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# Evaluation of the information transmission of treatment with dental aligners in social media: empathetic language versus non-empathetic language

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## Abstract

**Background** Information presented in audiovisual format, is more effective in the retention of information by patients than traditional written methods. On the other hand, empathy in the transmission of information is a crucial element in the relationship between health professionals and patients. This study aimed to determine whether the presentation of information in audiovisual format in an affective and empathetic way, as is done in social networks, improves the knowledge acquired by orthodontic patients treated with aligners.

**Methods** 60 participants, which were equally randomized in 2 groups, took part in this pilot study. Two videos were created that delivered the same informative content about treatment with dental aligners. One video used non-technical and empathetic language, for the level of understanding of patients (empathic video: EG), and the other used technical (similar to that used in clinical practice) but non-empathetic language (non-empathetic video: N-EG). Thirty randomized participants watched the empathic video and another thirty watched the non-empathetic video, and then completed the same questionnaire to compare the information acquired. The relative frequencies of correct responses in each group, were analysed by means of cross-tabulations. The significance of the differences between the results of the two groups was calculated with the Chi-square test.

**Results** The questionnaire confirmed that 70% of the participants had no prior knowledge of aligners. The 66.7% of patients, had no relatives or close friends or family who had been previously treated with aligners. Also 75% of them, stated that they had not previously searched for information about aligners on the Internet. After viewing the videos, all patients were able to respond adequately to most of the questions asked, regardless of whether they had viewed the empathic (EG) or non-empathetic (N-EG) video. Significant differences ( $p < 0,05$ ) were recorded in 2 questions classified as technical difficulty, in which the EG obtained better results in terms of knowledge acquired than the N-EG.

**Conclusions** Showing audiovisual format information to patients, improves patients' understanding of orthodontic treatment with dental aligners. Empathy enhances acquired knowledge for unusual and unknown information.

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**Keywords** Empathy, Clear aligners, Orthodontics, Surveys and questionnaires

## Background

Since the appearance of orthodontic treatment with Invisalign clear aligners in 1997 [1], the use of and demand for this treatment technique has increased exponentially [2, 3]. Proof of this is the increase in Google searches [4] for the terms “clear aligners” and “Invisalign” from January 2004 to May 2023 (Fig. 1).

Internet access has changed the behavior of society. Today, 80% of Internet users access web platforms to learn about their health problems and treatments [5]. More and more patients prefer to turn first to the Internet for information about their orthodontic treatment rather than seek advice from a professional. These platforms include YouTube and Instagram [6–9].

A common feature of these social platforms is that they offer content in audiovisual format. This format has been shown to be the best method in terms of information retention compared to the traditional written method [10]. However, some studies have shown that the information presented in these videos turns out to be of low informative quality [6]. Most of these contents are published by orthodontic patients who share their personal experience [11]. Although there are videos published by orthodontists, they are still of low quality, and many patients consider that orthodontists use language that is too technical for them to understand [12].

But it is not only the format in which information is presented that influences comprehension; the way in which it is delivered also plays an important role. This is where empathy plays an important role. Empathy is defined as the ability to perceive, feel and understand the emotions of another person [13]. It is a fundamental tool in the therapeutic relationship between caregivers and their patients [14–16]. It is widely accepted that adequate empathic ability of healthcare professionals leads to better therapeutic outcomes [17–24].

Audiovisual patient information (AVPI) has improved knowledge and understanding without increasing anxiety in other areas of medicine [25, 26].

The main aim of this study is to answer the following question: Do orthodontic patients understand their aligner treatment instructions better when they are explained in more empathetic language?

The information was presented in audiovisual format, imitating the format currently used by most social networks.

## Methods

For this purpose, two videos were recorded, one video that used more empathetic language (EG) and another that used non-empathetic language (N-EG) with a

language more similar to that used in clinical practice. Based on other studies [2, 27], both videos were 6.5 min long and included the same informative content (supplementary data) based on the Invisalign® aligner system. Each of the videos was recorded by a different person: one by the principal investigator (J.I.) imitating an orthodontist in a common clinical setting (Fig. 1) and the other by a patient previously treated with dental aligners and a qualified actor (J.C.), in a more colloquial setting (Fig. 2). The main researcher used a more technical language and little empathetic to the patient's level of understanding. On the other hand, the actor used language that was more colloquial and empathetic to the patient's level of understanding.

As aspects of the field of psychology were involved, prior to data collection, two psychologists from the university (I.C. and E.B.) were asked to document the researcher on empathy and to review the research to be performed to ensure that it had a reliable basis.

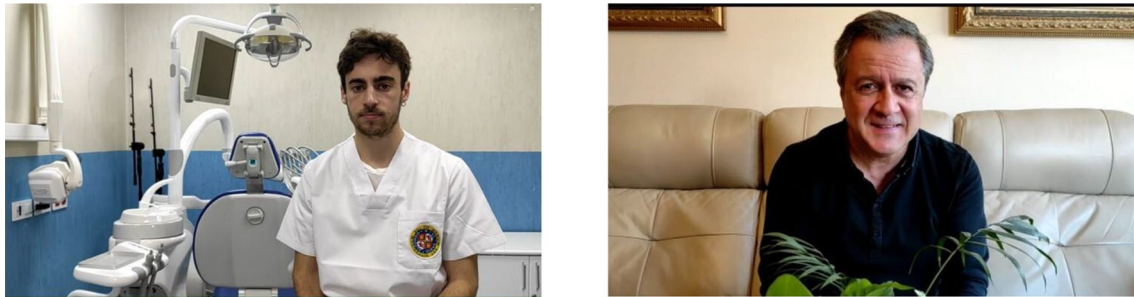
The sample of patients for the surveys were taken from the waiting room of a University Master of Orthodontics patient waiting room from September 1st, 2022 to September 25th 2023. All of them were over 16 years of age, native Spanish speakers, they have shown interest in receiving dental treatment with aligners and signed the informed consent form. Patients were excluded if they were undergoing active orthodontic treatment, had a craniofacial syndrome or had received orthodontic treatment previously.

60 volunteers were post Randomization with Sealed Envelope TM (Sealed Envelope Ltd. 2022. Simple Randomization Service. [Online] Available at: <https://www.sealedenvelope.com/simple-randomiser/v1/>. London, UK) in two different groups. 30 participants watched the video that used more empathetic language (EG) and another 30 watched the video that used non-empathetic language (N-EG). This was a pilot study, but a minimum sample size of 30 participants per group was deemed necessary based on Al-Silwadi et al. [27]. Their study is similar to this one but oriented to fixed devices.

Clinical staff were also instructed not to give verbal information about orthodontic treatments prior to patient participation in the study. Ethical approval was obtained from the Bioethics Committee of the Alfonso X el Sabio University (Resolution 2022\_7/147). The study was performed in accordance with the declaration of Helsinki. Written consent was obtained from all participants once they were informed verbally and in writing about the characteristics of the study. Both image models gave their written informed consent to use the image for publication. Clinical trial number: not applicable.



**Fig. 1** Google Trends search results for the term “Invisalign” in the world from 2004 to 2023. Source: Google Trends



**Fig. 2** Images from informational videos: **A**, video where non-empathetic language is used; **B**, video where empathetic language is used

To evaluate the comprehension of information about treatment with dental aligners, the participants watched in the same screen, one of the videos only once and then, completed a 19 multiple choice paper questionnaire in the presence of an investigator (J.I.), without being allowed to resolve any doubts during the completion of the questionnaire. They were told that they had a time limit of 10 min to answer the questions.

The questionnaire was designed based on previous studies on patients’ retention of information after the first consultation with the orthodontist [28–30]. Care was taken to match the questions to the information contained in the videos. The questionnaire was not published elsewhere. It was specifically developed for this study.

Once the data collection was completed and during the statistical analysis work, it was decided to cancel question number 17 due to its similarity with question number 3.

The relative frequencies of correct responses in each group (EG vs. N-EG) were analysed by means of cross-tabulations. The significance of the differences between the results of the two groups was calculated with the Chi-square test. The differences observed between the groups, were considered significant when the  $p$ -value of the statistical test showed values of less than 0.05. ( $S^*$ ) or highly significant when  $p < 0.01$ . ( $S^{**}$ ). The data were analysed with the SPSS program (IBM, Armonk, NY).

## Results

Analyzing the data obtained from the responses between questions 1 and 5, 66.7% of the participants surveyed did not have family members who had received orthodontic

**Table 1** Percentage of family or friends who have worn aligners

Answers	N	%
Yes	20	33,3
No	40	66,7

**Table 2** Percentage of participants previously informed about orthodontic treatment using aligners

Answers	N	%
Yes	15	25
No	45	75

**Table 3** Sources of information to acquire knowledge about orthodontic treatment using aligners

Answers	N	%	%
Internet	5	31,3	8,3
Friends/relatives	3	18,8	5
General dentist	3	18,8	5
Orthodontist	4	25	6,7
Other	1	6,3	1,7

**Table 4** Percentage of awareness that social media can be used to find information about aligner treatment

Answers	N	%
Yes	34	56,7
No	26	43,3

treatment with aligners (Table 1) and only 25% had been previously informed about the treatment (Table 2).

Of this 25%, 31,3% stated that they had been informed via the Internet (Table 3). 57% of patients knew that social networks can be used to find information about treatment with aligners (Table 4), with YouTube and

**Table 5** Participants use of social networks

Answers	Instagram		Snapchat		Google		Youtube	
	N	%	N	%	N	%	N	%
Instagram	12	36,4	1	21,2	34	39,4	9	3
Snapchat	7	5	1	5	14	10	27	80
Google	13	59,6	2	24,6	5	8,8	14	7
Youtube	1	18	16	54	4	28	0	0

Instagram being the social networks most consumed by participants (Table 5).

When analyzing the data obtained from the answers (Table 6), we observed that the empathic group (EG) chose the correct answer in seven of the questions and incorrect answers in three questions. In 3 of the questions asked, both groups agreed on the correct given answers. The statistically significant values ( $p < 0,05$ ) obtained in question 13 and 16, stand out. Considered as questions of technical difficulty, it was observed that most of the participants in the empathic group chose the correct answer.

On the contrary to the non-empathetic group, where a clear confusion is observed since most of the participants belonging to this group have chosen an incorrect answer (Tables 7 and 8). The answers to questions 13 and 16 are clearly explained in both empathic and non-empathetic videos.

## Discussion

Two thirds (66.7%) of the participants did not know anyone who had received treatment with aligners and three quarters (75%) had not been informed before. This shows that most of the participants had their first contact with this type of treatment through this study. This data is considered very relevant, since it shows that the patients had no previous knowledge that could condition the differences found between the two groups [31].

It has been shown that participants in this study seek information about their treatment from the orthodontist (25%), Internet and social media platforms (31.3%). This proportion of participants using Internet, is consistent with the study by Siddiqui et al. [6] where 73% of participants stated that they would like to use social media in the future to help support their orthodontic treatment.

Increasingly, patients are turning to online platforms first [7, 8], especially those who use the audiovisual format. This format has proven to be a better method of providing information in terms of information retention compared to the traditional written method [27, 30].

In this study, more than half (57%) of the participants were aware that social networks can be used to search for information about orthodontic treatment with clear aligners.

It was observed that the way the information was delivered, played an important role in comprehension. Considering that the two videos in this study delivered the same informative content, participants who watched the video using more empathetic language (EG) better understood the information delivered even if it was of a technical level, since the participants in the empathic group generally answered better. This is supported by the fact that patients in the empathic group had a significantly higher percentage of correct answers ( $p < 0.01$ ) to the technical questions.

These positive data obtained by changing the way information is delivered have been observed in previous studies. Levine et al. [28] showed that presenting orthodontic informed consent information in a humorous way made patients remember it better.

Therefore, the use of empathetic language can be considered part of the treatment and be associated with better clinical results [18, 21]. Reifarth et al. [32] highlight the importance of empathy in communication between healthcare professionals and patients' families. In their study, they recorded the importance of receiving empathic communication with the patient and family of patients.

The narrative way in which patients express their aligner treatment experience through social media provides essential emotional and social information that is not typically available through routine resources in an orthodontic clinic [33].

After analyzing the results, the researchers of this study consider that it is important to train orthodontists in the use of a more empathetic language, as it can be beneficial in improving communication and reducing treatment incidences [34]. The results of this study suggest that a change in the way information about aligner treatment is delivered could have a direct impact on the

**Table 6** Frequency of successful responses

Answers	% CG	% TG	p
6A	6,7	0	NS
6B	3,3	3,3	NS
6C	76,7	60	NS
6D	0	30	S**
6E	6,7	6,7	NS
6F	6,7	0	NS
7A	0	0	NS
7B	46,7	50	NS
7C	33,3	20	NS
7D	6,7	23,3	NS
7E	13,3	6,7	NS
8A	3,3	10	NS
8B	13,3	0	NS
8C	0	6,7	NS
8D	83,3	83,3	NS
9A	23,3	26,6	NS
9B	53,3	60	NS
9C	13,3	6,7	NS
9D	10	6,7	NS
10A	3,3	0	NS
10B	6,7	6,7	NS
10C	90	90	NS
10D	0	3,3	NS
10E	0	0	NS
11A	3,3	0	NS
11B	93,3	90	NS
11C	0	0	NS
11D	0	0	NS
11E	3,3	10	NS
12A	40	40	NS
12B	10	26,7	NS
12C	50	33,3	NS
13A	6,7	3,3	NS
13B	30	16,7	NS
13C	40	20	NS
13D	23,3	60	S*
14A	10	3,3	NS
14B	16,7	23,3	NS
14C	3,3	0	NS
14D	0	10	NS
14E	70	63,3	NS
15A	0	6,7	NS
15B	10	13,3	NS
15C	0	0	NS
15D	13,3	23,3	NS
15E	76,7	56,7	NS
16A	63,3	26,7	S*
16B	6,7	3,3	NS
16C	3,3	10	NS
16D	26,7	60	NS
18A	60	73,3	NS
18B	3,3	3,3	NS
18C	36,7	23,3	NS
19A	50	66,7	NS
19B	10	3,3	NS
19C	40	30	NS

**Table 7** Question 13, when does the participant believe that the treatment with aligners will end

Answer	EG		N-EG	
	N	%	N	%
When I am happy with the result	2	6,7	1	3,3
I can't know. Only the dentist will know	9	30	5	16,7
When I don't have to wear any other aligner and only the retainer	12	40	6	20
When my teeth are aligned	7	23,3	18	60

**Table 8** Question 16, what does the participant think will happen at the end of the treatment with aligners

Answer	EG		N-EG	
	N	%	N	%
A lifelong retainer must be placed to ensure that my teeth do not move	19	63,3	8	26,7
My dentist will always have to give me reconstructions	2	6,7	1	3,3
There is nothing else to do	1	3,3	3	10
Sometimes the orthodontist will put in retainers, but not in all cases	8	26,7	18	60

clinical outcome of treatment. However, further studies are needed to confirm this.

## Conclusions

Audiovisual information provided as shown in social networks, in an affective and empathetic way to orthodontic patients before undergoing treatment with aligners, produces an improvement in knowledge related to orthodontic treatment.

As other studies [31, 35–37] have already done, it is strongly suggested to the scientific community, orthodontic societies and colleges, and orthodontists, that we generate and share quality online educational content based on scientific evidence and that employs language that is more empathetic to the patient's level of understanding.

## Abbreviations

CG Colloquial video  
TG Technical video

## Acknowledgements

Not applicable.

## Author contributions

JIA and CMP wrote the main manuscript and ARS and INS helped in the conceptualization and protocol development of the study. All authors reviewed the manuscript.

## Funding

Not applicable.

## Data availability

The data that support the findings of this study are not openly available due to reasons of sensitivity and are available from the corresponding author upon reasonable request. Data are located in controlled access data storage at University Alfonso X el Sabio.

## Declarations

### Ethics approval and consent to participate

Ethical approval was obtained from the Bioethics Committee of the Alfonso X el Sabio University (Resolution 2022\_7/147). All patients were given oral and written information about the study and signed an informed consent.

### Consent for publication

Both image models gave their Written informed consent to use the image for publication.

### Competing interests

The authors declare no competing interests.

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Received: 19 September 2024 / Accepted: 11 February 2025

Published online: 13 March 2025

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