



Original Article

An assessment of the Quality of Information for Patients on YouTube™ Regarding Orthodontic Elastics

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Main Points

- Patients mainly refer to YouTube™, which is currently the second most visited video-sharing platform, to obtain information about orthodontic elastics (OEs).
- YouTube™ is a poor source of information concerning OE for patients.
- Clinicians should create their own YouTube™ accounts and refer their patients to these videos in order to provide high-quality information regarding OEs.

ABSTRACT

Objective: The study aimed to investigate the quality of the information available to patients on YouTube™ concerning orthodontic elastics.

Methods: A systematic search was carried out on YouTube™ using the keyword “elastics.” The first 120 videos were viewed by 2 independent reviewers, and after the inclusion criteria were applied, 39 videos were excluded from the study. Demographic data of the videos were collected for the remaining 81 videos. For each video, its purpose, target audience, and source were also recorded. A 10-point content scale was used to evaluate the video content. The Global Quality Scale was also used to determine the quality of the videos. Statistical analyses were performed using the Kruskal–Wallis and Mann–Whitney *U* tests, and correlation coefficient analyses were performed using Spearman’s rho.

Results: In total, 36% of the included videos were uploaded by dentists and 22% by laypersons. In 77% of the videos, the purpose was to inform laypersons, and in 4%, the purpose was to inform professionals only. The content discussed the most (85.2%) was the instruction of orthodontic elastics use. The mean 10-point Content Scale score and Global Quality Scale score of the videos were 2.25 ± 1.99 (poor) and 2.60 ± 0.73 (moderate), respectively. There was a positive correlation between 10-point Content Scale and Global Quality Scale score ($r = 0.258$).

Conclusion: The information available on YouTube™ regarding orthodontic elastics is quite poor and can be misleading for patients. Therefore, health professionals with evidence-based knowledge and clinical experience should improve the way they use YouTube™ to inform patients about the correct use of orthodontic elastics and to improve compliance with wearing orthodontic elastics.

Keywords: Dentistry, internet, orthodontic elastics, orthodontics, YouTube™

INTRODUCTION

Orthodontic elastics (OE)/rubber bands were first discussed by Calvin S. Case in 1893 at the Columbia Dental Congress and have been routinely used as an active component of fixed orthodontic therapy ever since. Orthodontic elastics are one of the most versatile materials available to the orthodontist. Correct use of OEs combined with cooperative patients allows orthodontists to improve both anteroposterior and vertical discrepancies.¹ While technology has developed significantly and clear aligner treatments are gradually becoming more widespread in orthodontic practice, currently, it is difficult to imagine orthodontic treatment without OEs.

Orthodontic elastics can be applied in various ways regarding the direction of force applied to the teeth to be moved. Therefore, patients must cooperate to ensure regular and correct usage, which directly affects the success of the treatment. Clinicians may choose to apply a number of methods, such as patient education, verbal praise, positive and negative reinforcement, use of charts and rewards in order to ensure patient compliance in the use of OEs.² In addition, it seems obvious that recommending reliable videos previously identified by the clinician would facilitate the patient's perception of treatment due to their visual content.³ Therefore, video-sharing platforms such as YouTube™ are becoming more prominent as they provide health-related information which can be easily accessed by the public. On average, 100 h of video are uploaded to YouTube™ every minute, and each user spends at least 15 min per day watching videos on this platform worldwide.⁴ A key consideration of YouTube™ is that it is a source of user-generated content, and due to the uncontrolled nature of the platform, many videos can unfortunately misinform the viewer.⁵ Such misinformation may affect patients' communication with their dentists and disrupt the cooperation with the treatment.

It is apparent that using social media to access health-related information will probably become even more significant in the future; thus, studies regarding the quality of video content and other shared visual information have become more crucial.⁶ As the volume of information patients find on the internet to make decisions about their health gradually increases, it becomes more critical for healthcare professionals to examine the information patients have been accessing. It is for this reason that several studies have been conducted to evaluate the quality of dentistry-related information (clear aligners, rapid palatal expansion, orthognathic surgery, accelerated orthodontics, impacted canines, root canal treatment, dental implants, early childhood caries, fluoride therapy, obstructive sleep apnea, genioplasty) on YouTube™.^{3,6-16} The majority of these studies evaluating the content in YouTube™ videos demonstrated that this tool is not an adequate source from which patients might obtain reliable information.⁶⁻¹¹ In terms of OEs, this issue may lead to incorrect use and, therefore, may adversely affect the success of the treatment.

To our knowledge, there have been no studies investigating the quality of OE-related information on YouTube™ to date. Considering the significant role of OEs in orthodontic practice, the aim of this study was to evaluate videos dealing with OEs on YouTube™ in terms of characteristics, content, and quality of the information.

METHODS

Search strategy

There was no requirement for this study to obtain the ethical approval of the Institutional Review Board due to its publicly available nature. The Google Trends application was used to determine the most used search terms regarding "orthodontic elastics" [Google Trends 2020]. Possible related keywords such as "orthodontic rubber bands," "orthodontic tires," and "intraoral

elastics" were also tried in the application, but "orthodontic elastics" was found as the search term most frequently used by patients. The search parameters were set as the "past 5 years," "Worldwide," and "YouTube™ Search." A YouTube™ search was systematically conducted on December 23, 2020, using the keyword "orthodontic elastics." In a recent study, it was noted that 95% of people only viewed the first 3 pages, corresponding to 60 videos of an online search, and looked no further than this.¹⁷ The majority of previous YouTube™ studies used this research method by Desai et al.¹⁷ Similarly, in the current study, the first 120 videos corresponding to the first 6 pages were sorted in order of relevance (a default option on YouTube™ which uses a complex algorithm based on view count, upload date, rating, comments, bookmarks, age of user, etc.) and were stored in the "Watch later" list in a specially created account to avoid duplications. All videos were examined by 2 independent researchers (T.H.Ö and D.D.) who had experience in the management of orthodontic treatment. The exclusion criteria for videos were as follows: (1) presentation in a language other than English, (2) having poor visual or audio quality, (3) exceeding 15 min in duration, (4) including duplicate parts, and (5) focusing on an unrelated topic (Figure 1). The uniform resource locators and titles of all the videos meeting the inclusion criteria were saved in a document to compare the results of the 2 researchers.

Data extraction

The following descriptive characteristics of each video were recorded: number of views, likes, dislikes, comments, video length (in minutes), and days since upload. The upload sources were classified as (1) dentist/orthodontists, (2) commercials, (3) health institutions, and (4) laypersons; the target audiences were classified as (1) laypersons, (2) professionals, and (3) both; and the purposes of the videos were classified as (1) patient information, (2) patient experiences, (3) product introductions, and (4) education. All videos were classified and recorded according to these categories. Since there is currently no tool available that can assess the quality of online information regarding OE, a novel 10-point content scoring system was used for this study. Each item on the checklist was given 1 point, with a maximum

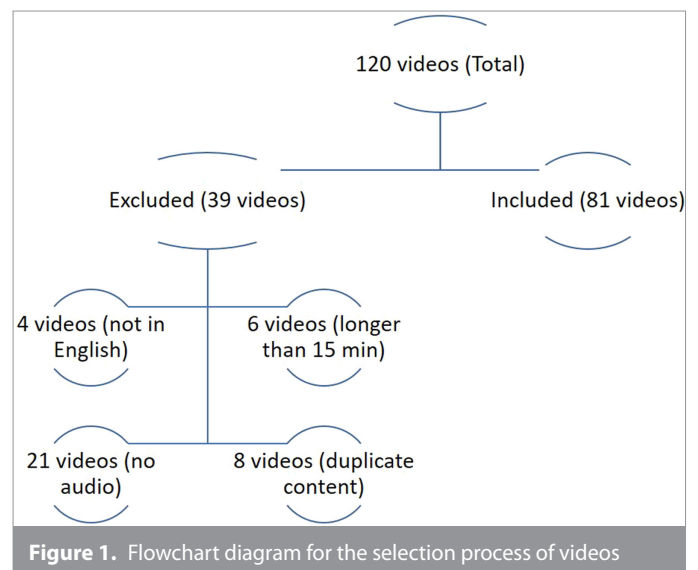


Table 1. GQS criteria proposed by Bernard et al.¹⁸

GQS Definition	GQS Score
Poor quality, poor flow of the video, most information missing, not at all useful for patients	1
Generally poor quality and poor flow, some information listed but many important topics missing, of very limited use to patients	2
Moderate quality, suboptimal flow, some important information is adequately discussed but others poorly discussed, somewhat useful for patients	3
Good quality and generally good flow, most of the relevant information is listed but some topics not covered, useful for patients	4
Excellent quality and flow, very useful for patients	5

of 10 points for each video. Based on the sum of the points, the videos were scored as having poor content (score 0-3), moderate content (score 4-7), or rich content (score 8-10). Additionally, the quality of videos was classified using Global Quality Scale (GQS) according to the criteria proposed by Bernard et al.¹⁸ as in Table 1.

Data Analysis

The Statistical Package for the Social Sciences for Windows version 15.0 (SPSS Inc., Chicago, Ill, USA) was used for statistical analyses. A total of 20 videos were randomly extracted to calculate the interobserver agreement using Cohen's kappa. Descriptive statistics (mean, standard deviation, median, frequency, and percentage) were calculated to examine the data. The Shapiro–Wilk test was used to approximate the normality of the quantitative data. The Kruskal–Wallis test for intergroup comparisons and the Mann–Whitney *U* test for 2-group comparisons were used for non-normally distributed variables. A *P* value of less than .05 was considered significant. Spearman's test was used to evaluate the correlation between scores.

RESULTS

A total of 120 videos were reviewed for the keyword “orthodontic elastics,” of which 39 videos were excluded due to the following reasons: 4 videos were not in English, 6 videos were longer than 15 min, 21 videos did not have audio, and 8 videos included duplicate content. The videos were uploaded between September 2010 and October 2020.

All video demographics, including the mean number of views, likes, dislikes of the videos, and days since upload are presented in Table 2. The mean number of views for all the videos was 498 848.05, with a variation between videos ranging from 187 to 7 441 177 views. The overall mean of number of “likes” was 3071.91 (ranging from 0 to 77 000), while the overall mean of number of “dislikes” was 183.26 (ranging from 0 to 2500). The mean number of comments was 366.79 (ranging from 0 to 5775), and the mean video length was 3:84 min (ranging from 0:25 to 13:45). Finally, the mean value of the days since upload was 1091.01 days (ranging from 60 to 3557 days). Other video characteristics including video source, target audience, and video purpose are summarized in Table 3.

In total, 85% of the videos presented clear instructions of the use of OE, 31% a correct definition of OE, 24% removability of OE, and 17% pain caused by OE. Only 15% of the videos mentioned the effect of OE on speech and 7.4% the psychological

Table 2. Descriptive statistics for included videos

Video Characteristics	Minimum	Maximum	Mean	SD
Views	187	7,441.177	498,848.05	1,430,273.9
Likes	0	77.000	3,071.91	223.00
Dislikes	0	2.500	183.26	15.00
Comments	0	5.775	366.79	1,049.713
Length	0:25	13:45	3:84	2.85
Days since upload	60	3.557	1,091.01	945.067
CS	0	10	2.2593	1.99861
GQS	1	5	2.6049	.73619

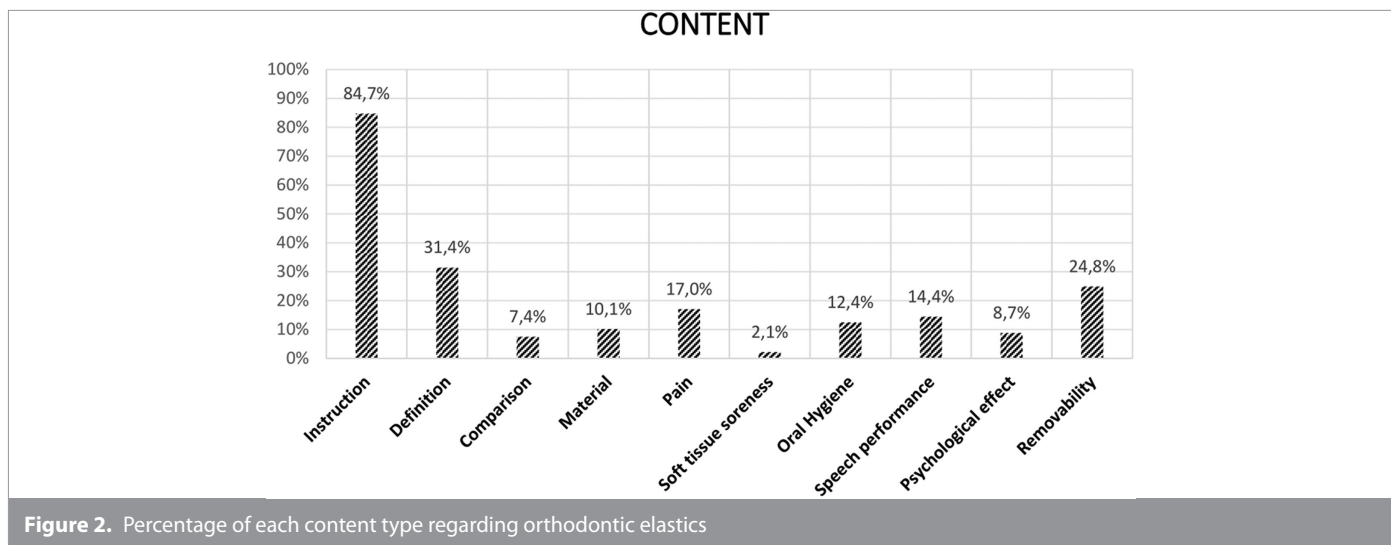
GQS, Global Quality Scale; CS, content score; SD, standard deviation

effect of OE (Figure 2), and 36% of all videos were uploaded by a dentist/orthodontist, 31% by a health institution, and 27% by a layperson. While the purpose of 95% of the videos was to inform laypersons, only 10% of the videos were intended for professionals. The purpose of 62% of the videos was to share patient information, 27% to share patient experience, 6% to provide a product introduction, and 4% to educate. The majority of GQS scores were classified as “moderate” (40%), followed by “generally poor” at 33%. The number of likes were significantly higher in videos targeting laypersons than those targeting professionals ($P < .05$). The number of comments were also higher in videos uploaded by laypersons than those uploaded by dental professionals ($P < .05$). Videos uploaded by laypersons had significantly longer video duration than those uploaded by dentists ($P < .05$). Videos with a purpose of patient experience had significantly longer video duration than those with other purposes ($P < .05$). The number of views were significantly higher in videos targeting both laypersons and professionals than those targeting only one of these groups ($P < .05$), (Table 4).

The Cohen's kappa coefficient was 0.76, indicating an admissible degree of similarity between the scores. The mean content score and GQS scores of the videos were 2.25 ± 1.99 (poor) and 2.60 ± 0.73 (moderate), respectively (Table 2). There was a positive correlation between the total CS score and GQS score ($r = 0.258$). The majority of the videos (86.4%) were classified as having “poor content,” 9% as having “moderate content,” and 5% as having “rich content” in terms of the CS score. There were no statistical differences in terms of demographic data between the 3 content groups. A total of 84.5% of the videos targeting laypersons were in the poor content group. Most of the videos informing patients

Table 3. Video demographics according to source, purpose, and target of videos

Video Demographics	Poor Content (n = 70) (86.4%)	Moderate Content (n = 7) (8.6%)	Rich Content (n = 4) (4.9%)	Total
Source of video				
Dentist/orthodontist	26 (89.7%)	3 (10.3%)	0 (0)	29
Commercial	5 (100%)	0 (0)	0 (0)	5
Health institution	23 (92%)	1 (4%)	1 (4%)	25
Layperson	16 (72.7%)	3 (13.6%)	3 (13.6%)	22
Purpose of video				
Patient information	46 (92%)	4 (8%)	0 (0)	50
Patient experience	16 (72.7%)	3 (13.6%)	3 (13.6%)	22
Product introduction	4 (80%)	0 (0)	1 (20%)	5
Education	4 (100%)	0 (0)	0 (0)	4
Target of video				
Layperson	60 (84.5%)	7 (9.9%)	4 (100%)	71
Professional	4 (100%)	0 (0)	0 (0)	4
Both	6 (100%)	0 (0)	0 (0)	6



were uploaded by dentists/orthodontists (46%) and health institutions (48%). A total of 30% of videos targeting laypersons were uploaded by dentists/orthodontists, 34% by health institutions, and 31% by laypersons.

DISCUSSION

Millions of people use the internet as the shortest way to access information on a global level today. Since orthodontics is a field where numerous visual and complex instructions are given to the patient, it seems that patients are likely to search for more information on the internet. Patients are mostly curious about the timings of the use of OE and the effect of OE in terms of pain, eating, speech, and so on.¹⁹ For these reasons, they mostly use YouTube™ as a social platform that provides rich visual content and easy access instead of scientific platforms where it can be harder to access information. Although this website is the second most visited video-sharing platform today, much of the

information can be misleading as it is not peer reviewed. Two independent reviewers evaluated all the videos. The researchers agreed on a new score by consensus in cases where there was an inconsistency in scores. We created a content scale considering the major concerns of patients regarding OE. As expected, most of the videos included instructions on the usage of OE. In a study, the authors reported that patients were mostly concerned about the effect of OE in terms of pain that might be experienced and social status.⁸ However, in the current study, only 17% of videos included content related to the pain associated with OEs and only a few videos were found that covered the psychological effects. Moreover, the effects of OE on speech, oral hygiene, and soft tissue soreness were under-represented topics in the videos. In terms of those questions most asked by patients such as alternatives (comparison content) of OEs, their effect on treatment duration, and the material from which they are made, YouTube™ seems a poor source of information. Even though 74% of videos were uploaded by dental professionals and 65% of videos

Table 4. Mean values of the descriptive characteristics and statistical analysis of the data

	Views	P	Likes	P	Dislikes	P	Comments	P	Days Since Upload	P	Duration	P
Source												
Dentist/orthodontist	176,523.45	.267	1395.72	.061	48.28	.051	225.86 ^a	.024	1021.66	.800	232.93 ^b	.000
Layperson	696,615.32		6240.82		332.86		599.68 ^a		981.14		385.36 ^b	
Commercial	1,558,009.40		2812.20		488.40		1034.40		1639.40		72.80	
Health institution	486,877.12		2279.60		147.16		191.80		1158.48		128.48	
Purpose												
Patient information	295,837.74	.085	1941.12	.209	93.60	.081	214.82	.070	1032.40	.698	161.78 ^c	.000
Patient experience	806,725.41		5581.73		316.64		620.32		1014.09		397.95 ^{c,d,e}	
Product introduction	469,783.40		1664.60		123.80		141.00		1667.40		255.80 ^d	
Education	1,379,482.25		5162.00		644.75		1154.25		1526.25		171.50 ^e	
Target												
Layperson	429,600.20 ^f	.014	2794.61 ^h	.037	165.39	.081	378.04	.083	967.65	.069	226.06	.490
Professional	101,441.75 ^g		512.00 ^h		30.50		58.50		1359.50		257.50	
Both	1,583,218.50 ^g		8060.00		496.50		439.17		2371.83		288.17	

Same superscripts indicate a statistical significance.

targeting laypersons were also uploaded by these professionals, most of the content of these videos was classified as being “poor” quality, indicating the deficiencies in these videos.

Although the content scores and GQS scores presented a positive correlation, the GQS scores were higher. This can be explained by the fact that the videos flow well despite their poor content. Similarly, Lena et al.¹⁹ and Ustdal et al.¹⁶ stated a moderate correlation between GQS and CS in their YouTube™ studies evaluating lingual orthodontics and accelerated orthodontics, respectively. Surprisingly, all “rich” content videos had been uploaded by laypersons. This may be because people like to share their experiences in detail on their personal blogs, especially including content on removability, pain, psychological effects, speech performance, and oral hygiene. Nevertheless, there was 1 video shared by an adolescent who believes it is possible to close his maxillary median diastema with OEs at home on his own, without referring to the risks involved in attempting this action. This means that videos uploaded by laypersons are always at risk of including misleading information. Therefore, the content of the videos uploaded by dental professionals should be improved to better inform those patients who want to find out more about OEs.

The video content was found poor in several previous dentistry-related YouTube™ studies.⁶⁻¹⁶ However, Yavuz et al.³ reported good content in videos concerning accelerated orthodontics and they attributed this to the fact that the majority of the videos they analyzed were uploaded by professionals. In contrast, previous YouTube™ studies demonstrated that the majority of analyzed videos were uploaded by laypersons rather than dentists or academicians.^{6,9,16} The majority of videos targeting laypersons were

in poor content group. These videos, most of which were shared by dental professionals in our study, once again showed how important it is to examine the available information to patients on YouTube™. In addition, the quality of the videos evaluated in this study was found to be moderate, as in similar studies.^{3,16,21}

Viewers can interact with uploaders by commenting or liking/disliking their videos.¹¹ Considering that the videos uploaded by laypersons had a significantly higher number of comments than the videos uploaded by professionals, it is disappointing that users preferred to interact with laypersons than professionals in order to obtain information regarding OEs. In addition, the duration of videos uploaded by professionals was found significantly shorter than videos uploaded by laypersons. The quality of videos on YouTube™ should be improved by professionals via extending the duration and detailing the accurate content. As expected, the videos targeting both laypersons and professionals were viewed more than videos targeting only one of these groups.

The current research has several limitations. First, as YouTube™ is a dynamic site, the results might vary due to the monitoring date of the videos. However, since “orthodontic elastics” is not a constantly changing and developing subject, this limitation may not have critically affected the study results. Second, laypersons may try searching for different keywords to find information concerning OEs. To limit the impact of this issue, the most searched term in Google Trends application was used for this research. Third, only videos in English were analyzed. Fortunately, the majority of videos were already in the English language (n = 116). In the current study, videos longer than 15 min were excluded. It has been reported that the audience will lose interest with the

prolongation of video duration on YouTube™.²⁰ Previous studies also demonstrated that short videos were viewed more on internet.^{9,22} However, only 6 videos were excluded in this study due to this reason.

In this study, the content of YouTube™ videos regarding OEs for patients was found to be of moderate and poor quality. Clinicians should create their own YouTube™ accounts and refer their patients to these videos in order to avoid the spread of misinformation and achieve more successful treatment results. Dental professionals should also warn their patients about any online platforms where they may encounter misleading and inaccurate information.

CONCLUSION

The content of the majority of YouTube™ videos regarding OEs for patients was found to be poor quality. In the light of these results, health professionals with evidence-based knowledge and clinical experience should improve the way they use YouTube™ to inform patients about the correct use of OEs and to improve compliance with wearing OEs.

Ethics Committee Approval: As the study does not deal with humans or any material previously collected from humans, no ethical approval was taken.

Informed Consent: As the study does not deal with humans or any material previously collected from humans, no informed consent was taken.

Peer-review: Externally peer-reviewed.

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