

Propolis Treatment for Dental Sensitivity after Tooth Bleaching

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Abstract: *Propolis is a brown substance collected by honey bees from sprouts and exudates of trees. The aim of this study was to assess the efficacy of Propolis extract on reducing dentinal hypersensitivity initiated by teeth bleaching procedures. Forty-one patients were divided into 2 groups. Patients of the test group were subjected to a chair-side teeth bleaching procedure followed by local application of Propolis extract on the teeth directly after the bleaching procedure, after one hour, and after one day. Patients of the control group were subjected to the same teeth bleaching procedure but without post application of Propolis. The degree of induced pain due to dentinal hypersensitivity was recorded by means of the Visual Analogue scale of Pain, and registered for each patient. Chi-square statistical test was used to compare the obtained results. Only 5 patients out of 23 suffered severe pain after teeth bleaching followed by Propolis application. Forty-four percent of patients who did not get Propolis application after teeth bleaching suffered severe pain related to dentinal hypersensitivity. One day after teeth bleaching followed by Propolis application, none of patients showed any degree of pain related to dentinal hypersensitivity. The efficacy of Propolis for dentinal hypersensitivity reduction was considered significant at ($P < 0.05$). Pain related to dentinal hypersensitivity that occurred due to chair-side teeth bleaching procedure could be successfully reduced by using a Propolis extract as a local application treatment. Further studies are needed for the verification of using Propolis in similar cases.*

Introduction

Propolis, also known as bee glue, is a sticky natural nontoxic resinous substance produced by honeybees (1, 2). Propolis has been used for anti-inflammatory

purposes in folk medicine since early times, especially in Europe and ancient Egypt (3).

In dentistry, the use of Propolis has been emphasized in several studies and has been found to be beneficial in many aspects, including prevention of dental caries (4), reduction of oral mucositis resulted from chemotherapy (5), oral cancer (6), gingival and periodontal diseases; plaque inhibition (7), direct pulp capping (8), and as an analgesic (2).

Dentinal hypersensitivity (DH) is defined as “short, sharp pain arising from exposed dentin in response to thermal, tactile, osmotic, or other stimuli and not attributable to any other tooth defect” (9, 10). Several theories exist to explain DH, however, the most accepted is the hydrodynamic theory. To date, analysis of most data supports a theory that these stimuli induce fluid flow within dental tubules, which triggers pulpal mechanoreceptors near the pulp, leading to pain (11). This hydrodynamic theory of pain generation assumes an exposed dentin surface and patent tubules that allow fluid flow to reach the pulp where the receptors reside (12).

A variety of treatments have been tried to stop or minimize pain caused by DH. The most widespread treatments involve application of desensitizing agents and other materials such as toothpaste containing strontium salts or potassium salts, high-concentration fluoride varnishes, cyanoacrylate adhesives, and restorative materials on the affected area (10). Despite the large number of published studies, however, there is still no consensus on which product constitutes the “gold standard” for DH treatment.

Some in vitro studies have successfully shown that, Propolis has clinically significant effect on reduction of dentin permeability (13), but to date, there have been very few studies done on desensitizing effect of Propolis in vivo (14).

To our knowledge, there are no studies in the current literature that examine the effect of Propolis extract on the DH caused by teeth bleaching procedures.

Therefore, The aim of this study was to assess the efficacy of Propolis extract on reducing the DH that occurred after teeth bleaching procedures at the dental office.

Materials and Methods

Forty-one patients (age 18-50 years old) were recruited in this study. All patients had good oral hygiene and demanded teeth bleaching procedure for esthetic reasons. All patients gave oral consents to participate in the study.

Patients were divided into 2 groups. The test group consisted of 23 patients who were subjected to a chair-side teeth bleaching procedure using (Contrast AM® In-Office Whitening System – Combination Kit - Spectrum Dental, Inc., USA) followed by one-minute local application of Propolis extract (Apipol, 625mg/ml, Bepharma company, Syria) being rubbed directly on teeth surfaces (i.e. onto the crowns) for 1 minute after the bleaching procedure, after one hour, and after one day. The control group consisted of 18 patients who were subjected to the same chair-side teeth bleaching procedure, but without post application of Propolis extract. The degree of pain that occurred due to post-bleaching DH was recorded by means of the Visual Analogue scale of Pain (VASP), which is previously described by (Huskisson EC, 1983) (15), and recorded on a prepared table for each patient in both test and control group (i.e. pre-, and post-application of Propolis).

Data extracted from patients were analyzed using statistics software (SPSS version 17) where Chi-square test had been used to compare the obtained results. The differences between results were considered significant at $P < 0.05$.

Results

1. Results of patients subjected to Propolis treatment after teeth bleaching (with no relation to time) (Nt=23):

Out of 23 patients, only 5 suffered a severe pain (VAS > 7 cm) due to DH related to the bleaching procedure, whereas 9 suffered a moderate pain (VAS > 4 cm), and 9 suffered slight pain (VAS > 1 cm).

In order to find out the significance of differences between patients who suffered any type of pain and others who did not, Chi-square test was used, and it was shown that P value for the difference between patients who suffered severe pain and those who did not suffer severe pain was 0.007, which is less than 0.05. Thus, the differences were significant, and those differences were related directly to the patients who did not suffer severe pain (18 patients; 78.3%) (Table 1).

2. Results of patients with no application of Propolis after teeth bleaching procedure (Nc=18)

Out of 18 patients, 8 suffered a severe pain due to DH related to the bleaching procedure, whereas 7 suffered a moderate pain, and 3 suffered slight pain.

In order to find out the significance of differences between patients who suffered any type of pain and others who did not, Chi-square test was used, and it was shown that P value for the difference between patients who suffered slight pain and those who did not suffer slight pain was 0.005 which was smaller than 0.05. Thus, the differences were significant, and those differences were related directly to the patients who did not suffer slight pain (15 patients; 83.3%) (Table 2).

3. Results of post-bleaching application of Propolis regarding the defined time periods (Nt=23)

Direct pain showed up in 5 patients (21.7%) after teeth bleaching and with application of Propolis in form of moderate pain which turned into slight pain within one hour after Propolis application. At the next day, those five patients showed no slight pain at all.

Direct pain in form of slight pain showed up in 7 patients (30.5%) after teeth bleaching and with application of Propolis. Within one hour after Propolis application, only one patient (14.3%) had been suffering slight pain. At the next day, this patient showed no slight pain at all.

Directly after Propolis application that followed bleaching procedure, 11 patients showed no pain at all (47.8%). This number increased after one hour (17 patients; 73.9%), and after one day, all patients showed no pain (23 patients; 100%).

Statistically, the differences between patients who suffered slight to moderate or even no pain after one hour were significant ($P = 0.02$). This significance was related to those patients who suffered no pain at all (17 patients; 73.9%) (Table 3).

4. Results of patients with and without Propolis application in relation to pain type at all time periods

The differences between patients with and without Propolis application after bleaching who suffered degrees of direct pain were significant ($P = 0.002$). This significance was related to those patients with Propolis application after bleaching (47.8%).

The differences between patients with and without Propolis application after bleaching who suffered degrees of pain one hour post-treatment were also significant (0.015). This significance was related to those patients with Propolis application after bleaching.

The differences between patients with and without Propolis application after bleaching who suffered degrees of pain one day post-treatment were significant ($P = 0.007$). This significance was related

to those patients with Propolis application after bleaching (Table 4).

Discussion

Propolis is a brown substance collected by honey bees from sprouts, exudates of trees and other parts of plants and modified in the beehives by addition of salivated secretions and wax. Many biological activities have been reported for Propolis, such as antimicrobial, antiviral, anti-inflammatory, antitumor, antioxidant, anesthetic and free radical scavenging action (16).

Dentine hypersensitivity is characterized by short, sharp pain arising from exposed dentine in response to tactile, evaporative, chemical or thermal stimuli and which cannot be ascribed to any other dental defect or pathology (17).

At present, the commonly used desensitizing agents generally are favorable for a short-time, while they blow the mark in a long-term. So, the development of new desensitizing agents is needed (18). The search for a natural desensitizing agent with long lasting effects has led to the observation that Propolis had promising effects on dentin hypersensitivity (19). Some in vitro studies have shown that, Propolis had a clinically significant effect on reduction of dentin permeability (13), but to date, only very few studies have been done on desensitizing effect of Propolis in vivo.

Our current study revealed that Propolis extract was effective in reducing DH and the following pain related to teeth bleaching procedure (i.e. chair-side teeth bleaching). This observation was obvious due to the results that showed that only 5 patients out of 23 did suffer severe pain after teeth bleaching followed by Propolis application. The efficacy of Propolis was also confirmed by the results that showed that 44.4% of patients who did not get Propolis application after teeth bleaching did suffer severe pain related to DH.

However, some studies did not find any significant effect for Propolis. In 2013, Torwane et al. (20) conducted a study to evaluate the efficacy of 30% ethanolic extract of Indian Propolis compared with Recaldent™ (casein phosphopeptide-amorphous calcium phosphate) in reduction of dentinal hypersensitivity. It was shown that Recaldent™ was significantly better in reducing the DH compared to Propolis and sterile water. In fact, our study was not a comparative study.

Purra et al. (2014) (21) evaluated the efficacy of saturated ethanolic solution of Propolis for the treatment of DH compared to 5% potassium nitrate and distilled water. They found no significant difference between the Propolis group and the potassium nitrate group in the immediate post-treatment period; however, the results were significant at the end of first week and second week.

At 4 weeks and 3 months period, a comparison between the groups again showed no significant difference, and it was concluded that Propolis was more effective than 5% potassium nitrate in relieving DH and had an immediate and sustained effect.

Those results were somehow similar to the results obtained in our study which revealed that one day after teeth bleaching that was followed by Propolis application, no patients showed any degree of pain related to DH. This might indicate an almost fast action of Propolis in sealing the dentine tubules and, therefore, reducing the permeability.

Author names and affiliations are to be centered beneath the title and printed in Times 12-point, non-boldface type. Multiple authors may be shown in a two- or three-column format, with their affiliations below their respective names. Affiliations are centered below each author name, italicized, not bold. Include e-mail addresses if possible. Follow the author information by two blank lines before main text.

Conclusion

Pain related to DH that occurred due to chair-side teeth bleaching procedure could be successfully reduced by using a Propolis home-grown extract (Apipol, 625mg/ml, Beepharma company, Syria) as a local application treatment.

The application of Propolis showed results in reducing DH that 100% of the patients showed no features of pain related to DH at the very next day following Propolis application.

However, comparable studies with other desensitizer agents are needed for the verification of using Propolis as natural extract for reducing post-teeth bleaching DH pain.

1. Table Captions

Table 1. Patients subjected to Propolis treatment after teeth bleaching (with no relation to time) (n=23)

P value	Percentage	Number of patients who did not suffer	Percentage	Number of patients who suffered	Degrees of Pain recorded by VASP
0,007	%78.3	18	%21.7	5	Severe pain
0,297	%60.9	14	%39.1	9	Moderate pain
0,297	%60.9	14	%39.1	9	Slight pain

Table 2. Patients with no application of Propolis after teeth bleaching procedure (n=18)

P value	Percentage	Number of patients who did not suffer	Percentage	Number of patients who suffered	Degrees of Pain recorded by VASP after teeth bleaching
0,637	%55.6	10	%44.4	8	Severe pain
0,346	%61.1	11	%38.9	7	Moderate pain
0,005	%83.3	15	%16.7	3	Slight pain

Table 3. Patients suffered pain post-bleaching application of Propolis regarding the defined time periods (n=23)

P value	Number of patients regarding pain degrees						Pain degrees after Propolis application
	Percentage	No pain	Percentage	Slight pain	Percentage	Moderate pain	
0.296	%47,8	11	%30,5	7	%21,7	5	Direct pain
0.022	%73,9	17	%26,1	6	-	-	Pain after one hour
-	%100	23	-	-	-	-	Pain after one day

Table 4. Comparing patients with and without Propolis application in relation to pain type at all time periods

P value	d.f	Chi-square goodness of fit	Number of patients		Pain degree	Pain degrees during bleaching
			Second group (Nc=18)	First group (Nt=23)		
0.002	3	14,946	0	11	No pain	Direct pain degree
			5	7	Slight pain	
			8	5	Moderate pain	
			5	0	Sever pain	
0,015	2	8,376	6	17	No pain	Pain degree after one hour
			7	6	Slight pain	
			5	0	Moderate pain	
			0	0	Severe pain	
0,007	2	7,276	12	23	No pain	Pain degree after one day
			5	0	Slight pain	
			1	0	Moderate pain	
			0	0	Severe pain	

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