

Linear Dimensional Change of Impression Materials Before and After Disinfection

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Introduction:

An important step of processing dental impressions is the disinfecting and removal of blood, debris, and saliva. The standard method involves thoroughly rinsing the impression under running water to remove as much bioburden as possible and spraying or immersing the impression with a disinfectant with an evidence-based efficacy. The choice of disinfectant used will often depend on the type of impression material as there can be specific incompatibilities depending on the material. A standard disinfectant chosen for fairly broad compatibility and availability is immersion in a 0.5% hypochlorite solution (bleach) for 10 minutes, but this can lead to increased distortion in some impression materials from the extended soaking time required to achieve disinfection. **Cavex ImpreSafe** uses a 3% quaternary ammonium compound (benzalkonium chloride) with a short 3-minute immersion time and claims minimal distortion due to the disinfection process compared to other disinfectants. We tested this claim with an alginate and a vinyl polysiloxane (VPS) impression material.

Experimental Design:

Materials: **Cavex ImpreSafe**, **Cavex Cream Alginate** Normal set [lot:191107], **Flexitime light flow** (Kulzer) [lot: K010113]

Disinfectants: immersion in **Cavex ImpreSafe** [19-16305] for 3 minutes, immersion in 0.5% Sodium Hypochlorite for 10 minutes.

ISO 21563:2013, ISO 4823:2015 Linear Dimensional Change (n=5): This test measures the dimensional stability of impression materials, and how much the material stretches or contracts. An impression is taken against a standard lined test block and the distance between lines 25 mm apart are measured with a traveling microscope to an accuracy of +/- 0.005 mm (0.02% of the full length). The maximum allowed linear dimensional change for ISO 4823 including silicone impression materials is 1.5% and for ISO 21563 including irreversible hydrocolloids (alginates) is 1.0 %.

Measurements were taken before and after disinfection to determine the effect disinfection had on the dimensional change. Results are shown with measurements before and after disinfection compared to the standard lined test block, and the difference of these two measurements is listed as "Due to Disinfection."

Results:

Disinfectant	Impression Material	Linear Dimensional Change, %		
		Before Disinfection	After Disinfection	Due to Disinfection
ImpreSafe	Cavex Cream Alginate	0.12 (0.03)	0.21 (0.02)	0.09 (0.04)
	Flexitime	0.11 (0.03)	0.13 (0.02)	0.02 (0.03)
0.5% Hypochlorite	Cavex Cream Alginate	0.11 (0.08)	0.44 (0.07)	0.33 (0.03)
	Flexitime	0.10 (0.06)	0.26 (0.07)	0.16 (0.07)

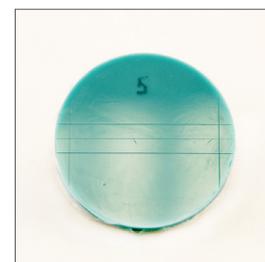
All specimens passed the ISO requirements for linear dimensional change for alginates (< 1.0%) and VPS materials (<1.5%). Linear dimensional change after disinfection with **Cavex ImpreSafe** showed virtually no distortion with Flexitime which was 8X less than hypochlorite (0.02 vs 0.16%), and minor change with **Cavex Cream Alginate** that was nearly 4X less than hypochlorite (0.09 vs 0.33%).

Conclusion:

Disinfection with **Cavex ImpreSafe** provides quick processing of contaminated impressions with minimal distortion, allowing for the maximum possible accuracy in detail reproduction.



Standard detail reproduction and linear dimensional change die (ADA 18, 19 ISO 4823, ISO 21563). 25 mm distance is used to measure linear dimensional change.



Flexitime specimen after disinfection with **Cavex ImpreSafe** showing virtually no distortion.