

## Precipitate from a combination of sodium hypochlorite and chlorhexidine

**Q** Recently I heard that Chlorhexidine can form a precipitate when used in combination with NaOCl during intra-canal irrigation. What's the adverse effect of this precipitate and how can I reduce the chance of precipitation?

**From Dr. Yoon-Woo Park  
(Chuncheon Ye-dental clinic)**

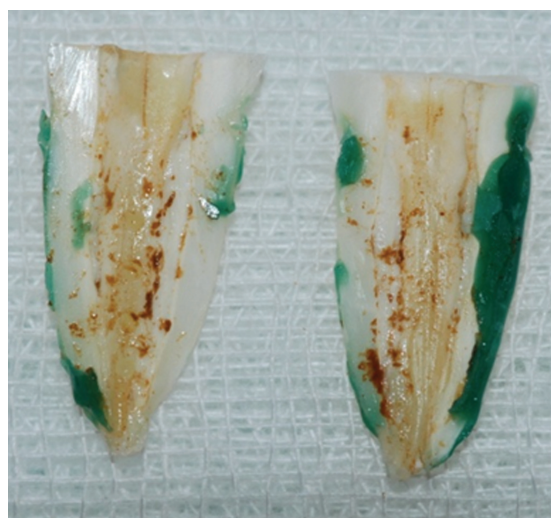
**A** During the cleaning and shaping of the root canal, various irrigants have been used to reduce the residual debris, necrotic tissue, and bacteria, as well as to remove smear layer.<sup>1-3</sup> Though sodium hypochlorite (NaOCl) is the most common irrigant used in root canal treatment, chlorhexidine (CHX) has been suggested as either an alternative or an adjunct root canal irrigant because of its antimicrobial qualities and substantivity.<sup>4-7</sup>

A combination of NaOCl and CHX for root canal irrigation has been advocated to enhance their antimicrobial properties.<sup>8</sup> Zehender proposed an irrigation regimen as the following: 2.5% NaOCl during instrumentation, and a final flush of the canals is performed in the sequence of 17% EDTA, 2.5% NaOCl, and 2% CHX.

However, the presence of NaOCl in the canals during irrigation with CHX produces an orange-brown precipitate known as parachloroaniline (PCA) (Figure 1).<sup>3,10-12</sup> The precipitate occludes the dentinal tubules and may compromise the seal of the obturated root canal.<sup>12</sup> Leaching of PCA from the insoluble precipitate is of concern because it has been shown to be cytotoxic in rats and possibly carcinogenic in humans (International Agency for Research on Cancer group 2B).<sup>13,14</sup>

To solve this problem, we have to try to prevent or minimize precipitation by preventing or minimizing the chance for the two irrigants to come in contact with each other. Basrani *et al.*<sup>11</sup> recommended washing away the remaining NaOCl with alcohol or EDTA, before using CHX. Choi *et al.*<sup>15</sup> compared different canal irrigation methods to prevent precipitation. There were no significant differences in percentage of remaining debris and patent tubules among all experimental groups at all levels.

It seems prudent to make an effort to prevent precipitation when using an irrigation regimen combining CHX and NaOCl.



**Figure 1.** A representative photograph of brown precipitate formation after consequent use of sodium hypochlorite and chlorhexidine in experimental conditions.

**Jin-Woo Kim  
(Gangneung-Wonju National University)**

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