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Navigating Root Canal Therapy in an Aging Population: Anatomical, Clinical, and Systemic Perspectives

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Abstract

As global life expectancy increases, the aging population is expanding, leading to a significant rise in dental care demands among geriatric patients. Root canal treatment (RCT) in elderly individuals poses unique challenges due to age-related anatomical, physiological, and systemic changes. This review explores the complexities associated with performing endodontic therapy in geriatric patients, including altered pulp chamber morphology, calcification, reduced salivary flow, comorbidities such as diabetes or cardiovascular diseases, polypharmacy-related complications, and limited physical and cognitive abilities. It also discusses advancements in technology and treatment protocols that enable clinicians to deliver safe and effective RCT for elderly patients. Understanding these specific considerations is essential for achieving successful endodontic outcomes and improving the quality of life in the aging population.

Keywords: Root canal therapy, Geriatric dentistry, Elderly patients, Endodontic challenges, Pulp calcification, Aging population.

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INTRODUCTION

"Adding life to years" rather than "years to life", expresses the state of geriatric care model Philip. J. Clark.

The global demographic shift toward an aging population has brought geriatric healthcare, including dental care, into sharper focus. With more elderly individuals retaining their natural dentition well into advanced age, root canal treatment (RCT) has become increasingly relevant in the management of dental diseases in this group. However, endodontic treatment in geriatric patients presents several challenges that differ from those in younger populations [1].

Aging affects the oral environment in multiple ways- there are changes in dental pulp size due to secondary dentin deposition, increased pulp chamber calcifications, reduced pain perception, and diminished healing capacity. Systemic health issues, such as osteoporosis, diabetes mellitus, cardiovascular conditions, and cognitive disorders, often complicate treatment planning and execution. Additionally, many elderly patients are on multiple medications, which can impact salivary flow, healing response, and overall prognosis [2].

Both uncertainty and complexity are inherent in the treatment planning of the elderly making treatment decisions difficult. Prior to any clinical treatment planning, the following determinants need to be considered:

1. Patient desires and expectations.

2. After assessing the four domains of need—function, symptoms, pathology, and aesthetics- the type and degree of the patient's dental issues.

3. Effects on the patient's quality of life, including eating habits, comfort level, and appearance, which may have an impact on self-esteem.

4. The likelihood of a successful course of treatment (prognosis).

5. The availability of affordable and condensed substitutes.

6. The capacity to withstand the stress of treatment.

7. The ability of the patient to maintain dental health, regardless of whether they are highly driven and capable of doing it on their own or need help.

8. The financial resources of the patient.

9. Lifespan.

10. Financial, emotional, or physical support from family.

In order to show the benefits of treating the elderly while considering how it will affect their quality of life, it is important to incorporate their needs- functional, psychological, perceived, and normative- into a comprehensive strategy. The dentist should concentrate on each issue and then differentiate between ideal, practical alternatives and a temporary plan when circumstances make it impossible to implement the ideal treatment plan. Staged treatment planning has been proposed by Bannet and Cramer. The necessary care can be provided in steps that are suitable for the immediate problems' resolution if the treatment is properly staged. After a serious dental issue has been resolved, think about offering more involved and thorough treatment [3].

This review aims to highlight the anatomical, physiological, and systemic changes relevant to endodontic procedures in geriatric patients. It will discuss current strategies, modifications in clinical approach, and emerging technologies that help manage these complexities effectively, thereby enhancing clinical success rates and patient outcomes.

STAGED TREATMENT PLAN

- **Stage I – Emergency care**

- **Stage II – Maintenance and monitoring:** Includes management of chronic infection, Root canal therapy, Root planing and curettage, restoration of carious lesions, work related to dentures, Patient education to improve oral health. A further period of evaluation is required before one proceeds further

- **Stage III – Rehabilitation phase:** Consists of implants, esthetic rehabilitation, surgical periodontics, surgical endodontics, occlusal plane reconstruction, and vertical dimension restoration [1].

GUIDELINES FOR MANAGING THE ELDERLY ENDODONTIC PATIENT

1. Short appointments

2. Pillows for back/neck comfort

3. Mouth props/bite blocks

4. Magnification and transillumination to identify calcified canals

5. Rotary NiTi instrumentation to reduce treatment.

RESTORATIVE MANAGEMENT OF COMMON ORAL DISEASES IN THE ELDERLY

DENTAL CARIES

It is estimated that between 50 and 60 percent of elderly persons have dental caries. The incidence of root caries is significantly higher (40–70%) than that of coronal caries, which is somewhat comparable in the elderly to that of the young. Repairs and replacements are the main operational tasks in today's dentistry, and the percentage of secondary caries in the elderly is higher than that of initial caries. Silver amalgam is found at gingivoproximal sites of class II restorations or crowns, accounting about 93% of recurrent caries. Since risk factors are crucial to treatment planning, it is essential to assess them as a first step.

Analysis of the patient's complete medical history, including prescription drugs, is necessary. It is necessary to elicit dietary history, including specifics about sucking candies, etc. Tests for buffering capacity and salivary volume can also aid in decision-making. Two stages of treatment can be implemented, taking into account the different determinants [4].

1. RESTORATIVE PHASE

The restorative approaches that older persons choose are largely the same as those used by younger people. However, since these restorations may be easily and affordably updated or fixed, it is preferable to use approved direct plastic restorative materials in the former case. Caries activity is rather high due to a number of risk factors, necessitating regular maintenance that may be difficult to accomplish with an indirect restoration. Root caries restorative considerations Since most root carious lesions are located gingival or subgingivally to the proximal surface, visibility, accessibility, and isolation are quite challenging.

In root caries, mineral loss can occur twice as quickly as in enamel. In 1984, Billings et al. divided root caries into multiple classes and described a treatment strategy that is still effective today. Compared to composites, glass ionomer cement (GIC) is the preferred restorative material because of its adhesive qualities, which allow for minimal preparation, fluoride release, reasonable aesthetics, biocompatibility, and reduced method sensitivity.

Numerous people have proposed innovative and different approaches to managing dental cavities. Holmes showed that ozone exposure reversed leathery root caries (grade I and II, non-cavitated sites). It is believed that exposing the lesion to ozone for 10–40 seconds has antimicrobial properties, removes the ecological niche, and decreases acidity, allowing for remineralization. It has also been proposed to use carisolv and lasers for caries excavation, particularly for patients who are intolerant to local anesthetics [3].

2. MAINTENANCE PHASE

Not only are there several risk factors that co-occur in the elderly, but many of them are also irreversible. Caries activity is going to stay high and erratic, and it may even get worse as people age. For the remainder of their lives, it is difficult and irritating to maintain minimal caries activity in the face of rising risk factors. With a few modest adjustments to accommodate the elderly, the preventative strategy also stays the same because the mechanism of dental cavities is the same in both young and old people [5]. It is recommended to utilize fluoride rinses and dentifrices every day in addition to a topical fluoride application regimen on occasion. It's possible that fluoride varnishes are better than others. People who have less dexterity might benefit from automated toothbrushes. Mouthwashes, mouth rinses, and chlorhexidine gel are recommended.

10 % varnish is preferred over rinse/gel once a week for four weeks. New remineralization products containing casein phosphopeptide-amorphous calcium phosphate (CPP-ACP), casein phosphopeptide-amorphous calcium phosphate fluoride (CPP-ACPF), may also be of some benefit. Xylitol containing candies help not only in getting over the dryness but also prevents caries. In order to prevent root caries, every effort should be made to stop more gingival tissue attachment loss [6].

PREVENTIVE REGIMEN FOR ELDERLY WITH DRY MOUTH

Consult the attending physician about changing the medication if it is drug-induced and causing significant discomfort. This may involve changing the timing of the medicine or switching to a medication with a less potent anticholinergic effect. Reducing caffeine-containing beverages and encouraging the patient to drink water often throughout the day could help alleviate symptoms. Advise the patient to substitute Xylitol-containing gums and candies with sugar-containing lozenges and candies. Artificial saliva, which comes in gel, spray, and liquid form, can be prescribed to patients who have severe salivary gland failure [7].

NON CARIOUS TOOTH TISSUE LOSS

One of the most prevalent issues among older dentate people is tooth wear. Attrition, abrasion, and erosion are the three processes that cause teeth to wear down; these processes are rarely observed separately. This is the reason Smith and Knight coined the more broad term "tooth wear" in 1984. Because to xerostomia, saliva's ability to act as a buffer is diminished, rendering teeth more vulnerable to acid erosion. Cementum that is exposed is prone to erosion and abrasion. Another element contributing to attrition is inadequate posterior support. Elderly tooth wear can lead to discomfort, a decrease in clinical crown height, an ugly appearance, and the potential for cavities to form on the exposed cemental and dentinal surfaces.

In order for teeth to continue migrating incisally or occlusally with the alveolar bone, progressive eruption typically occurs in tandem with a reduction in the height of the tooth crowns. This results in long, bulky alveolar processes that support the maintenance of the occlusal vertical dimension. When it comes to tooth wear issues, the degree of therapy required depends on the patient's age, symptoms, perceived needs, and motivation. The goal of treatment is usually to strengthen the modifying elements and eradicate the etiological factors [8].

According to Davies, there are two types of treatment: passive and active. The two components of passive treatment are prevention and observation. Monitoring aids in determining if tooth surface loss is static or progressive. Progress can be evaluated with the use of study casts, periodic examinations, and photographs taken at various points in time. Depending on the main etiological reasons, preventive therapy aims to stop more tooth tissue loss. For instance, dietary changes and a fluoride program may be recommended if erosion is caused by consuming too much citrus drink. The majority of patients can only be effectively treated passively.

The following factors, including sensitivity, aesthetics, functional problems, and vertical dimension loss, may necessitate active therapy. Depending on the location, occlusal load, and aesthetic requirements, glass ionomers or composite resin materials can be used to correct localized flaws brought on by erosion, abrasion, or attrition [9]. Advanced rehabilitative therapy is rarely required for patients. Following assessment of the patient's motivation, financial situation, and ability to handle stress, a careful selection of cases is necessary.

Reconstruction employing direct composite build-up can result in a little increase in vertical dimension of no more than 1-2 mm thanks to the introduction of newer, superior composite resin materials. It is preferable to proceed with substantial crown and bridge work after establishing a centric relationship with a stabilizing splint, before restoring the natural facial height, if it is greater than that or if it involves more than one or two surfaces [10].

ESTHETIC REHABILITATION OF THE ELDERLY

You can smile at any age. Due to their autonomous social lives, the majority of older people are self-conscious about their appearance. Elderly patients may receive simple recontouring procedures, bleaching, laminates, and crowns, among other aesthetic treatments. To get predictable results, any significant aesthetic rehabilitation should only be started after a thorough occlusal and aesthetic analysis [11].

ENDODONTIC CONSIDERATIONS IN THE ELDERLY

There are some circumstances that post limitations, such as in patients who cannot sit on the dental chair and endure a long course of treatment or in patients with severe Parkinson's disease, tremors, etc., even though there are no absolute contraindications for root canal therapy in the elderly. When treating older patients with root canal therapy, numerous technical difficulties arise at every stage of the procedure, from diagnostic to treatment. The response to conventional vitality testing may be reduced by increasing pulpal fibrosis and dentin volume. Therefore, it would be incorrect to treat the pulp without additional supporting data and to presume that it is not vital [4].

Certain systemic conditions may preclude the use of epinephrine reducing the duration of anesthesia warranting reinjections. Isolation is often difficult because of subgingival caries or defective restorations. Special techniques may be necessary to hold the dam in place. Access and canal negotiation probably presents the greatest challenge in geriatric endodontics. To avoid disastrous overcutting, the preoperative radiograph could be used to assess the physiological reparative and degenerative changes in the pulp space. With more light and magnification, the pulp stones are frequently visible. Particularly helpful for slicing through the calcifications covering the canal orifices are ultrasonic troughing tips. Teeth that are over-erupted, slanted, or have a lower clinical crown height require careful planning. Using half-sized files during canal preparation could make it easier for the expanding tools to follow the path [12].

The cemento-dentinal junction is typically located between 0.5 and 1 mm from the root's outer surface in young individuals, but in elderly patients, this distance increases due to ongoing cementum synthesis at the apex. Preparing the root canal and lowering the chance of binding and separation requires more time, attention, and work because the canals are much narrower. Patients who are able to handle stress and are functionally independent can be treated in a single sitting in terms of the number of sittings. Shorter, more frequent visits might be necessary for people who cannot tolerate extended mouth opening.

Using a rubber biting block could help alleviate this irritation to a certain degree. In conclusion, if adequate care is taken with the diagnosis, high-quality radiographs, and modifying methods to go around the problems caused by the calcification of the root canal system, endodontics can be beneficial for the elderly. Endodontic therapy is appropriate and acceptable for every patient as long as the tooth has a strategically significant role to play [7].

SYSTEMIC DISEASES AND ORAL HEALTH IN GERIATRIC PATIENTS

There is a correlation between systemic chronic diseases and oral ailments, according to several recent research. Furthermore, inflammation has been identified as the primary link between a number of these illnesses. Chronic diseases are described as illnesses that persist longer than three months, impact a person's life, and necessitate ongoing medical care. Elderly people are more likely to suffer from chronic illnesses; 50% have at least two problems, and 80% have one.

In the US, chronic illnesses are the main cause of death and disability. Heart disease, malignant neoplasm, chronic lower respiratory diseases, cerebrovascular diseases, Alzheimer's disease, diabetes mellitus (DM), influenza and pneumonia, nephritis, unintentional accidents, and septicemia are the top 10 causes of death for people 65 and older, according to the National Vital Statistics [13].

The writers have decided to select cardiovascular diseases (CADs), hypertension diabetes, arthritis, osteoporosis, and stroke to cover in this article. Oral guidelines are given, and their relationship to oral health is

emphasized. The papers by Drs. Scannapieco, Shay, Brennan, and Strauss address aspiration pneumonia and cognitive impairment in older persons [14].

NOTE:- The consequences of these chronic conditions, the prescribed medications, and their side effects make dental care more complicated for the elderly. Oral health affects general health, and systemic disorders can affect oral health. Good oral health improves nutrition, self-esteem, social connections, and food choices. Professionals in the field of oral health should be aware of how systemic disorders affect oral health. They will be better equipped to suggest appropriate preventative measures and create suitable treatment regimens for oral health with this increased understanding.

ORAL HEALTH IMPLICATIONS OF DIABETES

Gingivitis and periodontal disease

The primary cause of tooth loss in older adults is periodontitis, which is regarded as the sixth consequence of diabetes mellitus [13,15]. Severe periodontitis is 2.9 times more common in those 45 years of age and older with poorly managed diabetes (A1C >9%) than in those without the disease. Smokers with poorly managed diabetes have a significantly higher chance (4.6 times) [6]. Diabetes also raises the risk of oral infections and abscess formation, as well as delaying healing. A recent study conducted in Korea on an aged population showed a correlation between the incidence of periodontal disease and metabolic disorders. According to the findings, individuals who had high blood pressure, diabetes, and obesity for extended periods of time had a much higher risk of developing periodontal disease.

Hyperglycemia and inadequate management of diabetes are linked to periodontal disease. Diabetes is thought to increase the likelihood of developing periodontitis, and periodontitis may increase the severity of diabetes. This relationship is thought to be reciprocal. Diabetes increases cytokine levels, promotes oxidative stress in periodontal tissues, and causes the production of AGE (advanced glycation end-products), all of which exacerbate periodontal disease [16]. However, by lowering plasma HbA1C at three months by amounts comparable to adding a second medication to a pharmacologic regimen, periodontal therapy can play a significant role in managing diabetes [5].

Salivary dysfunction is the cause of xerostomia, or dry mouth. Macedonian researchers came to the conclusion that salivary glucose levels and the severity of xerostomia are significantly correlated. Dry and friable oral mucosa, decreased lubrication, decreased antibacterial activity, increased caries activity, increased oral fungal infections, glossodynia, dysgeusia, dysphagia, poor retention of detachable prostheses, and difficulties masticating are all consequences of salivary hypofunction. 20 Because of the greater use of prescription medications and the larger frequency of systemic disorders, xerostomia is more common in older populations [17].

Patients with diabetes have been observed to have more severe and frequent dental caries. A higher number of carious teeth was found to be associated with a lower salivary flow rate, poor glycemic management, and a significantly elevated HbA1C score. To better understand the impact of salivary flow rate and minerals in relation to dental caries in diabetic patients, more research is required. lesions in the oral mucosa. Research has indicated that some lesions, including angular cheilitis, denture stomatitis, and geographic tongue, are far more common in diabetics [11,12]. Although the exact origin of geographic tongue in diabetics is still unknown, it may be linked to the microangiopathy of the oral vasculature in diabetes individuals, which causes slower repair and delayed healing.

Fungal infections: According to a number of studies, diabetics are more likely to develop angular cheilitis, denture stomatitis, and oral candidiasis. Patients with diabetes have a significant prevalence of candidiasis and a subsequent association with salivary dysfunction [18].

RECOMMENDATIONS FOR PROVIDING DENTAL CARE TO DIABETICS

- Dental providers should assess glycemic control routinely before any invasive procedures.
- Patients should be asked about any changes in insulin dosage, hypoglycemic medications, and diet before their dental appointment.
- Consultations with an interdisciplinary health team should be done when needed.
- Routine screening for diabetes complications and close monitoring of patients should be done at each visit.
- The oral health provider should emphasize preventive procedures, periodic oral examinations, and prevention of periodontal disease.
- Patients with diabetes require good oral hygiene habits for maintenance of their oral health

ORAL HEALTH IMPLICATIONS OF HYPERTENSION

Xerostomia, a condition brought on by medications used to treat hypertension, may result in severe tooth decay, mouth ulcers, and oral infections. Patients with xerostomia frequently report glossodynia and trouble swallowing. The risk of xerostomia is increased by thiazide diuretics, a-/b-blockers, angiotensin-converting enzyme inhibitors, and calcium channel blockers. According to the Puerto Rican Elderly Dental Health Study, adults who have periodontitis may have trouble controlling their blood pressure. To confirm this conclusion, more research is necessary. Nifedipine, Diltiazepan, Verapamil, and Amlodipine are calcium channel blockers used to treat hypertension; they might cause gingival hyperplasia as a side effect. In extreme situations, tissue removal surgery can be necessary. A number of hypertensive drugs can also result in mucosal sores like lichenoid responses [15].

RECOMMENDATIONS FOR PROVIDING DENTAL CARE TO HYPERTENSIVE PATIENTS

- Measure a patient's blood pressure before the initiation of any dental treatment.
- Consultation with an interdisciplinary team may be needed to establish a parameter in which a patient can be safely treated in the dental office.
- Use caution when administrating local anesthetics that contain epinephrine. Limit their usage to 1 or 2 cartridges of 2% lidocaine with 1:100,000 epinephrine.
- In patients with uncontrolled and severe hypertension, anesthetics without vasoconstrictors should be used. Vasoconstrictors impregnated in gingival cords should also be avoided.
- Minimize the potential of orthostatic hypotension by raising the dental chair gradually and allowing the patient to remain in an upright seated position before standing.
- Reduce stress and anxiety to avoid an acute elevation in blood pressure as a result of the released of endogenous catecholamines

ORAL HEALTH COMPLICATIONS OF CVDS

Although there is no direct correlation between CVDs and oral symptoms, the oral cavity is impacted by the side effects of drugs used to treat CVDs. 72 Medication side effects for heart failure include

lichenoid responses, dry mouth, burning of the mouth, and changes in taste. Atherosclerosis, vascular disease, and periodontal infections may be related, according to epidemiologic data. The American Academy of Periodontology states that coronary artery disease may double as a result of periodontal disease. Several biological processes could account for the connection between periodontal disease and CVD. For individuals at risk of bacterial endocarditis, dentists should adhere to the American Heart Association's recommendations for antibiotic prophylaxis.

Excessive bleeding during surgery is a risk for certain patients receiving long-term anticoagulant medication (Coumadin). Regarding the operation kind and the international normalized ratio (INR) level, dentists should speak with the doctors of their patients. Even if a patient has a dental extraction, oral anticoagulants shouldn't be stopped for those with stable INRs in the therapeutic range of 2 to 4. Following dental treatments, patients receiving antiplatelet therapy—such as aspirin with clopidogrel/dipyridamole—may experience more postoperative bleeding. Local hemostatic techniques, however, can be used to control this bleeding [18].

RECOMMENDATIONS FOR PROVIDING DENTAL CARE TO PATIENTS WITH CVDS

• Prior to beginning any dental surgery, check vital signs. Make brief appointments, ideally early in the day. Anticholinergics with epinephrine (maximum 0.036 mg epinephrine or 0.20 mg levonordefrin) should be used with caution as they can cause cardiac excitement.

• Vasoconstrictors should not be used by people on digoxin as they may result in arrhythmias. Digoxin poisoning can result with the use of macrolide and tetracycline antibiotics, therefore be on the lookout for symptoms like hypersalivation.

• Avoid the use of NSAIDs.

• Avoid the use of gingival retraction cords impregnated with epinephrine in all patients with CVDs. Use alternatives such as tetrahydrozoline HCl 0.05% or ocymetazoline HCl 0.05%.

• Be cautious when using electrical devices that might interfere (eg, ultrasound scalers) in patients with pacemakers or implantable defibrillators.

• The INR or the prothrombin time laboratory values should be measured when performing dental procedures in patients with anticoagulant therapy to assure that they are in the acceptable range [19].

ORAL HEALTH COMPLICATIONS OF STROKE

Stroke patients are very vulnerable to oral diseases because of the limitations in the activities of daily living and impaired manual dexterity. Inadequate oral hygiene combined with xerostomia leads to additional oral problems, such as candidiasis, dental caries, periodontitis, mucosal lesions, and tooth loss.

RECOMMENDATIONS FOR PROVIDING DENTAL CARE TO PATIENTS WITH CVDS

• Prior to beginning any dental surgery, check vital signs. Make brief appointments, ideally early in the day. Anticholinergics with epinephrine (maximum 0.036 mg epinephrine or 0.20 mg levonordefrin) should be used with caution as they can cause cardiac excitement.
• Vasoconstrictors should not be used by people on digoxin as they may result in arrhythmias. Digoxin poisoning can result with the use of macrolide and tetracycline antibiotics, therefore be on the lookout for symptoms like hypersalivation.

• Steer clear of NSAIDs.

• For all patients with CVDs, refrain from using gingival retraction cords impregnated with epinephrine. Use substitutes like ocymetazoline HCl 0.05% or tetrahydrozoline HCl 0.05%.

• Exercise caution while employing electrical devices that could interfere with patients who have implanted defibrillators or pacemakers, such as ultrasound scalers.

• When performing dental treatments on patients receiving anticoagulant medicine, it is important to measure the INR or prothrombin time laboratory results to ensure that they are within an acceptable range.

RECOMMENDATIONS FOR PROVIDING DENTAL CARE TO PATIENTS AFFECTED BY STROKE

• Preventive dental treatment is essential, and more regular recall visits are advised.

• When there is a lack of manual dexterity, an electric toothbrush or adaptable holders are advised.

• Within the first three months following a stroke, dentists should postpone elective and invasive dental procedures for their patients.

• When providing dental care, make sure the patient is seated upright and take care to prevent them from aspirating foreign particles.

RECOMMENDATIONS FOR PROVIDING DENTAL CARE TO PATIENTS WITH ARTHRITIS

The temporomandibular joint may be impacted by arthritis, which could impair mastication and the range of the jaw aperture. Oral hygiene may be impacted by OA of the hands, which makes regular brushing and flossing more difficult due to pain and decreased manual dexterity. Antibiotic prophylaxis is necessary for patients with prosthetic joints prior to invasive dental procedures in order to stop oral germs from entering the circulation and reaching the prosthetic joint.

• For individuals with manual restrictions, using an electric toothbrush and long-handled floss can help with daily dental care. Since patients with multiple joint disorders may experience joint pain and discomfort in multiple body parts, short sessions are preferred. Additionally, patients must to be free to change positions as necessary.

• Additional pillows, cushioning, and/or adjustments of the dental chair can aid in patient comfort.

• For patients with removable partial dentures, clasps should be designed to maximize ease of placement and removal.

ORAL HEALTH IMPLICATIONS OF OSTEOPOROSIS

Studies have shown that mandibular and maxillary bone densities, as well as alveolar BMD and height, are modestly correlated with other skeletal sites. However, whether low BMD in the jaw results in other adverse changes, such as missing teeth, gingival bleeding, greater probing depth, and gingival recession, is still unclear.

• Dentists should be aware of the implications and possible risks when patients are under bisphosphonates therapy.

RECOMMENDATIONS FOR PROVIDING DENTAL CARE TO PATIENTS WITH OSTEOPOROSIS

• Dentists should be aware of the implications and possible risks when patients are under bisphosphonates therapy.

CONCLUSION

Root canal therapy in geriatric patients is a vital but complex aspect of modern dental care. The interplay between age-related changes in tooth structure, systemic comorbidities, and psychosocial factors requires a comprehensive and tailored approach. Successful outcomes in elderly patients depend not only on technical precision but also on the clinician's ability to adapt procedures to the patient's medical status, oral condition, and functional limitations.

This review emphasizes the importance of thorough preoperative assessment, use of magnification and advanced imaging, careful medication review, and patient-centered communication. With continued research, training, and the adoption of newer endodontic technologies, clinicians can overcome many of the traditional barriers to providing high-quality care to the aging population. Ultimately, improving access to and delivery of endodontic treatment in geriatric patients will significantly contribute to their overall oral health, comfort, and quality of life.

Conflicts of Interest

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