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Greetings from the editorial office!

The introduction of charcoal and neem in toothpaste and the revival of vintage clothing and styles in the market signify a heightened recognition of the insights and wisdom offered by older individuals. In this evolving landscape, old is truly becoming the new -new.

The time has come for us to celebrate the elderly as integral members of our communities, acknowledging that their stories and experiences are an invaluable asset to our shared human narrative.

The journey of geriatric individuals through decades of societal changes, technological advancements, and personal triumphs and challenges provides a rich tapestry that can serve as a guide for younger generations. The stories they tell, the lessons they've learned, and the resilience they've demonstrated contribute significantly to the collective memory of our society. By investing in geriatric care and support, we not only honor the elderly but also create a society that values the contributions of all its members, regardless of age. This includes accessible healthcare, age-friendly infrastructure, and social programs that cater to their specific requirements.

This edition marks a tribute to the elderly by IDA Karnataka State Branch. We intend to bring our readers updates in the form of reviews in the field of geriatric dental care from various specialities perspective. We trust you find the content engaging and informative.

To continue the attempt to bring our readers advances in various facets of dentistry, upcoming issue will feature essential perspectives and varied dimensions of implant dentistry. We request you to contribute to the journal content related to the topic. Nonetheless any topic of interest in dental science and its advancement is welcome for publication in the journal, in the form of case reports, reviews and original studies.

Enjoy your reading experience!

For any inquiries, submissions, suggestions, please feel free to reach out to us at editorksdj2023@gmail.com



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Oral health crisis in geriatric care- An overview.

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ABSTRACT

The oral health crisis within geriatric care is a pervasive and often underestimated concern that significantly impacts the overall well-being of the elderly population. This overview delves into the multifaceted factors contributing to this crisis, like physical and cognitive decline associated with aging, the socioeconomic landscape compounded by the adverse effects of medication use. Recognizing and addressing the oral health crisis in geriatric care is paramount to ensuring a higher quality of life for the aging population, necessitating concerted efforts from healthcare providers, policymakers, and society at large. This abstract aims to raise awareness and stimulate dialogue surrounding the urgent need for a comprehensive approach to oral health within the context of geriatric care.

Keywords: Oral health, Geriatric, Dental care

Introduction:

The older population's oral health crisis has become a critical issue as the world's population ages. Maintaining good dental health can present special problems for the elderly, and neglecting this important part of well-being can have dire implications.¹ The

purpose of this article is to examine the causes of the oral health crisis among the elderly, how it affects their general health, and possible solutions.

The age range that makes up the "elderly" population segment is three: 85 years and older is the oldest-old and usually physically frailer; 65–74 is the

new or young elderly and generally healthy and active; 75–84 is the old or mid-old and can range from healthy and active to managing a variety of chronic diseases. The older adult population's fastest-growing segment is the last age group. India is not an exception to the sudden explosion in the number of people 65 and older in the last ten years.²

Factors Associated with the Crisis in Elderly Oral Health:

Physiological Alterations:

Aging is linked to a number of physiological alterations, such as a reduction in salivary flow and modifications to the salivary composition. Decreased salivary flow can result in dry mouth, which raises the possibility of gum disease and tooth damage.³

Chronic Disease Prevalence:

Diabetes and cardiovascular disease are two chronic disorders that older people frequently deal with. These conditions can have an impact on oral health. The adverse effects of medications used to treat these problems might include gingival overgrowth, dry mouth, and other issues that affect oral health⁴.

Restricted Access to Dental Care:

A number of factors, such as decreased mobility, lack of transportation, and financial limitations, prevent many seniors from receiving dental care. They find it challenging to get preventative care and routine dental exams because of these issues⁵.

Dental Hygiene Practices:

The elderly may have poor dental hygiene due to a combination of factors such as cognitive decline, physical restrictions, or a lack of awareness. Inability to properly brush and floss can cause plaque to build up and raise the risk of dental problems.¹

Negative Dental Health Effects on General Health:

Links to Systemic Health:

Studies have shown a robust relationship between oral and systemic health. Diabetes, lung infections, and cardiovascular disease have all been related to poor dental health, and these illnesses can have a substantial negative influence on an aged person's general quality of life⁶.

Nutritional Implications:

A person's capacity to eat a healthy diet may be impacted by oral health conditions including tooth loss or difficulty chewing. This could lead to malnutrition and weight loss, further jeopardizing the health and vitality of older adults⁷.

Social and Psychological Factors:

Common among the elderly are social isolation, depression, and anxiety, all of which can negatively affect dental health. Mental health problems can make dental care neglect worse, which can worsen oral health in general^{8,9}.

Quality of Life:

Seniors who have untreated dental health issues may experience pain, discomfort, and a lower standard of living. Speech, self-esteem, and social

interactions can all be negatively impacted by problems like missing teeth or ill-fitting dentures⁶.

Approaches to the Elderly Oral Health Crisis:

Encouragement of Preventive Care

Oral health problems in the elderly can be addressed and prevented with the support of routine dental examinations, fluoride treatments, and education about good oral hygiene⁶.

Improving Dental Care Access:

Treatment barriers can be reduced with the support of initiatives like community outreach programs, telehealth services, and mobile dental clinics that enhance senior citizens' access to dental care⁸.

Geriatric-focused Dental Education:

Educating dental professionals in the special needs of elderly patients, such as their unique challenges, can enhance the quality of care provided and guarantee that dental offices are prepared to meet their needs¹⁰.

Including Oral Health in Total Healthcare:

It is critical that dentists and other medical professionals work together. Early detection and treatment of oral health problems can be facilitated by incorporating oral health assessments into regular medical check-ups¹.
Community Involvement and Awareness:

Seniors can be empowered to prioritize their oral health by increasing awareness of the value of good oral health among the senior population

through community programs, educational campaigns, and support networks¹¹.

Take home message:

The elderly population's oral health crisis is a complex problem with broad consequences for general health. An all-encompassing strategy that incorporates education, community involvement, improved access to dental care, and preventive measures is needed to address this crisis. By acknowledging and proactively addressing the obstacles elderly people face in preserving their dental health, society can help enhance the standard of living for this expanding population.

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Oral well-being for overall wellbeing – a clinical update on Concerns for the Elderly

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ABSTRACT

Age-related oral changes are evident in both hard and soft tissues of the oral cavity. Some of the effects can have co dependent and cascading effect on oral well-being. Many of the symptoms and presenting signs would be influenced by underlying systemic conditions too. So it's essential for oral health care providers to be well aware of changes pertaining to aging as well co existing effects of any systemic disease. Majority of the times the geriatric oral health care requires a comprehensive approach, for successful management [SEP] of aging-related conditions. This paper is an outline of age related oral health problems and measures to address them.

Keywords – Aging Mouth; Geriatric Oral Care; Xerostomia; Oral Frailty.

Introduction

Good health adds life to years, this is not only crucial for adequate mental wellbeing but also people with good health may continue to have an active role and be an integral part of families and communities which will in turn strengthen societies. The World health organisation emphasises that oral health is a key indicator of overall health in older age.¹

Aging is the physiologic change that occurs in the body with time² and according to the World Health Organization (WHO), 60 years old is established as the turning point to “old age.”³

As the population ages, it becomes more diverse, with a wider dispersal of physiologic reserve, cognitive status, presence of varied degrees of chronic multiple diseases, and polymedications.² Changes in the Oral cavity too is a part of physiologic aging and there is a definite established relationship between oral mucosal lesions and aging. This could be owing to reduced immunologic response, impaired DNA repair capacity, impaired carcinogen metabolism and atrophy of oral tissues, (oral epithelium and the salivary glands), and also oral mucosal conditions tend to develop more recurrently amongst elderly.⁴

The oral cavity in an aged individual will not only reflect the physiologic changes but also certain changes secondary to various systemic diseases, intake of medications and so on.⁵

Hence, the focus on the health and well-being of elderly people is mounting, and has also become a challenge for all clinicians. This goes to say that clinicians should be well aware of the changes occurring secondary to aging and its associated implications. This paper outlines the relationship of aging mouth and its oral and systemic implications.

Aging Changes in the Stomatognathic system-

The stomatognathic system comprising of the dentition, skeletal and muscular entities also undergo changes with aging along with changes in general systemic conditions.

There are instances when changes in the stomatognathic system directly or indirectly affect the systemic health and as dental practitioners we need to create awareness amongst patients regarding this. Many a times a clear distinction, between aging and disease manifestation may be difficult for clinicians. Clinicians may decide on the decision making course by assessing patient's status and need for treatment, bearing in mind the age, medical and dental status, as well as the patient's expectations.⁵

Changes in Hard tissues-

Changes in the teeth will present as changes in appearance of teeth and/or increase in incidence of caries. These changes are considered as part of aging

include wearing of the enamel; chipping and/or appearance of fracture lines with staining of the chipped areas; dentin exposure (inturn rapid wearing off of dentin); and deposition of secondary dentin leading to the reduced size of the pulp chamber and canals. As a combination of these etiologies aged teeth generally appear darker.⁶(Fig-1)

Temporomandibular joint (TMJ) changes in the elderly-

The TMJs are generally subjective, yet potentially debilitating.⁷The consensus from previous reports is that the prevalence of TMJ dysfunction does not increase with age.⁸However, there can be an increase in TMJ related osteoarthritis with or without symptoms. (Fig-2)

The Masticatory functioning-

It is very essential to make the geriatric patients realize that effective mastication will determine the appropriate nutritional intake and directly influence the overall wellbeing. Dentition, TMJs and muscles of mastication influence mastication. Dental disease leading to loss of teeth without adequate rehabilitation can be the cause of poor masticatory function.⁹Furthermore, loss of muscle mass and muscle function (sarcopenia) will accompany aging. Sarcopenia is accompanied by reduced function.¹⁰

Masticatory function is generally reduced with aging, which is a result of reduced muscle mass of the muscles of mastication.¹¹

Oral health-care providers have a

chance to assist patients with an indication of sarcopenia by assisting in establishing and maintaining a functional dentition.

Caries in aging-

Although Dental caries is a pathologic change; its incidence may rise with aging owing to xerostomia (Fig-3) secondary to polymedications¹² or systemic diseases like diabetes mellitus. It is essential to recognize that prioritizing preventive measures is just as crucial as treating caries. Also there is reduction in density of bone secondary to aging.¹³

Changes in soft tissue structures-

As a part of aging there are evident changes in the oral mucosa, saliva and microbial structure.

Oral mucosa

The oral mucosa in the presence of adequate amounts of saliva provides host defense, mastication, aids in swallowing, speech, and taste perception.¹³ Age-related changes of oral mucosa show a reduction in the elastic fibers. In the connective tissue there is thickening of the collagen bundles & reduction in the microvasculature. As a result the mucosa becomes less resilient and implies impaired wound healing.¹⁴

In addition to noticeable age-related alterations in appearance resulting from cellular changes, there may also be a decline in the perception of oral sensations.² Oral sensation, characterized by the ability to discern touch points, generally remains

relatively constant with age; however, individuals aged over 80 years may experience a slight reduction.¹⁴

Saliva

Saliva plays an important role in oral health and function. The age-related changes in salivary gland function will not only influence the production of saliva, but also its composition. These changes may result as thicker and ropier saliva. Daily oral hygiene practices may need to be more vigilant⁷

With an increase in number of patients suffering from Type 2 diabetes mellitus, hypertension or both, there has been a rise in use of polymedications as age advances.¹⁵ The medications used may give rise to number of additional oral effects like xerostomia, gingival enlargement to name a few. The side effects of these medications may add on to the burden of oral health deterioration in addition to effects of aging. Polypharmacy is known to be associated with poor oral health status.¹⁶

Also a major side effect of these medications is the qualitative and quantitative change in saliva (salivary hypofunction), owing to their anticholinergic effects.^{12, 17}

Microbiological changes of the aging oral cavity

The normative aging process is associated with a substantial alteration in the composition and complexity of species colonization within the oral microbiome. Among healthy adults in their seventh decade, the biofilm is dominantly gram-positive aerobes. Later there is a shift in spectrum to,

enterobacteria, staphylococci, actinomycetes, and yeasts. Age-related changes in the oral mucosa, influences the immunity as well, implying oral cavity becoming more susceptible to opportunistic infections.¹⁸ (Fig 4)

Oral Dysbiosis in diabetics - Resilience is a well known pattern of oral microbiome. But in presence of systemic diseases especially diabetes mellitus there can be a shift in the balance. The particular parasitic/pathogenic state wherein microbials promote disease in the host is known as “dysbiosis”.¹⁹ Peterson et al.¹⁹ assert that dysbiosis can manifest in three distinct scenarios, which are not mutually exclusive and may coexist: i) a general reduction in microbial diversity; ii) depletion of beneficial microbes; and iii) proliferation of pathogenic microbes. Therefore, clinicians should be mindful that any treatment may be influenced by the shifts in oral microbiome or dysbiosis.

Predominant Oral Mucosal lesions

The incidence of oral mucosal lesions ranges from 12% to 61.4% in the epidemiological studies related to the prevalence of oral mucosal lesions in the elderly in India and abroad.⁴The lesions may vary from fissured tongue, (Fig 5) denture stomatitis, angular cheilitis, lingual varicosities and so on.²⁰

Changes in oral sensory functions -

Also as a part of aging there is regression in oral sensory function and alterations in taste perception, secondary to alterations of taste buds,

their receptors, or dietary habits. There are significant changes within the salivary glands resulting in decreased salivary production and certain alterations in the composition of saliva. The thinning of the oral mucosa contributes to decline in local mucosal immunity and antimicrobial abilities.¹⁴

Oral Frailty – There have been reports emphasizing the fact of changing causes of oral frailty.²¹Frailty is a dynamic state of an individual experiencing losses in one or more domains of human functioning (physical, psychological, social) and those which are influenced by a range of variables and which increases the risk of adverse outcomes.²²

Operationally Oral frailty is defined by Tanaka²³ as poor status in three or more of the six targeting measures. Which include (i) the number of natural teeth, (ii) chewing ability, (iii) articulatory oral motor skill for "ta," (iv) tongue pressure, (v) subjective difficulty in eating tough foods, and (vi) subjective difficulty in swallowing".

Oral frailty is defined as a poor status in three or more of the six above mentioned measures.

General Measures for Diagnosis and management of geriatric patients –

Whenever a geriatric patient approaches oral health care providers, it is very essential to make them aware of addressing the comprehensive treatment approach, and making them aware of oral health concerns which they may not be keen about. Identifying the modifiable factors,

which can be treated, to ensure overall well-being is very crucial.

Some of the risk factors for specific changes are modifiable (e.g., smoking or other detrimental habits), while others depend on the cumulative effects of time.

Though the criteria for healthy oral aging have not yet been fully defined, some basic criteria which can be considered include a functional occlusion with at least 20 remaining teeth (10 adjoining teeth in each arch), a dentition that is free of active caries, no evidence of more than 4 mm of attachment loss, no probing depths > 4 mm and only physiologic tooth mobility. Restorations are functional, and mastication of a range of food types is achievable.⁷

Explaining these crucial criteria to the patients and making them aware of the importance of these aspects is very essential.

Salient features to be considered for comprehensive treatment include-

1. Assess for general status of mucosa
2. Assess for xerostomia if present and the severity.
3. Identify the presence of opportunistic infections if any.
4. Identify the nutritional deficiency manifestations if any.
5. Assess for motor functional deficiency of masticatory muscles.
6. Identify and rehabilitation of teeth which may contribute in occlusal balance.
7. Assessment of oral frailty.

The above-mentioned points inclusive of hard tissue and soft tissue assessment (Table 1) will contribute for successful management for patients in geriatric group.

The decline in circulatory function with aging may be alleviated by a combination of gingival massage (physical stimulation) and mechanical cleaning and practice of lingual resistance exercise is advocated.^{24,25}

Encouraging chewing sugar-free gum for a considerable time will ensure in functional increase in salivary flow, as well as an increase in pH and buffer capacity which can help reduce plaque acidogenicity.¹²

Regular chewing habits not only fail to increase saliva production in individuals with residual secretory capacity but also aid in maintaining the efficiency of masticatory muscles.

Patients can also be encouraged to undertake manual massaging and stimulation of parotid and submandibular glands helps expel mucous plugs and small sialoliths.¹²

Comprehensive management for xerostomia and its cascade effect-

1. XYLITOL usage- the xerostomia can be further tackled by use of xylitol-incorporated lozenges, spray, and gum stimulate.
2. Patients may be encouraged to use remineralizing solutions in concentrated doses, which will aid in enhancing remineralization and decrease demineralization of the calcified structures.
3. Application of fluoride varnishes specially recommended to people at risk for developing dental carious lesions.
4. SALIVARY SUBSTITUTES (mucoadhesive polymers like carboxymethylcellulose or hydroxyethylcellulose) may be recommended in few where

xerostomia is causing difficulty in swallowing and speech.⁹

Conclusion –

It is of critical importance to emphasize to the patients that oral health is related to general health, and good oral health is part of successful aging. The recommended frequency of visits to dental health care centres for elderly and xerostomic subjects is every 3 months. Apart from routine examinations, the patients need to be made aware of development of new carious lesions, soft tissue changes, and checking of compliance to the previously advised regimen if any.

Assessment of oral health status in the elderly should also be in terms of assessment of function and identification of the presence of disease process. The devised care must be tailored for each patient, determined by his or her health status and personal choices. In addition to restorative treatment options, elaboration of a prevention plan is important, which should be personalized for each individual and discussed adequately with patients.

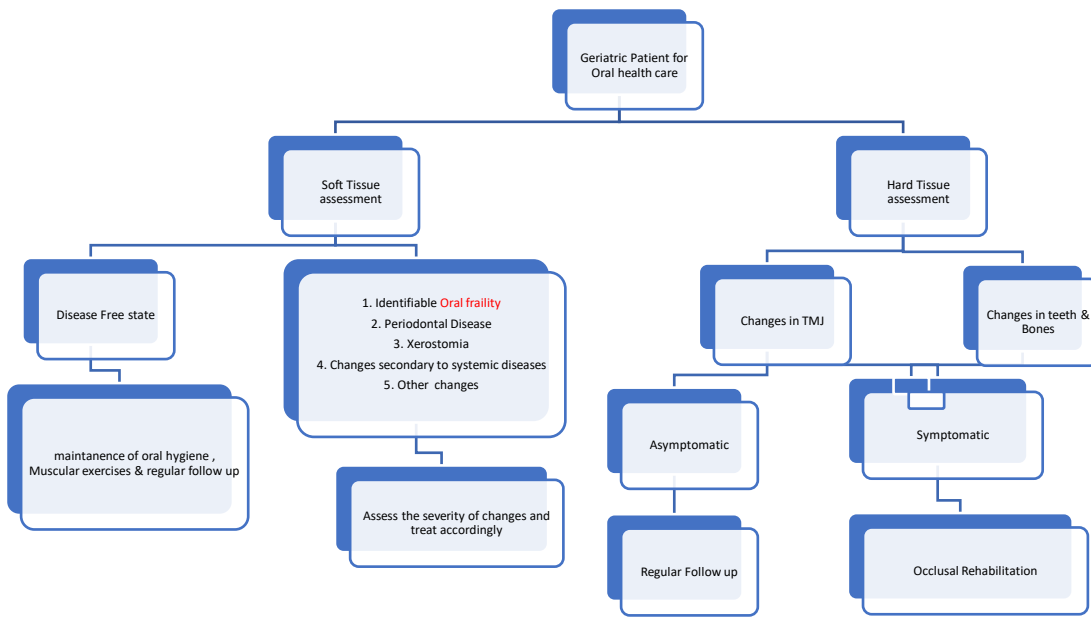
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Table 1- Summary of assessments and treatment essentials in geriatric subjects.



Figures

Fig 1 – Generalised attrition of teeth.



Fig 2- OPG depicting bilateral TMJ arthritis.



Fig 3- Severe grade xerostomia.



Fig 4- Pseudomembranous candidiasis on palate



Oral Mucosal Lesions in Geriatric Patients: Causes, Symptoms, and Care

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ABSTRACT

Oral health is a vital aspect of overall well-being, and it becomes increasingly significant as individuals age. Geriatric patients often face a higher risk of developing various oral health issues, including oral mucosal lesions. These lesions can significantly impact an individual's quality of life, making it crucial to understand their causes, symptoms, and appropriate care. The objective of this review is to raise awareness of frequent or significant oral mucosal disorders among the physicians, healthcare providers and caregivers to improve the quality of life among the elderly individuals.

Introduction:

Over the next three decades, the number of older persons worldwide is expected to double to 2.1 billion by 2050, with the share rising to 22 percent of the total population. World's population is ageing & India is hardly an exception. There are 149 million persons aged 60 years and above in 2022 (as on 1 July), comprising around 10.5 percent of the country's population and then up to 227 million that is around 15 per cent by 2036. By 2050, the share of older persons will double to 20.8 percent, with the absolute number at 347 million.¹

Increase in geriatric population demands improved oral health care. Oral health is a vital aspect of overall well-being, and it becomes increasingly significant as individuals age. Elderly patients often face a higher risk of developing various oral health issues, including oral mucosal

lesions. The majority arise primarily in the oral cavity. Some, however, are manifestations of generalized diseases.²

In addition to dental caries and periodontal disease, oral mucosal disease is a serious issue that affects elderly patients. Chronic conditions like diabetes and autoimmune disorders can make them more susceptible to oral mucosal lesions. Commonly used drugs like antihypertensives, antidepressants and antibiotics may have oral mucosal side-effects. Reduced awareness of oral mucosal changes, or the inability to voice concerns because of dementia, delirium, social isolation, are a barrier to receiving dental care & may exacerbate the issue.

These lesions can significantly impact elderly individual's quality of life, making it crucial to understand their causes, symptoms, and appropriate care. The objective of this review is to raise

awareness of frequent or significant oral mucosal disorders among the physicians, healthcare providers and caregivers to improve the quality of life among the elderly individuals

Age Changes In Oral Mucous Membrane:

Oral mucosa has protective functions that significantly affect the general health of the patient. With time, oral epithelium thins, loses elasticity, becomes more permeable to noxious substances and more vulnerable to external carcinogen and atrophies with age, making it more susceptible to pathology.³ Oral mucosa undergo changes throughout time, due to trauma, oral habits, and hypofunction of the salivary glands. The vulnerability to oral mucosal infection and damage is further increased by aging-related immunologic responsiveness decline.^{3,4}

The tongue in particular is reported to show marked clinical changes and to become smoother with loss of filiform papillae & appears bald and is more prone to developing sublingual varices and candidial infections. Systemic disease and a variety of medications can also result in oral mucosal disorders.⁴

With age, there is a tendency for development of sublingual varices and an increasing susceptibility to various pathological conditions such as Candidal infections and a decreased rate of wound healing. An additional complication in evaluating oral mucosal status in older persons is the use of prosthetic appliances, which have considerable potential to alter mucosal integrity if not maintained properly.^{5,6}

Oral mucosal conditions and diseases may be caused by infectious diseases (bacterial or viral), systemic diseases (metabolic or immunologic), drug-related reactions, or lifestyle factors such as the consumption of tobacco, betel quid, or alcohol.⁷

Oral mucosal lesions:

Prevalence of oral mucosal lesions in elderly patients varies from 22.8% to 83.6%. Most prevalent lesions were leukoplakia, followed by lichen planus, malignancy, denture stomatitis, non-healing and traumatic ulcers, oral submucous fibrosis, smoker's melanosis, fibromas and smoker's palate. The least prevalent oral mucosal lesions are burning mouth syndrome, mucocele, vascular malformations, epulis fissuratum, candidiasis, lichenoid reaction, tobacco pouch keratosis, pemphigoid, herpangina.^{3,8,9}

Oral Leukoplakia:

Oral Leukoplakia is a predominantly white lesion of the oral mucosa that may present clinically as homogenous or non-homogenous.¹⁰ It is more commonly seen in buccal mucosa (25%) followed by gingiva (20%), floor of the mouth and ventrolateral tongue (10%)¹¹ with higher prevalence in men and women over 70.¹²

The prevalence of Oral leukoplakia is directly related to tobacco usage. It is six times more prevalent among smokers than nonsmokers.¹³

India is the top most country in the usage of tobacco and tobacco-related products, many people are exposed to tobacco products even in older age. Tobacco poses a potential threat to the oral cavity as they are in direct contact with the mucosal surface. Global trends on

tobaccoconsumption suggest that by 2030, it would be one of the leading causes for death of approximately 8 million people per year residing in both the developed and developing countries.¹⁴ Estimated overall malignant transformation rate is 9.5%¹⁵

Leukoplakia not exhibiting dysplastic usually does not require surgical excision, but risk factor cessation is recommended with follow-up every 6 months and lesions exhibiting moderate to severe dysplasia need completeremoval by conventional scalpel excision, laser ablation, cryosurgery orelectrocautery.¹²

Chemoprevention using beta-carotene, retinoids, vitamin A, or bleomycin have been reported.¹⁶

Oral Lichen Planus:

Oral Lichen Planus is one of the more common ulcerative disorders of the oral mucosa affecting mainly people aged 30–60 years, and the disease process may continue for life. It has a female predisposition which also includes lichenoid reactions from medications. Predilection in females may be attributed to hormonal alterations (especially menopause) and psychosomatic pathophysiology (stress).¹⁷

It is a “chronic inflammatory disorder of unknown aetiology with characteristic relapses and remissions, displaying white reticular lesions, accompanied or not by atrophic, erosive and ulcerative and/or plaque type areas. Lesions are frequently bilaterally symmetrical. Desquamative gingivitis may be a feature.”¹⁸

Exact aetiology of oral lichen planus is unknown, certain factors are associated with oral lichen planus. It can present with a range of symptoms ranging from asymptomatic to severe soreness, with

impact on oral health-related quality of life.¹⁷

All current treatment strategies are aiming at reducing or eliminating symptoms. It involves the use of corticosteroids, cyclosporin, azathioprine, and retinoids. Topical steroids are widely used and accepted as the primary treatment of choice. Systemic steroids are used to control symptoms from recalcitrant lesions. Topical application of cyclosporine, tacrolimus, and retinoids has been suggested as a second-line therapy.¹⁹

Malignant transformation rate of oral lichen planus ranges from 0.44 to 1.4%.²⁰ It is higher in women than in men in the age group of 60–70 years.²¹ Hence management of oral lichen planus requires regular screening for dysplastic changes in the oral tissue.

Oral cancer:

It is the sixth most common cancer reported globally with an annual incidence of over 300,000 cases, of which 62% arise in developing countries. Age-adjusted rates of oral cancer in India are high, which is, 20 per 100,000 population and accounts for over 30% of all cancers in the country.²²

Incidence of oral cancer increases by age & most of them occur between the age of 50 to 70 years.²³ In India, men are two to four times more affected than women due to the changes in the behavioral and lifestyle patterns.²⁴

Typical sites of oral malignancy in the elderly include the tongue, lips, buccal mucosa, floor of mouth, and posterior oropharynx. The most common risk factor other than increased age is the use of tobacco and alcohol.⁴

Early diagnosis is key to improving survival rates and improving quality of life for survivors. A thorough oral cancer screening should be completed for all patients as well as reinforcement of prevention by decreasing risk factors such as sun exposure, alcohol use, and tobacco use.²⁵

It is commonly managed by surgical excision with or without reconstruction with a local or free flap. Patients may also receive postoperative radiation therapy. Patients may also suffer unpleasant side effects of radiation therapy such as mucositis, trismus and xerostomia.¹⁷ Patients diagnosed with and treated for oral cancer will have extensive acute and long-term complications related to cancer treatment.

Oral Submucous Fibrosis:

Oral submucous fibrosis (OSF) is a high risk potentially malignant disorder characterized by changes in the connective tissue fibers of lamina propria and deeper parts leading to stiffness of the mucosa and restricted mouth opening. Globally, the number of cases of OSF was estimated to be 2.5 million in 1996. Overall prevalence of OSF was found to range from 2.42 in 2000 to 6.42 per 1000 per year in 2004.²⁶

Most patients who develop OSF are between 45 and 54 years old and chew betel nuts 5 times per day. However, in India it is quite prevalent in teenagers as well.²⁷ Various aetiological factors have been suggested, which include local irritant such as capsaicin, pungent and spicy food and areca nut use. In addition to local factors, systemic factors like anaemia, chronic iron and vitamin B deficiency and genetic pre-disposition

have also been suggested to play a role in development of OSF.^{28,29}

Treatment for OSMF is based on the extent of tissue involvement and the rate at which the disease progresses. In the early stages, it can be beneficial to include nutritional supplements like iron, vitamins, and minerals along with quitting habits like chewing tobacco, betel nuts, and avoiding hot meals.³⁰

In mild stages of OSF, topical steroids, vitamins, antioxidants, and physical therapy are advised in addition to intralesional injections of dexamethasone with hyaluronidase or interferon gamma. In more advanced phases, surgical procedures involving the removal of fibrous bands with a potassium-titanyl-phosphate (KTP) laser and CO₂ are required. Physiotherapy is highly recommended. It has a 5.2% malignant transformation rate^{31,32}.

Smoker's melanosis:

Smoker's melanosis is a term used to describe an abnormality in melanin pigmentation of the oral mucosa that develops after a long period of tobacco use.³³ Longer the duration of smoking, higher the melanin content in the tissue, more the possibility of melanosis in the oral cavity.³⁴ The heat effect of tobacco smoke on the oral tissues causes this disease, as does the direct effect of nicotine, which activates melanocytes along the basal epithelial cells to create melanosomes, resulting in enhanced melanin deposition.³⁵

It typically manifests as diffuse melanosis of the maxilla and mandible's anterior vestibular gingiva, buccal mucosa, labial

commissures, lateral tongue, palate, and/or floor of the mouth.³⁶

It was the most frequently observed oral lesion at a rate of 37% in a study conducted on elderly indian population.³⁷ There is no definitive treatment for smoker's melanosis. Stopping the tobacco usage will result in disappearance of the pigmentation within 6 to 36 months.³⁸

Smoker's Palate:

It is a thickened, hyperkeratotic alteration of the palatal mucosa with occasional fissuring of the surface and reddened papular elevations (inflamed openings of minor salivary ducts). It occurs on the hard palate of pipe smokers but also is found in the cigar or cigarette smoker.³⁹ It is a response to heat not the chemicals in tobacco hence there is no premalignant potential. Nicotinic stomatitis is completely reversible upon cessation of tobacco use & palatal tissue return to its normal appearance in 1 to 2 weeks.³⁸

Tobacco Pouch Keratosis:

It is also known as Smokeless tobacco keratosis, snuff dipper's lesion is caused by constant frictional irritation of smokeless tobacco against the oral mucosa resulting in keratosis.⁴⁰ The formation rate depends on the type of smokeless tobacco, the brand of tobacco, the amount of tobacco used, and the amount of time the pinch or plug is in contact with the oral tissues. The lesion appears white and is present in 15% of chewing tobacco users and 60% of snuff/spit tobacco users.³⁸

In a study conducted to evaluate prevalence of oral mucosal lesions among elderly indian population 10.66% of cases had tobacco pouch keratosis.⁴¹ Diagnosis can be made by patient history and

examination of the oral mucosa. Biopsy may be performed if there is high clinical suspicion for malignancy. Upon cessation of tobacco use, the majority of mucosal lesions will return to normal appearance in 2 to 6 weeks. If the lesion persists despite cessation of products or dysplasia is present on histology, it may be monitored with periodic observation or removed with surgical excision.³⁸

Sublingual varices:

They are dilated tortuous veins that may be seen along the ventral surface of the tongue or floor of mouth, and tend to become more prominent with age. There is an increased incidence of lingual varices from 11.1-41.1% between ages 50-99 years⁴² and a correlation with cardiovascular disease and smoking has also been noted.¹⁷

Fissured tongue

It increases with age and is considered a variation of normal findings and a result of ageing process. Its characterized by a central groove on the dorsal surface of the tongue, with multiple laterally extending, branching fissures. Its usually asymptomatic unless associated with low grade bacterial infection or trapped food debris.. Pain, soreness, or a burning sensation of the tongue due to atrophy of the filiform papillae on dorsal surface of the tongue.¹⁷

Geographic Tongue:

Geographic tongue or benign migratory glossitis is defined as an inflammatory disorder with unknown etiology, characterized by decrease in the number of papillae in the dorsum and lateral border of the tongue circumfusing with the formation of red, round patches with white

distinct borders that give the tongue a map-like appearance. Main etiology of geographic tongue remains unknown, some factors including emotional stress, vitamin deficiency, allergy, genetic factors, immune disorders, bacterial or fungal infection and systemic diseases may play a causative role.⁴

The lesions need to be treated in case of presence of pain, burning sensation, taste diminution, cancer phobia or aesthetic concerns. There is not a definite cure for this condition. Topical steroids, retinoic acid, cyclosporine, antihistamine, tacrolimus and immune system regulators have been used in proposed treatment plans, yet they are neither specific nor curative.⁴³

Coated Tongue:

One of the common variations of the tongue is coated tongue, also known as white tongue, which is made up of leukocytes, significant numbers of desquamated epithelial cells, and anaerobic bacteria from blood metabolites, periodontal pockets, various nutrients, and occasionally irritated papillae. Untreated tongue coatings can serve as a favorable environment for bacteria and other microorganisms. The diagnosis of coated tongue is confirmed by clinical examination, which reveals white pseudomembranous on the tongue's dorsum. This tissue is scrapable but does not result in an erythematous area or pain. Oral thrush is one of the differential diagnoses for coated tongue. It was believed that a tongue coated in sulfur would be the perfect environment for the production of sulfurous chemicals such as dimethyl sulfide, methyl mercaptan, and

hydrogen sulfide, which would lead to halitosis.⁴⁴

Burning mouth syndrome

It is characterised by a burning sensation of the oral mucosa in the absence of any clinically apparent mucosal alterations. It is most common among middle-aged and older women, with range of 38-78 years occurring with a predilection for female 5:1.¹⁷ Patients may also complain of dysgeusia and xerostomia. It can be commonly associated with stressful life events, anxiety or depression. There is also evidence for a neurogenic cause.

It is commonly managed through psychological methods such as cognitive behavioural therapy (CBT), or pharmacological means such as a selective serotonin reuptake inhibitor (SSRI) or tricyclic antidepressant (TCA), or a combination of both.^{17,45}

Denture stomatitis:

The most commonly seen denture-related oral mucosal lesions are stomatitis, hyperplasia, angular cheilitis and traumatic ulcers. It was also seen more frequently in patients who wore complete dentures as opposed to removable partial dentures.⁴⁶

Denture stomatitis, a common disorder affecting denture wearers, is characterized as inflammation and erythema of the oral mucosal areas covered by the denture. Most mucosal changes in the elderly have been linked to denture use.³ It may be due to the presence of *Candida*, mechanical issues, long term wear and greater mucosal coverage by the denture base area.⁴⁷

Proper cleaning should include removing dentures and soaking them in a

commercial disinfectant solution, or diluted sodium hypochlorite.⁴⁸

Epulis fissuratum:

Epulis fissuratum also called as Denture-induced hyperplasia (DIH) is a tumor-like hyperplasia of fibrous connective tissue, which develops in association with an ill-fitting complete or partial denture. It is a reactive lesion of the oral mucosa to excessive mechanical pressure on the mucosa.⁴⁹ Trauma and irritation are the two main aetiological factors responsible for occurrence of epulis.

Management of the Epulis fissuratum can be especially challenging in geriatric patients. As they often pose with systemic disorders that are tough to deal with. It may be conservative or surgical. A conservative approach should be considered as the first option because of its noninvasive nature.⁵⁰

Papillary hyperplasia:

It is a type of chronic inflammatory proliferative lesion characterized by numerous small, wart like edematous red papillary growth. Most commonly seen in deepest part of the palate & rarely seen in the mandible.⁵¹

Chronic irritation, poor denture hygiene, continuous denture wearing, and many other factors play a significant role. As a method of prevention, patient should stop nocturnal wearing of denture and should be advised to stop continuing the use of old dentures. New dentures should be constructed and they must not be employed with suction discs or vacuum chambers.⁵²

Angular Cheilitis:

Angular cheilitis is less prevalent than denture-induced stomatitis, although usually it is associated with it and exacerbated by denture plaque. It is also observed in conjunction with insufficient maxillary lip support and a loss of occlusal vertical dimension. Despite the fact that nursing homes typically struggle to provide their residents with adequate oral hygiene, frail elders living at home appear to be more susceptible to this disorder than elderly residents of long-term care facilities. This likely reflects the advantages of supervised care, nutrition, and oral hygiene in the nursing home.⁶

Oral Candidiasis:

Oral mucosal infections in the elderly are mainly caused by *Candida*. In recent years, older adults have experienced a higher frequency of oral candidiasis as certain conditions increase the risk of overgrowth in older persons. These conditions include the pathogenicity of individual *Candida* strains; local factors like xerostomia, denture irritation, tobacco use, steroid inhaler use; and systemic factors like immunodeficiencies, systemic corticosteroid use, antibiotic use, chemotherapy, radiation therapy, endocrine disorders, malabsorption, malnutrition.⁴

There are three different forms of oral candidiasis. Pseudomembranous oral candidiasis characterized by the appearance of white moss, erythematous oral candidiasis by erythematous eruptions, and hyperplastic oral candidiasis by mucosal hyperplasia.⁵³ Diagnosis usually made based on the patient's history, clinical presentation, and response to antifungal treatment. Miconazole has

long been a popular treatment for oral candidiasis. On the other hand, elderly patients frequently get oral candidiasis. Therefore, taking action to stop a recurrence is crucial. Encouraging patients to quit smoking, reduce alcohol intake, and adopt a balanced diet can aid in lesion prevention and healing.

Aphthous ulcers:

Aphthous ulcerations are non traumatic ulcerations seen in elderly. It may occur due to underlying systemic disease such as inflammatory bowel disease, or Bechet's disease, vitamin deficiency, and psychological stress. They are painful, round or oval sores, surrounded by a erythematous halo appear on the soft tissues inside the mouth.⁴

In elderly, aphthous ulcers are recurrent, more painful & take longer time to heal. Diagnosis is based on history, clinical examination, haematological investigations. The predominant treatment for pain or discomfort is topical anesthetic gels; corticosteroids are recommended for larger or recurring ulcers; and mouth rinses containing chlorhexidine can be used to minimize ulcer-related inflammation.⁵⁴

Traumatic Ulcers:

They are caused by unintentional cheek-biting, motor dysfunction, rough edges due to broken teeth, irritation by faulty restorations, and deliberate injury by dentures. They appear as shallow ulcerations with a necrotic center and varying degrees of erythema at the periphery. Treatment of these lesions involves identifying the etiology and removing it. If no resolution occurs within a two-week period, an incisional biopsy for histologic diagnosis is prudent, as chronic traumatic lesions can be

indistinguishable from oral cancer. Any sharp edges of either teeth or dentures can be filed & palliation with topical emollients and anesthetics may help.⁵⁵

Conclusion

Oral mucosal lesions in geriatric patients are a common concern that can significantly impact their daily lives. Understanding the causes, risk factors, and appropriate care measures is crucial for healthcare providers and caregivers. The majority of doctors are unaware of the prevalence of oral disorders, which frequently leads to incorrect disease management, delayed diagnosis, and an underestimation of the condition's severity and improperly managing the disease. Primary care physicians can help older patients maintain good oral health by assessing risk, recognizing normal versus abnormal changes of aging, performing a focused oral examination, and referring patients to a dentist, if needed.

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Geriatric endodontics and restorative care in an elderly patient

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ABSTRACT

Geriatrics in dentistry tackles intricate oral health issues tied to aging, covering prevention, treatment, and understanding age's impact. Factors like heightened dental vulnerability, reduced saliva, and cognitive shifts contribute to more dental problems in older adults. Reluctance toward treatment often roots from cost, fear, or limited mobility. Elderly dental care demands tailored approaches due to age-related oral changes. Challenges, like root caries and adjusting to dental fixtures, underscore the value of preserving natural teeth. Yet, complexities in treatments, especially in endodontics, require specialized approaches for success. Treatment planning follows staged methods, considering emergency, maintenance, and rehabilitation, acknowledging elderly limitations. A holistic, multidisciplinary approach integrating dental specialties, geriatrics, psychiatry, and social services is vital for effective care. Ultimately, a blend of expertise, tailored care, and comprehensive knowledge is key to addressing oral health in the elderly.

Keywords: Aging, Dentistry, Geriatric Endodontic, Oral Health

Introduction:

Geriatrics involves medical care targeting health maintenance, disease prevention, and treatment during the later stages of life. It differs from gerontology, which focuses on understanding the aging process itself. Chronological age is the time since birth measured by a calendar, while functional or physiological age is

determined by individual performance capabilities. Gerontologists have categorized the study of older populations into distinct groups based on chronological age: New-old (55-64 years), Young-old (65-74 years), Middle-old (75-84 years), and Old-old (85-plus years).¹ Geriatric dentistry encompasses providing dental care to older adults, addressing diagnosis, prevention, and treatment of issues linked to normal

aging and age-related illnesses, often collaborating within an interdisciplinary healthcare team.²

Age is a recognized risk factor associated with numerous diseases, injuries, hospitalizations, prolonged hospital stays, and adverse reactions to medications.³ Among the elderly, several reasons deter them from seeking dental care, including high costs, fear of pain, limited understanding of dental care needs, decreased cognitive abilities, reduced tolerance for treatment procedures, and limited mobility.⁴ As individuals age or contend with conditions like Parkinson's disease, their hand-brain coordination often diminishes, posing challenges for maintaining daily oral hygiene.⁵

This struggle is exacerbated by changes in saliva function and structure, consistent consumption of soft foods, and the gradual erosion of the protective enamel layer on teeth, heightening susceptibility to cavities.⁶ Saliva flow rates from submandibular and sublingual glands decrease with age, while those from parotid and minor glands show less significant change.⁷ It's important to note that xerostomia, or dry mouth, isn't a natural consequence of aging. Nevertheless, it's estimated that between 25% and 50% of older adults experience xerostomia.^{8,9} Saliva production generally stays consistent among healthy older individuals, but the intake of various medications can reduce it, leading to dry mouth (xerostomia), especially in those over 80 years old who have multiple daily prescriptions. Educating patients about the consequences of dry mouth and ways to manage it is crucial. Despite the known remedy of sipping water to alleviate dry mouth, older adults might resist due to diminished perception of thirst.¹⁰

Among older adults, dental cavities are reported to affect more than 50-60% of the population. While the occurrence of surface cavities in older individuals is comparable to that in younger people, root cavities are much more prevalent (40-70%).⁷ Root surface cavities contribute significantly to tooth loss in geriatric patients, often exacerbated by attachment loss, gingival recession, and challenges in thoroughly cleaning food impactions and local traumas.^{6,11} Dental care tends to be a lower priority due to a lack of awareness and limited socioeconomic status among older adults.² Treatment plans for individuals aged 60 and above differ from those for younger patients, often focusing on extractions and removable prostheses. Unfortunately, age-related declines in orofacial sensorimotor functions affect biting forces, chewing, swallowing, and speech.¹²

As the mandible becomes more edentulous with age, it heightens the likelihood of residual ridge resorption. This can result in temporomandibular joint issues and challenges in retaining removable dentures among the elderly.¹³ The limited ability to adapt or compensate means the elderly may struggle to adjust to tooth loss, new dental prostheses, or oral implants. Thus, preserving natural teeth remains the preferred treatment option for older adults.¹⁴ Most elderly patients tend to opt for tooth extraction only when there are no other viable alternatives. Essentially, there are no age-related reasons to avoid endodontic therapy.⁶ Some propose that elderly patients often prefer fewer, longer treatment sessions over several shorter ones.¹⁵ In situations where time is restricted or treatment must be completed in a single visit, rotary

instruments could be advantageous for the clinician.¹⁶

The internal structure of teeth in elderly individuals differs from that of younger people.¹⁷ Quite frequently, the root canals of elderly teeth display narrowing.¹ Increased calcification in the pulp chamber and root canals can complicate pulp vitality tests during endodontic diagnosis, potentially resulting in inaccurate responses.⁸ Obstructions like narrow canals, internal irregularities, curves, and ledges might hinder the progress of root canal instruments toward the apex, posing a risk that proper canal cleaning and shaping cannot be achieved without an effective negotiation strategy. Failing to address these obstructions might leave the apical section of the root canal infected, casting doubt on the prognosis of the root canal treatment.¹⁷

Morphological alterations occur in both the crowns and roots of teeth as individuals age.¹⁸ Enamel attrition can alter the original shape of the tooth crown. This loss of important reference points can complicate the preparation of access to the root canal. Secondary dentin, formed during the tooth's lifespan, accumulates within the pulp chamber, while the volume of the pulp chamber decreases due to tertiary dentin.⁵ The pulp chamber's shape becomes flatter over time, making it challenging to identify. Secondary dentin deposits could lead to the closure of the root canal in elderly patients due to the aging process.¹⁹ Elderly patients typically present with a narrowed root canal and often an obliterated pulp space, posing negotiation challenges. Overcoming these technical hurdles becomes essential in dealing with the altered pulp chamber and root canal system of older teeth. The initial step involves establishing a smooth

pathway and determining the accurate working length to enable thorough shaping and cleaning of the root canal. Adequate irrigation becomes imperative to disinfect the canal walls.²⁰

In managing calcified canal openings, ultrasonic endodontic tips hold particular importance.⁸ Techniques like magnification and transillumination serve as valuable aids in locating calcified canals during root canal treatment for elderly patients.⁴ Once the negotiation technique for the root canal is effectively executed, it sets the groundwork for subsequent phases, enabling successful shaping, cleaning, and sealing up to the terminus of the root canal.¹⁷ Regarding root canal filling methods, while lateral cold and vertical warm gutta-percha obturation are frequently used and documented, no specific approach stands out as the preferred choice.²⁰ Interestingly, there were no notable differences in the technical quality of root fillings between elderly and young patients.¹⁴

In general, age doesn't significantly alter the considerations or indications for endodontic surgery. While medical concerns might warrant consultation, they typically don't prohibit surgical treatment if extraction is the alternative. Many older patients take low-dose aspirin as a preventive measure against blood clotting and interrupting this therapy could risk embolic formation. Hence, it's recommended to continue aspirin therapy even during dental procedures, including extraction or surgery.²⁰ The theoretical approach to endodontic treatment in the elderly mirrors that in younger patients. However, dealing with endodontic matters in the elderly presents its own set of challenges. Statistics show that around 1 in 3 individuals aged 65 to 74 experience

some level of hearing impairment, while 16% to 20% have mild cognitive impairments, potentially leading to communication barriers. Consequently, dentists might unintentionally offer limited services to elderly patients, resulting in suboptimal care.¹⁴

Treating elderly individuals involves inherent uncertainties and complexities, making treatment decisions quite challenging. Before initiating any clinical treatment plan, several factors need consideration. It's crucial, when treating the elderly, to adopt a holistic approach that integrates their specific needs, demonstrating the benefits while assessing the impact on their quality of life.²¹ When circumstances prevent the realization of an ideal treatment plan, it becomes essential for the dentist to address each issue and discern between ideal, realistic alternatives, and interim plans.⁶ Bannet and Cramer⁶ propose a phased approach to maintaining the oral health of elderly patients, comprising:

Stage I: Emergency care

Stage II: Maintenance and monitoring-encompassing the management of persistent infections, root canal treatments, root planning, and curettage, addressing cavities, denture-related procedures, and educating patients on enhancing oral health. Further assessment is necessary before progressing.

Stage III: Rehabilitation phase involving implants, surgical endodontics, periodontal surgeries, aesthetic enhancements, occlusal plane reconstruction, and restoration of vertical dimension.⁶

Managing elderly patients necessitates special attention to age-related physiological changes, complexities

arising from chronic conditions, heightened occurrences of physical or mental impairments, support systems, and financial constraints. Therefore, a comprehensive approach involving various dental specialties, along with experts in geriatrics, psychiatry, social services, and their rehabilitation teams, is recommended. Profound theoretical knowledge, clinical expertise, and adept behavioral management play pivotal roles in effectively caring for elderly patients seeking treatment.¹

Conclusion

Preserving strategic teeth in older individuals is crucial for optimal oral function. Treatment planning prioritizes these teeth for maintaining arch integrity, denture retention, and bone preservation. Addressing infection in narrow canals requires a systematic approach for improved access and negotiation. Safe, efficient care for older adults involves considering their diverse health needs. While chronic diseases vary, understanding their prevalence aids in anticipating likely scenarios. For cases outside one's expertise, consulting and referring to specialists ensure tailored and appropriate care at different functional levels and stages of life.

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Surgical considerations in geriatric patients

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ABSTRACT

First and foremost, elderly are not the same as younger adults. They respond physiologically to the stressors of disease differently, and their disease epidemiologies differ as well. Additionally, their expectations and ideals for the quantity and quality of their remaining lives varies as well. Dental practitioners must be prepared to care for elderly patients while considering their numerous medical conditions as well as any psychological, social, and family difficulties that may influence how they are treated. Older patients are expected to make up a significant percentage of any dental practice due to current population trends, so dentists must recognise the balance between providing dental care and surgical considerations for these patients. This article is an attempt to discuss some of the considerations in providing dental care to such patients and ways to overcome them.

Keywords: Surgical Considerations, Geriatric Patients, Dental Considerations, Systemic Considerations

Introduction:

Elders are a significant resource in any society. Ageing is a natural phenomenon with opportunities and challenges. Population aged 65 years and above of India increased from 3.7 % in 1973 to 6.9 % in 2022 growing at an average annual rate of 1.27%. [1] The dental field is dealing with an increasingly complex problem. There is a growing demand for services from a growing portion of the population that is most vulnerable to and at possibility of untreated dental and oral illness. Unchecked oral disease in an older person may also have a significantly higher systemic impact, with nutritional impairment, empyema, pneumonia, bacteremia, brain abscess, and other fatal outcomes recorded.

Understanding disease in the elderly requires a thorough understanding of age-related physiologic changes in the absence of pathology. Pre-existing chronic conditions, pharmacodynamic and pharmacokinetic aging-related changes, psychological concerns, and differentiating between pathological and typical ageing features are a few of these special considerations. Acknowledging and comprehending the interdependent effects between the oral cavity and the systemic system is essential for appropriate and efficient therapy. Dentists might identify diseases in their elderly patients before anybody else, allowing for the establishment of the necessary referrals. In addition, the geriatric interview includes targeted questions on everyday functioning, over-the-counter drugs, vitamin supplements, and diet. [2]

As people age, a variety of intricate circumstances may cause their oral hygiene to deteriorate. The resulting dental disorders can have a negative impact on the patients' quality of life. [3] The purpose of the article is to have an insight to the surgical considerations in elderly patients during their dental treatment.

A multidisciplinary diagnostic process which evaluates medical, psychological, functional, frailty status, social capabilities and other geriatric syndromes has to be evaluated under comprehensive geriatric assessment (CGA). [4] During the perioperative phase, older adult surgery patients frequently need a different kind of care than younger ones. They are more likely to experience loss of independence, functional deterioration, surgical complications, and other undesirable outcomes. To give the elderly surgical patient the best care possible, a complete evaluation of their health is necessary. In the hectic surgical practise setting, it may not always be feasible to achieve the goal of a customised, thorough geriatric evaluation at a preoperative session. [5] Complete medical history, patient information and chief complaint, history of current illness, dental history, social history, family history, review of systems, intraoral/extraoral examination, laboratory results, vital signs, impressions and models, imaging such as radiographs and photographs, are all components of a comprehensive diagnostic evaluation that leads to the diagnosis of disease and subsequent treatment plans. [6] A consultation with the patient's physician can often yield additional information; in cases

involving a complex medical history, the consultation may necessitate follow-up discussions with several healthcare providers.[7] Table 1 shows preoperative assessment in checklist form.

In surgical considerations of geriatric patients' haematological evaluation should be 3-4 weeks before the surgery. Analysing iron status should be the first step in the evaluation process if a screening blood test finds anaemia. Additionally, measurements of ferritin, transferrin, and serum iron should be taken. Iron supplementation is recommended when iron deficiency anaemia is verified. [8]

Ageing brings about alterations in hemostasis for a variety of reasons. Ageing causes an increase in platelet activation and most coagulation factors, which in turn causes an increase in thrombin production [9]. Reduced fibrinolytic activity, alterations in the vascular endothelium, and diminished renal function are also linked to ageing [10]. The elderly's coagulation and hemostatic agent interactions are influenced by all of these factors. The most frequent acquired bleeding disorders in the elderly include acquired haemophilia, acquired von Willebrand's disease, drug-induced bleeding disorders, and bleeding disorders owing to renal impairment or chronic kidney disease. Most older people's bleeding is iatrogenic. Aspirin and NSAIDs are being used more often to address chronic pain linked to ageing. Elderly persons who are at risk of venous thromboembolism and cardiovascular disease must take antiplatelet medications (Aspirin, Clopidogrel) and anticoagulant medications (Heparin, Warfarin), which raises the risk of bleeding

[10]. Nonetheless, dental treatments might be planned in consultation with the patient's haematologist for those on oral anticoagulants (Warfarin), taking into account the planned procedure's nature and the patient's International Normalised Ratio (INR). If the INR is kept below 4.0, most dental surgeries won't need stopping warfarin therapy. The dentist needs to be ready to handle bleeding both during and after surgery if the INR is close to the higher range. Before the dental operation, the haematologist may advise delaying the taking of warfarin for at least 24 hours or longer [11]. In cases when numerous visits are necessary for significant dental treatments, the haematologist may recommend switching from warfarin to low molecular weight heparin.

The American Society of Anaesthesiologists published pre-operative fasting guidelines in 2011, recommending that adults undergoing non-emergency surgical procedures fast from the intake of clear liquids for at least two hours before elective procedures requiring general anaesthesia, regional anaesthesia, or sedation/analgesia.[5]

A number of beneficial guidelines, involving the one released by the Infectious Diseases Society of America, the American Society of Health-System Pharmacists, the Society for Healthcare Epidemiology of America, and the Surgical Infection Society, state that pre-operative antibiotics should be administered within 60 minutes of the surgical incision, taking into account the procedure, risk factors, and the hospital's particular pathogen profile.[12]

Every day, medications should be evaluated and reassessed in the preoperative setting. During the perioperative period, essential medications should be continued and non-essential medications should be stopped. Ageing of the kidneys is a multifaceted, intricate process that includes structural and anatomical alterations. Numerous factors, such as decreased glomerular filtrate rate, impaired tubular function, impaired vasodilatory responses, and reduced renin-angiotensin-aldosterone function, are linked to increased rates of diminished renal function in older patients.[13] Pain management in the perioperative phase remains a difficult frontier for all doctors, owing to the high side effect profile of pain medications and the possibility of inadequate pain control. In consideration of these worries, elderly patients who are aware of their risk profile can safely use opioids at the lowest doses that are tolerated [14]. Regional approaches constitute a significant adjuvant analgesic modality, in addition to intravenous opioids, oral opioids, nonopioid analgesics, and alternative therapies such as acupuncture, music therapy, massage, and cryotherapy). [5]

Several research are being conducted in an effort to improve the safety and quality of anaesthetic care in geriatric patients. For elderly patients, there is no one conventional anaesthetic plan to follow; instead, the anaesthetic plan should be customised for each patient. Compared to general anaesthesia, regional anaesthesia may be associated with a lower risk of complications in certain patient groups.[15]

Patients exhibit decreased chest wall compliance, lower respiratory muscle strength, impaired reaction to hypercapnia or hypoxia, higher risk of dysphagia and aspiration, impaired gas exchange, and a tendency for atelectasis as they age.[16] Patients' pulmonary function is altered by anaesthesia and surgery while they are in a supine position, which is linked to decreased lung volumes, diaphragm dysfunction, and modifications in chest wall mechanics.[17] The repercussions of anaesthesia and surgery are taken into account to prevent post operative pulmonary complications (PPCs) by preoperative risk assessment and perioperative care.[18] Preoperative smoking cessation at least 4-8 weeks before surgery, optimisation of COPD medication, and lung expansion exercises are all the measures to reduce PPCs risk. In the postoperative phase, PPCs can be reduced with appropriate pain management, lung expansion exercises, and prompt mobilisation. It could be necessary to use non-invasive positive-pressure breathing to help offset the physiological effects of anaesthesia and serves as both prophylactically and as a therapeutic agent.[19]

Adults are more susceptible to volume overload and fluid retention as they get older due to a variety of causes, including the effects of ageing on the kidneys and co-occurring illnesses like heart failure. Perioperative fluid management needs to be considered on the basis of these aging-related physiological changes as well as the stress reaction to surgery, which includes elevated antidiuretic hormone secretion and subsequent salt and water

retention.[20]In order to meet predetermined hemodynamic targets, these procedures encourage goal-directed therapy for IV fluids, which includes intraoperative monitoring and early, aggressive fluid and vasoactive medication administration. The degree of monitoring, whether invasive or less invasive, varies depending on the procedure, as the guidelines for postoperative IV fluid delivery. The overall goal of this strategy is to prevent hypovolemic and hypervolemic conditions.[21]

Conclusion

In the upcoming years and decades, musculoskeletal disorders will continue to rise in the aged, particularly in geriatric patients. They are still common, intricate processes that have a significant influence on mortality over the long term and different consequences on the activities and quality of daily life. To improve morbidity and mortality and produce positive outcomes, multidisciplinary hospital teams (nurses and physicians) must align with hospital care approaches towards optimal care. Additionally, optimal planning of necessary surgeries must be done. To maximise the results of elderly patients undergoing surgical procedures—not just in cases of trauma but also for so-called "elective" procedures like cancer, pathologies—a number of concepts and activities must be implemented. Carefully considering the patient's medical, social, psychological, and financial barriers to oral health, the clinician must create a carefully thought-out treatment plan that addresses the dental condition and promotes improved oral health.

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Table 1. Checklist for the optimal preoperative assessment of the geriatric surgical patient.[8]

Apart from performing a thorough medical history and physical examination, it is highly advised to perform the following assessments:

- a. Assess the patient's cognitive ability and understanding of the intended procedure.
- b. Assess the patient for signs of depression.
- c. Identify the factors that put the patient at risk of developing postoperative delirium.
- d. Check for dependency on alcohol and other substances.
- e. Perform a preoperative cardiac evaluation in compliance with the American College of Cardiology/American Heart Association algorithm for patients undergoing noncardiac surgery.
- f. Establish the risk factors for the patient's postoperative pulmonary complications and take the appropriate precautions.
- g. Note the functional condition as well as any falls.
- h. Examine for drug and alcohol addictions.
- i. Find the initial fragility score.
- j. Assess the patient's nutritional status and take preoperative precautions into account if there is a significant risk of malnutrition.
- k. Gather an accurate and comprehensive medication history and consider the best perioperative adjustments. Keep an eye out for any cases of polypharmacy.
- l. Considering the possible outcomes, determine the patient's expectations and treatment objectives.
- m. Find out who the patient's family and social support system.

Ask for relevant preoperative diagnostic tests, paying special attention to elderly patients