

# SIDE EFFECTS EXPERIENCED BY PATIENTS AFTER TEETH WHITENING PROCEDURES

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**Abstract.** Nowadays, huge attention is paid to appearance, of which healthy teeth and a beautiful white smile have become an integral part. As teeth whitening procedures become more popular, newest teeth whitening products are emerging on the market, which, if used incorrectly, can damage the soft and hard tissues of the mouth. The aim of the study is to determine the side effects experienced by patients after teeth whitening procedures using different whitening methods. The study involved adult respondents who had undergone a teeth whitening procedure. A quantitative research method was applied. The results of the study showed that respondents undergo teeth whitening procedures either in dental offices or at home, and the main side effect they identify is tooth sensitivity, which occurs immediately or the next day.

**Keywords:** teeth whitening; side effects; tooth sensitivity

## INTRODUCTION

**Relevance of the Study:** Tooth discoloration is one of the most common complaints among patients seeking to improve the color of their front teeth. Over the past decades, aesthetic dentistry has become an important part of dental practice, and teeth whitening has become one of the most popular dental procedures. The market observes a variety of teeth whitening products, allowing the selection of major categories of professional teeth whitening products, whitening systems at home or in dental clinics. (Jin Y. at al, 2024; Awati A.S. at al 2024).

**Objective:** Reveal the side effects experienced by respondents after teeth whitening.

**Tasks:**

1. To find out which teeth whitening method respondents choose to improve the color of their teeth.
2. To determine the most common side effects after teeth whitening procedures.
3. Compare the tooth sensitivity experienced by respondents after teeth whitening procedures, whether they whitened their teeth in a dental office or at home.

## THE RESEARCH METHOD

A quantitative research method was chosen for the study. The study involved persons aged from 18 who had undergone teeth whitening. An anonymous questionnaire was used to obtain the results, and the data were not publicly published. 115 respondents participated in the study. The SPSS program version 24.0 was used to perform statistical analysis of the study data. MS Excel version 2010 was used to display the diagrams.

## RESULTS

Table 1

**Demographic Data of Respondents**

Demographic Factors		<i>n</i>	<i>Percentage</i>
Gender	Women	93	80,9%
	Men	22	19,1%
Place of Residence	City	83	72,2%
	Village	10	8,7%
	Town	22	19,1%
Age	18-29 years	59	51,3%
	30 years and older	56	48,7%

The study involved 115 respondents who used teeth whitening procedures. The majority of respondents were women, accounting for 80.9% (n=93). Most of the participants lived in the city 72.2% (n=83), 19.1% (n=22) lived in town, and 8.7% (n=10) lived in village. The age of the participants ranged from 18 to 65 years.

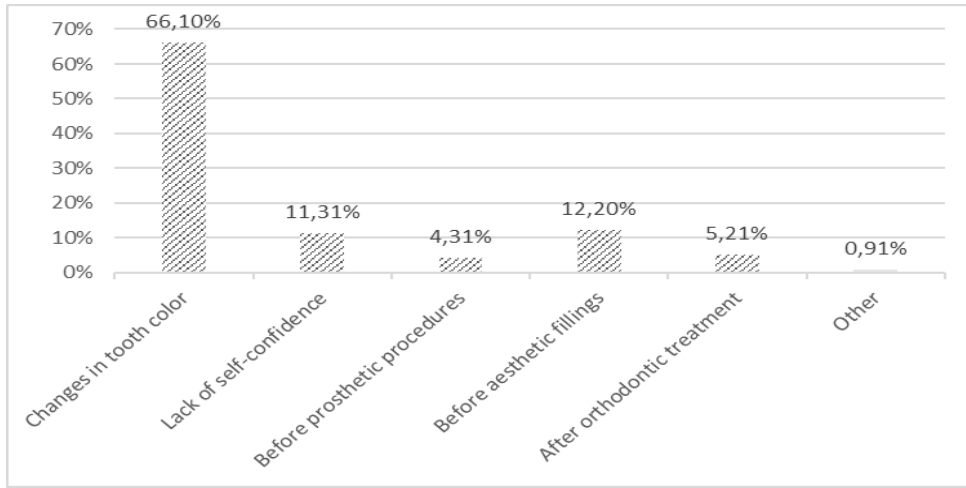


Figure 1. Reasons Influencing Respondents' Choice to Whiten Their Teeth

A conducted study showed (see Fig. 1) that the main reason respondents whiten their teeth is due to changes in tooth color (66.1%; n=76). The least chosen reasons for teeth whitening are before prosthetics and after orthodontic treatment, at 4.3% and 0.9%, respectively.

The aim was to determine the reasons for choosing to whiten teeth, comparing the distribution of respondents' answers between those living in the city and those living in the countryside/town.

Table 2

Reasons Influencing Respondents' Choice to Whiten Their Teeth, Comparing Between City and Village/Town

Reasons	Place of residence	
	City (n=83)	Village/town (n=32)
Changes in tooth color	75,9% (63)	40,6 % (13)
Lack of self-confidence	6 % (5)	25 % (8)
Before prosthetic procedures	2,4 % (2)	9,4% (3)
Before aesthetic fillings	10,8% (9)	15,6% (5)
After orthodontic treatment	4,8% (4)	6,3% (2)
Other	-	3,1% (1)

The study found (see Table 2) that respondents living in the city and village/town most often choose teeth whitening procedures due to tooth color changes (75.9% and 40.6%, respectively). Those living in the city least often choose teeth whitening before prosthetic procedures (2.4%), while respondents living in the village/town least often choose teeth whitening after orthodontic treatment (6.3%). Joiner A, Luo W. (2017) in their article state that the main reason for an unattractive smile was the changed teeth color, i.e., stained or yellowed teeth.

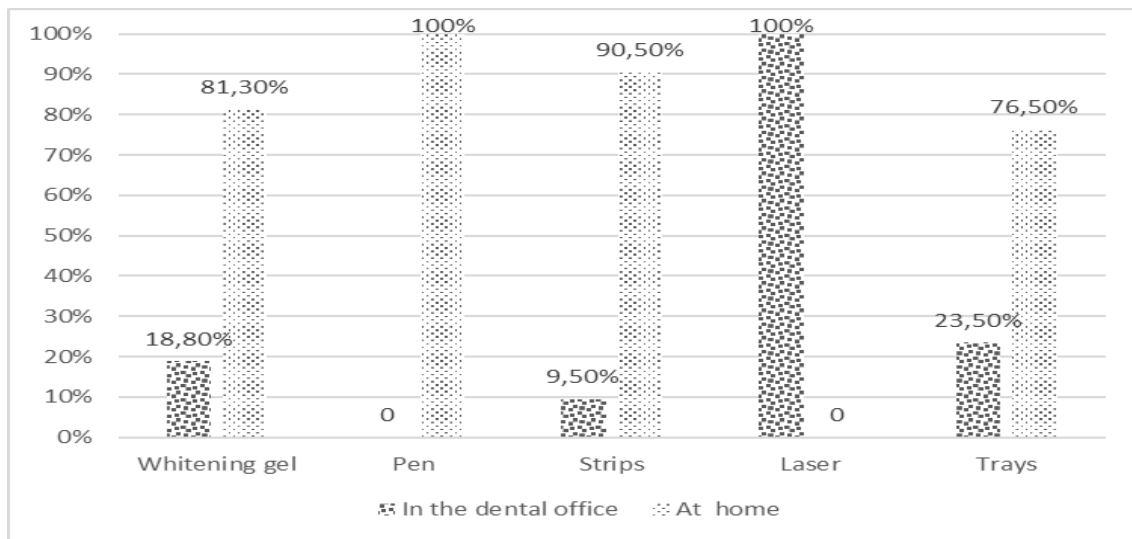


Figure 2. Teeth Whitening Method Applied to Respondents

Figure 2 shows that laser teeth whitening is most commonly used in dental offices (100%), while whitening strips are the least used (9.5%). At home, respondents chose whitening pens for teeth whitening (100%) and used whitening trays the least (76.5%). Naidu AS et al. (2020) in their study noted that whitening strips are the most effective home whitening products for changing tooth color. The conclusions of Zhao X et al. (2023) confirm that whitening systems are effective both at home and in dental clinics, and patients can decide which system to choose based on their personal preferences regarding treatment duration.

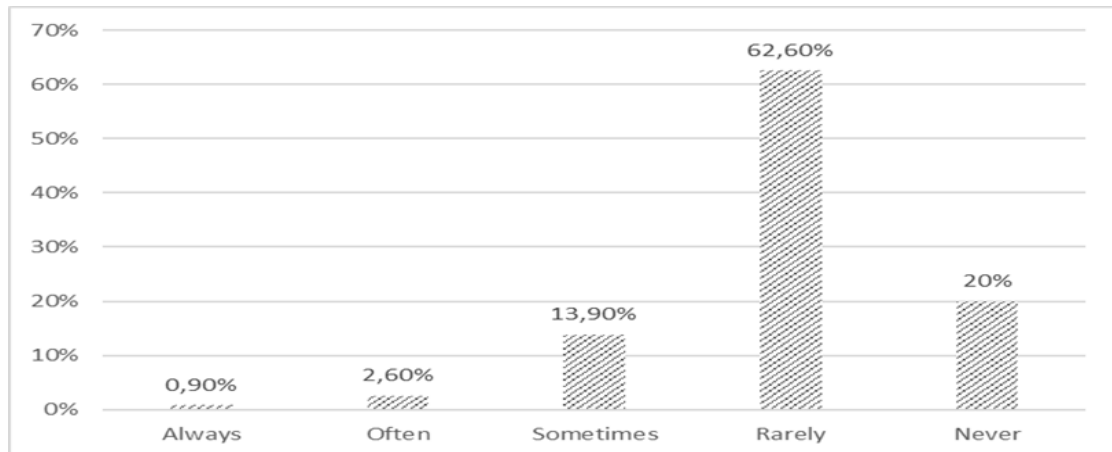


Figure 3. **Distribution of Tooth Sensitivity in Respondents Before Teeth Whitening Procedure**

The study results revealed (Figure 3) that 0.9% of respondents always felt tooth sensitivity before the teeth whitening procedure, while 62.6% of respondents rarely felt tooth sensitivity.

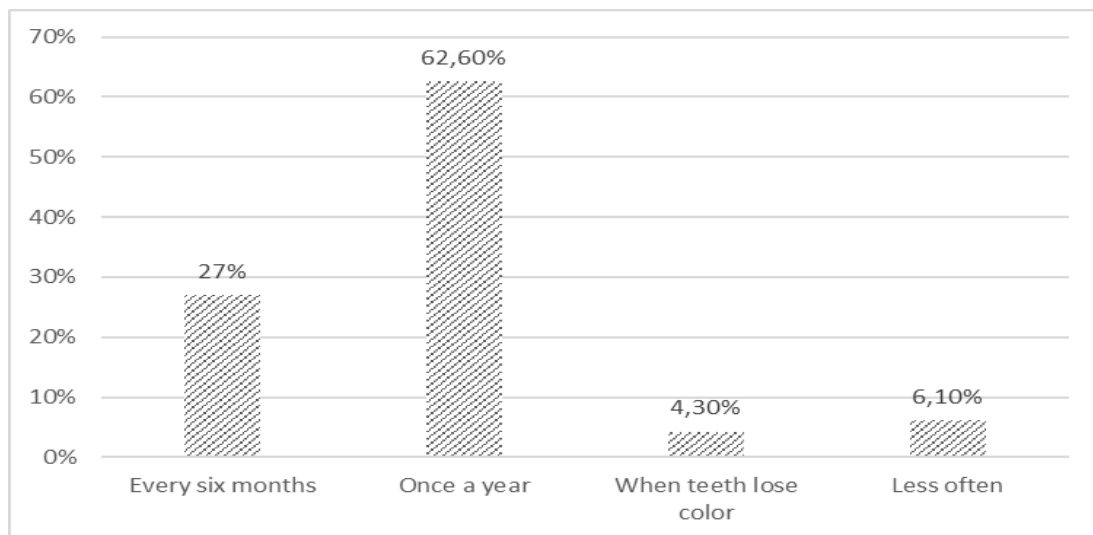


Figure 4. **Distribution of respondents' answers based on how often they whiten their teeth**

The study results showed (Figure 4) that the majority of respondents (62.6%) whiten their teeth once a year, while 4.3% of respondents stated that they whiten their teeth only when they lose color. Pan Q, Westland S. (2018) state that the teeth whitening procedure has become popular in order to improve the color and aesthetic appearance of teeth, and the respondents' choice was influenced by the desire to increase self-confidence and improve appearance. A study conducted by Awati AS et al. (2024) showed that 90% of patients choose whitening as a treatment method, which is considered minimally invasive.

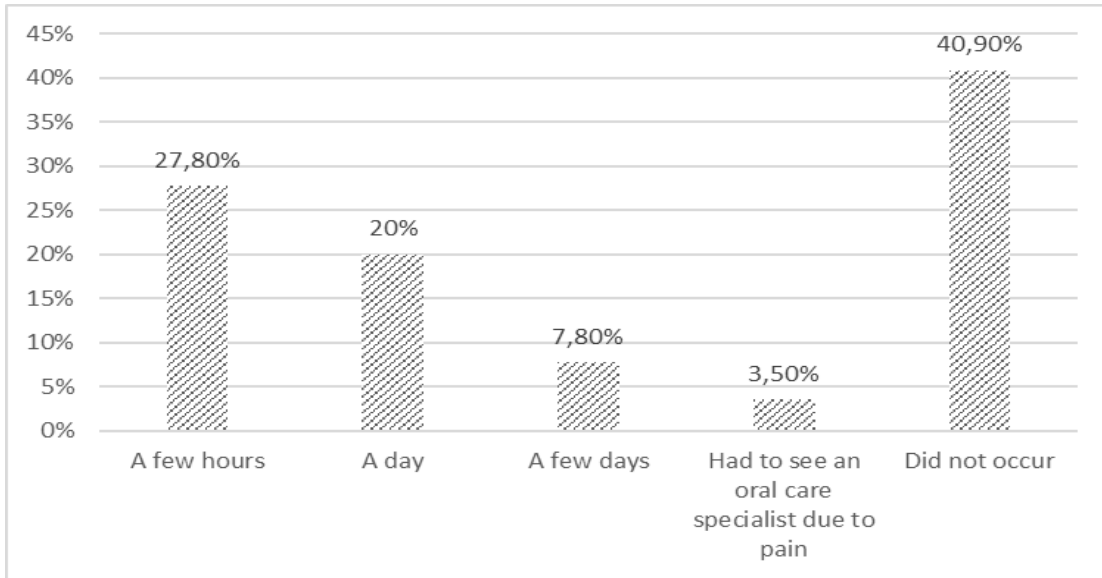


Figure 5. Distribution of respondents' answers based on the duration of tooth sensitivity after the teeth whitening procedure

The results of the study (Figure 5) showed that 40.9% of the subjects did not experience tooth sensitivity, while 3.5% had to consult an oral care specialist due to pain. Krishnakumar K. et al. (2022) in their article state that the most significant reduction in postoperative tooth sensitivity was observed immediately (within an hour) and 24 hours after in-office teeth whitening.

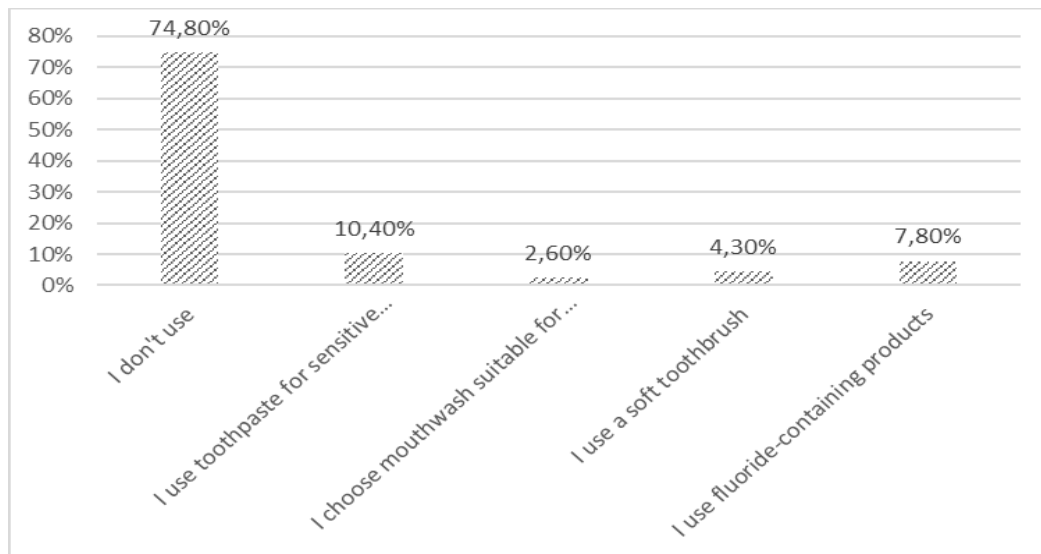


Figure 6. Distribution of respondents' answers based on the measures they use to alleviate tooth sensitivity after the teeth whitening procedure

The results of the study (Figure 6) showed that the majority of respondents, 74.8%, do not use additional measures to reduce tooth sensitivity after teeth whitening. Only 2.6% of the subjects use mouthwash for sensitive teeth. Cabral AEA et al. (2024) in their article state that toothpastes for sensitivity are effective when teeth are whitened at home with high-concentration carbamide peroxide or when teeth are whitened with highly concentrated hydrogen peroxide in the dental office.

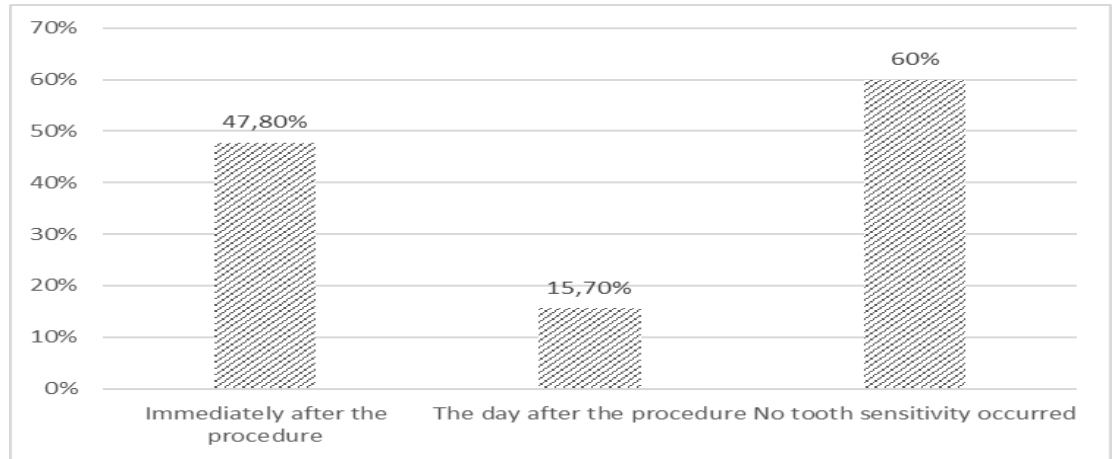


Figure 7. **Distribution of respondents' opinions on when tooth sensitivity occurred after the teeth whitening procedure**

The study found (Figure 7) that the majority of respondents, 60%, did not experience tooth sensitivity after teeth whitening procedures, while 15.7% of respondents experienced tooth sensitivity the following day. Teeth whitening causes increased tooth sensitivity and this is one of the side effects of teeth whitening (Rodríguez-Martínez, J. at al. 2019).

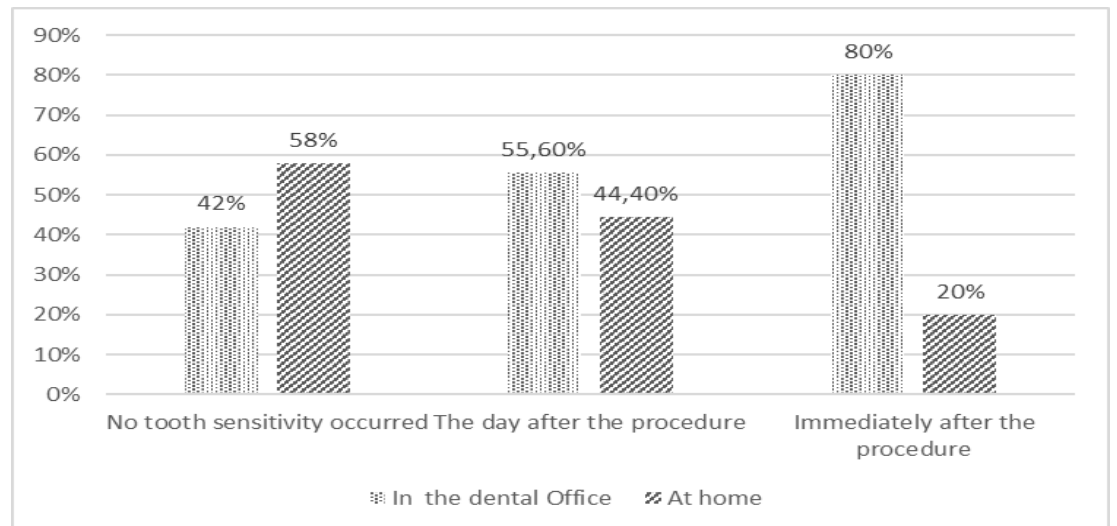


Figure 8. **Distribution of respondents' opinions on when tooth sensitivity occurred during in-office and at-home teeth whitening**

The study observed (see Fig. 8) that the majority of respondents (80%) who had their teeth whitened in the office experienced tooth sensitivity immediately after the procedure, while 42% did not experience any sensitivity. Among those who whitened their teeth at home, 58% did not feel any tooth sensitivity, and the least number of respondents (20%) experienced sensitivity immediately after the procedure.

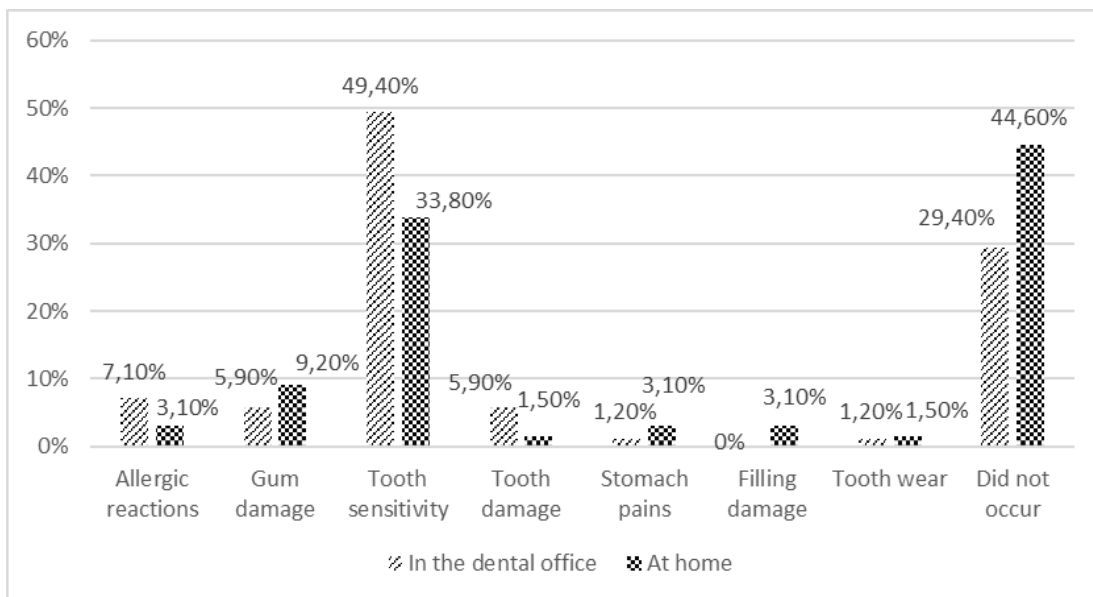


Figure 9. Side effects experienced by respondents after teeth whitening procedures, both at home and in-office

The results (Figure 9) showed that the most common side effect reported by patients whitening their teeth at home was tooth sensitivity, chosen by 33.8% of respondents. The least common side effects were tooth damage and wear, each reported by 1.5% of respondents. Additionally, 44.6% of respondents reported no side effects from home whitening. After in-office whitening, 49.4% of respondents reported tooth sensitivity as the most common side effect, while 29.4% reported no side effects. The least common side effects after in-office whitening were tooth wear and stomach pain, each reported by 1.2% of respondents. Barbosa et al. (2024) and Krishnakumar K (2022) state that the use of whitening agents can cause side effects such as tooth sensitivity, gum irritation, and changes to the enamel surface, including indentations and roughness. Aidos M. et al. (2024) mention in their study that there are no significant differences in tooth color changes between different whitening methods, as tooth sensitivity is present regardless of the chosen whitening technique.

## CONCLUSIONS

1. The results of the study showed that respondents prefer to whiten their teeth at home or in dental clinics to improve the color of their teeth. At home, they mostly use pencils, whitening strips and whitening gels for teeth whitening, while in dental offices, they most often used laser teeth whitening, and less often - whitening trays and whitening gel.
2. The most common side effects after teeth whitening procedures, as identified by the respondents, were teeth sensitivity, gum damage, allergic reactions, and teeth damage.
3. The results of the study showed that respondents who had their teeth whitened in a dental office experienced teeth sensitivity immediately after the procedure and the next day, while those who had whitened their teeth at home reported tooth sensitivity only the next day.

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