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# Social media impact on students' decision-making regarding aesthetic dental treatments based on cross-sectional survey data

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This study investigated the influence of social media on patients regarding aesthetic dental treatments according to sex, type of treatment, and time since their last treatment. A cross-sectional study was conducted using a web-based survey. Participants were students over 18 years of age who were social media users and had undergone aesthetic dental treatment. 504 responses were included. Data evaluation was made using Pearson chi-square test. The level of significance was set at  $p < .05$ . 29.37% of the respondents indicated that social media influenced their decision to have their aesthetic treatment. Regarding the influence of social media, no differences were observed between males and females, nor by type of aesthetic treatment. Participants who had undergone an aesthetic dental treatment within the last year were more influenced by social media than those who had undergone it more than two years ago. Posts from dental clinics or dentists were the type of content that most influenced participants. Social media can influence some patients' decision to undergo aesthetic dental treatment, thus dental practices and dentists should consider the increasing importance of social media in their daily practice.

**Keywords** Dentistry, Social media, Esthetics, Internet, Delivery of health care

Web 1.0 initially emerged as a space for companies to disseminate information to the public<sup>1</sup> and it was characterized by its limited scope for interactive communication with users<sup>2</sup>, as it only allowed searching and reading information<sup>1</sup>. However, the evolution of web technologies and user interfaces has significantly changed the way users interact with information<sup>3</sup>. This development has led to dynamic and interactive websites with user-oriented features, also referred to as Web 2.0<sup>4</sup>, which encompasses a range of Internet applications that have fostered increased participation, collaboration, openness, and social networking<sup>2</sup>. These Web 2.0 applications include blogs, social networking platforms, and social media<sup>5</sup>. According to the Cambridge Dictionary, social media refers to 'websites and computer programs that allow people to communicate and share information over the Internet using a computer or mobile phone<sup>6</sup>'. Examples of social media include blogs, wikis, podcasts, Facebook, Twitter, YouTube, or LinkedIn<sup>6,7</sup>.

In recent years, there has been a significant increase in the use of social media<sup>8</sup>. Originally designed for personal use, they are now widely used by businesses to promote products or services and engage with consumers<sup>9</sup>. In the health sector, social media play a crucial role in various areas such as health promotion, research, recruitment, and marketing<sup>10</sup>. Specifically, in the field of dentistry, marketing has emerged as an additional facet to the clinical practice of dentists<sup>11</sup>. Consequently, this has led to a proliferation of oral health-related information on certain websites, aimed at promoting specific products<sup>12</sup>.

Dental websites sometimes contain posts with promotional content, often accompanied by before and after photographs<sup>13</sup>. These photographs have been found to be effective in encouraging some people to seek

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treatment<sup>14</sup>. In addition, advertisements related to cosmetic dentistry<sup>15</sup> or specific publications on treatments such as tooth whitening<sup>16</sup>. As a result, social media platforms have facilitated direct access to such content, contributing to an increased demand for cosmetic dentistry<sup>17</sup>. However, the content published is not always developed by oral health professionals, but rather by users or individuals commonly referred to as influencers. In recent years, the figure of the influencer has grown as a communication method to engage directly with consumers<sup>18</sup>. For example, influencers are individuals with a large number of followers and interactions on social media<sup>19</sup> who sometimes post content related to dentistry. It is therefore relevant to investigate the potential influence of social media in relation to aesthetic dental treatments, especially given the increasing demand for such treatments<sup>17</sup> and the impact of website advertising on customer perceptions of oral healthcare<sup>12</sup>. This aspect is of particular importance in the young adult population, as they have a higher use of social media<sup>20</sup>. Therefore, the rationale for the study is that there is lack of scientific evidence analyzing the impact of social media on aesthetic dentistry. It is important for dentists to be aware of the impact of social media on the demand for aesthetic treatments so that they can take it into account in their daily practice. Thus, the aim of this study was to describe the influence of social media on students who had undergone aesthetic dental treatment according to sex, type of aesthetic dental treatment received and time when it was performed to explore whether social media have influenced the performance of these treatments. The null hypothesis was that there would be no significant differences in the influence of social media on young patients in terms of sex, type of aesthetic dental treatment received and when it was performed.

## Methods

### Study design

To conduct this cross-sectional study, the web-based questionnaire (WBQ) survey method was chosen. WBQs are self-administered questionnaires that users can access through a browser on several devices, such as computers, mobiles, or tablets<sup>21</sup>. With the increasing use of the Internet, WBQ questionnaires represent an alternative to traditional paper questionnaires<sup>22</sup>. It has been observed that this type of questionnaire is completed to a greater extent and with fewer missing items compared to paper-based questionnaires<sup>23</sup>. At present, the WBQ questionnaires have been used in various research studies<sup>24,25</sup>. Access to the survey was facilitated by a QR code. This study was conducted in accordance with the principles of the World Medical Association's Declaration of Helsinki and was registered in Clinical Trials under ID NCT05850403 in May 2023.

### Ethics committee approval

This study was approved by the Ethics Committee of the Universidad Europea de Madrid (CIPI/22.022). Data handling was carried out in accordance with the regulations (EU) 2016/679 of the European Parliament, and of the European Council 27th April 2016 on the protection of personal data, its processing and free movement. Participation in the study was voluntary and no financial compensation was provided for participation in the study.

### Sample recruitment

It was calculated that a minimum of 395 surveys were required to estimate the proportion of people who reported being influenced by social media in their last aesthetic dental treatment (expected proportion: 50%) with a precision margin of 5%, a confidence level of 95% and assuming a 5% loss rate.

The target population were young social media users who had previously undergone aesthetic dental treatment. Therefore, the inclusion criteria were students over 18 years of age that accepted the informed consent. Exclusion criteria were not having social media or not having previously undergone esthetic dental treatment. The sampling method used was non-probability sampling. Participants were recruited during the celebration of an Oral Health campaign, framed within the IX Oral Health and Healthy Habits campaign of the First Region Official College of Dentists and Stomatologists on 22 and 23 March 2023. Recruitment was carried out by some volunteer students of the fourth year of the Degree in Dentistry of the Universidad Europea de Madrid, as well as by the authors of the study. A link was shared via a QR code that was displayed by volunteers and available on posters at the event.

### Questionnaire

The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) checklist<sup>26</sup> was used to design the questionnaire. The study was conducted using the Microsoft Forms platform (Microsoft Inc., Seattle, WA, USA), which did not require registration for access. For validation purposes, a first version of the questionnaire was created in Spanish, consisting of 19 questions distributed over four pages and divided into three sections. The final questionnaire was available in both Spanish and English, allowing participants to choose their preferred language.

**Informed consent section.** This section provided information about the aims of the study, explained that data collection would be anonymous, informed participants of their right to withdraw from the study at any time, information about the principal investigator was provided (Y.F) as well as information about the location and method of storage of the data collected. Consent was obtained through a dichotomous question (yes/no). Only participants who responded affirmatively to this question were included in the study.

**Sociodemographic characteristics section.** First, an open question asked for a nickname. Then, age was asked with a closed polytomous question (18–25; 26–35; > 36) and sex (male, female), being a student (yes/no) and having had aesthetic dental treatment (yes/no) were asked with dichotomous questions. Participants were then asked about the most recent dental treatment (orthodontic treatment; invisible orthodontic treatment; teeth whitening; veneers or crowns; other treatment) and when it was received (less than one year ago; within the last two to five years; more than six years ago) using two closed polytomous questions.

Participants' social media behavior section. Participants were asked if they had a social media account (response: yes/no). If they answered yes, they were asked about their general use of social media through four closed, polytomous questions:

- Social media platforms on which they had an account (response: Facebook; Instagram; Twitter; LinkedIn; TikTok; Snapchat)
- Most frequently used social media (response: Facebook; Instagram; Twitter; LinkedIn; TikTok; Snapchat)
- Frequency of their use (response: daily; weekly; monthly; occasionally)
- Preferred time of day (response: morning; afternoon/evening; night).

Then, participants were asked whether they had sought information about their most recent dental treatment on social media (response: yes/no). If the answer was yes, participants were asked if social media had influenced their decision to undergo an aesthetic dental treatment (response: yes/no). If the participant responded affirmatively, the questionnaire proceeded to explore the influence of different content displayed on social media in the performance of the last aesthetic dental treatment through 5 questions based on a 3-point Likert scale (agree, neutral, disagree):

- Aesthetic dental treatments social media posts from dental clinics or dentists.
- Aesthetic dental treatments advertised on social media.
- Influencers who have undergone the aesthetic dental treatment.
- Collaborations with influencers.
- The perception that it is a common aesthetic dental treatment.

The questionnaire was tested for validity<sup>17,27</sup> for this purpose. 30 participants were recruited to evaluate the clarity of the questions (0 = no; 1 = unsure; 2 = yes), if they would include the questions (0 = no; 1 = unsure; 2 = yes) and to rate the importance of the questions using a 3-point Likert scale (1 = very important, 2 = important, 3 = not very important). Based on the results, the questionnaire was adapted, and a pilot study was conducted. 40 individuals were then asked to complete the questionnaire and to repeat the process one week later to analyze internal consistency, obtaining scores considered to be highly consistent.

The final questionnaire was on the Microsoft Forms platform. Results were only recorded if the participant completed the questionnaire and selected the submit option. The questionnaire data were only accessible to the principal investigator (Y.F). Upon completion of data collection, the data were downloaded in Excel format and the survey was then deleted to protect data security.

### Data processing

A total of 964 responses were collected. 457 responses were excluded as they did not meet the inclusion and exclusion criteria: 21 did not provide informed consent; 18 were from participants under the age of 18; 129 were from participants who were not students; 245 were from participants who had not received aesthetic dental treatment; and 44 were from participants who were not social media users. 507 responses that met the eligibility criteria were evaluated to identify possible duplicate responses. For this purpose, responses with the same nickname were analyzed, looking at gender and age group. Responses from a later time period were excluded, following the methodology described in the literature, which suggests that first impressions are more reliable<sup>28</sup>. Thus, 3 responses were excluded.

### Statistical analysis

Data analysis was performed using SPSS software (IBM SPSS Statistics, v.22, 2013). Sociodemographic characteristics of participants and variables related to social media use were subjected to descriptive analysis. The Pearson chi-square test was used to assess the relationship between variables. The significance level was set at  $p < .05$ .

### Results

The response rate was 72.22% and the completion rate was 100% as all questionnaires were correctly completed. Finally, 504 responses were included in the data analysis. The average response time was 4 min 17 s. The sociodemographic characteristics of the participants are shown in Table 1. 68.65% of the participants were female and most participants were aged 18–25 years (84.52%). Most participants reported having undergone an aesthetic dental treatment in the last 5 years, with orthodontic treatment being the most common.

### Participant behavior with respect to social media

Table 2 shows the overall use of social media among the participants. On average, participants reported using 3 social media platforms, with Instagram being as the most popular choice (64.48%). Most participants reported using social media on a daily basis (95.63%), with the night being the most common time of day for use (57.74%).

### Participant social media behavior with respect to their last aesthetic dental treatment

33.33% of participants indicated that they had used social media to find information about their last aesthetic dental treatment. In addition, 29.37% of participants indicated that social media influenced their decision to have their last aesthetic dental treatment.

No differences were observed between males and females regarding the influence of social media on the last aesthetic dental treatment received or the type of aesthetic treatment received. However, respondents who had

Characteristics	Participants n (percentage, %)
Sex	
Male	156 (30.95%)
Female	348 (69.05%)
Age group (years)	
18–25	426 (84.52%)
26–35	60 (11.9%)
> 36	18 (3.58%)
Last aesthetic dental treatment performed	
Whitening	108 (21.43%)
Veneers and crowns	37 (7.35%)
Orthodontics	243 (48.21%)
Invisible Orthodontics	58 (11.51%)
Other	58 (11.51%)
When the last aesthetic dental treatment was performed	
< 1 year	199 (39.48%)
2–5 years ago	203 (40.28%)
> 6 years ago	102(20.24%)

**Table 1.** Sociodemographic characteristics and last aesthetic dental treatment performed by participants (N = 504).

Characteristics	Participants n (percentage, %)
Number of social media used	
One	73 (14.48%)
Two	82 (16.27%)
Three	141 (27.98%)
Four	115 (22.82%)
Five	64 (12.7%)
Six	29 (5.75%)
Most social media used	
Facebook	12 (2.38%)
Instagram	325 (64.48%)
LinkedIn	9 (1.79%)
Snapchat	20 (3.97%)
TikTok	108 (21.43%)
Twitter	30 (5.95%)
Frequency of use	
Daily	482 (95.63%)
Weekly	16 (3.17%)
Monthly	1 (0.2%)
Occasionally	5 (0.99%)
Time of most use	
Morning	34 (6.75%)
Afternoon/Evening	179 (35.52%)
Night	291 (57.74%)

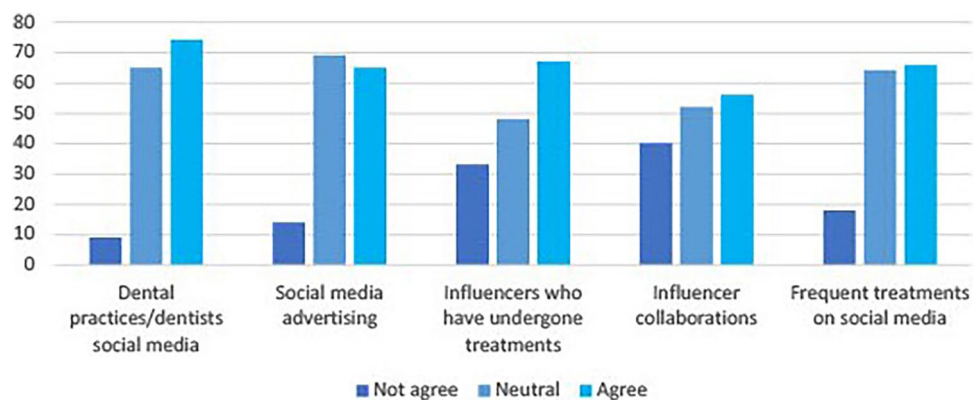
**Table 2.** General use of social media by participants (N = 504).

undergone an aesthetic dental treatment in the last year were more influenced by social media than those who had undergone an aesthetic dental treatment more than two years ago ( $p < .05$ ) (Table 3).

Aesthetic dental treatments social media posts from dental clinics or dentists were the most agreed option among participants who said that social media influenced their decision to have their last aesthetic dental treatment. Collaborations with influencers who recommended the aesthetic dental treatment was the most strongly disagreed option (Fig. 1).

Variable	Participants, n (percentage, %)	p-value
Sex		
Male	156 (30.95%)	$p > .05$
Female	348 (69.05%)	$p > .05$
Aesthetic dental treatment type		
Teeth whitening	108 (21.43%)	$p > .05$
Veneers and crowns	37 (7.35%)	$p > .05$
Orthodontics	243 (48.21%)	$p > .05$
Invisible orthodontics	58 (11.51%)	$p > .05$
Others	58 (11.51%)	$p > .05$
Last time aesthetic dental treatment was performed		
< 1 year	199 (39.48%)	$p < .05$
2–5 years ago	203 (40.28%)	$p > .05$
> 6 years ago	102 (20.24%)	$p > .05$

**Table 3.** Influence of social media on the last aesthetic dental treatment performed (N = 504).



**Fig. 1.** Factors influencing the most recent aesthetic dental treatment (n = 148).

## Discussion

This study assessed the behavior of students in relation to the influence of social media on the last aesthetic dental treatment. The null hypothesis was partially accepted, as significant differences were observed in terms of the time since the last aesthetic dental treatment, but no differences were observed in terms of sex or type of aesthetic dental treatment. Dental aesthetics play an important role in the perception of a visually pleasing face<sup>29</sup>, with the younger population showing a greater awareness of dental aesthetics<sup>30</sup>. Recently, there has been an increase in the demand for dental treatment for aesthetic purposes<sup>30,31</sup>, mainly influenced by the appearance of public figures and social media<sup>30</sup>. Abbasi et al. observed that many dentists believe that patients visiting dental clinics are seeking aesthetic dental treatment because of their popularity on social media<sup>17</sup>. However, it is also important to consider the influence of social media from the patients' perspective. Therefore, this study explored the influence that social media have had on the demand for aesthetic treatments.

In relation to the use of social media to obtain information about aesthetic treatments, 33.33% of the participants stated that they had used social media for this purpose. These results are in line with previous studies that examined the interaction between dental patients and social media. Previous studies showed that 30% of participants used social media to obtain information about orthodontic treatment<sup>32</sup>, 41.4% had visited their dental clinic's social media<sup>33</sup>, and 36% had searched for their dentist on social media<sup>34</sup>.

In this study, 29.37% of participants reported that social media had influenced their aesthetic treatment, which is in line with a previous study<sup>33</sup>, that found that most of participants who used social media to change their dental practice were influenced in their decision. No significant differences were observed between males and females regarding the influence of social media on the aesthetic treatment. Previous studies also found no significant differences between males and females in the use of social media in the field of dentistry<sup>34</sup> or in the influence of social media before changing dental practice<sup>32</sup>. However, other studies found that women are more likely to follow dentist/dental accounts<sup>14</sup> and show a greater interest in dental clinics with social media presence<sup>27</sup>. In relation to aesthetic dental treatments, several reviews have assessed the perception of laypeople with respect to dental aesthetics<sup>31,35</sup>, observing that central incisors play a key role in patient esthetics. It has also been observed that the most desired treatments to improve aesthetics among young patients are whitening and

orthodontic treatment<sup>29</sup>. However, in this study, when examining the influence between aesthetic treatments and social media, no significant differences were observed.

In addition, it was observed that social media had a greater influence on participants who had undergone aesthetic dental treatment in the last year compared to those who had undergone treatment more than two years ago. A previous study<sup>33</sup> also found that social media had a greater influence on those participants who had changed dental practices in the past or current year. Therefore, there is a need for further studies analyzing the growing influence of social media on dental patients, as the use of these platforms is becoming increasingly popular<sup>20</sup>. Regarding the content that might have an influence on some patients, most participants agreed with the statement that the visualization of aesthetic dental treatments in social media posts from dental clinics or dentists was the content they most agreed to have influenced them. This might be beneficial to the patient, as such content is generally produced by dental professionals who are expected to adhere to social contract between the profession and society<sup>36</sup>. It has been observed that reaching patients through social media can provide accurate and practical information<sup>37</sup>, which enhances health education and promotion among patients<sup>38,39</sup>. Therefore, the development of digital applications can enable the promotion of evidence-based recommendations<sup>39</sup> and improve oral health and hygiene behaviors among patients<sup>40,41</sup>. However, it is important to consider that not all content available on social media is produced by professionals or based on scientific evidence, due to the lack of a peer review process on these platforms, which can lead to the dissemination of inaccurate and potentially misleading health information<sup>42</sup>. Several studies have found that content on certain platforms is not an adequate source of information for patients<sup>43,44</sup>.

There are a few limitations to this study. First, it was conducted in a single country, which means that when extrapolating the results, it is important to consider differences in internet and social media use across countries. Second, the study population consisted of a university population, thus, the results do not reflect the influence of social media on dental treatment in other age groups. Therefore, future research evaluating the impact of social media on other age groups would be necessary. Third, the use of Microsoft Forms allows individuals to complete the survey multiple times. However, the use of a nickname and cross-referencing of demographic data was implemented to minimise this risk.

29.37% of participants indicated that social media had influenced their aesthetic treatment. No significant differences were found between male and female participants or by type of treatment. However, social media was found to have a greater influence on those participants who had undergone an aesthetic dental treatment in the last year. While various factors might influence the decision to undergo cosmetic dental treatment, it is worth noting that social media is increasingly becoming a factor to be considered.

## Data availability

The datasets generated for this study are available from the corresponding author upon reasonable request.

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## Author contributions

Y.F.: contributed to the literature review, design, data collection, data analysis and drafting of the manuscript. M.G.S.: contributed to the design of the study, data collection and critical revision of the manuscript. J.S.I.: contributed to the design of the study, data collection and critical revision of the manuscript. M.F.S.: contributed to data collection and critical revision of the manuscript. V.D.F.G.: contributed to data collection and critically revised the manuscript. A.S.: contributed to the design, data collection, data analysis and drafting of the manuscript.

## Competing interests

The authors declare no competing interests.

## Additional information

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