

# TOOTH WHITENING: WHAT WE NOW KNOW

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SORT SCORE			
A	B	C	NA

SORT, Strength of Recommendation Taxonomy

LEVEL OF EVIDENCE		
1	2	3

See page A8 for complete details regarding SORT and LEVEL OF EVIDENCE grading system

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## ABSTRACT

Current research about tooth whitening shows that it is safe and effective when manufacturer's protocol is followed, yet there are risks of which the profession and users should be aware. This update provides a summary of current research and assessment of the safety and efficacy of tooth whitening regimens.

### Background

Tooth whitening has become one of the most frequently requested dental procedures by the public. The public has come to demand whiter, more perfect smiles and in response many choices for tooth whitening have been made available. These include home-based products such as toothpastes, gels, and films, as well as in-office based systems where products containing highly concentrated bleaching agents are applied under professional supervision. The profession and public have been aware of certain risks related to tooth whitening such as increased tooth sensitivity and gingival irritation. New research has shown that there are other risks such as tooth surface roughening and softening, increased potential for demineralization, degradation of dental restorations, and unacceptable color change of dental restorations. The new research is also focused on optimizing whitening procedures to reduce tooth sensitivity and to increase the persistence of the whitening.

### Methods

Current reports in the literature are reviewed that are related to the use of peroxide based whitening methods. These reports include *in vitro* studies for method optimization and mechanism as well as clinical studies on effects of various whitening regimens.

### Conclusions

When manufacturer's instructions are followed, hydrogen peroxide and carbamide peroxide based tooth whitening is safe and effective. Patients should be informed of the risks associated with tooth whitening and instructed on identification of adverse occurrences so that they may seek professional help as needed.

**Key words:** Tooth whitening, bleaching, hydrogen peroxide, carbamide peroxide, bleaching risks, hypersensitivity, light activation, restoration bleaching

## INTRODUCTION

The public has been influenced by the portrayal of perfect white smiles in the media. The color quality of television, movies, electronic and print media has raised self-awareness of discolored teeth. In the late 1980's several companies introduced both home-based products and professionally applied tooth whitening products into the U.S. marketplace. These have gained popularity with the public who has come to demand whiter, more perfect smiles.<sup>1</sup> There are several different methods for whitening teeth, each with their own mechanism of action. The efficacy of these different methods is dependent upon the particular tooth discoloration that

**Figure 1.** Examples of tooth staining. Extrinsic staining examples: A. Smoking; B. Wine stain; and C. Food stain. Intrinsic staining examples: D. Age yellowing; E. Decay; F. Orthodontic white spot lesion; G. Mild fluorosis; H. Amalgam restoration; I. Tetracycline stain; J. Genetic (amelogenesis imperfecta); K. and non-vital coloring.



is being treated. Causes of tooth discoloration can be categorized into two main groups: intrinsic and extrinsic staining (see [Figure 1](#)). Intrinsic staining, sometimes called

internal staining, can be attributed to factors such as genetics, age (from enamel wear over time exposing yellower dentin), antibiotics, high levels of fluoride, and

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