



Original Article

Quality of Information on YouTube™ about Rapid Maxillary Expansion

Suleyman Kutalmış Büyük^{ID}, Mehmed Taha Alpaydın^{ID}

Department of Orthodontics, Faculty of Dentistry, Ordu University, Ordu, Turkey

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Main points:

- YouTube™ is a social platform that patients use to share information and experiences related to orthodontics.
- This study evaluated the content and quality of YouTube™ videos on rapid maxillary expansion (RME).
- YouTube™ videos are generally inadequate regarding containing information about RME.

ABSTRACT

Objective: This study aimed to evaluate the content and quality of YouTube™ videos about rapid maxillary expansion (RME).

Methods: Videos on YouTube™ were searched using the term "palatal expansion." After sorting by relevance, the final 100 videos were analyzed for video demographics, primary purpose, information reliability, audiovisual quality, and Global Quality Scale (GQS). Also, viewers' interaction index and viewing rate formulas were calculated for each YouTube™ video. Mann-Whitney U test, Spearman's correlation coefficient and Intra-class Correlation Coefficient were used for statistical analyses.

Results: YouTube™ videos about palatal expansion were mostly uploaded by patients and their relatives (51%). The reliability of the information in the videos with a GQS value >3 was significantly higher than those with a GQS value ≤3 (4.33 vs. 1.69) ($P < .001$). There was an excellent correlation between information reliability and GQS in videos uploaded by orthodontists and dentistry professionals ($r=0.878, P < .01$).

Conclusion: YouTube™ is currently not an appropriate source of information about RME for patients. Orthodontists should refer patients to reliable sources of information on social media platforms.

Keywords: Internet, rapid maxillary expansion, social media, YouTube

INTRODUCTION

Most of the world's population has access to many websites that provide information regarding modern health-care. Recent studies have found that 8 of 10 internet users have access to online healthcare information.^{1,2} It has been demonstrated that patients believe that the internet is a valuable source of healthcare information, and it plays a role in the patients' relationship with healthcare professionals.³ Not only healthcare professionals but also any internet user can produce health-related information and upload it on the related websites. Therefore, the validity and reliability of this information are controversial.

People have quick and easy access to information on social media regarding orthodontic treatment for themselves or their children. Therefore, YouTube™ is the first source of information about treatment, especially orthodontic treatment, more than other social media platforms because YouTube™ provides visual and auditory information.^{4,5} Since 2005, YouTube™ has become a phenomenon for commercial and personal content distribution, that is, it has become the second most growing video platform on the internet. Over 1.9 billion logged-in users visit YouTube™ each month. In addition, over a billion hours of videos are watched every day, and billions of pieces of content are created.⁶ However, YouTube™ videos about dentistry are mostly underdeveloped and

underestimated.⁷ The quality and integrity of dental information on YouTube™ are controversial because of the minimal filtering of uploaded videos.⁸

Rapid maxillary expansion (RME) is a routine clinical procedure in orthodontics that is used to expand the maxilla transversally. The main purpose of the procedure is to expand the maxilla in young adolescents who have transversal maxillary narrowness, deep palatal vault, and associated maxillary cross-bite. Although this treatment is intended to correct the dental and skeletal maxillary transverse malocclusions, some authors have shown that treatment outcomes may increase nasopharyngeal airway size and improve nasal breathing.⁹ The literature includes reports on potential positive effects of RME in the treatment of nasal airways, septal deformity, recurrent ear or nose infections, allergic rhinitis, asthma, and their combinations.¹⁰ However, RME may involve complex and difficult procedures from the patient's perspective despite such positive outcomes. Not understanding the RME screw activation protocol causes the RME screw to get stuck and causes the appliance to fail to function. Moreover, patients may have other complaints, including pain, formation of median diastema between the maxillary incisors, periodontal and oral mucosa injury, and difficulty in speech. The risk of swallowing and aspiration of the RME screw key during screw activation is critical as it may lead to serious complications. YouTube™ is also a social media platform that patients use to share information and experiences about such issues in dentistry. Therefore, the content quality of RME videos is important to guarantee the accuracy of information on YouTube™.

The number of studies on the relationship between social media and orthodontics are limited^{11,12}, and there are no studies that have investigated the information on RME treatment on social media. Therefore, the purpose of this study was to evaluate the content and quality of YouTube™ videos about RME and to analyze the effectiveness and usefulness of the videos for patients. The null hypothesis was that videos about RME on YouTube™ are of low quality.

METHODS

YouTube™ Search Strategy

Using the term "rapid maxillary expansion" as a starting point, this study evaluated the search frequency of similar terms in the Google Trends application. Among similar terms, "palatal expansion" was returned as the most used search term on YouTube™. The search parameters were set to "Worldwide"/ "All Categories" for the last 5 years to expand the search results.

A search was performed on YouTube™ (<https://www.youtube.com>) on June 30, 2019, with the term "palatal expansion" to evaluate the videos shared about "rapid maxillary expansion." A new YouTube™ account was created for this study. To avoid any bias when searching for results, the computer history and cookies were deleted. The uniform resource locators of all videos were saved. Videos that were in a language other than English, videos that had no audio, and videos that lasted longer than 15 min-

utes were not included, and in total, 30 videos were excluded from the study (11 videos with no audio, 7 videos not related to the subject, 4 duplicate videos, and 8 videos longer than 15 minutes). Our research was classified using default search filters. The only search filter applied was "relevance"¹³, and other filters were not changed or replaced. Two researchers (MTA and SKB) evaluated all the videos for all parameters. Because this study comprised only the data available in the public domain, it did not require approval from an ethics committee. Furthermore, this study was approved by Clinic Research Committee of Ordu University (2020/154).

The remaining 100 videos were evaluated in this study. Thus, the relevant search term was returned as a representative of audience behavior.¹⁴

Video Assessment

All the videos were watched in full, and the following general parameters were recorded for each video: (1) number of views, (2) time (seconds), (3) total number of "likes and dislikes," and (4) number of comments.

The videos were also divided into 2 main groups according to their sources as follows: (1) orthodontists and dentistry professionals and (2) patients and relatives.

The purpose of the video was categorized under 3 main groups as follows: (1) patient information, (2) patient experiences, and (3) education. The main reason for creating the videos this way was to ensure that the videos fulfilled these purposes. While creating groups, the researchers combined the related sub-groups with each other to achieve more successful results.

The reliability of information was scored between 1 and 5 (reliability score) based on 5 questions (Table 1).¹⁴ Furthermore, all videos were rated using the Global Quality Scale (GQS) (Table 2), according to the quality of information and reviewer's comments on the usefulness of the video for patients.¹⁴ Videos with a GQS score of ≤ 3 were considered low to poor in quality, and those with a score >3 were classified as good to excellent.

The interaction of viewers was calculated using the interaction index and viewing rate formulas. Video interaction was calculated through the difference of the total number of "likes" and "dislikes" divided by the total number of views.¹⁴ The video viewing rate was calculated by dividing the total number of views by the number of days of the video on YouTube™. A total of 20 videos were evaluated again by the same researchers (MTA and SKB). The agreement coefficients of reliability of information and GQS scores between the 2 evaluation times (intra-observer correlation: MTA) were 0.769 and 0.772, respectively, according to the Cohens' kappa (κ) statistics.

Statistical Analysis

The Statistical Package for Social Sciences, version 20.0 software (SPSS Inc.; Chicago, IL, USA) was used for the statistical analyses. The normality of data distribution was assessed by Shapiro-Wilk test. Mann-Whitney U test was performed for comparison of the

video characteristics. Spearman's correlation coefficients were also calculated to assess the possible correlations between the GQS, content, and reliability scores. Intra-class correlation coefficients were calculated to define intra-rater reliability. Statistical significance was evaluated on the $P < .05$ level.

RESULTS

The inter-observer (MTA versus SKB) agreement coefficients for GQS and reliability of information evaluation of randomly selected videos were statistically significant (κ : 0.781 and κ : 0.741, respectively).

Table 1. Evaluation of the reliability of videos useful for maxillary expansion on YouTube™

| Serial number | Questions |
|---------------|---|
| 1 | Were the aims clear and achieved? |
| 2 | Were the sources of information reliable? (Examples include valid studies cited to support claims, information presented by an orthodontist specialist) |
| 3 | Is the information balanced and unbiased? |
| 4 | Are additional resources for learning provided? |
| 5 | Does the video address areas of controversy/uncertainty? |

Table 2. Global Quality Scale criteria used to rate videos containing information about rapid maxillary expansion on YouTube™

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

Table 3 shows the descriptive statistics of the video characteristics. The mean length of the YouTube™ videos about palatal expansion was 4.86 (\pm 3.95) minutes. The mean total number of views was 50,014.51 (\pm 173,455.92). The mean view-through rate was 3,826.10 (\pm 10,000.67). The mean interaction index value was .70 (\pm 0.76). The mean GQS score was 2.07 (\pm 1.09).

YouTube™ videos about palatal expansion were mostly uploaded by patients and their relatives (51%, $n = 51$), followed by orthodontists and dentistry professionals (49%, $n = 49$).

Patient experiences ($n = 49$) took prominence in terms of the purpose of sharing, followed by patient information ($n = 45$) and education ($n = 6$).

The videos were divided into 2 groups based on the source as follows: orthodontists and dentistry professionals ($n = 49$) and patients and patient relatives ($n = 51$).

There was a significant difference between the mean number of views of videos created by orthodontists/dentistry professionals and those uploaded by patients and their relatives ($P = .027$). When the reliability of the information in the videos was examined, it was found that the information reliability of the videos uploaded by orthodontists/dentistry professionals was significantly higher than that of the videos uploaded by patients and their relatives (2.81 vs. 1.23) ($P < .001$). The GQS scores of the videos uploaded by orthodontists/dentistry professionals were significantly higher than those uploaded by the patients and their relatives ($P < .001$). The mean interaction index of the videos by patients and their relatives was significantly higher than that of the videos created by orthodontists ($P = .008$) (Table 4).

The reliability of the information in the videos with a good to excellent GQS score was significantly higher than that in videos with a low to poor GQS score (4.33 vs. 1.69) ($P < .001$) (Table 5).

Table 6 shows the Spearman's correlation coefficients between the scores of reliabilities of information and GQS and YouTube™ parameters. There was a high correlation between the information reliability and GQS ($r = 0.878$, $P < .01$) in the videos uploaded by orthodontists/dental professionals, whereas the correlation between the interaction index ($r = 0.337$, $P < .05$) and the view-

Table 3. Descriptive statistics of the YouTube™ videos

| | N | Minimum | Maximum | Mean | SD |
|----------------------------|-----|---------|--------------|-----------|------------|
| No. of views | 100 | 89.00 | 1,440,723.00 | 50,014.51 | 173,455.92 |
| Duration in minutes | 100 | .20 | 14.59 | 4.86 | 3.95 |
| No. of likes | 100 | .00 | 7,847.00 | 301.14 | 950.10 |
| No. of dislikes | 100 | .00 | 267.00 | 13.71 | 39.68 |
| No. of comments | 100 | .00 | 1,015.00 | 60.96 | 155.45 |
| Reliability of information | 100 | .00 | 5.00 | 2.01 | 1.23 |
| Global Quality Scale (GQS) | 100 | 1.00 | 5.00 | 2.07 | 1.09 |
| Interaction Index | 100 | .00 | 3.77 | 0.71 | 0.77 |
| Viewing Rate | 100 | 25.89 | 77,944.15 | 3,826.11 | 10,000.67 |

SD: Standard deviation.

ing rate ($r = 0.392, P < .01$) was moderate. Moreover, there was a moderate correlation between the GQS and interaction index ($r = 0.318, P < .05$) and viewing rate ($r = 0.434, P < .01$) in the videos

uploaded by orthodontists/dentistry professionals. In contrast, there was an high correlation between the information reliability and GQS ($r = 0.642, P < .01$); however, the correlation between information reliability and viewing rate ($r = 0.305, P < .05$) was on a moderate level in the videos uploaded by patients. There was moderate correlation between the GQS and viewing rate ($r = 0.514, P < .01$) for the videos uploaded by patients, whereas the correlation between GQS and interaction index ($r = 0.351, P < .05$) was moderate.

Table 4. Quality of useful videos (n=100) on rapid maxillary expansion to source of information

| | Orthodontist/ Dental Professionals (n=49) Mean (SD) | Patient/ Relative (n=51) Mean (SD) | P* |
|----------------------------|--|---|-----------|
| Number of views | 64137.98 (226964.25) | 36444.90 (98674.28) | .027 |
| Duration in minutes | 2.44 (1.95) | 7.19 (4) | <.001 |
| Number of likes | 195.39 (501.65) | 402.74 (1234.59) | <.001 |
| Number of dislikes | 13.65 (45.12) | 13.76 (34.11) | .015 |
| Number of comments | 66.75 (188.53) | 55.39 (116.88) | .012 |
| Reliability of information | 2.81 (1.15) | 1.23 (0.71) | <.001 |
| Global Quality Scale | 2.65 (1.11) | 1.51 (0.73) | <.001 |
| Interaction index | 0.64 (0.84) | 0.77 (0.69) | .008 |
| Viewing rate | 2945.84 (7575.36) | 4671.85 (11893.15) | <.001 |

*Result of the Mann-Whitney U Test, SD: Standard deviation.

DISCUSSION

Many patients research about their orthodontic treatment for detailed information. They mostly use YouTube™ that provides rich visual content and easy access instead of scientific platforms that provide more academic and accurate information.¹⁵ However, the validity of information on YouTube™ is questionable because anyone can share videos, and there is no standardization of content for the uploaded videos. Therefore, this study evaluated the content quality of YouTube™ videos on RME and evaluated the primary purposes of sharing these videos.

Table 5. Comparison of RME videos according to GQS information

| | Orthodontist/ Dental Professionals (n=49) Mean (SD) | Patient/ Relative (n=51) Mean (SD) | P* |
|----------------------------|--|---|-----------|
| Number of views | 253131.08 (454698.93) | 22316.79 (40366.13) | .051 |
| Duration in minutes | 4.42 (3.08) | 4.92 (4.06) | .783 |
| Number of likes | 1102.83 (2256.67) | 191.81 (531.56) | .137 |
| Number of dislikes | 59.41 (99.61) | 7.47 (14.48) | .217 |
| Number of comments | 175.66 (329.82) | 45.31 (108.08) | .190 |
| Reliability of information | 4.33 (0.65) | 1.69 (0.91) | <.001 |
| Interaction index | 1.16 (1.25) | 0.64 (0.66) | .211 |
| Viewing Rate | 14861.95 (24041.43) | 2321.21 (4651.86) | .304 |

*Results of the Mann-Whitney U test
RME: Rapid maxillary expansion, GQS: Global Quality Scale, SD: Standard deviation.

The concept of opening the midpalatal suture was first described by Angell in 1860.¹⁶ However, opening of the midpalatal suture with RME appliances could be radiographically proven only in the early 1900s because X-rays were not discovered before those years. RME became a popular method in recent years for eliminating transversal disorders between the dental arches because of maxillary narrowing.¹⁷ Some potential positive effects of RME are reported for the treatment of a combination of poor nasal airway, septal deformity, recurrent ear or nose infection, allergic rhinitis, and asthma.¹⁸ RME produces great forces to overcome the limitations of orthodontic tooth movement and achieve a minimum dental and maximum orthopedic effect, thus enabling expansion and gradual opening of the middle palatal suture.¹⁹ The expansion force depends on the activation protocol. For example, the screw may be activated once or twice a day for approximately 2–4 weeks, and a single activation creates a force of 3–10 pounds.²⁰ However, RME may involve complex and challenging procedures from the patient’s perspective despite such positive outcomes. Failure to understand the screw activation protocol causes the RME screw to jam and the device to malfunction. Moreover, patients may have other complaints such as pain, median diastema formation between the maxillary incisors, bad breath, periodontal and oral mucosa injury, and dif-

Table 6. Spearman correlation coefficients between scores reliability information, GQS, and YouTube™ parameters

| | | Number of Views | Duration (minute) | Number of Likes | Number of Dislikes | Number of Comments | Information Reliability | GQS | Interaction Index | Viewing rate |
|--|-------------------------|----------------------------|------------------------------|----------------------------|-------------------------------|-------------------------------|------------------------------------|------------|------------------------------|-------------------------|
| Patient/Relative | Information Reliability | 0.100 | 0.132 | 0.160 | 0.129 | 0.254 | 1.000 | 0.642** | 0.164 | 0.305* |
| | GQS | 0.272 | 0.374** | 0.417** | 0.367** | 0.527** | 0.642** | 1.000 | 0.351* | 0.514** |
| Orthodontist/ Dental Professionals | Information Reliability | 0.285* | 0.624** | 0.532** | 0.379** | 0.585** | 1.000 | 0.878** | 0.337* | 0.392** |
| | GQS | 0.327* | 0.615** | 0.542** | 0.447** | 0.623** | 0.878** | 1.000 | 0.318* | 0.434** |

Significance levels, * $P < .05$; ** $P < .01$
GQS: Global Quality Scale.

difficulty in speaking. The risk of swallowing and aspiration of the key during screw installation is critical as this may lead to severe complications. YouTube™ is also a platform that patients use to share information and experiences about orthodontics. Therefore, the content quality of RME videos is crucial to guarantee the accuracy of information.

There are no standards for the videos shared on medical issues on YouTube™ because not only orthodontists but also lay people can upload and share videos, and this may affect human health. However, the information reliability of high-quality videos scored higher than the information reliability of low-quality videos in our study. This result showed a positive correlation between information reliability and video quality. The mean duration of the videos shared by patients or their relatives was longer than that of the videos shared by orthodontists or dentistry professionals. This could be because patients or their relatives do not share videos with an educational purpose but would like to share their experiences about the treatments. The mean GQS score of the videos shared by orthodontists or dentistry professionals and the reliability score of information in these videos were higher than those of the videos shared by patients or their relatives. This finding showed that the videos shared by orthodontists on RME were more beneficial than those shared by patients or their relatives in terms of content, streaming quality, and reliability. This finding also showed that the content of videos shared by orthodontists or dentistry professionals was educational because orthodontists or dentistry professionals are educated in this field.

The increasing use of social media in all fields of life has led to a need for studies investigating the quality, accuracy, and precision of the content of videos, especially those related to the field of health.¹²⁻¹⁴ Numerous studies have analyzed websites in different areas in health-related fields. Several studies have also evaluated the content of videos related to orthodontics on YouTube™ and other social media platforms.^{4, 11-13, 21, 22, 23} Canigur-Bavbek and Balos-Tuncer²² evaluated the quality of website information related to orthognathic surgery in Turkey, they concluded that web-based information was of low quality. Olkun et al.²³, in their study on the quality and reliability of websites providing information about lingual orthodontics in Turkey, reached the conclusion that there was insufficient information on these websites regarding lingual orthodontics. In our study, similar results were obtained with the conclusion that the quality of Internet-based information was low.

A systematic review by Papadimitriou et al.²⁴ on the use of social media in providing information and its effects on orthodontic patients has shown that information exchange on several social networks developed as a significant source of information on orthodontics. The study showed that social media was a common platform for information exchange, especially among young people. In addition, these young people shared their experiences on various social media platforms. One of the possible reasons was that young people were more comfortable communicating through social media than communicating with orthodontist face to face. As a result of the

increasing use of the Internet and social media both by professionals and employees in the field of medicine and dentistry, studies regarding the quality of video content and other shared visual information become more crucial. There are many studies evaluating online information on medicine and dentistry. Knösel and Jung⁷ conducted a study to measure the level of knowledge in orthodontic posts on YouTube™. They concluded that although YouTube™ was a platform for sharing patient experiences, related videos remain inadequate in terms of content. Singh et al.¹⁴ have investigated the quality of information shared on YouTube™ about rheumatoid arthritis, and they analyzed viewer interactions. They concluded that there was no standard of quality of relevant information on YouTube™, and there was no difference between the popularity and viewing of useful and misleading videos. Lena and Dindaroglu¹³ conducted a study examining the content and quality of YouTube™ videos on lingual orthodontics and concluded that the content and quality of the videos were inadequate. Hatipoglu and Gas²⁵ investigated the quality of YouTube™ videos regarding surgically supported rapid palatal expansion. The results of the study showed that only 25.76% of all uploaded videos were of moderate content quality. The remaining videos had low-quality content. There were no high-quality content videos. The results of these studies show that the quality of video content is essential because the feedback on these videos affect the patients' decision-making process regarding the orthodontic treatment.

Patients and their relatives mostly shared their experiences in the videos, but healthcare professionals created and shared videos mostly for education and information. Therefore, these videos were more crucial and valuable. In our study, the ratios of the videos uploaded by patients/patients' relatives and dentistry professionals were 51% and 49%, respectively. Among the shared videos, only 3 obtained 5 full ratings in terms of information reliability and GQS, and they were all shared by orthodontists. This finding suggested that orthodontists should share high-quality videos, and there should be a control system to upload such videos.

For the videos shared by orthodontists and patients in terms of information reliability and GQS as well as other YouTube™ parameters, the correlation between the GQS score of the videos shared by orthodontists and information reliability was more significant than the correlation between the GQS score and information reliability of the videos shared by patients. In the videos shared by orthodontists, the scores on information reliability and GQS showed a positive correlation with duration in minutes, number of likes and dislikes, and number of comments. This finding suggested that patients prefer interacting through videos rather than directly with orthodontists.

YouTube™ content is dynamic, and search results are constantly changing. Comments, likes, dislikes, view rates, and various other parameters can be changed and manipulated. It should also be noted that although we had selected keywords for search using the Google Trends application, different videos might appear by using different keywords.

CONCLUSION

YouTube™ videos were generally inadequate in their content of information on RME. Therefore, patients who want to learn about RME on YouTube™ may have difficulty finding videos with high-quality content. Orthodontists should refer their patients to the right sources for up-to-date information on YouTube™.

Ethics Committee Approval: This study was approved by Clinic Research Ethic Committee of Ordu University (Approval No: 2020/154).

Informed Consent: Not applicable.

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