## COMMENTARY

TOOTH BLEACHING BY DIFFERENT CONCENTRATIONS OF CARBAMIDE PEROXIDE AND HYDROGEN PEROXIDE WHITENING STRIPS: AN IN VITRO STUDY

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Experienced dental clinicians who appreciate dental research and its importance to the progression of clinical science in their practices learn to be wary of in vitro studies. All too often, such studies, regardless of how carefully conceived or rendered, do not take into account that laboratory simulations of intraoral experiences can have limited relevance to actual clinical care. The attraction of the Sulieman and colleagues study is that the investigators understand the problems of in vitro versus in vivo experimentation and designed and executed this work with the goal of gathering results meaningful to clinical dentists.

Levitt and Dubner, in their current bestseller *Freakonomics: A Rogue Economist Explores the Hidden Side of Everything*, discuss the problems of blindly accepting conventional wisdom and how logical assumptions can be completely distorted when one takes only a superficial view.[1] How surprised the reader is to learn that some bouts in the honorable sport of sumo may be predetermined and that some teachers may be cheating for their students, so that they may appear to be better teachers and receive certain benefits from that deception! By our nature, we apply logic to how we perceive all things around us and assume that things should be a certain way. Dental experiments and new clinical treatment ideas usually begin with someone's assumption, and dental science advances as evidence mounts proving or disproving the initial thought.

It is logical for a dentist who applies (or prescribes application of) tooth bleaching solutions to patients' teeth that higher concentrations of those solutions would work more efficiently. It is also logical to assume that various concentrations of tooth bleaching solutions would give similar tooth whitening results if the lower concentration fluids were used for longer times. This study proves those assumptions using three different tooth shade measuring systems and carefully quantifies the shade measurements.

The authors are prudent and generous to the reader by urging caution in interpreting their results. They cite the phenomenon of dentinal fluid dynamics, which could influence internal bleach penetration and saturation. Extracted teeth would not be subject to that variable. Their chief finding, "that the final color change is independent of the concentration of bleaching agent used and that time is the dominant variable," is a valuable piece of information for the clinical dentist. Based on this in vitro work, it is now logical for dentists using 10% CP over a longer time period to feel confident that their patients are achieving results similar to those using much higher concentrations. Likewise, dentists using higher concentrations of solution whose patients are complaining of tooth sensitivity may be able to offer identical bleaching results to their patients, with less chance of tooth sensitivity, simply by offering a lower concentration of solution with the recommendation of a longer treatment course.

The value of this work is its practicality and immediate usefulness to dental clinicians. In addition, just as it is elucidating to learn that one's assumption is incorrect, it is refreshing and encouraging to have one's correct assumption scientifically confirmed.

REFERENCE

1. Levitt, SD, Dubner, SJ. Freakonomics: a rogue economist explores the hidden side of everything. New York: Wm Morrow; 2005.

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