

Patient Age Is No Contraindication to Endodontic Treatment

• Geoffrey H. Sperber, BSc Hons, MS, BDS, PhD, Dr Med Dent hc •
 • Donald C. Yu, BS, DMD, CAGS, MScD, FRCD(C), FAGD •

© J Can Dent Assoc 2003; 69(8):494-6
 This article has been peer reviewed.

Clinical decision making in elderly patients is becoming increasingly challenging as our society ages.¹ Edentulism was once considered normal for anyone entering the seventh decade of life, as was so eloquently declaimed by Jaques in Shakespeare's *As You Like It*: "sans teeth, sans eyes, sans taste, sans everything."² Today, however, preservation of the natural dentition has been so successful that tooth loss is no longer accepted as inevitable. Nonetheless, there is a cohort of elderly individuals who did not benefit from modern preventive practices and who now present a dilemma in terms of maintaining the masticatory apparatus necessary for nutritional intake.³ Even with excellent dental care, such patients experience abrasion of the natural tooth crowns with age, and embedded roots are left within the alveolar bone (Fig. 1).

According to previous concepts of dental care, extraction of these roots would have been recommended, but today's goal of excellence in endodontics dictates otherwise. Our experience of performing endodontic treatment on the retained roots of a 93-year-old patient provides an unusual opportunity to justify and indicate the need for such treatment in elderly people. The retention of roots of excessively worn or destroyed tooth crowns is in fact a highly desirable objective, as it allows the alveolar bone in which the roots are lodged to be maintained. The loss of tooth roots is a well-known cause of alveolar bone resorption and is an example of Wolff's law of bone architecture,⁴ whereby bone structure reflects its function. In the absence of tooth roots, the need for the alveolar bone disappears, which leads to resorption.^{4,5} Moreover, loss of teeth alters the material properties of cortical thickness, elastic and shear moduli, anisotropy and stiffness of the cortical mandibular bone, thereby greatly weakening the mandible.⁶

A 93-year-old woman was referred to our office for nonsurgical endodontic treatment. A review of her somatic

systems and medical history indicated that she was in relatively good health and had no contraindications to use of local anesthetic solution. The oral examination revealed maxillary edentulism and loss of all mandibular teeth except for incisors 31 and 41. The missing teeth had been extracted many years previously. Radiographic examination revealed that root submergence therapy had been previously performed on tooth 42, and that the root had preserved the alveolar bone. The 2 remaining teeth had excessive wear facets, and there was extensive loss of alveolar bone height in the posterior regions bilaterally (Fig. 2). The teeth were sensitive to percussion but not to palpation at the apical area of the roots in the vestibular fold. The teeth had excellent alveolar bone support, and periodontal conditions were optimal. The patient wore complete upper and lower dentures, the latter serving as an overdenture on the retained incisor roots. The patient had fairly good oral hygiene. The 2 remaining teeth were sensitive when she drank hot soup or hot coffee, and she sometimes experienced throbbing pain in them. A heat test confirmed irreversible pulpitis of these teeth. Informed consent was obtained for endodontic treatment.

Dry field isolation was achieved with the placement of a rubber dam and cotton rolls. A dose of 1.8 mL of 2% lidocaine with 1:100,000 epinephrine was infiltrated locally at the apices of teeth 31 and 41. Straight-line access was performed with a #2 round bur on a high-speed handpiece. The root canal systems were cleaned and shaped, with sequential serial filing and reaming followed by drilling with #2 and #3 Gates-Glidden drills. During the debridement, the area was copiously irrigated with 2.5% sodium hypochlorite.⁷ The canals were then closed with a small cotton pellet and a temporary filling material (Cavit, ESPE, Seefeld, Germany).

The patient returned the next week for obturation; she reported no discomfort in the intervening period. The root

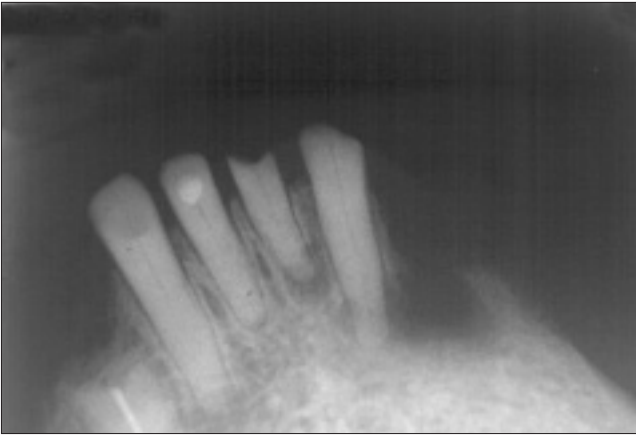


Figure 1: Radiograph taken about 5 years before current treatment, showing retained anterior tooth roots 42, 41, 31, 32 and 33 in an elderly patient.



Figure 2: Intraoral view of retained teeth 41 and 31, as well as the retained alveolar bone and resorbed posterior ridge.



Figure 3: Postoperative radiograph of endodontically treated roots 42 (submerged root), 41 and 31.

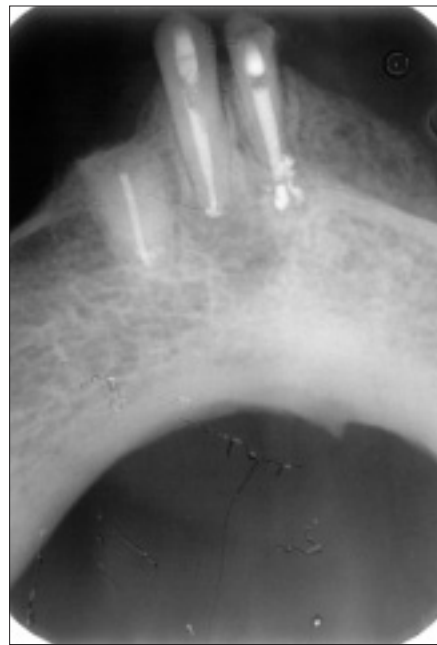


Figure 4: Radiograph obtained 7 months after the procedure.

canal systems were obturated with fine-to-medium gutta-percha cone and Kerr Pulp Canal Sealer (Kerr Corporation, Romulus, Michigan) according to the warm vertical compaction technique (Fig. 3).⁸ No anesthetic was used during this second visit, and the patient did not experience any discomfort. The follow-up examination 7 days later indicated no complications, and the patient's teeth were comfortable. Her general dentist subsequently placed composite restorations on these teeth. A follow-up examination 7 months later indicated that both teeth 31 and 41 were asymptomatic, and the periradicular bone was intact and normal (Fig. 4).

This case demonstrates dramatically the loss of alveolar bone where molars, premolars and canines have been

extracted many years previously (Fig. 2). The radiograph from 5 years ago clearly indicated excellent alveolar bone height in the area of teeth 32 and 33 (Fig. 1). However, these 2 teeth were extracted because of acute apical abscesses. The subsequent loss of alveolar bone height was evident on later radiographic examination (Fig. 3). The retention of the roots of teeth 31, 41 and 42 (with a submerged root), despite the crowns being worn to the gum line, allowed endodontic therapy to be performed, even though the patient was at an advanced age, and the outcome was successful (Fig. 4).

Root submergence therapy is selectively performed in the anterior mandible of patients with a history of severe periodontal disease who have lost their posterior teeth.

These patients have little or no posterior alveolar bone height. Additional extraction of the anterior mandibular teeth would result in a significant loss of the remaining anterior alveolar bone and ridge form. Full denture treatment would be very difficult because of lack of retention in both the posterior and anterior regions. Root submergence therapy is employed to preserve the patient's anterior ridge form and height. Retention of the roots allows for maintenance of the surrounding alveolar bone and provides some stability for an overdenture.

The opportunity to use endodontically treated teeth for post insertion as stabilizers for precision overdenture attachments is self-evident.⁹ For this purpose, natural tooth roots have an enormous advantage over artificial osseointegrated implants into alveolar bone, and this is the main reason for retaining tooth roots whenever possible.^{10,11} This case demonstrates that old age is not a contraindication to endodontic therapy, if periapical healing is anticipated.

If care is taken to establish a reasonable standard of good health in elderly people and there are no contraindications to the administration of local anesthesia, endodontic treatment of retained roots can be a successful component of gerodontic practice. ♦

Dr. Sperber is professor emeritus, department of dentistry, University of Alberta, Edmonton, Alberta.

Dr. Yu is clinical professor and director of endodontics, department of dentistry, University of Alberta, Edmonton, Alberta.

Correspondence to: Dr. Donald Yu, Department of Dentistry, Faculty of Medicine and Dentistry, University of Alberta, Edmonton, AB T6G 2N8. E-mail: donaldyu@ualberta.ca.

The views expressed are those of the authors and do not necessarily reflect the opinions or official policies of the Canadian Dental Association. The authors have no declared financial interests in any company manufacturing the types of products mentioned in this article.

References

1. Berkey D, Berg RG, Ettinger RL, Mersel A, Mann J. The old-old patient: the challenge of clinical decision making. *J Am Dent Assoc* 1996; 127(3):321–32.
2. Shakespeare W. As you like it. In: Alexander P, editor. *The Complete Works of Shakespeare. The Comedies*. London: Collins; 1958. II, vii, 166.
3. Sheiham A, Steele JG, Marcenes W, Lowe C, Finch S, Bates CJ, and others. The relationship among dental status, nutrient intake, and nutritional status in older people. *J Dent Res* 2001; 80(2):408–13.
4. Frost HM. *Bone remodelling dynamics*. Springfield, Illinois. C.C. Thomas; 1963.
5. Heath MR. The effect of maximum biting force and bone loss upon masticatory function and dietary selection of the elderly. *Int Dent J* 1982; 32(4):345–56.
6. Schwartz-Dabney CL, Dechow PC. Edentulation alters material properties of cortical bone in the human mandible. *J Dent Res* 2002; 81(9):613–7.
7. Yu DC, Schilder H. Cleaning and shaping the apical third of a root canal system. *Gen Dent* 2001; 49(3):266–70.
8. Schilder H. Filling root canals in three dimensions. *Dent Clin North Am* 1967; 11:723–44.
9. Haraldson T, Jemt T, Stalblad P, Lekholm U. Oral function in subjects with overdentures supported by osseointegrated implants. *Scand J Dent Res* 1988; 96(3):235–42.
10. Fontijn-Tekamp FA, Slagter AP, van der Bilt A, Van 'T Hof MA, Witter DJ, Kalk W, and other. Biting and chewing with mandibular implant-retained overdentures, full dentures, and natural dentition. *J Dent Res* 2000; 79(7):1519–24.
11. van Kampen FMC, van der Bilt A, Cune MS, Bosman F. The influence of various attachment types in mandibular implant-retained overdentures on maximum bite force and EMG. *J Dent Res* 2002; 81(3):170–3.