REVIEW ARTICLE

Geriatric Dental Aesthetics-A genuine concern

Dr Shashi Rashmi Acharya[1], Dr Sandya Kini[2], Dr Veena Hegde[3]

1. *Professor, Conservative Dentistry and Endodontics, Manipal college of Dental sciences, Manipal. Manipal Academy of Higher Education, Manipal*
2. *Professor, Conservative Dentistry and Endodontics, Manipal college of Dental sciences, Manipal. Manipal Academy of Higher Education, Manipal*
3. *Professor, Prosthodontics and crown and bridge, Manipal college of Dental sciences, Manipal. Manipal Academy of Higher Education, Manipal*

Abstract

The confidence that is exhibited with a healthy and bold smile has made the aging population also seek dental care to uphold their dental aesthetics. Senior citizens experience loss of self-esteem when the tonicity of perioral muscles decrease, inclination of anterior teeth changes and gingiva recedes. Geriatric oral care is a genuine concern across the globe today. Various dental treatment options like bleaching, bonding, direct/indirect restorations, periodontal aesthetics and preplanning prosthetic care should be tailor made for geriatric cases because age changes of soft tissue and hard tissue with systemic illness demands slight modification in selection of dental materials and also adopted technique. This review highlights the changes in macro and micro-aesthetic parameters with aging and the treatment considerations preferred with the aim to provide a functionally stable and aesthetically acceptable healthy smile.

Keywords: Geriatric dentistry, Aesthetics, Tooth wear, Root caries

Introduction

It's a known fact that with advances made in medicine and public health measures in the last half of the 20th century, there is a substantial increase in the life span of an individual. Elders

have health problems as a result of aging process, which calls for special consideration. This demographic change will have a major impact on the delivery of general and oral health care, as well as on the providers of these services.[1] In geriatric dental care it's not only the oral conditions that have to be concentrated on but also the systemic and psychological condition that has to be skillfully managed. However, age should not be considered as a bar for any kind of treatment.

Elderly are respectfully termed as "Young Elderly"- 65 to 75 years of age when they are healthy and active, "Mild Old" - 75 to 85 years when they are managing an array of symptoms and "Oldest Old" - 85 years and above when they are physically frail.[2] In general, ill health, functional limitation and financial constraint poses a problem in providing ideal dental care. Objectives of Geriatric Dentistry may be maintaining oral and general health, recognizing and relieving chief complaint, aiding in restoration and preservation of function for maintaining normal life in elderly patients.

Gradual changes in the smile line, changing color of the teeth, migration of front teeth, development of spaces, observation of regressive alterations and changes in the gum line are the anterior aesthetic concerns of the elderly. As there are various changes occurring in the tooth tissues and also soft tissues of the oral cavity as a part of the aging process, treatment planning needs special consideration for geriatric cases.

Importance of natural Dentition

The benefits of retaining the natural dentition until late in life is incomparable. The mechanoreceptors in the periodontal ligament gets stimulated by the occlusal load and this in turn enhances tactile sensitivity. Masticatory muscles are kept active by the chewing process and this activity pumps oxygenated blood to the brain. There is natural cleansing activity of the oral cavity by 'Active chewing'. Lastly, natural teeth provide an age-adequate confidence with dental appearance, hence favouring social interaction and active participation in society.[3]

Influence of Systemic illness

Origin of this cycle which includes Friality- Sarcopenia-Malnutrition-poor oral Health-Systemic Perturbation and again Friality is unknown. Bidirectional relationship is appreciated

in oral and general health. Diabetes, hypertension, rheumatoid arthritis, Alzheimer's disease, Parkinson's disease and depression are common diseases that become more prevalent with age[4] Periodontal disease, dental caries and even oral precancerous and cancerous lesions may be commonly observed due to these systemic diseases and their related medications. This makes the older adults more vulnerable leading to certain degenerative changes that become more severe with age. Reduction of salivary flow, mouth dryness is physiological due to atrophy of the salivary parenchyma or hormonal as well as lack of stimulation. Hypo ptyalism changes the composition of saliva by decreasing the levels of immunoglobulin, lysozyme and mucin levels compromising the moisturizing, lubricating, immunological and antibacterial role of the salivary flow.[10]

Aging and Dental Aesthetics

It's obvious that there is an inexorable increase in the proportion of older people. Better standard of health has led to a "dental transition", whereby the proportion of that group who are edentulous has also been steadily falling. A substantial proportion of the older people present with chronic dry mouth, affecting their speaking, enjoyment, ingestion of food and denture wearing.[5] Elderly individuals appear tired and dull because the orofacial muscles lose their tonicity over aging process. If there is anterior tooth loss along with reduced tonicity the nasio-labial fold looks enhanced. The young and bright smile gradually changes because of the wear, size, position, and colour of the teeth. Most important phenomenon today is the regressive alteration of teeth in elderly which results in loss of vertical dimension and shorter appearance of visible teeth in the smile window. "Reverse Smile" is considered un-aesthetic which results from the tips of the canines or premolars being longer than those of the central incisors.[6] Parafunctional habits create a visible change in the occlusion for which the masticatory muscles get adapted. Reversal and reconstruction of all the lost parameters demands a skill full treatment planning in the elderly.

Aging and Micro-Aesthetics

Incisal Embrasures are lost due to wear of the anterior teeth. Gradual loss of incisal edge alters width-to-height ratio of teeth. The **connector space** is the zone in which two adjacent teeth appear to touch. The ''50%-40%-30%'' connector rule of youthful, harmonious smile

changes to more flat contact between the teeth making it un-aesthetic and difficult to maintain oral hygiene. **Buccal corridor** or the negative space appears wide as regressive alterations of maxillary posterior teeth appear to disappear failing to fill up the space resulting in lack of youthful smile**.** Tooth color is a major concern in geriatric aesthetics. Naturally with aging, enamel thins down and the dentin colour becomes more prominent, resulting in darker teeth. Other reasons for tooth discolorations may be medications, coffee, soft drinks, tea, or cigarettes. [6] Therefore, the greater Chroma saturation results in a lower value of teeth resulting in a poor contrast with the lips and perioral skin. Change in axial inclination of anterior teeth leading to poor smile or incompetent lips may be observed due to long standing underlying periodontal pathology.

Cosmetic contouring

Tooth contouring or shaping in terms of enameloplasty is a very conservative approach done for chipped or partially fractured incisal edges. In elderly due to erosion and attrition sharp enamel edges abrade the tongue and the mucosa leading to a graver clinical condition. This procedure must always be done with the principles of proper occlusion in mind. Cosmetic contouring is also done to achieve illusions in the smile window, angle correction, length reduction, altering tooth form and arch irregularity. [7]

Tooth Whitening

Well-groomed older people consider teeth stains and discolorations as being capable of being interpreted by others, like grandchildren, as reflecting poor maintenance of oral cavity. Bleaching represents a proven, sensible, pragmatic, affordable and practical approach to treat the aesthetic issues of older patients. [8] The benefits are achievable without destroying their residual sound tooth tissue. In-office vital bleaching is very effective and night guard vital bleaching can be practised at senior citizens own pace. However, reminerelizing agents post bleaching will help protect enamel surface alterations.

Bonding and aged teeth

Direct or indirect composite restorations help improve the shape of worn, un-aesthetic teeth without damaging the structure or health of the residual tooth tissue. As a rule of thumb while treating the elderly patients, additive restorations should be considered with minimal preparation of the remaining tooth structure. However, tooth adhesion may be a challenge in aged tooth tissues.

Gradual enlargement of the peritubular dentin and intra-tubular mineral deposits, resulting in narrowed or completely occluded tubules interferes in bonding. More sclerotic dentin demands modification of the etching time or roughening of the surface. [9]

Senile Caries

WHO has mentioned that dental caries is the third global scourge affecting all ages of life. As the word meaning goes for Senility, Senile caries is no excuse. Clinically recurring decay around the necks of the teeth can produce a 'chipmunking' effect which can be extremely difficult to control with a conventional 'drill and fill' approach. [10] Root caries is primarily because of acid attack by bacteria directly on the exposed root surface or micro leakage around previously treated caries at the cervical margins of teeth around dentures or fixed prosthesis. Cemental caries propagate twice as fast as enamel caries as cementum demineralizes at a pH of 6.7. Application of 0.4% stannous fluoride in mouth guard is suggested as "Active Prevention" of Root caries creating a biologic balance in the favour of remineralisation.

As age advances there is anatomical and physiological change in the oral environment. Due to generalized attrition cuspal inclination is reduced and grooves /fissures become non-retentive. Thus, coronal fissure caries is rarer, compared to other age groups. Physiological wear and tear blunts the coronal relief and modifies the points of interdental contact. Therefore, biofilm, food debris, is no longer retained at the coronal level but accumulates in interdental spaces leading to multiple proximal decay. Restorative materials with chemical adhesion like Glass ionomers with fluoride releasing property, reasonable aesthetics, biocompatibility and less technique sensitivity are considered. [11] Resin composite with minimal tooth preparation reinforces the remaining tooth structure.

Tooth wear

Manifestation of some degree of tooth wear in all dentate older patients is common. The degree of tooth wear decides the clinical consequence and required intervention. Patient complaint may include tooth sensitivity, sharp edges of teeth, soft tissue trauma or pulpitis. Aesthetic concerns can manifest as shortened teeth, altered tooth shape or reduced lower face height whereas functional concern is reduced masticatory function or altered diet selection. [12] Long standing chronicity and slow-paced progress of attrition, abrasion and erosion lesions tend to deposit thick secondary dentin and also promotes pulp chamber regression.

Restoring cervical lesions is a challenge in elderly with sclerotic dentin and cementum in the cervical margin. Attrition with shortened teeth and vertical height loss can be well managed with the introduction of the 'Dahl Concept'. This clinical procedure deals with selective provision of adhesive restorations in supra-occlusion with the remaining teeth out of occlusion. Over a period of time, the teeth which are out of occlusion will erupt into occlusion, thus creating space for the restoration of anterior teeth.

Loss of vertical Dimension

Cases of the elderly losing several teeth will often show a decrease in the vertical dimension, causing dysfunctionality, discomfort, and visual displeasure. Decreased VD causes saliva to drip on the corners of the mouth and the possibility of angular cheilitis. Lack of lip and cheek support with protrusion of chin during jaw closure makes an individual aesthetically displeasing. [13] Unclear phonetics can be judged by the pronunciation of the letters F and V with malposition of upper anterior teeth and with the letter S with malposition of lower teeth. Pre-prosthetic workup is mandatory to decide the amount VD increase. Full coverage crowns, onlays, overlays and fixed prosthesis can be bonded to increase the VD which maintains the harmonious stomatognathic system.

Periodontal concerns

As discussed earlier, longer lifespan means teeth and supporting structures continue to be used and exposed to bacteria for much longer. The impact of systemic health, poly pharmacy usage and local oral factors lead to swollen gums, sore gums, receding gums, loose teeth, teeth that have drifted and bad breath.[14] These conditions lead to dark triangles, spacing and change in inclination of teeth expressing an un-aesthetic smile. Conservative adhesive composite

restorations with minimal tooth preparation on the gingival embrasure area helps in reconstruction of the lost smile. Ceramic laminates or full crowns to re-establish the lost arch form is another option in smile designing. However, with cognitive or motor impairment in elderly, periodontal aesthetic treatment planning should aim at minimal tooth preparation and easy maintenance of the restorations.

Prosthetic Planning

While considering the "mild old" and "oldest old" category of geriatrics, loss of few teeth in the dental arch is inevitable. For multidimensional and multidisciplinary geriatric oral care assessment, there are certain observations noted which is termed as "Oral Functional Capacity". OFC consists of four resilience capacity levels (RCL 1—RCL 4) and three parameters namely therapeutic capability, oral hygiene ability and self-responsibility.[15] It is recommended to design prosthetic constructions in a manner that they can be easily modified in case of one more tooth loss or other biological complications. After OFC assessment removable or fixed prosthesis is designed. The Shortened Dental Arch - "SDA" concept is a frequently discussed treatment option for geriatric dental treatment planning which designs and fabricates typically ten occluding antagonistic pairs usually ranging up to the second premolar meeting the functional requirement. While age is not regarded as a contraindication for the insertion of implants per se, placement of implants is an alternative treatment option.

Treatment Planning in elderly

For older adults' special considerations should be given during treatment planning. Informed consent, discussion with family members, involvement of care givers is very important before decision making. It is suggested in the literature, that a systematic approach to planning oral care for older adults, is called "OSCAR". OSCAR explains Oral Condition, Systemic illness, Capability, Autonomy and Reality. [16] A perpetual dilemma may exist during treatment planning for senior citizens which can be solved on identification of "key Teeth". Key teeth are those teeth which is crucial in the arch for function, it can support itself and also support other teeth in the arch.

Geriatric satisfaction

On aging, even small imperfections in dental aesthetics might lead to a fear of negative public reactions and cause appearance-based insecurity leading to psychological stress. There are innumerable questionnaires and scoring scales mentioned in literature to assess the geriatric and adult health status. One such questionnaire, titled the **"Smile Aesthetics Satisfaction Scale"** (SASS), showed good psychometric properties and its use can be recommended.[17] Simple clinical predictors of greater satisfaction with smile aesthetics like tooth display when smiling, Tooth colour, absence of gingivitis, as well as absence of crowded, fractured and restored teeth in the anterior segment are evaluated. Understanding patient's satisfaction and willingness to improve helps therapist to assess the patient's desires and increase the likelihood of treatment success.

Conclusion

In future, more and more of the aged population will seek dental care to reverse the signs of the aging smile. "One size fits all" approach of smile designing does not work in geriatric aesthetics. Treating the elderly should have the touch of care which includes strong, sensitive, dynamic and peaceful expressions in our treatment. "Visagism" applies the principles of visual art to the composition of a customized smile which upholds overall health of the elderly. [18] With dentistry's many advances, patients have choices that can help plan and execute a more creative, customized and biomimetic smile which can express their emotions and uphold their personality. Aesthetic dentistry offers an opportunity for the aged population to have a more youthful, harmonious smile with function and optimum oral health.

References

1. P Abdul Razak, K M Jose Richard. Geriatric Oral Health: A Review Article. Journal of International Oral Health 2014; 6(6):110-116
2. Priyadarshini Karthikeyan, Dr.Ramesh Kumaresan. Geriatric Dentistry- A Review. European Journal of Molecular & Clinical Medicine. Volume 07, Issue 11, 2020.5158-5162
3. Frauke Muller, Yoshihiro Shimazaki. Oral health for an ageing population: the importance of a natural dentition in older adults. International Dental Journal 2017; 67: 7–13

4. Alice Kit Ying Chan, Manisha Tamrakar. Common Medical and Dental Problems of Older Adults-A Narrative Review. Geriatrics 2021, 6, 76 (mdpi)
5. William Murray, Sunyoung ma. An ageing population poses dental challenges. Singapore Dental Journal 35 (2014) 3–8
6. Betsy K. Davis. Dental Aesthetics and the Aging Patient. Facial plastic Surgery/Vol 22, Number 2 2006
7. Ronald E. Goldstein. Cosmetic Contouring. Text Book of Esthetic Dentistry.
8. Martin GD Kelleher, Serpil Djemal. Bleaching and Bonding for the Older Patient. Dental Update. June 2011, 294 -303
9. Marcelo Giannini, Patrícia chaves. Effect of tooth age on bond strength to dentin. J Appl Oral Sci 2003; 11(4): 342-7
10. Rapp L, Maret D. Dental Caries in Geriatric Dentistry: An Update for Clinicians. International Journal of Oral and Dental Health. 2019, Vol 5 Issue 1.1-6
11. Roopa R Nadig, Usha, Vinod Kumar. Geriatric restorative care - the need, the demand and the challenges. J Conserv Dent. 2011 Jul-Sep; 14(3): 208–214
12. Francis M Burke, Gerald McKenna. Tooth-wear and the Older Patient. Dental Update · April 2011.165-168
13. Nova Adrian. Rehabilitation of Vertical Dimension Decreased Case in Elderly Patient. Journal of Indonesian Dental Association 2019 2(2), 81-85
14. I Darby. Periodontal considerations in older individuals. Australian Dental Journal 2015; 60:(1 Suppl): 14–19
15. Ina Nitschke, Anja Wendland. Considerations for the Prosthetic Dental Treatment of Geriatric Patients in Germany. J. Clin. Med. 2021, 10, 304
16. RL Ettinger. Treatment planning concepts for the ageing patient. Australian Dental Journal 2015; 60:(1 Suppl): 71–85
17. Vlatka Lajnert, Daniela Kovacevic Pavicic. Smile Aesthetics Satisfaction Scale: development and validation of a new brief five-item measure of satisfaction with smile aesthetics in adults and the elderly. International Dental Journal 2018; 68: 162–170
18. Dibyendu Majumder, Mithra N. Hegde. Recommended clinical practice guidelines of aesthetic dentistry for Indians: An expert consensus. Journal of Conservative Dentistry | Volume 25 | Issue 2 | March-April 2022