

## **Endodontic treatment in geriatric patients**

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### **ABSTRACT**

With the increased number of geriatric population, it is predicted that the need for dental treatment also increases. The needs for esthetic factors and function of geriatric patient are maybe similar to young patient. The number of geriatric patients who refuse dental extraction is increasing if there are still other alternative. They can be more convinced when the clinician said that the dental disease experienced is a focal infection so that the loss of the tooth can be accepted as the best option. But if it is possible, they will prefer endodontic treatment, because they want to keep their teeth according to the treatment plan or based on patient's request, as a less traumatic alternative compared to extraction. Endodontic treatment consideration for geriatric patient is quite similar to younger patients. The technique is also the same, although the problem may be bigger. The problem or obstacle that may arise in endodontic treatment for geriatric patient relates to the visit duration, problems during x-ray, problems in defining root canal location, vertical root fracture, and in some cases, decreased pulp tissue recovery ability. Due to the fact that the challenge is quite big, the success of endodontic treatment in geriatric patients needs to be considered. This paper will explain the endodontic treatment prognosis for geriatric patients.

**Key words:** Endodontic treatment, geriatric patient

### **INTRODUCTION**

Many geriatric patients are active and productive, they tend to keep their pride and not consider themselves as having problems.<sup>1</sup> Faski et al.<sup>1</sup> stated that the dental loss is often related to aging process and vitality decrease. Several geriatric patients have excessive psychological concerns about dental loss and try to keep their teeth anyway they can. These patients must be sympathetically treated and the teeth also need to be kept if it is possible.

Rossman<sup>2</sup> explained that similar to other age groups, geriatric patients should be considered as an individual. Most of geriatric patients

above 65 years are more concerned about how to maintain and control their live than thinking about the aging process. Goodis et al.<sup>3</sup> stated that the aging effect on diagnosis and pulp and periradicular disease treatment of geriatric patients needs a special treatment.

Request for endodontic treatment on geriatric patient has increased because the treatment is considered to be more comfortable and age is not a factor that predicts the success. Geriatric patients have complex condition and problems that may arise during the endodontic treatment and become obstacle during the treatment. The problem now is what is the endodontic treatment prognosis of geriatric patients?

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### **Endodontic treatment in geriatric patients**

Usually, geriatric patient has smaller pulp chamber and small root canal. The method and technique for endodontic treatment in geriatric patient is similar to young patients, although the problems may be more. In general, the endodontic treatment stages are as follows.

**Perform dental isolation by rubber dam installation.** A closed isolation can reduce saliva contamination to the pulp chamber and prevent the irrigation liquid from contacting the mucosa.

**Make an access preparation.** Cavity access is made using carbide tungsten fissure bur to remove the pulp chamber roof. In posterior teeth, the preparation depth can be predicted by placing the fissure bur on the x-ray image, this will reduce perforation risk in pulp chamber base. In posterior teeth, the cavity access is made through the biggest root canal, i.e. distal part of lower molar and palatal part of upper molar. After the pulp chamber is found, continue with pulp chamber root removal. The pulp chamber base is usually easy to be identified because it is darker than surrounding dentin. Sometimes, the pulp chamber is shrinking, so the pulp roof contacts the pulp base that it is better to use round bur with low speed to perform access preparation.

**Measuring work-length.** Electronic apex locator is helpful to define work length, especially when problems arise when defining the work length. The work length should be 1 mm less than the work length that is recorded so the apical stop can be placed at the apical constriction.

**Cleaning and shaping.** The purpose of root canal preparation is to remove all debris through cavity access, and shape the root canal so it can be obturated. The step-down preparation method is used as root canal preparation method. Initially, the technique extends 2/3 of the coronal part of the canal using a file and continues the extension with gates glidden bur, and finally uses a step-back technique for preparation of one third of the canal apex.

**Root canal medication.** Calcium hydroxide is the canal root medication used due to the fact that the material is an antimicrobial that can inhibit the bacterial growth and reduce the periradicular inflammation. Other materials that are often used as chelating agent to remove dentinal wall in small root canal is EDTA. EDTA

is available in liquid and paste. EDTA utilization aims at extending the narrow canal after it can be perfectly negotiated.

**Root canal filling.** There is no approach of choice for root canal filling although lateral cold and vertical warm obturation with gutapercha is often performed and documented.

### **Potential difficulties during endodontic treatment in geriatric patients**

**Difficulties when installing rubber dam to isolate the teeth.** If it is possible, we should isolate the teeth using rubber dam. Usually, the isolation is difficult due to the presence of damaged restoration or sub gingival caries.

**Difficulties when defining the orifice location during cavity access preparation.** By making sound x-ray image, we will be able to define the pulp chamber size, position and direction of root arch and periapical disorder in a precise manner. In geriatric patient with jaw tremor, it will be difficult to do the x-ray imaging session. The cavity access shape in geriatric patients is similar to younger patients, although the possibility is smaller because of the reduction of pulp chamber size and root canal diameter. The pulp chamber can be very small and sometimes does not exist due to reparative dentin or pulp stone formations. This will make the endodontic needle insertion into the pulp chamber more difficult. Teeth that have short crown due to supra eruption need not-too-deep access preparation. Defining the root canal orifice is often exhausting and frustrating to both dentist and patient. Usually, geriatric patient cannot tolerate long-visit. Maybe it is appropriate to stop the treatment and continue it in the next visit.

**Difficulties in measuring work length because of varied apical foramen width.** There are differences in measuring work length in geriatric patients compared to younger patients. In geriatric patient, the apical foramen width is varied due to the reduction of root canal diameter towards apical part. This will make the process to define actual root canal length difficult. Stein and Corcoran<sup>4</sup> stated that the dental work length of geriatric patient can be decreased compared to the normal dental average length. This is caused by attrition and secondary cement due to physiological process.

**Difficulties in performing cleaning and shaping of the root canal due to root canal shrinking.** Generally, along with the aging process, root canal size will also decrease. Reparative dentin as a result of restoration procedure, trauma, attrition, and caries will cause the shrinking. Walton & Torabinejad<sup>5</sup> stated that the common challenge is seen when the small root canal is enlarged, because it will need more time and effort. Common challenge in geriatric patient is seen when the small root canal needs more time to be enlarged.

**Root canal medication.** The main precaution in EDTA utilization is that EDTA has a function to soften dentin that may allow operator to make his own canal.

**Root canal filling.** There is no approach of choice, although lateral cold and vertical warm obturation with gutapercha is often performed and documented.

#### **Efforts to overcome the difficulties during endodontic treatment in geriatric patients**

The efforts to overcome difficulties during endodontics treatment for geriatric patient are, First, perform dental isolation using cotton roll. Usually, dental isolation is difficult because of the presence of damaged restoration or sub gingival caries. Therefore, accuracy is needed during the installation. Caries or leaked restoration should be removed. If it is possible, the teeth should be re-restored to support the rubber dam installation. If the damage is serious that it is impossible to install rubber dam, then other alternatives should be considered, such as performing isolation using cotton roll.

Second, soak the pulp chamber with iodine solution to identify the orifice during access preparation. The access preparation difficulties are caused by the shrinking due to the aging process that can be observed in radiograph image. To overcome the problem in identifying orifice soaking pulp chamber with iodine solution followed with alcohol rinsing can be done. This soaking makes the orifice looks black. It is necessary to be careful in doing root canal treatment because it is difficult to find root canal orifice that may lead to lateral perforation. However, if the orifice has been found, the root canal preparation will no longer become a problem. Usually dentin softener

is needed. The softener should be used carefully considering that geriatric patients have difficulties in keeping their mouth open for a long duration.

Third, defining work length using electronic apex locator. Stein and Corcoran<sup>4</sup> stated that work length of geriatric patients may be decreased compared to the normal dental average length. This due to the attrition and secondary cement. Gordon and Chandler<sup>6</sup> stated that electronic apex locator will help in determining the work length, especially when it is difficult to determine the work length through X-ray image.

Fourth, cleaning and shaping are assisted by lubrication liquid. Generally, along with aging process, the root canal size will decrease. Reparative dentin as the result of restoration procedure, trauma, attrition, and caries will cause root canal shrinking. Walton and Torabinejad<sup>5</sup> stated that the common challenge is that when small root canal is enlarged, then more time and effort are needed. In early preparation, it is easier for very small root canal if lubrication liquid is used on the file with 2 or 3 smaller numbers to support the root canal enlargement and reduce the perforation risk; First Use EDTA paste to prevent penetration to periapical tissue. EDTA Paste use is safer because this material can be controlled easily, and there is no penetration risk to periapical tissue compared to the liquid form.

Sixth, root canal obturation with condensation lateral technique. There are no approaches of choice, although obturation with condensation lateral method using guttapercha is commonly performed.

#### **Endodontic treatment success prognosis**

Recovery after root canal treatment is the determining factor for the success of endodontic treatment. Ingle<sup>7</sup> stated that the success in geriatric patients is better than other age groups. This due to the fact that one third area of root canal is fully obstructed by secondary cement and root canal ramification is much reduced.

#### **CONCLUSION**

Endodontic treatment considerations for geriatric patients compared to younger patients are almost similar. The technique is also similar, although the problems may be bigger. The problems