

# The effects of sodium bicarbonate dentifrices in oral health

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# Why sodium bicarbonate (↑)



- Sodium bicarbonate is also known as *baking soda*, *bicarb*, *bicarbonate of soda*, or *carbonic acid monosodium salt*.
- Certain ingredients are incorporated in dentifrices to help reduce plaque and bacterial accumulation in the oral cavity. Sodium bicarbonate is one of these ingredients.
- Dr. Jules Sarrazin, dean of New Orleans College of Dentistry, recommends the use of baking soda because of its ability to polish teeth and low abrasion to the teeth and gingiva.
- The **disadvantage** of  $\text{NaHCO}_3$  dentifrice used to be the salty taste, yet the problem has been modified by the addition of sweeteners and flavors.
- The **advantages** of  $\text{NaHCO}_3$  are how it's inexpensive, available in a sufficient amount, non harmful to living system or tissues, and kills microorganisms.
- It's also naturally compatible with sodium fluoride ( $\text{NaF}$ ).



# Properties of sodium bicarbonate

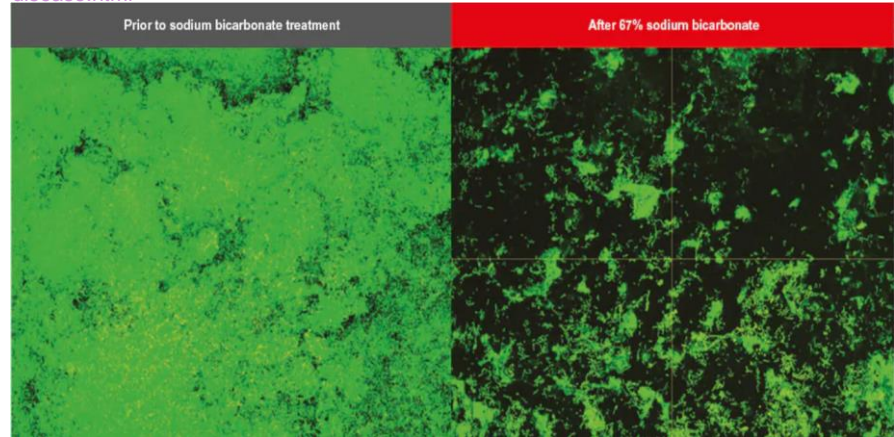
- Buffering capability- reduces the risk of caries after ingestion of carbohydrates, allowing pH to return to normal before demineralization occurs.
- Sodium bicarbonate dissolves quickly, so it can find its way into the tiniest spaces in the oral cavity to fight plaque and bacteria.
- Not only does  $\text{NaHCO}_3$  help reduce plaque and bacteria accumulation, it also lowers the levels of acidity in the mouth that cause bad breath—or halitosis.
- Baking soda whitens teeth naturally: its gritty texture is effective at removing the yellowish-brown extrinsic stains.



<https://brainandmouth.com/best-whitening-toothpaste/>



<https://www.carsondds.com/dental-services/common-dental-problems/gingivitis-periodontal-disease.html>




<https://www.gskhealthpartner.com/en-gb/oral-health/brands/corsodyl/science/sodium-bicarbonate/>



# A randomized controlled trial evaluating the efficacy of a 67% sodium bicarbonate toothpaste on gingivitis

**Background/ Study Purpose:** A randomized controlled trial was conducted to determine the effectiveness of 67% sodium bicarbonate toothpaste compared to non-sodium bicarbonate toothpaste on gingivitis as well as its effect on volatile sulphur compounds (VSC) levels which contributes to halitosis. The ideal subject was in good health, had 20 gradable teeth, mild to moderate gingivitis, and experienced significant bleeding when brushing. Over a 6-week period, researchers performed assessments from the initial screening and compared it to the baseline. Subjects were instructed to brush twice daily with the assigned toothpaste and to temporarily discontinue any other oral hygiene routines while active in the study. Researchers expected to see a significant improvement because it was proven in a previous study to be effective when used at a high concentration. The authors concluded that toothpaste containing 67% sodium bicarbonate is effective in improving gingival health and in the reduction of bleeding. Patients can benefit from using this toothpaste to prevent worsening of gingivitis and improve overall oral health.

**Method:** The subjects in this study were randomized, those who were in the experimental group used the Parodontax daily toothpaste and the control group used the non-sodium bicarbonate toothpaste. Researchers held three screening visits performing intra oral, visual soft tissue, and gingival examinations on eligible subjects. Subjects were supplied with a medium manual toothbrush and were instructed to brush as they normally would for one minute (using non sodium bicarbonate toothpaste), upon completion researchers collected sputum 

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**Results:** 148 subjects were randomized out of the 198 that were screened. 74 subjects per group. At week 6, the test group presented with a lower number of bleeding sites than the control group. Statically, there was an absolute difference of -11.0 and a relative difference of -25.4%. The test group also scored considerably lower on both the modified gingival index (MGI) and bleeding index (BI) score versus the control group. The relative differences were -28.8% and -27.4%. Intentionally, volatile sulphur compounds (VSC) were not analyzed due to the large number of values that fell below the level of quantification and the difference between the groups didn't reach statistical significance. Researchers utilized Pearson's correlation coefficients to analyze MGI and VSC and BI and VSC. The results ranged between 0.8 and 0.26.


**Conclusion:** Based on their findings, the authors concluded that after 6 weeks of use toothpaste containing 67% sodium bicarbonate has the ability to improve gingival health and lessened bleeding in comparison to non- sodium bicarbonate toothpaste. According to the significant statistical data, there was a 25.4% reduction in bleeding sites, the modified gingival index (MGI) improved by 28.8%, and the bleeding index (BI) reduced by 24.4%. The authors findings contributed to the knowledge of the subject because they furthered the investigation of a previous study that proved that higher concentrations of sodium bicarbonate improved gingival health by determining the benefits of use over a shorter period of


# Efficacy and Tolerability of Sodium Bicarbonate Toothpaste in Subjects with Gingivitis: A 6-Month Randomized Controlled Study

**Background/Study Purpose:** The authors conducted this study to analyze and examine the outcomes of brushing twice daily with toothpaste containing 67% or 0%  $\text{NaHCO}_3$  in subjects with moderate gingivitis for 24 weeks. Certain ingredients are incorporated in toothpaste to help reduce plaque and bacterial accumulation in the oral cavity. Sodium bicarbonate is one of these ingredients. Previous studies evaluated how  $\text{NaHCO}_3$  help reduce biofilm on subjects with pre-existing gingivitis and the results were positive. However, this study examined on subjects with moderate gingivitis. From this observation, the authors aim to learn whether  $\text{NaHCO}_3$  in toothpaste improve in reduction of plaque and bleeding sites on subjects with moderate gingivitis compared to subjects using toothpaste containing 0%  $\text{NaHCO}_3$  by evaluating the results in the measurements they recorded.

**Methods:** The study was a single-blind randomized controlled study that started out with 247 subjects but only 228 completed until the end. It was conducted at Silverstone Research Group, Las Vegas, NV, USA in August 2014 and completed in March 2015. After the screening, 247 subjects were chosen. Out of the 247 subjects, 124 were randomly given the toothpaste containing 67%  $\text{NaHCO}_3$  and the rest were given the toothpaste containing 0%  $\text{NaHCO}_3$ . The control group is the group of subjects that used toothpaste containing 0%  $\text{NaHCO}_3$ . For the next 24 weeks, they were instructed to brush twice daily for 1 timed minute. Many measures were used by the researchers during this study such as number of bleeding sites, Modified Gingival Index (MGI), Bleeding Index (BI), Turesky modification of the Quigley-Hein Plaque Index (TPI), and interproximal TPI. All of these methods were measured in the beginning of the study, week 6, 12, and 24. After the assessments were completed before the start of the study, each subject had a professional dental prophylaxis and was

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**Results:** The researchers found a significant improvement on the subjects using the toothpaste containing 67%  $\text{NaHCO}_3$  throughout the study by observing the measurements taken. The number of bleeding sites, and indices scores declined significantly compared to the measurements taken on subjects using the toothpaste containing 0%  $\text{NaHCO}_3$ . The mean of each measurement taken presented a noticeable decline at each study visit (week 6, 12, and 24) on subjects who used 67%  $\text{NaHCO}_3$ -contained toothpaste whereas the 0%  $\text{NaHCO}_3$  didn't show a huge difference and actually went up during week 24. The results were statistically significant. All of the indices resulted with  $p < 0.0001$  and the confidence interval was 95%. 

**Conclusion:** Based on the authors findings, they concluded that toothpaste containing  $\text{NaHCO}_3$  definitely helps in improving gingivitis, bleeding of the gums, removing plaque and is more effective compared to toothpaste without  $\text{NaHCO}_3$ . Their findings contribute to the knowledge of the subject by the change in their gingiva and results of less bleeding sites when brushing. Subjects saw a difference after treatment by using the toothpaste containing  $\text{NaHCO}_3$ . Such as less inflammation and bleeding of the gums. 



# A Randomized clinical trial to evaluate the effect of a 67% sodium bicarbonate-containing dentifrice on 0.2% chlorhexidine digluconate mouthwash tooth staining

**Study:** Akwagyrim et al. researched the stain control properties of 67% sodium bicarbonate ( $\text{NaHCO}_3$ ) dentifrice versus sodium fluoride ( $\text{NaF}$ ) with 0%  $\text{NaHCO}_3$  between participants with mild stains when using 0.2% chlorhexidine digluconate (CHX) mouthwash.

**Background:** Previous studies have shown the efficiency of using CHX mouthwash on patients with gingivitis because of its antibacterial properties against gram-positive and gram-negative bacteria and in addition its ability to sustain these properties from 8-12 hours. It can also be beneficial in the break down of existing plaque, reduction of plaque regrowth, and inhibit the development of gingivitis. However, some patients are reluctant to use it because it has shown to be significantly more likely to stain compared to other mouthwashes.

**Purpose & Design/Methods:** There were 160 participants in this randomized control trial into a parallel, examiner-blind, two-site (Site: Manchester, UK; Site 2: Maldon, UK) under two treatment groups for 6 weeks: one control dentifrice consisting of 0%  $\text{NaHCO}_3$  and  $\text{NaF}$  1450 ppm and 0.2% CHX mouthwash and the other 67%  $\text{NaHCO}_3$  and  $\text{NaF}$  1400 ppm and 0.2% CHX mouthwash. Using the modified Lobene



# A Randomized clinical trial to evaluate the effect of a 67% sodium bicarbonate-containing dentifrice on 0.2% chlorhexidine digluconate mouthwash tooth staining

**Results:** After six weeks, the Overall facial modified Lobene Stain Index (MLSI) was significantly different in favor for 67% NaHCO<sub>3</sub> dentifrice (-32.2%, P=0.0404, CI=95%) yet no significant difference between treatments for primary efficacy variable of Overall MLSI at 6 weeks (-19.9%, P= 0.1313, CI=95%).

**Conclusion:** Researchers concluded that the study showed effectiveness of 67% NaHCO<sub>3</sub> dentifrice on accessible surfaces with the index, Overall Facial MLSI by week 6 (-32.2% =95%).



Chlorhexidine stain

<http://jairjp.com/JANUARY%202013/02%20SRUTHY%20PRATHAP.pdf>



<http://www.expresschemist.co.uk/hugepicpopup.jsp?pageid=11194&slotindex=&picindex=1&scope=0>

# Key points for dental hygienists & patients

- Oral health depends mainly on home care. Home care can decrease the risk of frequent visits for dental work and complications in the future such as caries and gum diseases. This includes flossing correctly at least once a day, using the correct toothpaste, brushing twice a day, using a tongue cleaner, and oral rinse.
- As dental hygienists, it is our job to recommend the most effective dentifrices, mouthrinses, and supplementary aids that will benefit them, according to their individual case.
- Patients trust that our knowledge will help them answer their questions.
- Sodium bicarbonate dentifrice (67%) demonstrated to be beneficial for accessible



# Why is this so important?



- To preserve your beautiful smile.
- Enjoy confidence in your breath.
- Even cardiologists are advising their patients with cardiovascular disease about the importance of eliminating all inflammation in their bodies, including in their gums. This is known as The Oral Systemic Connection.



<https://southairdriesmiles.ca/get-the-smile-you-deserve-with-cosmetic-dental-services/>



<https://placervilledentistry.com/oral-health/when-good-breath-goes-bad/>



Thank You!



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