Available online at https://www.sjomr.org

SCIENTIFIC JOURNAL
OF MEDICAL RESEARCH

Vol. 6, Issue 21, pp 47-50 , 2022

ISSN: 2520-5234

REVIEW ARTICLE

Geriatric orthodontics: A Review

Sara M. Al-mashhadany, Zainab M. Kadhom*

Department of Orthodontic, College of Dentistry, University of Baghdad, Iraq

ARTICLE INFORMATIONS

Article history:

Received: 23 December 2021

Revised: 26 January 2022

Accepted: 17 February 2022

Published: 24 March 2022

Keywords:

Elderly patients,
Geriatric orthodontics,
Orthodontic treatment.

Corresponding author:

Zainab M. Kadhom

Email: schati1981@yahoo.com

Lecturer in Orthodontic Department, College of Dentistry, University of Baghdad, Iraq

ABSTRACT

Objectives This review aimed to study the orthodontics treatment of elderly patients in all aspects, including indication, limitation, biological and biomechanical consideration in the basis of dental and orthodontic points of view.

Data and Sources: A literature review of the English articles has been conducted using PubMed, Google Scholar, and Scopus to search for orthodontic treatment in elderly patients.

Conclusions: Orthodontic treatment in the elderly is usually limited to the area of the problem (adjunctive treatment) and has an aesthetic and mainly functional objective, helping to rehabilitate the entire stomatognathic system.

It is necessary to have a multidisciplinary plan with a good correlation between professionals that are involved, observing the requirements of the patient, limitations of the case and treatment goals, and patient motivation are considered for the success of orthodontic treatment of geriatric patients.

INTRODUCTION

With advances in medicine and science, the life expectancy of the population had considerably increased. Every day a greater number of elderly people, aged 60 years or older, are concerned with health and aesthetic care. The dental profession is involved in this side, refining its knowledge and developing new materials, serving this public increasingly concerned with their appearance and health; currently, orthodontists are frequently required to deal with elderly patients who request restoration of their facial form and oral function.[1]

Based on National Institute for the Elderly Adults, the elderly individual can be defined as the person who is biologically aged 60 years or older.[1] The diffusions of healthcare and prevention, increasing care for one's quality of life and self-image, in addition to the increase in the involvement of the elderly individuals in social context, had resulted in increasing the numbers of the elderly patients who aren't willing to accept limited treatment attitudes.[2]

The geriatric or the odonto-geriatrics dentistry can be defined as an area of dentistry, emphasizing oral healthcare in elderly populations, particularly the curative and preventive care of the patients with illness or chronic and systemic conditions that are related to the physiological, psychological or physical problems.[3] Age has been considered one of the clinically relevant biological variables because patients of all ages are presently routinely pursuing orthodontic treatments. This is why understanding the age-dependent responses to the orthodontic forces may improve our force system selection for providing safer and more sufficient treatments for all orthodontics patients. Younger patients have a biological response of higher robustness to the orthodontic forces, leading to a faster tooth movement rate than older patients.[4] In itself, age is not considered a contraindication for orthodontic treatments.

CITATION: Al-mashhadany SM, Kadhom ZM. "Geriatric orthodontics: A Review". Sci. J. Med. Res. 2022;6(21):47-50. DOI: 10.37623/sjomr.v06i21.10

Nonetheless, there is a high importance in bearing in mind that in elderly patients, tissue responses to the orthodontic forces are considerably slower. This results from the decrease of the cellular activities, and that to that the tissues become a richer challenge.[5]

The orthodontic treatments for the senior patients target to present a more sufficient occlusion. As a result, they are leading to the enhancement of the prosthetic and the restorative operations, fundamentally, in a premature dental loss case, through either closing the spaces or uprighting the teeth, which will serve as prosthetic supports.[6] On the other hand, in the older patients, secondary crowding and spacing had higher levels of priority that could result from decreased support provided by the affected periodontium.[7] It could also indicate that older patients have more awareness of their teeth malalignment. However, they aren't aware of periodontium status and their treatment needs concerning periodontal as well as other illnesses.

In Korea National Health and Nutrition Examinations Survey conducted in 2015, periodontitis' prevalence rate amongst the participants in the ages of 50s has been nearly 31% in the females, and 54% in the males, and this percentage has been increased with age. Those results could emphasize the significance of disease control throughout the orthodontic treatments in elderly patients.[8]

The Elderly Segment of Population

Physiological Individual aging is highly affected by genetic factors, diet, social status, and the occurrence of diseases, three mainly categorized into three groups:

- People 65–74 years old are the new or young elderly tending to be rather active and healthy.
- People who are 75–84 years old are old or mid-old, varying from those who are healthy and active to those who manage a set of chronic illnesses.
- People who are 85 years or older represent the oldest-old, tending to be physically weaker.[9]

Health- and Oral Health Associated Quality of Life

The correlation between the status of oral health and general health may be explored from a variety of viewpoints. It indicates an individual's well-being level, is beneficial for the analysis of potential oral disorder consequences.[10] A method to oral health in geriatric patients has to emphasize enhancing the quality and function of life. Dolan[11] has suggested that oral health has been identified by "a functional and comfortable dentition allowing the individuals to keep going in their required social roles." The insufficient dentition and oral functional impairments could obstruct one's capability to live with no discomfort or pain, engage in satisfying inter-personal relationships, ingest and enjoy the foods, maintain a favorable self-image, and even with the individual's personal appearance.

Dental Changes in Elder Patients

Geriatric patients are susceptible to degenerative teeth diseases, like abrasion, attrition, erosion, and abfraction, which is why teeth are functional for prolonged periods of time. Periodontal inflammations, missing teeth, edentulism, loss of attachment, oral ulcerations, ill-fitting dentures, oral carcinomas, and xerostomias are some of the age-associated changes. In addition to that, root caries is the other most widespread caries that have been found in senior patients. The loss of the posterior teeth may result in the drifting and tipping of the adjacent teeth, poor gingival contour, poor interproximal contacts, reduced inter-radicular bone, supra eruption of the unopposed teeth.[12] The facial morphology and the soft tissue changes consequent to loss of dentition. The early stages of jaw atrophy have been related to a reduction in the commissure width and increases of nasolabial angle. Later stages have been related to a reduction of the height of the lower face, an increase of the prominence of the chin as a result of clockwise rotation of mandible and loss of the vermillion show of lips and lips invert shape[13] and seem intro-flexed, thinned due to modification of supporting muscles and flexor tonicity with a decrease of buccal rima. The nose could appear more protruding and enlarged. Peri-oral face muscles decussate at modiolus that lies lateral to commissure.[14]

Limitations of Treatment

Factors to be observed which affect the success of the orthodontic movement, with a clinical and radiographic examination is necessary:[3]

- Advanced systemic illnesses.
- Use of medication.
- Poor oral health.
- Amount of alveolar bone.
- Lack of patient motivation.
- Impossibility of achieving occlusal stability after orthodontic therapy.

The relationship between orthodontic movement and drugs such as acetylsalicylic acid (an anti-inflammatory) is an inhibitor of the synthesis of prostaglandins, which represent one of the inflammation mediators and contribute to osteoclasts' activity during orthodontic movement. Another aspect of being considered is the chronic use of corticosteroid drugs that induce osteoporosis when administered in supra-physiological doses.

Another aspect to be considered is the hormones such as hypoparathyroidism (decreased bone resorption due to the decrease in clasts), hyperparathyroidism (extreme clastic activity that causes a decrease in bone density) and osteoporosis. Osteoporosis is a term that denotes an increase in skeletal porosity resulting from a reduction in bone mass due to a decrease in the inorganic matrix of this tissue. This disease commonly occurs in women after menopause because at this stage of life, the body faces a decrease in estrogen secretion (a hormone secreted by the ovaries), which accelerates bone metabolism with a negative calcium balance another systemic change - diabetes is quite common, which causes a disturbance of cellular functioning, decreasing its metabolism, with a consequent decrease in the tissue repair capacity, However, when these diseases are controlled, and the patient is under

medical supervision, they do not represent an obstacle to orthodontic movement.

Contraindications and Indications for the Orthodontic Treatments in the Elderly Patients

In general, geriatric dentistry has been targeted at maintaining the individuals' oral health and the optimal masticatory system's health and function.[15]

The causes bringing elderly patients seeking orthodontic treatments differ from these of the adult and/or young patients. The majority of those seek the treatments of the, primarily due to the fact they wish to enhance appearance, others due to the fact that they aim to improve occlusal correlations for solving the temporomandibular pains, psychological issues dysfunction, and myofascial pains/dysfunction.

In the senior patients, an ANB angle reduction and of anterior lower vertical dimensions of face as a result of progressive losses of the dental supports may be demonstrated. Which is usually related to an unstable, non-physiological mandibular position that causes a contraction state of masticatory muscles. As a result, Temporomandibular pain and dysfunctions (TMDs) could develop (joint noise, pain, and limited movements) with potential symptomatic projections in the entire brachial-cervical-facial area. This is why, through the restoration of vertical dimensions, there is a possibility of re-establishing the good neuro-muscular functions and functional harmony amongst all stomato-gnathic elements (temporomandibular joints TMJs, masticatory muscles, dental components).[16]

The loss of the teeth and the position of lips could have an impact on the capability for speaking, masticating, and socializing. Edentulism may also significantly impact emotional, psychological, general, and oral health.[17] A saliva overflow could happen as well as a result of a substituted perception of the irrigation processes or nervous reflexes and the lesions of the tongue with the infective complications. A wide range of the senior subjects is suffering from insomnia and depression and are usually treated with anxiety-relieving anti-depressants or medications. All of the described modifications may result in causing decreased personal esteem as a result of an appearance that has no longer been considered pleasant and could result in the induction of elderly patients for seeking orthodontic treatments and consultation.[17]

It's usually considered that the orthodontic treatments in the elderly and adult subjects have to be limited to the minor orthodontic motions, like the axial repositioning of the teeth, which have drifted after the extractions or bone loss, the corrections of cross-bites of the single teeth, closing of the small diastema.[18]

The orthodontic treatments have to be aimed at correcting malocclusions, re-creating the dental arches' integrity, and restoration of functional occlusion. Periodontal aspects, as well as present and previous situations, have to be taken into consideration carefully.

The design of appliances that will be utilized is dependent upon the availability of anchorage, the number of the teeth that have to be moved, and needed direction and amount of the root or crown movement.[19]

Orthodontic treatment in the elderly is usually limited to the area of the problem (adjunctive treatment) and has an aesthetic and mainly functional objective, helping in the rehabilitation of the entire stomatognathic system. The balanced distribution of teeth represents one of these objectives, making the spaces caused by missing teeth suitable for the placement of implants and prostheses.[3]

Biologic Consideration Influencing Geriatric Orthodontic

Bone remodeling procedures in older subjects don't happen as fast as in children. In some of the cases, the phenomena of osteomalacia or osteoporosis may be noticed due to systemic disorders or vitamin and hormonal anomalies, which is why there is a need for a more extensive and cautious diagnostic valuation is needed. In older adults, cortical bones are increased in the thickness as a result of the progressive calcifications, cellular components and vascularization undergo a reduction, osteoclastic activities may be more advanced compared to osteoblastic ones, which is why, structural and morphological modifications, as well as remodeling operations, take place more slowly. In some of the cases, the processes of root resorption may be observed.[20]

Biomechanical Consideration of Elderly Patient

Orthodontic biomechanics usually have to be updated. In the case where a patient had lost a degree of the periodontal support, there is an importance for keeping the light of the forces. Nonetheless, in the presence of the spaces as well as suitable bone, all of the dental movements (such as distal, mesial, lingual**,** vestibular, extrusion, rotation and intrusion) can be possible, which is why, they need to apply the same biomechanical concepts that are followed in orthodontic treatments of the young patients. Orthodontics has to be affected with the use of continuous and light forces to avoid risks of the vast losses of the bone. The structural, morphological modifications have been established slower, and in the case of applying incongruous forces, the recovery is going to be more difficult and delayed. This is why, knowing those physiological factors, typical of an adult, although inducing the prudence, doesn't have to limit planning of the orthodontic therapies, however, have to tend toward the choice of the briefest and easiest technique.[20]

Tiberio *et al.* had noticed that about 80% of the senior patients require a type of periodontal intervention and about 10% of the senile patients require more complicated periodontal treatment. The orthodontic movements have to be carried out in the absence of the active periodontal illness, or else, there is a worsening of bone loss already initiated by periodontal disease. In periodontally compromised dentitions, the alveolar bone loss results in causing the apical movement of the resistance center and net effects. The teeth have a higher likelihood of having a tilt motion rather than bodily movement. In the case that has been described, 2nd and 3rd order movements have been

limited by biomechanical considerations of supporting tissues. The combinations of the periodontal treatment and intrusion was shown to result in the improvement of the compromised periodontal conditions in the case of the maintenance of the oral hygiene and health of the tissues, Wang & Ong have advised using lighter forces (5–15g for each tooth) for the reduction of the potential for the resorption of the root and reduction of dental movement delay that results from the hyalinization.[21]

CONCLUSION

A multidisciplinary plan with a good correlation between involved professionals is necessary; observing patient requirements, case limitations, and the objectives of the treatment and patient motivation are considered for the success of orthodontic treatment of geriatric patients.

REFERENCES

1. http://www.inapam.gob.mx/index/index.php?sec=3.
2. Syono M, Tada W, Rokusya Y, Zuiki Y, Tensin S, Tabuchi T. Psychological study of questionnaire relating to dentition and orthodontic treatment. Nippon Kyosei Shika Gakkai Zasshi.1990 ;49(5):443–53.
3. Valle-Corotti KM, Valle CVM, Neves LS, Henriques JFC, Pinzan A. The orthodontic treatment in older patients. R Dental Press Ortodon Ortop Facial .2008; 13: 84–93.
4. Alikhani M, Michelle Y. C, Khoo E, Alansari S, Kwal R, Elfersi T, Almansour A, Sangsuwon C, Al Jearah M, Nervina JM and Cristina C. Age-dependent biologic response to orthodontic forces. TeixeiragAmerican Journal of Orthodontics and Dentofacial Orthopedics. 2018; 153(5).
5. Girón FH. Orthodontic treatment in an elderly patient. Silvia Tavira Fernández§Revista Mexicana de Ortodoncia 2014; 2 (3): 192-199
6. Ryan W, Hegarty D. Tooth movement in the elderly: a case report. Gerodontology. 2006; 23: 242–244.
7. Pinho T, Neves M, Alves C. Multidisciplinary management including periodontics, orthodontics, implants, and prosthetics for an adult. Am J Orthod Dentofacial Orthop .2012; 142:235-45.
8. Kim Y.Study on the perception of orthodontic treatment according to age: A questionnaire survey [Korean J Orthod 2017; 47(4):215-221.
9. Abdul Razak P, Richard KMJ, Abdul Hafiz KA, Kumar AKN, Sameer KMJ. Geriatric Oral Health: A Review Article J. Int Oral Health. 2014; 6(6): 110–116.
10. Sischo L, Broder HL. Oral health-related quality of life: what, why, how, and future implications. J Dent Res. 2011; 90(11):1264–1270
11. Dolan TA. Identification of appropriate outcomes for an aging population. Spec Care Dentist .1993; 13:37.
12. Burt BA. Epidemiology of dental diseases in the elderly. Clin Geriatr Med 1992; 8:447-59.
13. Sutton DN, Lewis BR, Patel M, Cawood JI. Changes in facial form relative to progressive atrophy of the edentulous jaws. Int J Oral Maxillofac Surg 2004; 33(7):676–82.
14. Farronato G, Maspero C, Farronato D, Giannini L. Orthodontic treatment in elderly patients, Prog Orthod. 2010.
15. Vincent JR, Tenenbaum MP, Massicotte P. Teaching of geriatric dentistry; Training of ‘‘mobile dental service’’ dentists. J Dent .1992; 29: 15–17.
16. Giannì E. La nuova ortognatodonzia. Padova: Piccin; 1980.
17. Marcus PA, Joshi A, Jones JA, Morgano SM. Complete edentulism and denture use for elders in New England. JProsthet Dent .1996; 76(3):260–6.
18. Farronato GP, Calderini A, Brotto E. Trattamento ortodonticoin soggetti adulti: problematiche emergenti a anni didistanza. Ortognatodonzia Italiana .1992; (6):805–16.
19. Proffit WR, Fields HW. Ortodonzia moderna. Milano: Masson.2001.
20. Gianni E, Farronato GP, Anselmi M, Balestrieri L. Orthognathic surgical therapy. 1. Preventive dentistry problems. *Mondo Ortod.* 1988; 13(1):13–21.
21. Marianne MA. Ong and Hom-Lay Wang. Periodontic and orthodontic treatment in adults. Am J Orthod Dentofacial Orthop. 2002; 122: 420-428.