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EFFECT OF CHLOROHEXIDINE MOUTHWASH ON COLOR STABILITYOF CERAMIC MATERIALS (E-MAX, ZERCONIA)

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ABSTRACT

Tooth color restorative filling materials were heavily investigated for longevity and durability unacceptable color match or staining are the major reasons for replacement of restorations the aim of this study was to evaluate the effect of chlorhexidine mouthwash on color stability of ceramic materials (zirconia, E-Max). Material and methods: A total of 30 specimens of two types of ceramic materials were used; E-MAX and Zirconia the color shade was taken using (easy-shade) devise in Riyadh colleges of dentistry and pharmacy. Afterwards they were immersed in (chlorhexidine gluconate 0.2%) for three periods of time 24 hours - 72 hours- and 7 days. Then they were subjected to color measurement by the same devise again in three periods of time, then all results was subjected to statistical analysis by statistical special program (SPSS) version 22 windows. The results showed that the all samples were whiter after exposing to chlorhexidine in two types of ceramic used and in three periods of time.

INTRODUCTION

Tooth color restorative filling materials were heavily investigated for longevity and durability (Baratieri et al., 2001) The major reasons for replacement of anterior restorations are unacceptable color match or staining (Trevor burke, 1999) For special patients especially for those who have malodor, the use of mouthwash is highly recommended by clinicians (Fischman, 1994) For long-term success of esthetic restoration, Color stability is critical. The use of mouthwash is increasing among patients,as some of physical properties affected by some mouthwashes applications (Gurdal et al., 2002; Weiner et al., 1997) However, as a supplementary method for controlling dental plaque, could be considered the use of mouthwashes as disinfection solutions (Sheen et al., 2001; Zanatta et al., 2010) Because of the strong anti-microbial activity of Chlorhexidine (CHX), it is routinely prescribed. wide ranges of bacteria are affected like candida, and some spices of viruses including HIV and Hepatitis virus (Zanatta et al., 2010; Addy et al., 1991; Torres et al., 2007).

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Furthermore, formation and accumulation of bacterial plaque and the development of gingivitis can be prevented by CHX (Sheen et al., 2001; Lorenz et al., 2006; Brecx et al., 2013; Lang et al., 1998) However, detrimental effects on oral and dental tissues may be occur due to frequent use of CHX. Inducing of brown stains on enamel, composite restorations, oral mucosa, and tongue have been found due to the use of CHX (Zanatta et al., 2010; Addy, 1991; Torres et al., 2007; Sheen et al., 2001). In the present study, it was observed the staining effect of CHX on dental enamel. Therefore, it is of great interest to find mouthwashes that provide minimal side effects with effective plaque control. A mouthwash is defined as a non-sterile aqueous solution used mostly for refreshing or antiseptic effect and designed to reduce oral bacteria, remove food particles, temporary reduce bad breath and provide a pleasant taste (http://www.mouthwashes.net). Chlorhexidine is extremely interactive with anions due to its dicationicnature, which is relevant to its efficacy, safety and side effects (Harbison, 1989; Suci, 2002). There are various preventative and therapeutic purposes for Chlorohexidine, to treat oral infections, reduce inflammation, decrease halitosis and to deliver fluoride locally for preventing caries. We going to use two restorative materials which are Zirconia and Emax. zirconia is a very hard ceramic that is used as a strong base

material in some full ceramic restorations. Zirconia is relatively new in dentistry and the published clinical data is correspondingly limited. The zirconia used in dentistry is Zirconium oxide which has been stabilized with a material that provides optimum esthetics & strengthto enable conventional or adhesive cementation which is yttrium oxide IPS e.max (Shen, 2013) Due to the needle-like crystal structure of IPS e.max lithium dislocate which offers excellent strength and durability as well as outstanding optical properties. BY CAD/CAM technology, IPS e.max lithium disilicate can be traditionally pressed or contemporary processed (Dong et al., 1992).

MATERIALS AND METHODS

A total of 30 specimens of two types of ceramic materials were used; E-MAX and Zirconia which divided into two groups, each group include 15 samples (zircon veneers (zenostar materials from lvoclarvivadent 900mpA) and IPS (emax press veneers 500MPa) first, the color shade was taken using (easy-shade) devise in Riyadh colleges of dentistry and pharmacy. Afterwards they were immersed in (chlorhexidine gluconate 0.2%) for three periods of time 24 hours - 72 hours- and 7 days. after removing the samples from 0.2% CHX mouthwash they were subjected to color measurement by the same devise again in three periods of time, then all results was subjected to statistical analysis by statistical special program (SPSS) version 22 windows, Descriptive analysis using median was used. Test of statistical significance at each time period between the two groups using Mann Whitney U test and within the groups between different time period using Friedman test was performed. A p value of <0.05 was considered as statistically significant.

RESULTS

Table 1. Average color change of the ceramic materials after immersion in chlorhexidine mouthwash at different time periods

	Before immersion	24 hours after immersion	72 hours after immersion	7 days after immersion
Zirconia	A1	BL4	B2	B2
E.max	A1	BL3	B1	B1

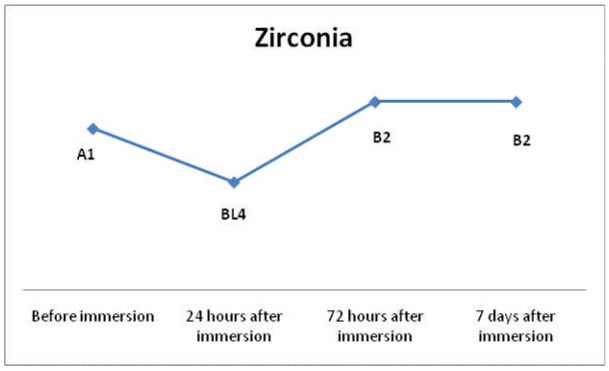

Figure 1. Average color change of the ceramic material (Zirconia) after immersion in chlorhexidine mouthwash

Figure 1 and 2 shows color change of ceramic materials at different time periods.

Before immersion (Baseline)

Both Zirconia and E.max ceramic materials before immersion in chlorhexidine mouthwash had a baseline colour value A1.

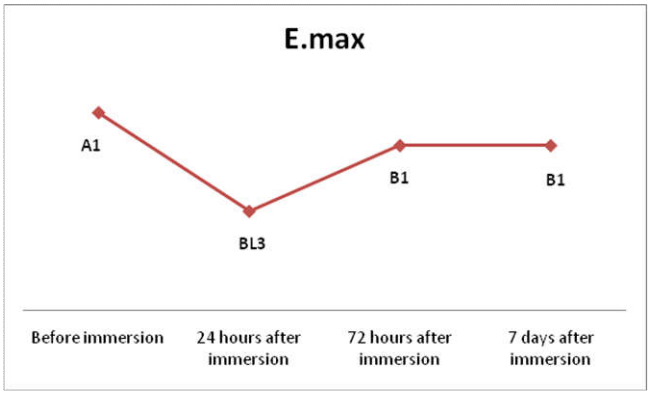

Figure 2. Average color change of the ceramic material (E.max) after immersion in chlorhexidine mouthwash

Twenty four hours after immersion

In Zicronia the colour changed from A1 to BL4 and in E.max from A1 to BL3. There was a statistically significant difference in the colour change in both from baseline to 24 hours immersion ($p<0.05$).

Seventy two hours after immersion

In Zicronia the colour changed from BL4 to B2 and in E.max from BL3 to B1. There was a statistically significant difference in the colour change in both from baseline to 72 hours immersion ($p<0.05$) and 24 hours immersion to 72 hours immersion ($p<0.05$).

Seven days after immersion

In both Ziconia and E.max there was no colour change. There was a statistically significant difference in the colour change from baseline to 7 days of immersion ($p<0.05$) and 24 hours immersion to 7 days of immersion ($p<0.05$). However, there was no statistically significant in colour change between 72 hours and 7 days of immersion ($p>0.05$).

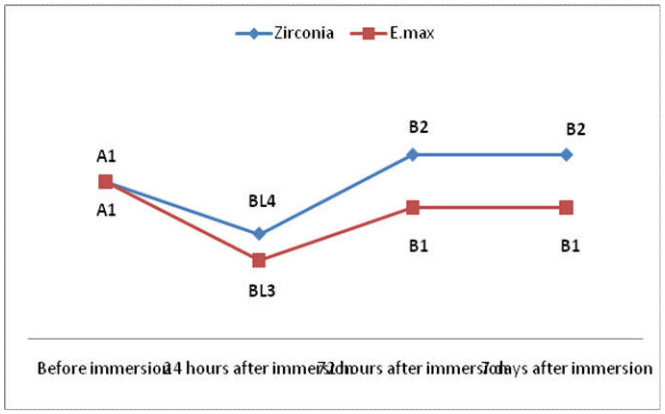

Figure 3. Comparison between color changes in each group for different time durations

Figure 3 indicates that the storage of specimens in chlorhexidine mouthwash at different time periods causes a clinically diagnosable color change in comparison to the baseline. At 24 hours after immersion, both Zirconia and E.maxcolour changed brighter than baseline but E.maxcolour change was brighter than Zirconia. On the other hand, at 72 hours and 7 days after immersion, Zirconia colour changed darker than baseline and E. maxcolour changed brighter than baseline.

In comparison, Zirconia colour changed darker than E.max. The difference in colour change between Zirconia and E.max at 24 hours, 72 hours, and 7 days was statistically significant ($p<0.05$). Therefore, E.max showed better colour stability than Zirconia.

DISCUSSION

As results showed there were distinguish changing in the shade of the ceramic tested, in this area it was clear that there was whitening in the shade of all samples, this is may be interpreted because of the absence of saliva and other natural components, in addition the time factor wasn't highly influential and that may be explained by the in vitro environment which used in our research..

Conclusion

As results have shown there is changing in color stability after using chlorhexidine with materials used, but it was notable that all samples were whiter after exposing to chlorhexidine in two types of ceramic used and in three periods of time tested. So we conclude that chlorhexidine may remove some stains from the composition of ceramic material to appears lighter.

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