Silver point retreatment: a case report

by Ahmad Tehrani, DDS

The use of various metals as root filling material has a long history dating back to the 18th century. Metals such as gold, lead, tin foil, copper amalgam, tin alloy, and silver have been used in various forms to fill the roots. However, only silver gained acceptance among endodontists. There are several reasons for its popularity and adaptation in endodontics.[1]

The Swedish scientist Arhennis observed that contaminated water was sterilized when stored in copper vessels, due to the minute amount of copper dissolved from the walls. This phenomenon was coined "Oligodynamic" by Swiss botanist Naegeli. In 1930, German dentists Trebitsch, Greth, and Eckstein were among the first to recommend the use of silver in endodontics. They observed the Oligodynamic effects of silver, the toxic effect of exceedingly small quantities of pure metal on living cells. Given the pervasiveness of the focal infection theory at the time, the need for disinfection and the sealing of root canals were of utmost importance for root-filling materials.

Elmer Jasper of St. Louis advocated manufacturing silver points corresponding to existing dental instruments.[2] Once the root canal was enlarged to a certain root canal file, a silver point of the same size could be cemented to seal the root canal system. Jasper's technique, developed in 1933, remains the core concept of silver point technique until today. During the next 20 years, the University of Michigan, under the leadership of Ralph Sommer, became the leading institution for advocacy of this new technique, adding refinements and modifications to adapt it for a wider array of endodontic cases.

This expanded interest in the use of silver point stimulated further research of root anatomy and instrumentation. Meanwhile, researchers set out to standardize the mechanical aspect of procedures and armamentarium used in endodontics.

Ironically, the result of this research was to discourage its use as a universal root filling material. The relative ease of use and esthetic appearance of a dense fill radiographically may give the inexperienced practitioner a false sense of security, despite the fact that the success of any root filling material depends on the ability to fill the entire root canal space 3 dimensionally. The dichotomy between clinical practice and silver point theory became apparent after an increasing number of cases was completed and it was soon discovered that silver point was neither adequate to seal the root canal, nor was it a universal solution. One glaring problem was the discrepancy of size and taper of root canal instruments and silver points. The other problem was the difficulty of placing posts to build up severely fractured and decayed endodontically treated teeth.

Fig. 1: Pre-operative radiograph depicting silver points and periradicular radiolucency.

Later, the Oligodynamic effect of silver became a major concern when the cytotoxicity and corrosive behavior of silver was investigated.[3] Silver point corrodes spontaneously in the presence of serum and blood.

Seltzer published a study of 25 silver points retrieved from 13 teeth that were diagnosed as failing endodontic cases and 5 cones from successful asymptomatic cases. Interestingly, all silver points exhibited some degree of corrosion, but failing cases had the most corrosion present. Tissue cultures revealed the points to be extremely cytotoxic, whereas the new or uncorroded points had no tissue diffusion. Seltzer concluded that corrosive byproducts were cytotoxic and not metallic silver by itself. This corrosion may in part be due to serum proteins in the absence of apical seal.[4]

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Silver point technique was replaced by gutta percha in later years, but most of the advances in endodontics are owed to Ag point advocates who encouraged conservative therapy to save teeth that would otherwise be extracted, paving the way toward establishing endodontics as a recognized dental specialty. Silver point may still have limited indication today, although that option needs to be carefully examined by the conscientious practitioner. Pathways of the Pulp, 8th Edition (Cohen & Burns), however, regards silver point obturation as below standard of care in today's endodontic practice.[5]

Dr. Herbert Schilder popularized the warm gutta percha technique that enabled filling more of the canal space (laterally as well as coronal-apically) rather than a single cone obturation. However, the endodontic literature unequivocally indicates bacteria as the number-one cause of failed endodontic cases. Therefore, endodontic treatment objectives and protocol revolve around reducing and minimizing the bacterial population and sealing the root canal system.

Case report

A healthy 32-year-old female presented to my office with complaint of a vague toothache in the lower right quadrant. Her medical history was noncontributory, she was not under a physician's care, she had no known drug allergies, and there were no contraindications to dental treatment. Her chief complaint was the episodic appearance of a "pus pocket alongside of her molars" that would swell and then decrease in size. There was no evidence of sinus tract at the time of examination. The pulp vitality test did not elicit a response from the lower right first molar. All other teeth in the quadrant tested WNL to ice, heat, and electric pulp tester. However, the tooth was tender to percussion and gingival palpation of the root apices. Periodontal probing depths did not exceed 3-4 mm.

Radiographically, there was periradicular radiolucency associated with both the mesial and distal roots of #30 *(Fig. 1)*. The distal root was laterally resorbed around the Ag point, giving the appearance of Ag point overextension. Only two Ag points were observed radiographically. The stainless steel crown had poor marginal adaptation with open interproximal margins. The original treatment was 15 years old.

The evaluation resulted in a diagnosis of necrotic tooth #30 (previously failing root canal therapy)

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Fig. 2: Two layers of rubber dam were placed initially. To provide better asepsis, the first layer was peeled away prior to cleaning the canals.

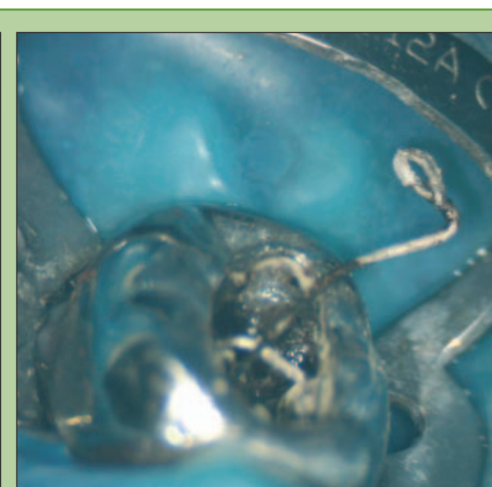

Fig. 3: Removal of silver point after access opening. Note the oxidized portion of the Ag point extending into the canal space. Presumably the "hook" was to aid in retention of the core.

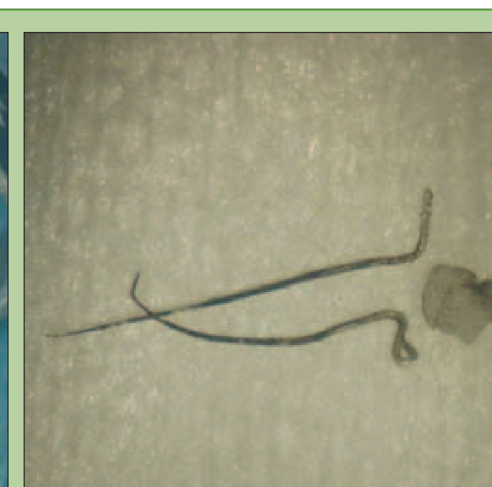

Fig. 4: Silver point after extraction from the canals.

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with chronic periradicular periodontitis. The patient was informed of all clinical findings and was presented with a nonsurgical endodontic revision approach with good prognosis. The possibility of a surgical endodontic approach was also discussed with the patient. In addition to the option of saving her tooth endodontically, she was presented with options including extraction, implant, or fixed bridge. She consented to save her tooth via nonsurgical root canal therapy.

Clinical treatment

Pretreatment vital signs were within normal limits. Blood pressure ranged from 115/84 to 124/87. Her pulse rate was 60/minute and her respiration rate was 12/minute. She was instructed to rinse her mouth with 0.12% solution of chlorhexidine gluconate (Peridex) before she was anesthetized in classic IAN block, with one cartridge of 3% Carbocaine plain followed by a cartridge of 2% Xylocaine with 1:100,000 epinephrine. Rubber dam was applied and the periphery of the crown through the dam was sealed to prevent saliva contamination or leakage of irrigants to the mouth *(Fig. 2)*. An endodontic access was prepared, carefully utilizing a surgical operating microscope to expose the silver point heads for retrieval. The Ag points were removed effortlessly *(Figs. 3 and 4)*.

After removing the impediments, the pulpal floor was explored for perforation and accessory canals under the xenon light of the microscope. Two mesial *(Figs. 5a and 5b)* and 2 distal canals *(Figs. 6a and 6b)* were identified. A wire film x-ray verified the location of the canals *(Fig. 7)*.

All canals were shaped to the apex with copious irrigation of 6% NaOCl and 17% EDTA. Patency was maintained in mesial canals with a size 10 K file. The distal canals merged apically to a wide-open apex. The distal root was irrigated with NaOCl through a side-vented needle slowly and carefully so as not to extrude the passed apex. EDTA was flushed through the canals to remove the smear layer and neutralize the hypochlorite solution before a final rinse of 2% CHX. The canals were dressed with a mixture of chlorhexidine and $Ca(OH)_2$ paste placed with a lentulo file to the apex. Access was closed with cavit over the CH and a bonded composite over the cavit.

The patient was re-appointed in 30 days for evaluation. On her next appointment she was asymptomatic and the percussion sensitivity had subsided *(Fig. 8)*. The canals were irrigated copiously once more with NaOCl and the solution was agitated with an ultrasonic file to remove the silver oxide residue from the canal walls *(Fig. 9)*.

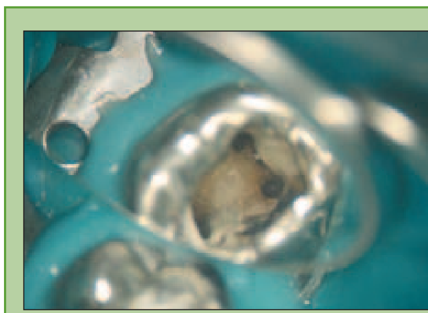

Fig. 5a: Locating the mesial canals and refining the entry to gain straight-line access for unimpeded instrumentation.

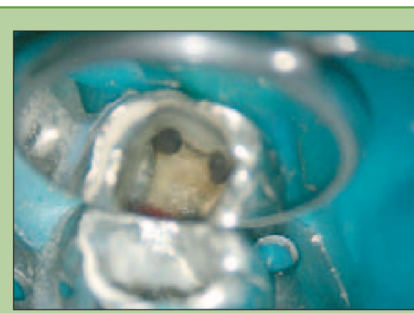

Fig. 5b: Another view of mesial canals after enlargement of orifice. Beginning of debridement and disinfection phase.

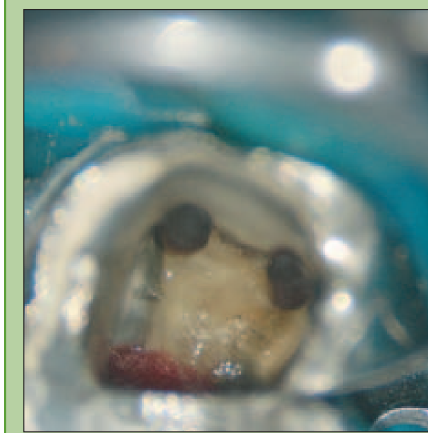

Fig. 6a: Isthmus connector was troughed with an ultrasonic tip in the presence of sodium hypochlorite.

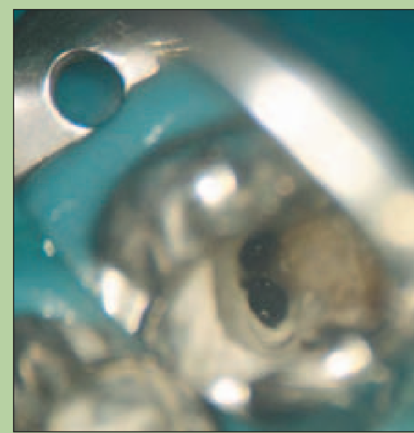

Fig. 6b: Location of two separate distal canal systems.

On second visit the patient was anesthetized, rubber dam was applied, and the CH dressing was removed under EDTA irrigation *(Fig. 10)*. The canals were irrigated copiously once more with NaOCl and the solution was agitated with an ultrasonic file to remove even more of the silver oxide residue from the canal walls. The canals were re-instrumented in the presence of 6% NaOCl, then flushed and neutralized with EDTA. A final rinse of CHX was applied and the CH dressing was re-applied.

The patient was rescheduled for a third visit in 30 days and the same procedure was repeated once more. After 3 months, the tooth was completely asymptomatic and we proceeded to complete the endodontic procedure.

Since the distal canal was wide open, a thick wet mixture of Mineral Trioxide Aggregate (MTA) was placed apically with dedicated MTA carrier. After initial placement, it was vibrated indirectly to apical extent with ultrasonic energy through a long endodontic explorer. The rest of the canal was obturated with gutta percha and sealer *(Fig. 11)*.

Fig. 7: Verification of canals with wire film. The distal canals were confluent; however, there were two separate mesial canal systems.

Fig. 8: Appearance of CH after 30 days.

It is ideal to seal the orifice immediately after endodontic treatment while the dam is still in place and perform the definitive buildup to prevent recontamination of the root canal systems.

The mesial canals were obturated with gutta percha and Kerr EWT sealer. Warm vertical compaction

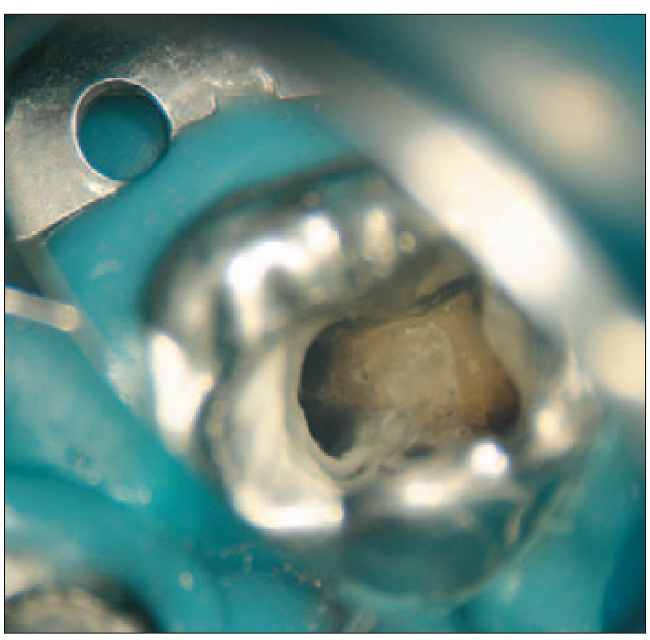

Fig. 9: Distal canals after the CH was removed and the canals were irrigated.

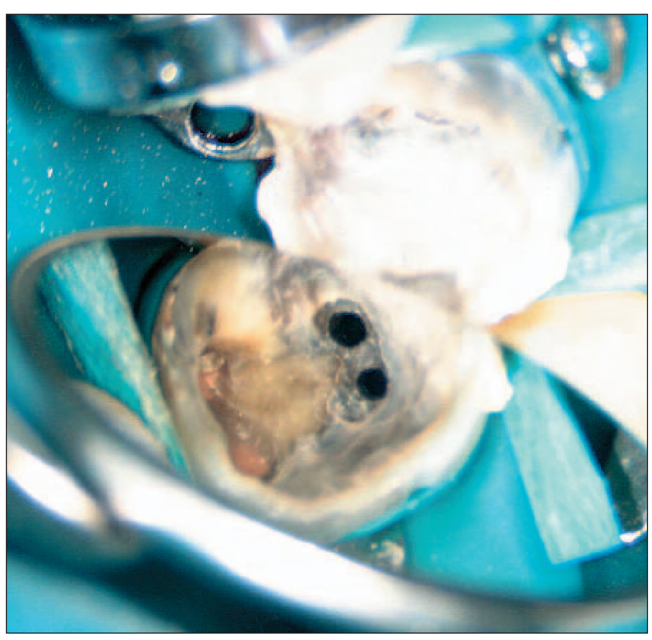

Fig. 10: View of distal canals after MTA placement.

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Fig. 11: Gutta percha in the distal canals.

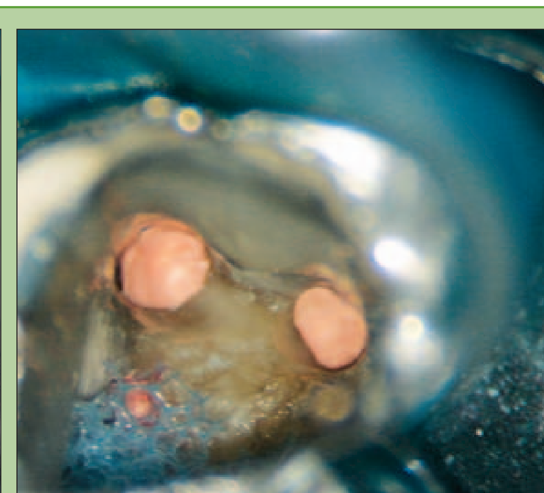

Fig. 12: Gutta percha in the mesial canals.

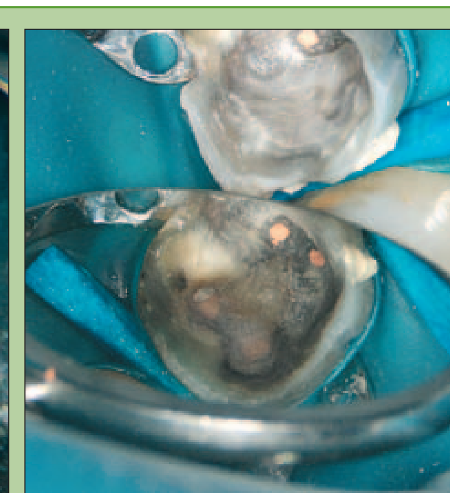

Fig. 13: Appearance of flowable composite over the mesial orifice.

Fig. 14: Post-operative view of canal obturation.

Fig 15: Off-angle view of obturated canals showing all the canal systems.

Fig. 16: 30-day recall after the crown was seated.

Fig. 17: One-year recall. Osseous repair of apical lesion and complete absence of symptoms.

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was accomplished with a System B heat source. The orifice of each canal was sealed with a bonded restoration as a buildup. It is ideal to seal the orifice immediately after endodontic treatment while the dam is still in place and perform the buildup to prevent recontamination of the root canal systems *(Fig. 12)*. Flowable composite was used to cover the gutta percha prior to definitive buildup *(Figs. 13 and 14)*.

MTA was placed in the apical extent of the distal canal and the remainder of the canal was packed with warm gutta percha. A bonded core buildup was used as a core for a future crown. The 2 different materials used had different radiopacity, creating an unaesthetic radiographic appearance. An off-angle radiograph was exposed to ascertain the obturation of all canals *(Fig. 15)*.

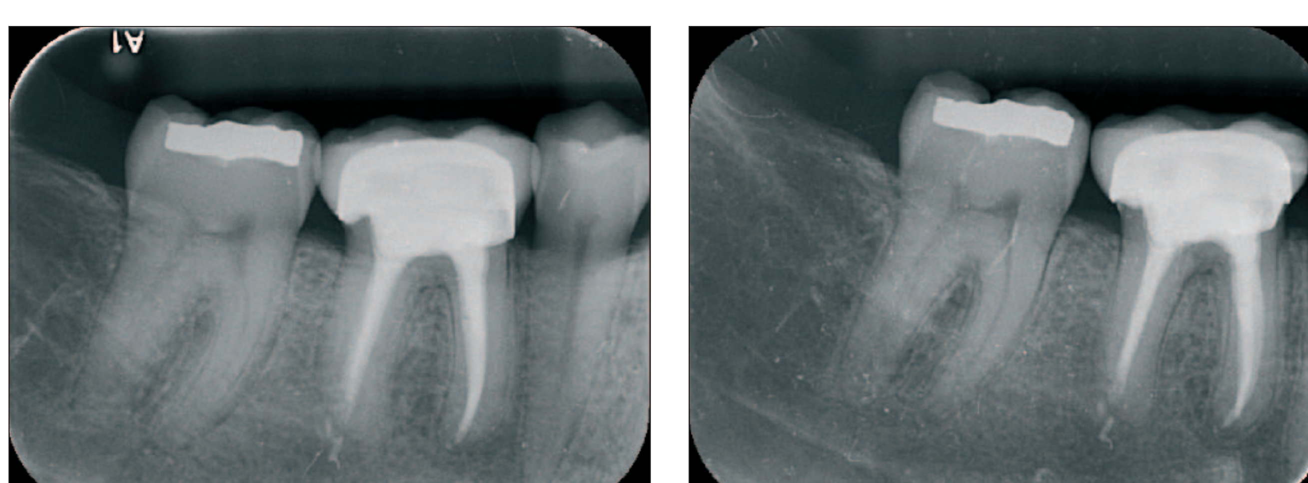
At one-year recall, continued osseous repair of the apical lesion was apparent and the patient was asymptomatic.

At 30 days recall, the crown was seated *(Fig. 16)*. The tooth was asymptomatic and the patient was pain free. She also reported absence of pain upon chewing. No percussion sensitivity was recorded.

At one-year recall, continued osseous repair of the apical lesion was apparent and the patient was asymptomatic *(Fig. 17)*. The tooth was comfortable and asymptomatic during function. At 18-month recall *(Figs. 18 and 19)*, there was continued evidence of osseous structure repair and healing. ET

The author would like to thank ROOTS online endodontic discussion forum (www.rxroots.com) and its contributing members for their continued dedication to the advancement of endodontics.

The author also acknowledges Dr. Benjamin Schein of Las Vegas, NV, and Dr. Fredrick Barnett, chairman and director of the Albert Einstein Medical Center graduate endodontics program, for providing assistance in research and bibliography. Also, special thanks to Dr. Gary B. Carr of San Diego for his continued mentorship in endodontics, the use of the surgical operating microscope, and scope photography.



Figs. 18 and 19: 18-month recall, showing repair of osseous structure and continued healing.

ET About the author

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