Dental Bleaching Efficacy of Stained Arrested Caries Lesion and their Re-Staining Susceptibility \textit{In-Vitro}

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\section*{Introduction}
Aesthetic and conservative management of arrested caries lesions is not well explored in literature. Bleaching has shown promising results as an aesthetic and a non-invasive approach, yet the possibility of re-staining which may affect the bleaching outcome, have not been investigated.

\section*{Objective}
To investigate (1) the efficacy of two different dental bleaching systems on stained-arrested caries lesions; and (2) to assess the susceptibility of the bleached lesions to staining.

\section*{Materials and Methods}

\subsection*{Study design:}
The experimental units were 60 human teeth with stained arrested caries lesions (pit and fissure surface) embedded in acrylic blocks (n= 20 per treatment group).

Baseline color was measured spectrophotometrically.

Then, specimens were randomized into 3 groups (n=20) based on the bleaching protocol used.

\begin{itemize}
  \item G1: No bleaching (negative control)
  \item G2: Simulated at-home bleaching
  \item G3: Simulated in-office bleaching
\end{itemize}

\subsection*{1. Bleaching test:}
A. At-Home bleaching:
15% carbamide peroxide, 4h/d × 7.

B. In-office bleaching:
40% hydrogen peroxide; 20min × 3.

\subsection*{2. Staining test:}
Specimens were subjected to staining (combination of coffee and tea solution; 8h/d × 5), in an incubator at 37°C.

\subsection*{Results}

\subsection*{Color:}
At-home bleaching protocol significantly (p<0.001) improved the color lightness ($\Delta E$ 7.6) of stained arrested caries lesions, compared to in-office bleaching protocol ($\Delta E$ 3.2) and control ($\Delta E$ 3.7).

\subsection*{Re-staining susceptibility:}
After staining, both at-home ($\Delta E$ 8) and in-office bleaching groups ($\Delta E$ 7.3) produced a significant (p<0.009) increase in stains absorption (darker) compared to the control group ($\Delta E$ 3.1), indicating more surface stain deposition.

\begin{table}
  \centering
  \begin{tabular}{|c|c|c|c|}
    \hline
    Groups & $\Delta E_{\text{Bleaching}}$ & $\Delta E_{\text{Staining}}$ & p-value &
    \\
    \hline
    G1 & 3.2 (1.9) & 3.1 (1.7) & A/a &
    \\
    G2 (At-home bleaching) & 7.6 (4.1) & 8.0 (3.4) & A/b &
    \\
    G3 (In-office bleaching) & 3.7 (2.3) & 7.3 (5.1) & B/b &
    \\
    \hline
  \end{tabular}
  \caption{Color change ($\Delta E$) means (standard-deviation) after bleaching and staining.}
  \end{table}

\section*{Clinical significant}
The expected results will help clinicians to carefully consider selecting appropriate arrested caries lesions cases as well as the type of bleaching agent, based on the effectiveness to manage such lesions in a conservative and aesthetic approach.

\section*{References}

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