

5-1-2022

10-Minute EBD: Charcoal Toothpastes Pose Risks with Few Benefits

Kelly Lemke DDS, MS

UT Health San Antonio School of Dentistry, lemkek@uthscsa.edu

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Recommended Citation

Lemke, Kelly DDS, MS (2022) "10-Minute EBD: Charcoal Toothpastes Pose Risks with Few Benefits," *The Journal of the Michigan Dental Association*: Vol. 104: No. 5, Article 7.

Available at: <https://commons.ada.org/journalmichigandentalassociation/vol104/iss5/7>

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Charcoal Toothpastes Pose Risks with Few Benefits

By Kelly Lemke, DDS, MS

Social media platforms such as Instagram and Twitter — and the influencers who post content there — have become an important source of health-related information for many. Driven in part by thriving communities on social media, personal care products containing natural and organic ingredients have surged in popularity in recent years.

Such is the case with the increased interest in and use of toothpastes containing activated charcoal among consumers aiming for whiter teeth. Although there is a long history of charcoal use in oral care in many countries,^{1,2} commercially available charcoal toothpastes have been considered to be a niche product until recently. Now, charcoal toothpastes can be found on the shelves of major grocery and big box stores. Crest, Colgate, and Arm & Hammer all produce their own versions, joining natural-product heavyweights such as Tom's of Maine, Burt's Bees, and Hello along with lesser-known "boutique" brands that rely on celebrity endorsements of their whitening effectiveness.³

The unique grey-to-black color of the paste seems tailor-made for the visual nature of social platforms, and indeed, most brands maintain Instagram accounts.⁴ The almost 51,000 Instagram posts hash-tagged #charcoaltoothpaste further testify to the popularity of these products.

Charcoal toothpastes contain a finely ground, powdered form of acti-

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Clinical Scenario	Literature Search Strategies	Evidence Summary
 <p>Dentists and dental team members may be asked for their opinion on the use and benefits of charcoal toothpastes.</p>	 <p>Google Scholar is a search engine of the whole internet that filters for 'scholarly' content, while PubMed is a comprehensive biomedical database with both quality and scholarly criteria for inclusion.</p> <p>Because of the potential availability of less-scrutinized health information in the former, the search for research evidence was conducted in PubMed.</p>	 <p>There is a lack of evidence to support the claimed whitening efficacy of charcoal toothpastes without additional bleaching-promoting ingredients.</p> <p>There is a lack of evidence to support purported bacteria-fighting, fungus-fighting, or toxin-removing abilities of these products.</p>

vated charcoal, which is produced when charcoal is reheated to a high temperature, usually in the presence of a gas, resulting in the formation of internal spaces or pores.^{1,5} The capacity of the powdered charcoal to abrade away surface enamel stains is the basis for its potential to whiten or to produce the appearance of lighter teeth;⁴ however, this same abrasiveness has the potential to result in loss of tooth tissues and/or changes in their surface roughness.

This article aims to examine the evidence on the effectiveness and potential adverse effects related to toothpastes containing activated charcoal.

PICO questions

To capture all high-quality research

evidence related to this objective, a PICO (P: Population, I: Intervention, C: Comparison, O: Outcome) question was formulated: In patients seeking whiter teeth, do toothpastes containing activated charcoal whiten teeth more effectively without increased enamel abrasion or loss as compared standard whitening toothpastes?

P = patients seeking whiter teeth

I = toothpastes containing activated charcoal

C = standard whitening toothpastes

O = whiter teeth without increased enamel abrasion

Literature search

Google Scholar is a search engine of the whole internet that filters for

“scholarly” content, while PubMed is a comprehensive biomedical database with both quality and scholarly criteria for inclusion. Because of the potential availability of less-scrutinized health information in the former, the search for research evidence was conducted in PubMed. The peer-reviewed evidence on activated charcoal in toothpaste formulations was limited to literature reviews and *in vitro* (laboratory) studies. Some studies

Dentists and dental team members may be asked for their opinion on the use and benefits of charcoal toothpastes. Today, more than ever, dental providers must conduct their own due diligence on fashionable oral hygiene products so as to avoid giving advice based solely on personal observation or experience.

reported solely on charcoal-based powders, which are less commonly available in the United States and not the focus of this article.

A 2017 literature review by Brooks and colleagues included 13 studies on the use of charcoal-containing oral hygiene products.² The authors also summarized advertised product information available on the internet for 50 charcoal toothpastes. They found

that almost all products advertised whitening ability, and close to half of the products promoted various therapeutic claims such as detoxification and antibacterial and/or antiseptic abilities. The authors determined that there was not sufficient science to validate either the cosmetic or health benefits promoted on behalf of charcoal-containing oral products.

A more recent literature review concurs with these findings.⁴ Bauler et al. located 21 *in vitro* and one short-term, non-controlled clinical study sponsored by the manufacturer of the product under study. Five studies showed positive results for the charcoal dentifrices, five showed no difference vs. the control product, and 12 reported various negative results, including no whitening ability, surface loss, and increased surface roughness. An interesting finding was that 41% of these papers have been cited on the internet and/or social media. About three-fourths of the products were affiliated with an Instagram account. The number of followers of these accounts ranged from 2,300 to 576,000 (median = 32,000 followers).

The review by Bauler and colleagues included an analysis of label information and indications for 36 charcoal-based toothpastes and abrasive powders available in Brazil, several of which are also on the U.S. market. They found that manufacturers made non-scientific claims, rarely made mention of risks and/or adverse effects, and often included statements appealing to niche markets, such as gluten-free, cruelty-free, and vegan.⁴

Evidence summary

Dentists and dental team members may be asked for their opinion on the use and benefits of charcoal toothpastes. Today, more than ever, dental providers must conduct their own due diligence on fashionable oral hygiene products. (Continued on Page 32)



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giene products so as to avoid giving advice based solely on personal observation or experience.

Claims about effectiveness and safety of these toothpastes on the websites of major brands include “noticeably whiter teeth,” “removes stains and impurities,” “gently whitens teeth,” and “safe for enamel.” These statements are undermined by the lack of clinical and laboratory data to support the claimed whitening efficacy of charcoal toothpastes without additional bleaching-promoting ingredients.^{1,2} Neither is there any evidence of these products’ purported bacteria-fighting, fungus-fighting, or toxin-removing abilities.

No activated charcoal-containing toothpaste has received the American Dental Association Seal of Acceptance.⁶ All toothpastes with the ADA Seal of Acceptance — including stain-removal toothpastes — contain fluoride, whereas many charcoal-infused toothpastes are fluoride-free, raising concerns about the risk for caries among those who opt to use them.

The abrasiveness of charcoal toothpastes presents a risk for users. Many charcoal-containing products are overly abrasive, and their use can lead to alterations or loss of the tooth surface.^{1,7,8} Loss of surface enamel can lead to a rougher tooth surface that may be more liable to absorb stains. Moreover, surface loss can lead to dentin exposure, hypersensitivity, and a less-white or yellower tooth appearance.² In other words, these products can lead to unintended effects that negate the primary purpose of their use for many patients.

The ADA has approved certain abrasive agents for use in toothpastes. These include modified silica abra-

sives or enzymes that help clean and potentially whiten teeth by physically removing surface stains: calcium carbonate, dehydrated silica gels, hydrated aluminum oxides, magnesium carbonate, phosphate salts, and silicates. During the ADA Seal of Acceptance process all toothpastes are assigned a Relative Dentin Abrasivity (RDA) value. An upper limit of 250 RDA has been adopted by the ADA as safe, indicating that these toothpastes result in limited wear to dentin and virtually no wear to enamel.⁶

When the American Academy of Cosmetic Dentistry asked people what makes a smile unattractive, the most common answer was discolored, yellow, or stained teeth.⁹ So it’s no wonder that whitening continues to be one of the most popular dental treatments. Teeth whitening can be done safely and effectively using an evidence-based approach. In addition to professionally monitored take-home and in-office tooth whitening, options include whitening toothpastes that have earned the ADA Seal of Acceptance for removal of surface stains, as well as ADA-accepted over-the-counter bleaching strips. ●

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About the Author

Kelly Lemke, DDS, MS, is director of admissions at UT Health San Antonio School of Dentistry and an assistant professor in the Department of Developmental Dentistry. She completed a general practice residency at Audie L. Murphy Memorial VA Hospital and has practiced dentistry in both private practice and public health settings. She earned an MS in clinical investigations from the UTHSCSA Graduate School of Biomedical Sciences in 2017. Dr. Lemke is an associate editor for the *Journal of the American Dental Association*.



Lemke