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Is YouTube™ a reliable source of information regarding ultra-thin ceramic laminates?

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Aim: An aesthetic smile is usually associated with healthy appearance and success in many areas of life. Currently, individuals access the internet and social media in search of health information. The aim of this study was to analyse the quality and reliability of information in videos available on the YouTube™ platform about ultra-thin ceramic laminates. **Methods:** YouTube™ was searched using the therms "dental ceramic laminates" and "dental contact lens" for videos uploaded on ultra-thin ceramic laminates. The first 100 videos in Portuguese were selected and rated for quality and reliability. The content and source of videos were also noted. The quality of the videos was determined by evaluating the presence or absence of reliable information and distributed into seven domains. To compare the distributions of quantitative variables between the classifications of source, content, and quality, the Kruskal-Wallis and Dunn's post-hoc tests were performed. **Results:** Seventy-two videos were included for qualitative analysis. Regarding quality rating, most videos were rated with poor quality. The reliability of the evaluated videos was low. **Conclusion:** YouTube™ showed a large number of videos with many views on the topic, but it does not contribute with good quality and reliable information to the population.

Keywords: Dental veneers. Social media. Internet.

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Introduction

A smile is one of the main features of the face and can contribute to facial attractiveness among individuals. An aesthetic smile is often associated with success in life[1,2]. Individuals satisfied with their physical appearance tend to be more outgoing and successful in social interactions[3,4]. When the appearance of teeth compromises the smile, commonly the individual has low self-esteem and compromised personal image with effects on mental health[4].

To meet current aesthetic and resistance requirements, scientific research has advanced and new materials and techniques have emerged in order to achieve better physical and mechanical properties of resins, ceramics, and bonding agents. In this context, ceramic veneers have emerged, and more recently, dental contact lenses have become popular. Dental contact lenses are porcelain laminate veneers with a thickness of 0.2 mm to 0.5 mm[5] and represent an aesthetic treatment[6]. Patients willing to perform aesthetic treatment are predominantly young female patients[7].

Social media can currently be considered a key source of information, education, and entertainment. The importance of social media is demonstrable through the 140 million active users in Brazil. YouTube™ is one of the fastest growing social media with over 500 hours of new videos posted per minute and is considered the largest video sharing platform (https://www.omnicoreagency.com/youtube-statistics/). People are constantly looking for information about aesthetic and up to date dental treatments, guided by the media, which shows models with perfect smiles. Within this context, the present study analyses the quality and reliability of information in videos available on the YouTube™ platform about ultra-thin ceramic laminates.

Materials and methods

Study design and video selection strategy

This study evaluated information collected from videos posted on the YouTube™ platform through the Brazilian Portuguese expressions "dental ceramic laminates" and "dental contact lens". The search was carried out on June 20, 2021, and all videos found, published from June 2020 to June 2021, were included. We searched for each term separately by opening a new incognito session in the Chrome web browser and entering www.youtube.com.br in the URL field to open the YouTube™ website.

The following filters established by YouTube™ were used — upload date: this year; type: videos; duration: 4 to 20 minutes; features: high definition; sort by: relevance. The first 100 videos of each searched expression were evaluated. The following quantitative information was also collected: total number of results by searched expression, upload date, video duration, count of views, classification of the source of the videos (professional, personal, academic, and mixed), classification regarding the content of the videos (useful, misleading, and personal experience), and number of "likes" and "dislikes". Popularity was calculated as the number of views divided by the number of days since upload[7].

The inclusion criteria were videos on ultra-thin ceramic laminates, in high definition, with a duration of 4 to 10 minutes. The exclusion criteria were duplicate videos that

were exclusively intended for marketing of treatments or dental products and those without informative content.

Classification of videos according to content and source

The content of the videos was classified according to criteria adapted from Delli et al.[7]. Useful: they contain information according to the main scientific references on the topic. Misleading: they contain erroneous information according to the main scientific references on the topic. Personal experience: the videos describe a user's personal experience during treatment with porcelain laminate veneers.

Videos were also classified by source as professional, personal, academic, and mixed, according to criteria adapted from Fortuna et al.[8]. Professional: someone identified as a dentist (whether in name, presentation, or description of the channel). Personal: someone identified as a non-professional individual. Academic: students or professors who teach at universities of dentistry. Mixed: if the video contains information belonging to more than one of the three categories mentioned above.

Video Quality Assessment Score

The quality of the videos was determined by evaluating the presence or absence of information, based on a current and reliable reference on the topic, and distributed into seven domains. Contents were defined scientifically accurate if they adhere to those reported in a reference book.[9] A video received 1 point in each domain if the required content was mentioned (Table 1), leading to a final score ranging from 0 to 7. A score of 0 indicated that no accurate content in any of the seven domains was present in the videos, while a score of 7 indicated that the video contained information in all domains (Table 1).

A single examiner (MF) performed the initial selection of videos and two examiners (MF and CU), previously trained and calibrated from the viewing of 27 videos not included in the sample, performed the quality assessment of the videos. These 27 videos were randomly selected and reviewed by the same authors after 1 week first evaluation. Kappa correlation coefficients were calculated to determine interrater reliability. The Kappa test showed good reliability between observers (k = 0.865; $p < 0.001$; agreement = 76.7%).

Table 1. Quality assessment score.

ITEM	*Score*[a]
Definition	1
Indications	1
Limitations	1
Dental wear	1
Irreversibility	1
Longevity	1
Care	1

The content of each item was evaluated based on a book considered reference on restorative dentistry.[9]
[a] 7 = Excellent Quality, 5-6 = Good Quality, 3-4 = Moderate Quality, 1-2 = Poor Quality and 0 = Very Poor Quality.

Reliability of information

All videos classified as useful according to the criteria of Delli et al.[7], were further analysed for reliability using a scale. Reliability of information received a score from 1 to 5 based on five questions adapted from DISCERN— a validation tool for assessment of written consumer health information. The five questions are: 1. Are the objectives clear and achieved?; 2. Are reliable sources of information used? (i.e., publication cited); 3. Is the information presented balanced and impartial?; 4. Are there additional sources of information listed for patient reference?; 5. Are areas of uncertainty mentioned? Positive responses scored 1 point, whereas negative responses scored 0 point.

Statistical analysis

Categorical variables were represented by absolute and relative frequency. Quantitative variables were represented by the median and the 25th and 75th percentiles, average and standard deviation (minimum and maximum). To compare the distributions of quantitative variables between the classifications of source, content, and quality, the Kruskal-Wallis test was performed. When significant, Dunn's post-hoc test was used to find categories with different distributions. The chi-square test was performed to verify the association between categorical variables. The significance level used was $p < 0.05$. The IBM SPSS Statistics 25 was used to perform the analyses.

Results

The initial search obtained 491 videos with the expressions "dental contact lens" (n = 465) and "dental ceramic laminates" (n = 26). Six videos without informative content were excluded, four were duplicates, six were exclusively for advertising, and 38 were over the 10-minute time limit. The final sample consisted of 72 videos.

The description of frequencies in relation to source, content, rating, and quality classifications are shown (Table 2). Among the selected videos, the majority (n = 49; 68.1%) were classified as useful and the source as professional (n = 51; 70.8%). Regarding quality, most (n = 33; 45.8%) of the videos had poor quality. In all videos evaluated, tooth wear was mentioned. Most videos classified as moderate to excellent quality (n = 34) were produced by professionals (n = 31) and were considered useful content (n = 29) (data not shown).

Table 2. Description of frequencies in relation to source, content rating and quality classifications.

Variables	n (%)
Source of videos	
Professional	51 (70.8)
Personal	20 (27.8)
Mixed	1 (1.4)
Content rating	
Useful	49 (68.1)
Misleading	4 (5.6)
Personal experience	19 (26.4)

Continue

Continuation	
Quality	
Very poor	5 (6.9)
Poor	33 (45.8)
Moderate	18 (25.0)
Good	14 (19.4)
Excellent	2 (2.8)

A statistically significant difference was found between professional and personal sources and the number of views ($p = 0.001$), count of "liked" ($p < 0.001$), count of "disliked" ($p < 0.001$), and popularity of videos ($p < 0.001$). No difference was found with the mixed category due to the small sample size (Table 3).

Table 3. Comparisons among quantitative variables and the source.

	SOURCE			P-value*
	Professional (n = 51)	Personal (n = 20)	Mixed (n = 1)	
Video length in minutes				
median [P25; P75]	6.10 [4.70; 7.10]	6.01 [4.48; 8.32]	6.62	0.874
Number of views				
median [P25; P75]	132 [31.0; 816]a	4,743.5 [477; 31,428.5]b	40	0.001
Number of likes				
median [P25; P75]	9.0 [1.0; 41.0]a	247 [16.5; 2,050]b	1	<0.001
Number of dislikes				
median [P25; P75]	0.0 [0.0; 1.0]a	9.0 [0.5; 62.5]b	0	<0.001
Popularity of videos				
median [P25; P75]	0.6 [0.2; 3.2]a	25.9 [2.1; 151.4]b	1	0.002

*Kruskal-Wallis test. Dunn's post-hoc test. Distinct letters represent distribution of distinct classifications.

The comparison of distributions of the quantitative variables between the content classification of videos is shown (Table 4). The number of views of personal experience when compared to useful content has a positive association ($p = 0.002$). The number of "liked" for personal experience when compared with the number of "liked" for useful content also presented a positive association ($p < 0.001$). No difference was found with the misleading category due to the small sample size. It was also investigated whether the distributions of video duration in seconds, number of views, number of "liked" and "disliked", and popularity of videos were associated with the content categories. The Kruskal-Wallis test did not find statistical significance ($p \geq 0.05$) among quality categories (Table 5).

Table 4. Multiple comparisons among quantitative variables and the contents using the Kruskal-Wallis test.

	CONTENTS			P-value
	Useful (n = 49)	**Misleading (n = 4)**	**Personal Experience (n = 19)**	
Video length in minutes				
median [P25; P75]	6.12 [4.7; 7.00]	5.56 [4.00; 7.24]	5.85 [4.42; 8.33]	0.719
Number of views				
median [P25; P75]	132 [35; 736]a	684 [22; 5,901.5]	6806 [285; 40,000]b	0.002
Number of likes				
median [P25; P75]	9[2; 22]a	11.5 [1; 112]	314 [14; 2,700]b	<0.001
Number of dislikes				
median [P25; P75]	0[0; 1]a	2.5 [0; 6]	13[0; 84]b	<0.001
Popularity of videos				
median [P25; P75]	0.6 [0.2; 2.5]a	2.3 [0.8; 27.8]	30.5 [1.9; 206.2]b	<0.001

Distinct letters represent distribution of distinct classifications.

Table 5. Multiple comparisons among quantitative variables and the quality classification using the Kruskal-Wallis test.

	QUALITY					P-value
	Very Poor	**Poor**	**Moderate**	**Good**	**Excellent**	
	(n = 5)	**(n = 33)**	**(n = 18)**	**(n = 14)**	**(n = 2)**	
Video length in minutes						
median [P25; P75]	4.37 [4.27; 4.42]	6.3 [4.58; 7.38]	6.45 [4.73; 7.10]	6.15 [4.83; 7.13]	409.5 [280; 539]	0.15
Number of views						
median [P25; P75]	285 [173; 669]	845.0 [50; 9,474]	135.5 [80; 746]	44.0 [21; 736]	73 [62; 84]	0.354
Number of likes						
median [P25; P75]	14 [11; 17]	19.0 [4.0; 378]	17.5 [6; 80]	5.0 [1.0; 41]	14.5 [12; 17]	0.482
Number of dislikes						
median [P25; P75]	0.0 [0.0; 1.0]	0.0 [0.0; 15]	1.0 [0.0; 3.0]	0.0 [0.0; 1.0]	0.0 [0.0; 0.0]	0.31
Popularity of videos						
median [P25; P75]	2.2 [1.9; 9.1]	2.5 [0.4; 43.2]	1.0 [0.5; 17.3]	0.6 [0.1; 2.5]	0.2 [0.2; 0.2]	0.223

As for reliability, 49 useful videos were evaluated based on the five questions adapted from the DISCERN tool. The only questions answered referred to questions 1 and 3 (Are the objectives clear and achieved? / Is the information presented balanced and impartial?). The mean was 1.71 (SD = 0.645); median 2.00; minimum 0; and maximum 2.

Discussion

YouTube™ is an entertainment, an information and learning tool with a huge spread of information about diseases, treatments and aesthetic procedures. One may posit that the published content influence the behaviour of the population and has great relevance in a society wherein health is seen as a consumer product. This platform was designed for entertainment, but today is accessed by the population in search of information about health. However, there are concerns about the risk of disseminating poor quality information to the lay public. Our results showed that professional and personal experience videos superficially mentioned the wear of healthy tooth structure. Many videos mentioned a conservative wear. However, it is known that this wear is an irreversible process. Dentistry practiced nowadays, according to the World Dental Federation (FDI), must be minimally invasive[10] and the dentists must preserve the dental structure. We agree with a previous study[7] that specialists should be actively involved in the development of e-information resources, video-sharing platforms and should also refer their patients to evidence-based videos.

A previous study on endodontic treatment observed that the videos partially mentioned aspects of the procedure performed[11]. Our results found only one video that was classified as mixed (professional and academic). However, it did not include the items evaluated as important for the lay person. Only information aimed at dental professionals was presented. It is worth emphasizing the need for health professionals to improve communication with their patients, transmitting high quality scientific information through conversation or by showing a video about the procedure to be performed. It should also inform patients of possible harm, adverse effects, or risks of procedures failing. The lack of reliable information, and the incomplete explanation of risks and benefits, lead to complications in the dentist-patient relationship. Moreover, we believe that most of the people who seek information regarding dental contact lens in YouTube™ are lay persons and need reliable information about dental treatments.

Most videos rated as good and excellent were published by professionals. Poor and very poor quality videos showed reports of personal experience without scientifically based evidence. The number of views of videos from the personal source was higher when compared to the professional source. The same result was also observed in the study by Fortuna et al.[8], where the number of views of the personal source was approximately 10 times greater than that of the professional source.

Our findings also showed that more than half of the Youtube™ videos about ultra-thin ceramic laminates were considered useful. However, this assessment considers useful if at least one item was present in each video. The quality assessment is another topic that should be considered in this study since only two videos met all criteria. These findings corroborate the study by Clerici et al.[12], which evaluated videos on soft tissue sarcoma and, of the 149 videos evaluated, only one met all the criteria analysed. Another study that used the same scoring criteria also found only one video with a maximum score[13].

Popularity is the second most cited measure in YouTube™ videos, often defined in relation to view count. But care must be taken with popularity as a measure of quality, as the number of views can be easily manipulated by marketing strategies[14]. In our

study, the most popular videos were classified as from a personal source. Here, it is worth emphasising the population's interest in other people's lives, with reports of successful experiences or even a curiosity about other people's conduct.

Our results showed reliability to be low, with scores ranging from 0 to 2. It was observed that many videos did not cite references and did not mention authors or scientific research to support the proposed treatment. Low reliability was also observed in a review that evaluated other diseases and alterations[14]. To evaluate reliability, we used a questionnaire modified from the DISCERN validation tool for assessment of written consumer health information. According to this tool, the evaluators could present some bias for subjective criteria (e.g., impartial) because only positive or negative responses were possible.

Other limitations should be noted in our study. Only videos in Brazilian Portuguese were included, thus restricting the sample size. To minimise the evaluators' fatigue in front of the screen, only six videos per day were evaluated. Finally, it is noteworthy that there is no validated system for evaluating the quality of videos on dental treatments on public platforms. However, we sought to follow a careful methodology similar to that described in previous studies, like the criteria adapted from Delli et al.[7] and Fortuna et al.[8]

Conclusion

In conclusion, YouTube™ showed a lot of personal videos with many views on porcelain laminate veneers; however, the information available to the lay public has not been classified as useful, had low quality and low reliability.

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Conflict of interests

The authors have no conflicts of interest to declare.

Data availability

Datasets related to this article will be available upon request to the corresponding author.

Authors contribution

Marceli de França: Substantial contributions to the conception and design of the work, acquisition, analysis and interpretation of data for the work, drafting the work and revising it critically for important intellectual content, final approval of the version to be published, agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. **Caroline Uemoto:** contributed with the data aqui-

sition. **Dennis de Carvalho Ferreira:** contributed with the design of the article, final approval of the version to be published, agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investi-gated and resolved. **Maíra do Prado:** contributed with the analysis of data, drafting the article and revising critically for important intellectual content, final approval of the version to be published, agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. **Patricia Nivoloni Tannure:** contributed to conception and design of the work and analysis and interpretation of data. Additionally, this author was important in drafting the article and revising it critically for important intellectual content. Final approval of the version to be published, agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

All authors actively participated in the discussion of the manuscript's findings, and have revised and approved the final version of the manuscript

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