

Geriatric Endodontics- An Overview: Diagnosis and Treatment Planning (Part –II)

Manpreet Kaur¹, Rishu Gautam^{2*} and Munnasha Uppal³

¹Consultant Endodontist, Chandigarh & Mohali, India

²Senior Lecturer, Department of Conservative Dentistry & Endodontics, Baba Jaswant Singh Dental College & Hospital, Ludhiana

³Consultant Pedodontist, Chandigarh & Mohali, India

*Corresponding Author

Rishu Gautam, Senior Lecturer, Department of Conservative Dentistry and Endodontics, , Baba Jaswant Singh Dental College & Hospital, Ludhiana. India, Tel: 9814903216, E-mail: dr.manpreetkaur700@gmail.com

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Abstract

Clinical decision making in elderly patients is becoming increasingly challenging. Today, however, preservation of the natural dentition has been so successful that tooth loss is no longer accepted as inevitable. 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 preservation of key teeth which will facilitate the satisfactory oral function for elderly patients. Elimination of infection can be challenging in narrow canals and a systematic approach in improving access and negotiating these canals is important for successful endodontic therapy. This review paper describes the challenges posed upon diagnosing, treatment planning and treating the elderly endodontic patient.

Keywords: Decision making, diagnosis, elderly endodontic patient, geriatric endodontics, treatment planning.

Introduction

Endodontic considerations in the elderly patients are similar in many ways to those in the younger patients. Endodontic procedures in the elderly 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 [1].

The physiological aging process starts in early adulthood, yet a person's reserve capacity is lost well before they notice any limitations in their everyday life. Nature provides sufficient reserve to enable an independent life even in old age [2].

Apical periodontitis has a strong, negative influence on the outcome of endodontic therapy. The success rate of endodontic therapy is 10–25% lower in the preoperative presence of apical periodontitis [3]. Other factors influencing endodontic treatment outcomes are intracanal presence of bacteria and quality of endodontic therapy [4].

Staged treatment plan

Bennett and Creamer (1983) [5] have suggested staged treatment planning for the maintenance of the oral health of the elderly patients.

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.

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

Diagnosis of disease

Diagnosis is the correct determination, discriminative estimation, and logical appraisal of conditions found during examination as evidenced by distinctive signs, marks and symptoms.

➤ Chief complaint

The clinician should, without leading, allow the patient to explain the problem(s) in his or her own words. Not only does this reveal symptoms, but also allows an opportunity to determine the patient's dental knowledge and ability to communicate. This may also disclose some difficulties in communication because of problems with sight, hearing or mental status [7,8].

➤ Medical History

Systemic conditions, medications and related considerations should be discussed in depth. It is appropriate at this time to explain to the patient how his or her condition might affect diagnosis, treatment planning and treatment.⁷ The *Physicians' Desk Reference* should be consulted and any precaution or side effect of medication should be noted. It is available online at <http://www.pdr.net/> and several other websites have been developed specifically for drug interactions [8].

➤ Dental History

- In general, the elderly have a great deal of history to review and recall. There may have been important dental occurrences that are only a dim memory, which require prompting by the examiner. Examples include history of traumatic injuries, pain, fractures, caries and swelling.

- Subjective findings - includes information obtained by questioning the patient's description of current signs and symptoms. The elderly tend to be more stoic and less likely to report a symptom they considered to be minor, but which, in fact, may be important to the diagnosis [9].

- Absence of significant signs and symptoms is common, more so than presence of signs and symptoms. Thus, objective tests are required whether or not there are significant signs and symptoms when pathosis is suspected [6,7].

➤ Objective tests – they are primarily related to pulpal and periapical tests and are always necessary to confirm or identify problems.

1. Pulp testing - No correlation exists between the degree of response to electric pulp testing and the degree of inflammation. The presence or absence of response is of limited value and must be correlated with other tests, examination findings and radiographs [10].

Extensive restorations, pulp recession and excessive calcifications are limitations in both performing and interpreting results of electric and thermal pulp testing. An alternative to the electric pulp test is assessment of pulp sensibility by applying a thermal stimulus to the tooth surface.

A test cavity is generally less useful as the test of last resort because of reduced dentin innervation. Vital pulps can sometimes be exposed and even negotiated with a file with minimal pain, then the root canal treatment becomes part of the diagnostic procedure. Test cavities should be used only when other findings are suggestive but not conclusive [6,7].

2. Periapical testing - Percussion and palpation tests indicate periapical inflammation but are not particularly useful unless the patient reports significant pain. These are most useful to confirm that such symptoms are from a particular tooth and determine the severity of response.

3. Radiographic findings - Small canals are the rule in older patients. Midroot disappearance of a detectable canal may indicate bifurcation rather than calcification. Canals calcify evenly throughout their length unless an irritant (e.g. caries, restoration, cervical abrasion) has separated the chamber from the root canal. Root-end fillings during root-end resection (more common during retreatment of older patients) indicate missed canals and roots as a common cause of failure. The lamina dura should be examined in its entirety and anatomic landmarks distinguished from periapical radiolucencies and radiopacities [8,11].

4. Endodontic considerations in elderly -

There are many technical challenges encountered during the root canal treatment of the elderly starting from diagnosis to various stages in the therapy. This includes:-

➤ Isolation is often difficult because of subgingival caries or defective restorations. So, special techniques may be necessary to hold the rubber dam in place [6].

➤ Access and canal negotiation probably presents the greatest challenge due to physiological reparative and degenerative changes in the pulp space. This could be analyzed in the preoperative radiograph to prevent catastrophic overcutting [12].

➤ When it comes to the number of sittings, functionally independent patients who can tolerate stress can be treated in a

single sitting. For patients who cannot tolerate prolonged mouth opening, shorter multiple appointments would be required with use of a rubber bite block to solve the discomfort to some extent [13].

1. Differential diagnosis - These include numerous entities, many of which are more common in elderly patients. The lesion that commonly mimics endodontic pathosis is periodontal. Nonendodontic symptomatic disorders that may mimic endodontic pathosis include headaches, temporomandibular joint dysfunction, neuritis and neuralgia. The incidence of these tends to increase somewhat with age, particularly in patients who have specific disorders such as arthritis that may affect the joints [6,7].

2. Prognosis - Each patient should have a pre-treatment and post-treatment assessment of prognosis. The pre-treatment assessment is anticipated outcome and the post-treatment assessment reviews what should happen according to modifiers determined during treatment [14,15].

Root Canal Treatment

➤ Consultation and consent

➤ Patients deserve a better explanation for their disease than that it is caused by age. When a physician told one patient that the problem with his knee was due to age, the patient replied, "The other knee is the same age, and nothing is wrong with it." It is important that all older patients be well informed of risks and alternatives.

- Physicians or mental health experts should be consulted as needed and no elective procedures should be performed until valid consent is established [8].

➤ Procedures

i. Local anaesthesia –

- Pain control is always advised.

- Better to proceed in comfort than to chance upon tags of vital pulp tissue or to cause discomfort and be compromised during rubber dam isolation [16].

ii. Isolation –

- A petroleum-based lubricant for the lips and gingiva reduces chafing from saliva or perspiration beneath the rubber dam [8].
- For most situations, a single hole is punched somewhere near the middle of a rubber dam sheet and applied with a clamp which makes stable, four point contact on the tooth beneath its maximum bulbosity.
- In the case of decoronated teeth, a slit dam method may be applied if there are adjacent teeth, plugging leaking gaps in the dam with a proprietary caulking agent.
- For lone-standing decoronated teeth, it may sometimes be necessary to impinge on the gingival tissues, or remove some gingival tissue before the procedure to allow a clamp to engage the root [16].

i. Entering the canal system –

Useful aids include:

- Accurate preoperative radiograph,
- Light,
- Front-silvered mirror,
- Magnification,
- Medium length tapered diamond bur,
- Safe-ended endodontic access burs,
- Ultrasonics,
- Long-necked round burs (pin bur, Goose-neck bur),
- DG16 endodontic canal explorer and
- Canal lubrication.

ii. Orientation and access –

- Access cavities may be considered deep preparations, but in most circumstances, a high-speed medium tapered diamond bur will suffice to outline the cavity and gain initial penetration.
- Long burs should only be used when needed, avoiding the risk of damaging overcutting where internal landmarks are unclear.
- If the initial access bur has not entered the canal, it is time to reconsider alignment.
- Exposure of radiographs is legitimate to confirm progress and realignment.

- Sometimes placing a radiopaque marker, such as a ball of compacted warm gutta percha in the depth of the excavations helps radiographic orientation and reveals the path to follow.
- Under no circumstances should the clinician progress beyond the expected entry depth without careful consideration, otherwise the bur could enter the periodontal ligament.
- Having reached the extent of a medium tapered diamond bur in good orientation, but without entry, it is time to move to less aggressive, slow speed burs to continue the procedure. Ideal are burs such as the Meissenger goose neck bur and the Maillefer LN pin bur.
- In multirouted teeth, the chamber should be fully unroofed to expose its contents using safe-ended high speed burs (Endo Z or Diamendo, Maillefer).
- Often heavy probing with a DG16 is able to fragment pulp stones along soft-tissue cleavage planes and allow removal.
- Pain, bleeding, disorientation of the probing instruments, or an unfamiliar feel to the canal may indicate a perforation.
- A lengthy, unproductive search for canals is fatiguing and frustrating to both the clinician and the patient. Scheduling a second attempt at this procedure is often productive [6,7,16].

i. Entering the canal –

- Having established a sticking spot, files can now be brought into play.
- Once the canal has been distinguished, negotiation is attempted with a stainless steel (SS) #8, #10, or #15 K-file. The #6 K-file lacks stiffness in its shaft and easily bends and curls under gentle apical pressure. Nickel-titanium (NiTi) files lack strength in the long axis and are not useful for initial negotiation. The canal can be negotiated using a watch winding action with slight apical pressure.
- Chelating agents are seldom of value in locating the orifice but can be very useful during canal negotiation.⁸
- Lubricants such as EDTA are always helpful to ease the glide path during entry. (A glide path is defined as a smooth, though possibly narrow, tunnel or passage from the coronal orifice of the

canal to the radiographic terminus or electronically determined portal of exit) [17].

ii. Working length –

- CDJ is the ideal place to terminate the canal preparation and may vary from 0.5 to 2.5 mm from the radiographic apex. So, may be difficult to determine clinically [8].

iii. Cleaning and shaping –

- Flaring of the canal should be performed as early in the procedure as possible to provide for a reservoir of irrigating solution and reduce the stress on metal instruments that occurs when they bind with the canal walls. Thorough and frequent irrigation should be performed to remove the debris that could block access [18].

- Problems are especially common in moving from the negotiating size 10 instrument to the size 15 file, which is 50% wider. The use of half-sized files such as Golden Mediums (Maillefer/Dentsply), which include instruments in sizes 12.5, 17.5, and 22.5 help to overcome these issues.

iv. Intracanal medicaments –

- These are contraindicated, with the exception of calcium hydroxide. This chemical is antimicrobial, inhibits bacterial growth between appointments, and may reduce periradicular inflammation.

- It is indicated if the pulp is necrotic and the canal preparation is essentially complete.

v. Obturation –

- There is no demonstrated preferred approach, although cold-lateral and warm-vertical gutta-percha obturations are the most commonly used and the best documented.⁷

In conclusion, successful endodontics can be achieved for the elderly, if proper attention is given to the diagnosis, good quality radiographs and adapting techniques that overcome the challenges posed by calcification of the root canal system. As long as the tooth has a strategically important role to play, endodontic therapy is indicated and justified in any patient [12].

Endodontic Surgery

Considerations and indications for surgery are similar in elderly and younger patients. These include incision for drainage, periradicular procedures, corrective surgery, root removal and intentional replantation. Overall, the incidence of most of these will increase with age [6,7].

► Medical considerations

- Many studies examined bleeding patterns in oral surgery patients taking low-dose aspirin¹⁹ and prescribed anticoagulants [20,21]. The findings were that the anticoagulant therapy should not be altered and should be continued throughout dental procedures, even during extraction or surgery. The hemorrhage was controllable by local hemostatic agents.

- Another study by Badal et al. (2012) [22] evaluated that patients on antiplatelet therapy undergoing invasive dental procedures should continue taking the medication to avoid the risk of thromboembolism, cerebrovascular accident or myocardial infarction.

- Interrupting therapeutic levels of continuous anticoagulation therapy for dental surgery is not based on scientific fact but seems to be based on its own mythology [8,21].

► Biologic and anatomic factors

- Bony and soft tissues are similar and respond the same in older and younger patients. There may be somewhat less thickness of overlying soft tissue.

- Anatomic structures such as the sinuses, floor of the nose and location of neurovascular bundles are essentially unchanged. But, their relationship to surrounding structures may change when teeth have been lost [6,8].

► Healing after surgery

- Lindhe and Nyman (1985) [23] evaluated that older patients experience not more significant adverse effects from surgery than do younger patients; outcomes are more dependent on oral hygiene than on age as has been shown in periodontal surgery patients.

- Ecchymosis is a more common postoperative finding in older patients and may appear to be extreme. The patient should be reassured that this condition is normal and that normal color may take as long as 2 weeks to return. The blue discoloration changes to brown and yellow before it disappears.
- Immediate application of an ice pack after surgery reduces bleeding and initiates coagulation to reduce the extent of ecchymosis [24,25].
- Later, application of heat helps dissipate the discoloration [8].

Conclusion

It can be summarized that old age is not a contraindication to endodontic therapy, if periapical healing is anticipated. The management of the elderly population differs from that of the general population because of age-related physiological changes, presence of age-related conditions/diseases, increased incidence of physical and mental disabilities, and also social and economic concerns. Thus, if care is taken to establish a reasonable standard of good health in elderly people, then endodontic treatment can be a successful component of gerodontic practice.

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