Endodontic considerations in the elderly - case series

Deepak Nayak U.S. # *
Roma M. # *
Sureshchandra B. # *
Amrita Majumdar # *

ABSTRACT
Tooth retention has increased significantly in older individuals, and dentists are now challenged to preserve the strategic teeth. There will be a need to consider the endodontic therapy, and this paper describes how successful endodontics can be provided for elderly patients. Strategic treatment planning is essential, and preservation of key teeth will facilitate the satisfactory oral function for elderly patients. These teeth may be important in achieving and maintaining an intact anterior dental arch, for removable partial denture retention or preservation of alveolar bone. Elimination of infection can be challenging in narrow canals, and a systematic approach in improving access into and negotiating these canals is outlined.

Key words: Geriatric dentistry, Elderly

Introduction
Endodontic considerations in the elderly patients are similar in many ways to those in the younger patient in many ways. Endodontics has been successively performed on patients ranging from the age of 2 to 96 yrs. Elderly patients are very aware of their oral health and the value of each tooth.

The number of persons age of 65yrs and older in the United States, is estimated to exceed 35 million by 21st century. Not only is this older group going to grow in numbers, but also their dental needs will continue to increase. Their expectations for the dental health parallel their demands for quality medical care. Most of the elderly patients will accept extraction only when there is no other alternative. An even more important consideration is that their dentition would have experienced decades of dental disease as well as restorative and periodontal procedures. These all have an adverse effect on the pulp, periradicular and surrounding tissues and with a compound effect. In other words, the more injuries that are inflicted, the greater the likelihood of the irreversible disease and the damage.

The combination of an increase in pathosis and dental needs coupled with greater expectations has resulted in more endodontic procedures for older adults. Furthermore, expanded dental insurance benefits for pensioners as well as more disposable income has made more complex treatment affordable.

Endodontic procedures in the elderly patients have been challenging from a technical perspective in view of the likelihood of the pulp space system being obliterated. These challenges also include biological, medical, and psychological differences from the younger patient as well as treatment complications.

The purpose of this paper is to outline the role of endodontic treatment in helping older adults achieve the goal of retaining healthy teeth and satisfactory oral function into old age.
Patient considerations

The response of teeth in elderly patients to high quality endodontic procedures is as good as it would be in younger adults. In these patients, the success of the endodontic treatment depends on elimination of pathogenic bacteria from the pulp space and prevention of re-infection. There are, nonetheless, some general considerations pertinent to the elderly patient.

Geriatric Essentials

- The elderly are more susceptible to caries; contributing factors inability to perform adequate oral hygiene, missed dental examinations and cleanings, salivary gland dysfunction, frequent intake of snacks, and removable partial dentures.

- Root surface caries become more common in the elderly patients because of erosion periodontitis, local trauma including chipping of tooth, alveolar bone loss, exposure of root surfaces by gingival recession and periodontal pocketing, and inadequate removal of the food between teeth.

- The elderly experience less tooth sensitivity overall, but symptoms, signs and diagnostic strategies are otherwise similar to those of adults of other age groups.

- Elderly patients with impaired dexterity may benefit from electric tooth brushes or manual tooth brushes with larger handles, and from floss holders.

- Patients with dementia and those with disorders that limit upper extremity mobility and dexterity (eg.stroke, Parkinson’s disease) may require tooth brushing by others and professional cleaning more often than every 6 months.

Endodontic challenges in treating a geriatric patient

Basically there are no age-related contraindications to endodontic therapy. But as the body ages, inevitable regressive changes take place in a number of body tissues. Various changes occur in teeth and surrounding structures.
Gerontology of the oral cavity

Data on the effect of aging on oral tissues are scarce. Often there is no clear demarcation between normal physiological aging and pathological diseases.\(^4\)

1. Pulpal changes due to aging
   - The number and size of pulpal cells decrease.
   - The number of pulpal collagen fibres increase.
   - Constant recession of the pulp due to secondary and tertiary dentin formation.
   - The number of blood vessels and nerve fibres decreases.

2. Pulpal cellular changes due to aging
   - The number of odontoblasts and fibroblasts decrease.
   - Remaining odontoblasts and fibroblasts are more likely to appear less active.

3. Pulpal fibrotic changes due to aging
   - Decrease in the number and size of fibroblast.
   - Apparent increased fibrosis with time may not be from continued formation of collagen but may be due to the persistence of connective tissue sheaths in an increasingly narrow space.

4. Pulpal vascular changes in the pulp
   - Decrease in the number of blood vessels.
   - Many pulpal arteries may demonstrate arteriosclerotic changes.
   - Arteriosclerosis results in the decrease of the lumen size with intimal thickening and hyperplasia of elastic fibres.
   - Calcification of precapillaries and arterioles is also common.

5. Dentin formation
   - Dentin formation continues throughout the entire life as long as the pulp remains vital. Continued dentin formation occurs with the deposition of
     a. Secondary dentin
     b. Tertiary dentin - irritation dentin and reparative dentin.
   - Secondary dentin formation is greatest in the incisal pulp in the anterior teeth and on the floor of the mouth in the posterior teeth. This makes location of the pulp chamber and/or root canals difficult.
   - The pulp chamber of the posterior teeth becomes flattened and disc-like making it easier to pass a bur through the chamber into the furcation.
   - Tertiary dentin forms under the stimulation of function and irritation. An aged tooth may represent a premature response to the abuses of caries, extensive restorative procedures and inflicted trauma. Regressive alterations result in increased amounts of hard tissue in the underlying pulp.
   - Irritation dentin may be extensive enough to fill the entire pulp space.

Diagnosis

Diagnostic procedure \(^2\)

- Chief complaint: Patient’s dental knowledge and ability to communicate
- Medical history (systemic condition and drugs)
- Dental history
- Subjective tests (absence of significant signs and symptoms are common)
- Objective tests: Pulp vitality testing
a. EPT, Routine pulp testing done, cold testing is said to be more reliable
b. Periapical testing

Pulps with a high degree of pulpal calcifications may give false negative responses to pulp testing procedures including heat, cold and electric pulp testing.

• Radiographic Findings: Parallel and bitewing

Treatment planning for elderly

Both uncertainty and complexity is inherent in the treatment planning of the elderly making treatment decisions difficult. Prior to any clinical treatment planning, the following determinants to be considered[^1]:

• Patient desires and expectations.
• Type and severity of patients dental problems after evaluating the four domains of need such as function, symptoms, pathology, and esthetics.
• Impact on patient’s quality of life in terms of ability to eat, comfort level, and esthetics that could affect self-image.
• Probability of positive treatment outcome.
• Availability of reasonable and less extensive alternatives.
• Ability to tolerate treatment stress.
• Patient’s capability to maintain oral health, whether he or she is well motivated and can carry out independently or require assistance.
• Patient’s financial resources.
• Life span.
• Family support - physical, psychological or financial.

While treating the elderly, one should integrate their needs into a holistic approach to demonstrate the benefit, taking into account the impact of it on the patient’s quality of life.[^9] When conditions prevent the achievement of an ideal treatment plan, the dentist should focus on each problem and then distinguish between ideal, realistic alternatives and an interim plan.

Bannet and Cramer[^14] have suggested staged treatment planning for the maintenance of the oral health of the elderly patients.

Staged treatment plan:

Stage I: Emergency care
Stage II: Maintenance and monitoring- includes management of chronic infection, root canal therapy, root planing and curettage, restorations of carious lesions, work related to dentures, patient education to improve oral health. A further period of evaluation is required before proceeds further.

Stage III: Rehabilitation phase - includes implants, surgical endodontics, surgical periodontics, esthetic rehabilitation, reconstruction of occlusal plane and restoration of vertical dimension.

Case Reports

Case -1

A 81 year old male reported to the Department of Conservative dentistry and Endodontics, A.J Institute of Dental Sciences, with the complaint of decayed tooth in the lower left back region of the jaw. The patient also complained of being partially edentulous and wanted the replacement of the missing teeth. Preoperative orthopantomograph (OPG) was taken. On examination, 36 presented with deep occlusal carious lesion and sensitive to percussion. An IOPA radiograph was advised. The diagnostic radiograph revealed no periapical changes but shows radiolucency involving pulp.
Caries excavation was done. 2 % local anaesthesia was administered and the tooth was isolated under rubber dam. Access opening was done with Endo Access bur. The canal orifices were explored with DG-16 explorer (Dentsply, Switzerland). Mesiobuccal, mesiolingual and distal canals were located. Working length was determined using a radiograph. Patency of the canals was made with #6, #8 and #10 number K-files with glyde till working length. Canal orifices were enlarged with gates glidden drills. Cleaning and shaping was done by standardized technique using K files. Apical preparation of mesiobuccal and mesiolingual canals was prepared till # 25 file and the distal canal was prepared till #30 file. Glyde was used as lubricant and 5.25% sodium hypochlorite, saline were used as irrigants.

The canals were obturated using gutta percha by lateral and vertical condensation technique. Post obturation radiograph was taken. The tooth is restored with silver amalgam permanent restoration and followed up clinically and radiographically. The patient was further referred to the Department of Prosthodontics for replacement of the remaining missing teeth.

Case - 2

A 83 year old male reported to the Department of Conservative dentistry and Endodontics, A.J Institute of Dental Sciences, with the complaint of decayed tooth in the lower front region of the jaw. The patient also complained of being partially edentulous and wanted the replacement of the missing teeth. Preoperative orthopantomograph (OPG) was taken. On examination, 41 presented with deep occlusal carious lesion and sensitive to percussion. An IOPA radiograph was advised. The diagnostic radiograph revealed no periapical changes but shows radiolucency involving pulp.

![Pre-operative radiograph](image1)

![Post operative radiograph](image2)

![Completed treatment](image3)
Caries excavation was done. 2% local anaesthesia was administered and the tooth was isolated under rubber dam. Access opening was done with Endo Access bur. The canal orifice was explored with DG-16 explorer (Dentsply, Switzerland). Working length was determined using a radiograph. Patency of the canal was made using #6 and #8 files and number K-files with glyde till working length. Canal orifice was enlarged with gates glidden drills. Cleaning and shaping was done by standardized technique using K files. Apical preparation of the canal was prepared till #40 file. Glyde was used as lubricant and 5.25% sodium hypochlorite, saline were used as irrigants.

The canal was obturated using gutta percha by lateral and vertical condensation technique. Post obturation radiograph was taken. The tooth is restored with glass ionomer as the permanent restoration and followed up clinically and radiographically. The patient was further referred to the Department of Prosthodontics for replacement of the remaining missing teeth.

**Conclusion**

The elderly population is increasing in industrialized societies worldwide. With the decline of caries and periodontal diseases in the younger age groups, dental professionals will be expected to take care of more elderly dentate patients. The management of the elderly population differs from that of the general population because of age-related physiological changes, the presence of age-related conditions/diseases, increased incidence of physical and mental disabilities, and also social and economic concerns. Geriatric dentistry is a specialized multidisciplinary branch of general dentistry designed to provide dental services to elderly patients. Today, oral changes occurring during aging are not clearly understood. Many treatment modalities for geriatric patients are still experimental. Further studies in geriatric dentistry both at the clinical and basic science level are necessary. Oral health is linked to general well being for the elderly. Conversely, adverse oral health has been identified as a risk factor for several systemic disorders/diseases. Dental care should be integrated into overall health management of all geriatric patients.

**References**


