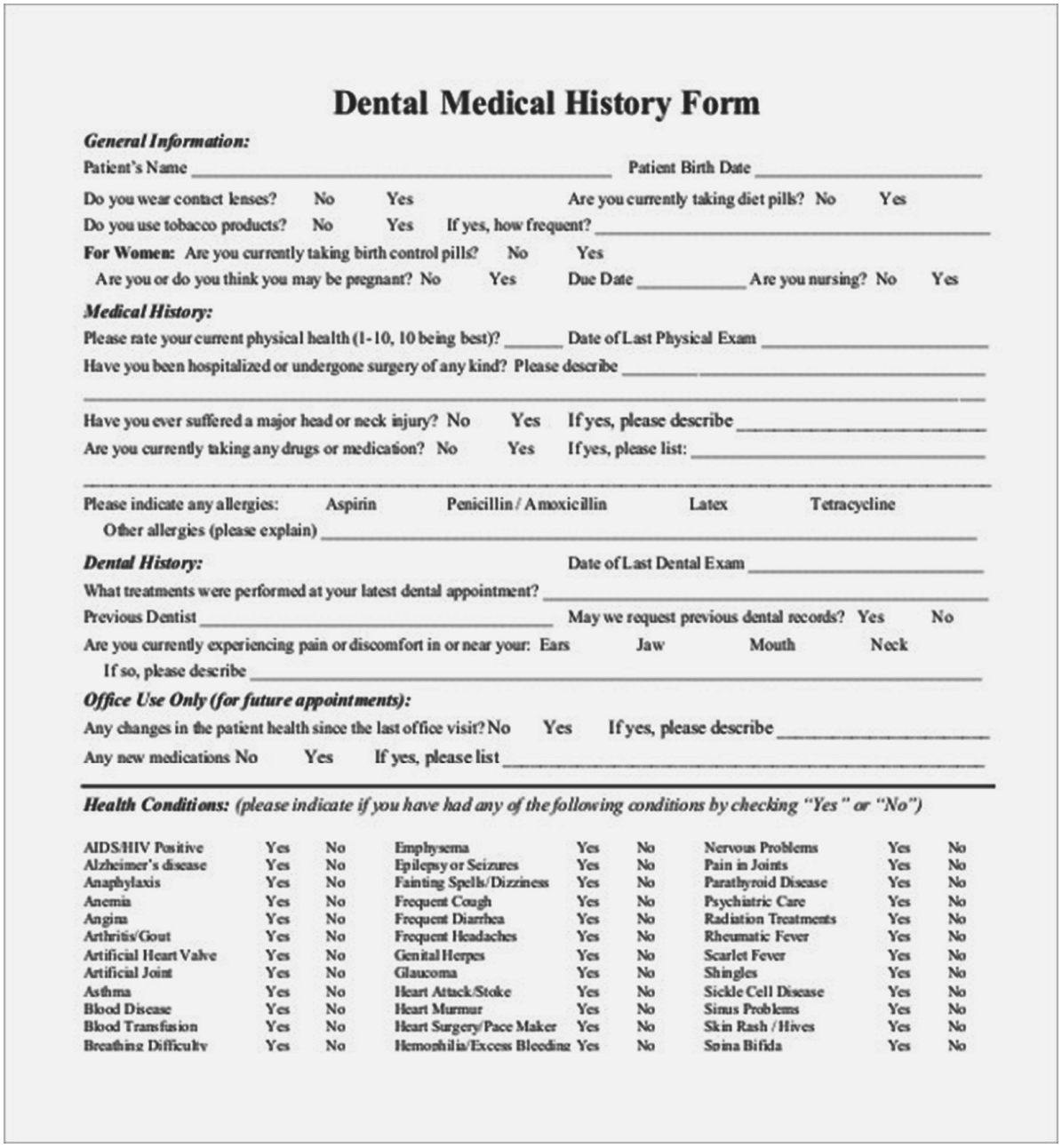
Received on: 19-05-2023

Accepted on: 30-06-2023

The Elderly Patient: Interestingly, the geriatric population is divided as:[8]

Geriatric Patient category	Age (in years)
Young old	65 - 74
Older old	75 -84
Oldest old	greater than 85

The success of restorative treatment is as predictable in the elderly as in the young patient. Nonetheless, there are some considerations that a dentist needs to undertake when treating an elderly patient. The elderly patients are more prone to caries, especially root caries since they lose their manual dexterity.[9] Conditions of teeth like attrition, abrasion, abfraction, erosion are so common in the elderly. In this review article we focus on the diagnosis, treatment planning and management of regressive alterations of teeth in the geriatric population.[10]



Dental Medical History Form

General Information:

Patient's Name _____ Patient Birth Date _____

Do you wear contact lenses? No Yes Are you currently taking diet pills? No Yes

Do you use tobacco products? No Yes If yes, how frequent? _____

For Women: Are you currently taking birth control pills? No Yes

Are you or do you think you may be pregnant? No Yes Due Date _____ Are you nursing? No Yes

Medical History:

Please rate your current physical health (1-10, 10 being best)? _____ Date of Last Physical Exam _____

Have you been hospitalized or undergone surgery of any kind? Please describe _____

_____

Have you ever suffered a major head or neck injury? No Yes If yes, please describe _____

Are you currently taking any drugs or medication? No Yes If yes, please list: _____

_____

Please indicate any allergies: Aspirin Penicillin / Amoxicillin Latex Tetracycline

Other allergies (please explain) _____

Dental History: Date of Last Dental Exam _____

What treatments were performed at your latest dental appointment? _____

Previous Dentist _____ May we request previous dental records? Yes No

Are you currently experiencing pain or discomfort in or near your: Ears Jaw Mouth Neck

If so, please describe _____

Office Use Only (for future appointments):

Any changes in the patient health since the last office visit? No Yes If yes, please describe _____

Any new medications No Yes If yes, please list _____

Health Conditions: *(please indicate if you have had any of the following conditions by checking "Yes" or "No")*

AIDS/HIV Positive	Yes	No	Emphysema	Yes	No	Nervous Problems	Yes	No
Alzheimer's disease	Yes	No	Epilepsy or Seizures	Yes	No	Pain in Joints	Yes	No
Anaphylaxis	Yes	No	Fainting Spells/Dizziness	Yes	No	Parathyroid Disease	Yes	No
Anemia	Yes	No	Frequent Cough	Yes	No	Psychiatric Care	Yes	No
Angina	Yes	No	Frequent Diarrhea	Yes	No	Radiation Treatments	Yes	No
Arthritis/Gout	Yes	No	Frequent Headaches	Yes	No	Rheumatic Fever	Yes	No
Artificial Heart Valve	Yes	No	Genital Herpes	Yes	No	Scarlet Fever	Yes	No
Artificial Joint	Yes	No	Glaucoma	Yes	No	Shingles	Yes	No
Asthma	Yes	No	Heart Attack/Stoke	Yes	No	Sickle Cell Disease	Yes	No
Blood Disease	Yes	No	Heart Murmur	Yes	No	Sinus Problems	Yes	No
Blood Transfusion	Yes	No	Heart Surgery/Pace Maker	Yes	No	Skin Rash / Hives	Yes	No
Breathing Difficulty	Yes	No	Hemophilia/Excess Bleeding	Yes	No	Spina Bifida	Yes	No

Fig. 1: Medical history proforma for assessing the medical status of the elderly patient.

Systemic Changes and Challenges with Age: The oral cavity is the mirror of systemic health. These changes occur over a long period of activity and inactivity.[11] There is a paucity of data describing the prevalence of systemic conditions and drug use in elderly dental patients.[12] This is especially

important in elderly patients who may regularly use several prescription and/or over the counter medications, making them more vulnerable to medication errors, drug interactions or adverse drug reactions.[13]

Age related Regressive alterations of teeth

These alterations are not caused by bacteria unlike caries.[6,14] They usually occur in the areas of flexural stress.[15–17] In a study it was found thecervical, occlusal and incisal surfaces are more prone for tooth wear in the elderly and the prevalence of tooth wear was in the rangeof 6 to 45%.[6,7]

Attrition: *Latin: attritium.* Insimple terms attrition means action of friction against an opposing surface. Attrition of teeth produces wear facets on the functional surfaces. Etiology of attrition is varied and ranges from malocclusion, type of diet, abnormal masticatory forces, or it can be some developmental anomaly.[7,18]

Abrasion: Dental abrasion is defined as the wear of teeth by any substance other than tooth substance. The cervical is the most commonly abraded site and the term non-carious cervical lesions (NCCLs) is the appropriate term to describe the lesions formed.

Betel nut chewing, chewing pens, and other objects as part of a nervous displacement behaviour, gnawing on bones,occupational (e.g. workers in cement factory), pica the chewing and possible ingestion of non edible items (e.g. stones), pipe smoking, using teeth as tools.[19]

Abfraction: Abfraction means "to break away", a term derived from the Latin words "*ab*", or "*away*" and "*fractio*".[20] Occlusal forces exert flexural force on the cervical portion of the teeth resulting in abfraction.[21,22]

Erosion: Erosion is caused by acids. The lesions appear saucer shaped and progress with time.[23] The sources of acid generally are intrinsic or extrinsic.[24,25] Extrinsic sources like citus and acidic food also cause erosion.[26]

Treatment Planning

In the elderly patients, many factors affect the decision making for restorative treatment of regressive alterations of teeth. Nevertheless, the ideal treatment planning should always be in line with the evidence based literature. For independent elderly patients also dentist should always obtain a consent before discussing the treatment with athird party, including the patient's family members. In an elderly patient, comfort and function become a priority over esthetics.[27,28] Treatment in elderly should be approached in a step wise manner. In the first appointment, it is important for the dentist to understand patients' expectations. Then the dentist can propose a suitable treatment plan. A common ground should be reached. Often an element of compromise is considered acceptable to both parties when the evidence would suggest an alternative treatment to be preferable.[29]

RESTORATIVE MANAGEMENT

Attrition: Attrition is difficult to treat because it will not treat the underlying etiology. A novel classification of attrition was proposed by Richards and Brown:[30]

Treatment of attrition can be divided as:

Attrition index	
0	No wear
1	Minimal wear
2	Noticeable flattening of occluding planes
3	Flattening of cusps or grooves
4	Total loss of contour &/or dentine exposure when identifiable.

Preventive or Restorative. In the preventive therapy, patient is advised to wear a protective splint. Choice of splints can be hard or soft. During the time the patient is wearing splint, any other contributing factor of tooth wear like erosion can be diagnosed. This involves taking proper diet history, using topical fluoride and desensitizing toothpastes.[27-29] If the patient is consistent with wearing the splint, restorative treatment can be done but this is mostly for aesthetic reasons. Dahl technique[34,35] is popular that is anterior ramp or a platform.[36]

Normal attrition can be treated with restorative treatment. Treatment of severe attrition i.e. when teeth are worn till gingival margin needs restoration of vertical dimension to improve the aesthetics. Treatment options include extraction of affected teeth, replacement with conventional dentures, overdentures, composite buildups, fixed or removal prosthesis.[21]

Abfraction: Treatment of abrasion is variable since the prognosis of this condition is not predictable. *Preventive techniques include:* change in brushing technique, monitoring diet, protective modalities. Invasive treatment options include occlusal adjustments, occlusal splints, techniques to alleviate hypersensitivity, placement of restorations, and root coverage surgical procedures in combination with restorations.[37,38]

Abfraction lesions associated with gingival recessionare to be treated with surgical procedures for root coverage. Some systematic reviews support the use of connective tissue grafts (CTG).[39] Extraction should the last resort of teeth affected with abfraction.

Abrasion: There are various aesthetic restorative materials indicated for such cases, including glass-ionomer cements, composites and hybrids of these materials. The release of fluoride is very advantageous. Glass-ionomers provide a sustained release over years and can absorb fluoride from the oral cavity for later release, thus acting as a storage reservoir. Composites do not have this ability, although the polyacid modified resin composites or compomers have hydrophilic monomers, which allows water diffusion into the set material and fluoride ions out of the matrix.[19] Studies have shown that tooth brush design and dentifrices are insignificant. Abrasion presents in a variety of forms depending on the severity and etiologic agents. The decision to restore NCLs include strengthening the tooth and decreasing the hypothetical stress concentration and fulcrum, preventing hypersensitivity and improved aesthetics.[40]

EROSION

Classification of Erosion:[41]	
Class I	Superficial lesions involving enamel
Class II	Localised lesions involving dentine for less than one of the three surfaces
Class III	Generalised lesions involving dentine for more than one of the three surfaces:
	Facial surfaces, lingual and palatal surfaces, incisal and occlusal surfaces, severe multi-surface involvement.

The dietary advice includes eliminate acids from their diet. Fluoride is also of help in remineralizing early lesions. Use of bonding agents to seal the exposed dentine is still debatable. Sometimes fissure sealants are also used with promising results.[23,42]

Endodontic Management

There is reduction in pulpal volume, and pulpal calcifications.[43] Preparation of an adequate access cavity in case of severe calcification of the pulp chamber is very challenging and may lead to a tremendous loss of tooth structure, an innovative approach to treat teeth with pulp canal calcifications by using an intra-oral scan with CBCT data to produce a template for a guided access cavity preparation and root canal localization.[44] After preparing adequate glide path the canal instrumentation completed with a single file NiTi system.[18] The use of a single cone with bioceramic sealers is a viable option for obturation, which has achieved a high success rate.[45]

CONCLUSION

The elderly population of a society needs special care and their treatment needs are also different. This article provides a broad view on the diagnosis and treatment of elderly population with regressive changes like attrition, abfraction, abrasion and erosion. More studies are required for detailed treatment plan.

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