

Compiled by  
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# SILVER FLUORIDE, POTASSIUM IODIDE: endodontics?

**Irrespective of the** materials or techniques dentists have available, most will modify treatment methods until they find a clinical protocol that satisfies the needs of their patients, is predictable, efficient and suits their clinical style.

One such protocol has been the application of silver fluoride (AgF) followed by potassium iodide (KI) prior to the obturation of root canals.

The rationale for this procedure is based upon the ability of silver fluoride followed by potassium iodide to prevent biofilm formation. The potassium iodide precipitates out any free silver ions that have not reacted with tooth structure to form silver iodide, a highly antibacterial white precipitate that enhances the antibacterial properties of the silver fluoride and prevents staining of surrounding tooth material that occurs when silver fluoride is used alone.

Scanning electron microscope (SEM) and light microscope evidence shows the penetration of the silver fluoride and potassium iodide well into the dentinal tubules at the canal interface (Figs 1 and 2). Furthermore, the silver iodide precipitate remains on the walls of the canal (Fig 3), concentrates at the



Fig 2. Light microscope view showing penetration of silver precipitates into the dentinal tubules.

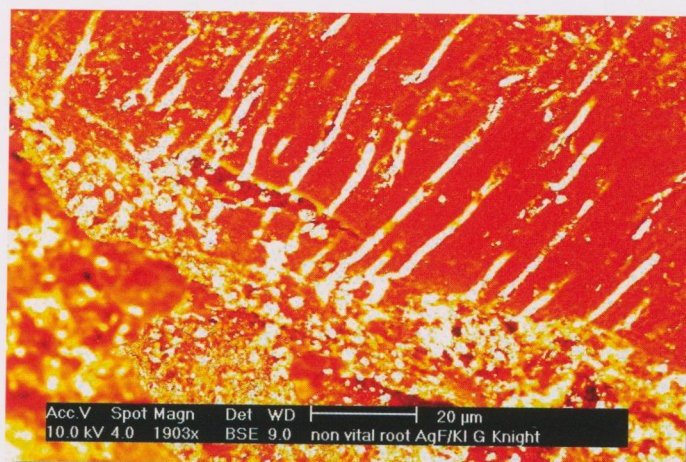


Fig 1. SEM slide showing penetration of silver precipitates into dentinal tubules within the root canal.

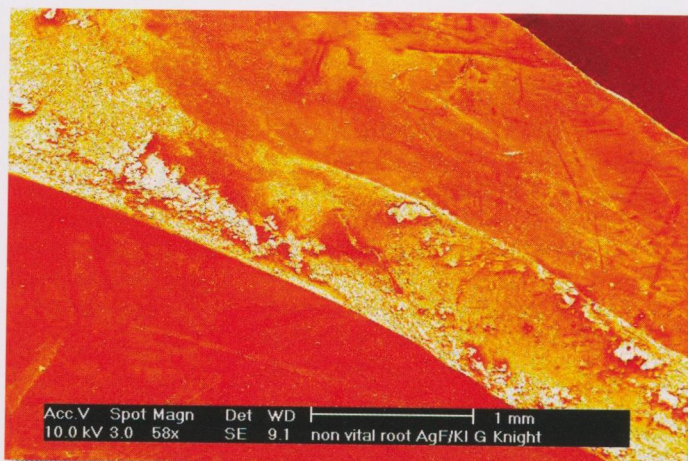


Fig 3. SEM showing silver precipitates on the sides of the root canal.



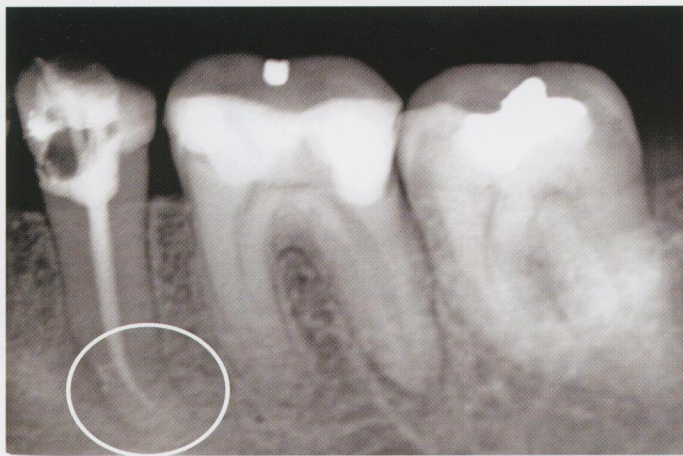


Fig 4. Silver precipitates seen at the tooth apex and lateral canal.

apical region and infuses into any lateral canals in the area (Fig 4).

After nine years of clinical experience, despite the occasional inability to negotiate the full length of a canal or manage a fractured instrument, this procedure has fulfilled the clinical criteria of satisfying patients needs in a predictable and efficient way. Figure 5 shows a radiograph of a lower molar with occluded root canals. Figure 6 is the same tooth, symptomless after almost four years showing increased radiopacity at the apical area.



Fig 5. March 2003, unable to negotiate root canals on a lower first molar.



Fig 6. February 2007, AgF/KI placed into base of pulp chamber, followed by an intermediate GIC dressing, tooth asymptomatic showing increased radiopacity in apical area.

## CLINICAL TECHNIQUE

- The canals are prepared by preferred technique. As the AgF/KI penetrates well into the dentinal tubules preparation does not need to exceed a #25 instrument, unless the canal diameter is beyond this.
- Sodium hypochlorite will react with silver fluoride. At the completion of canal preparation, prior to obturation, flush the pulp chamber and canals with water and dry the area after inserting paper points in the canals to soak up remaining moisture and prevent an air embolism.
- Sufficient silver fluoride solution is then applied with a micro brush to cover the floor of the pulp chamber. The solution is conveyed into the canals with a reamer or file to a distance 1.5 mm short of the apex. Should the silver fluoride penetrate beyond the apex, patients will be aware of a slight discomfort that resolves in a couple of days.

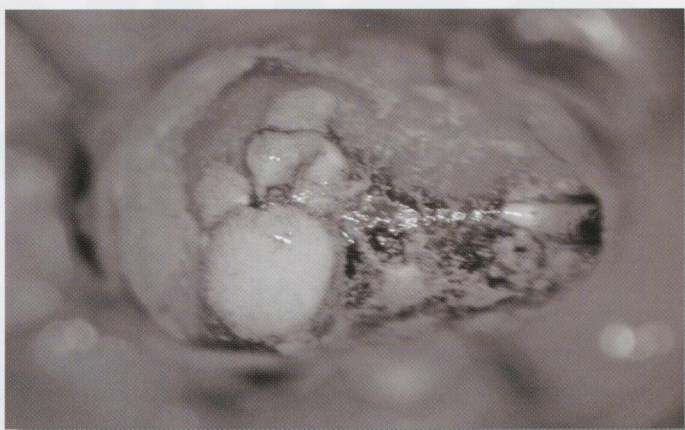


Fig 7. White precipitate of silver iodide forms when KI first applied.

- Potassium iodide is next applied into the pulp chamber and the cavity walls with a micro brush. Clinicians will notice a flash of white precipitate when the potassium iodide is first applied (Fig 7). Continue applying the potassium iodide until the solution clears signalling that all free silver ions have reacted with the potassium iodide (Fig 8). The potassium iodide is then conveyed into the canals with a reamer or file to 1.5 mm short of the apex. Clinicians may observe a white precipitate in the canals following this procedure.

- The pulp chamber is next flushed with water to remove any silver iodide on the dentine walls and paper points inserted into the canals to absorb remaining moisture and concentrate free silver iodide into the apical regions. This may require a second application of paper points to completely dry the canals.

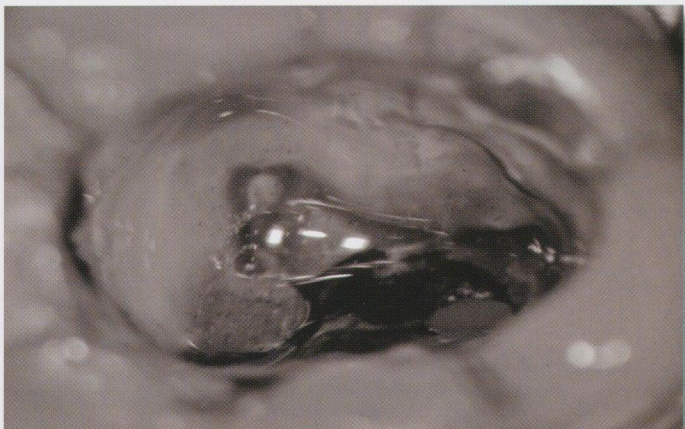


Fig 8. KI continued to be applied until solution clears indicating there are no free silver ions remaining.



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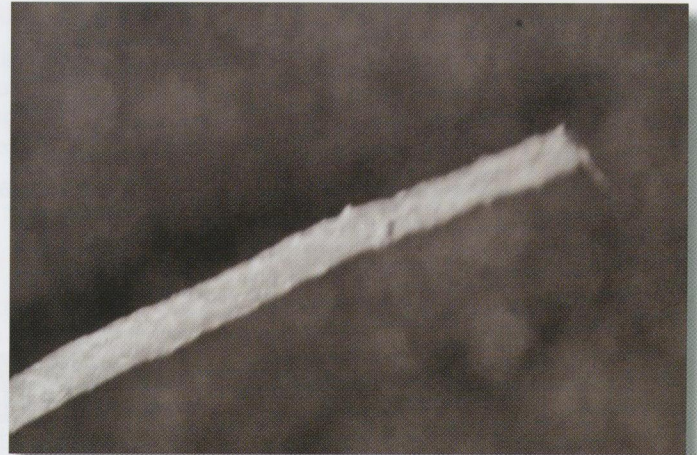
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*Fig 9. Deposits of white silver precipitates on paper point removed after drying the canals prior to obturation.*

Clinicians will observe deposits of white silver precipitates on the points when removed from the canals (Fig 9).

- Following drying of the canals the preparation is ready for obturation.

The first layer of restorative material should be auto cured glass ionomer cement as silver fluoride and potassium iodide enhance the bond strength of glass ionomer cement to dentine while the bond strength is reduced if composite resin or resin modified glass ionomer cement are used.

## CONCLUSIONS

Successful clinical outcomes can be achieved over a wide range of treatment protocols. Practitioners may find this technique a useful option if they have been unable to negotiate the full length of a canal or separated an instrument and the patient declines referral to a specialist endodontist.

## REFERENCES

References are available from the author.  
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## DISCLOSURE

*The author's name appears on a process patent for the application of silver fluoride followed by potassium iodide.*

## Silver Fluoride Potassium Iodide for Endodontics

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