



INTRODUCTION

Tooth bleaching procedure are often considered the preferred esthetic approach for treating extrinsic tooth discoloration cases that commonly present in dental clinics. Most patients desire to have whiter teeth for cosmetic reasons.

In-office tooth bleaching or professional bleaching techniques are known to be

- ✓ Conservative,
- ✓ Safe,
- ✓ Effective,
- ✓ And provide long-lasting, predictable clinical outcomes.

Moreover, a variety of over-the-counter whitening products such as whitening oral rinses, dentifrices, paint-on gels, chewing gum, dental floss, and whitening strips are readily available as home care products.

Whitening strips are proven to show some predictable esthetic outcomes, but these results have insufficient clinical relevance as the studies were based on short term evaluations.

In fact, legislation varies in different countries across the globe regarding the use of OTC dental bleaching products as a home care intervention.

It is the foremost responsibility of a dentist to be aware of these types of products and educate their patients regarding the associated drawbacks of frequently using OTC bleaching products.

The aim of this review was to examine the efficacy and safety profile of whitening strips containing variable concentration of hydrogen peroxide content in comparison to other OTC whitening products.

OVERVIEW

Numerous clinical trials have been published that discussed the efficacy of using whitening strips (WS) (different %) in relevance to other OTC products.

Strength of Evidence

(Whitening strips with 5.3% hydrogen peroxide concentration)

- ❑ A study by Gerlach, with 57 participants showed Whitening strips with 5.3% hydrogen peroxide produced a significant ($P < 0.0001$) tooth color improvement including reduction in yellowness and increased lightness versus the placebo group.
- ❑ Gerlach RW stated the improvement in tooth color using **5.3% HPS** over 2 weeks

(Whitening strips with 6-6.5 % hydrogen peroxide concentration)

- ❑ A meta-analysis with a larger sample population involving 148 healthy individuals supported the use of whitening strips with 6% hydrogen peroxide twice per day for 30 minutes over 2 weeks, resulting in significant tooth color improvement from baseline.
- ❑ Lo EC et al conducted an RCT with 87 adults showed that 6% HPS group demonstrated significantly ($P < 0.01$) higher whiteness improvement, whitening satisfaction, and overall impression as compared to whitening gel (12% carbamide peroxide) and the placebo groups

OVERVIEW

(Whitening strips with 6-6.5 % hydrogen peroxide concentration)

- ❑ A clinical study of 54 adult volunteers revealed that strip with 9.5% hydrogen peroxide content provided significant tooth color improvement in comparison to a placebo strip after 3 days of product use.
- ❑ Another in vitro study supported the finding that whitening strips with 9.5% hydrogen peroxide concentration (Crest 3D White strips CWS) produced significantly greater color changes than the other OTC products

(Whitening strips with 10 % hydrogen peroxide concentration)

- ❑ A clinical study with 16 subjects was conducted to evaluate the clinical effectiveness of 10% hydrogen peroxide gel (Crest White Strips Premium). The product was used under supervision, and strips were then removed after 5, 10, 30, and 60 minutes.
- ❑ In conclusion, strips with 10% HP concentration provided effective tooth whitening within a short time
- ❑ An RCT with 28 participants showed that 7-day use of the whitening strips containing 10% HP resulted in significant tooth color improvement in comparison to 2% HP pre-brushing whitening oral rinse.

(Whitening strips with 14 % hydrogen peroxide concentration)

- ❑ A novel whitening strip with 14% hydrogen peroxide concentration formally known as Crest White Strips Supreme was introduced in the year 2003.
- ❑ 14% hydrogen peroxide gel strip provided greater whitening, including 42 to 49% greater improvement in tooth color and faster whitening onset as compared to 6% hydrogen peroxide strip, without clinical evidence of oral-tissue irritation.

Effects of Hydrogen Peroxide on the Enamel Surface

- ❑ None of the teeth studied showed detectible enamel surface changes.
- ❑ Other studies support the contention that whitening strips with controlled doses of hydrogen peroxide around 11.7% and 14% concentrations do not produce changes in surface microhardness, histomorphology, or micro-chemical mineral composition of teeth

Genotoxic Effect of Hydrogen Peroxide Whitening Strips

- ❑ No genotoxic effects caused by 10% hydrogen peroxide concentration were reported in patients using home-based whitening systems for 30 min/day over 14 days, or even 30 days after the end of treatment.

CONCLUSION

Evidenced-Based Approach

The key determinant factor in the effectiveness of any whitening treatment is usually the concentration of the bleaching agent and the duration of the exposure.

Conclusive evidence

Clinical trials effectively support the long-term safety profile and effectiveness of tooth whitening with gel strips containing 14% hydrogen peroxide, resulting in 42- 49% improvement in tooth color and faster whitening onset without clinical evidence of increased oral- tissue irritation.