ABSTRACT

Aim: Since it is difficult to understand by patients or parents, YouTube™ videos can be used to describe space maintainers. However, the reliability and quality of the information in the YouTube™ videos about space maintainers have not been investigated. Therefore, the purpose of this study was to examine the quality of information provided on YouTube™ about space maintainers.

Materials and Methods: Videos were searched on YouTube™ using the key words of “space maintainers” in the Google Trends application. From the first 120 results, after discarding the ones immediately deemed insufficient, 46 videos were selected for analysis. To classify the video content as high or low, a scoring system formed of seven parameters was used. For a global evaluation of the video quality, the video information and quality index were applied. Data obtained were analyzed statistically using the independent t-test, the Mann–Whitney U-test, and the Chi-square test, and the Pearson correlation coefficient was calculated.

Results: The quality of the content of videos was found to be mean 2.89 from a maximum of seven points, with 15 (32.6%) videos determined to be of high quality and 31 (67.4%) of low quality. The “likes” index was higher in the high-quality videos (P < 0.05). No statistically significant difference was determined between the groups responsible for uploading videos to YouTube™ in respect of the quality content (P > 0.05). Conclusion: The content quality of videos on YouTube™ about space maintainers is usually low. High-quality content expected from videos uploaded by specialists/dental practitioners was not provided compared to other groups.

KEYWORDS: Internet, social media, space maintainers, YouTube™

Introduction

After the loss of primary teeth, replacement with permanent dentition is the desired normal physiological process. However, deep caries, trauma, or iatrogenic reasons may disrupt this process due to the early loss of the primary teeth.[1] The loss of the arc perimeter caused by migration of teeth toward the space can cause permanent teeth to remain impacted, crowding, or supraeruption of opposing tooth.[2] Space loss that will cause malpositioning or impaction has been reported at the rate of approximately 51% in the early loss of first primary molars and 70% in the early loss of second primary molars.[3] The best way of avoiding this frequently seen problem is for the primary teeth to remain in the mouth until the time of natural missing.[4] However, in conditions such as early tooth extraction or loss, which cannot be avoided because of large caries or other reasons, the safest option to preserve the arch length is the placement of a space maintainer.[2]
In addition to face-to-face patient–clinician and patient–patient interaction, the Internet is an important source of information for dental and health fields.\(^5\) While only 4.5% of Internet users in the 2000s researched information related to health, this rate has increased to a current level of 80%.\(^6,7\) Furthermore, the Internet is used both by professionals and nonprofessionals to share knowledge and experience.\(^8-10\) Sharing platforms, known as social media, present advantages such as independence, speed, ease of use, and access to universal information.\(^11\)

YouTube\(^\mathrm{TM}\) can be accessed on a variety of media platforms, including smartphones, personal computers, and televisions, and after Google, it is the most visited website on the Internet.\(^12\) Since the establishment of YouTube\(^\mathrm{TM}\) in 2005, approximately 5 billion videos have been uploaded, and the site is used by approximately 1.5 billion people a month.\(^13\) In addition to the popularity of YouTube\(^\mathrm{TM}\), it is preferred more by patients because of the capability of providing visual and oral information compared to other social media platforms.\(^14\)

With social media, patients nowadays can easily acquire and share information about subjects they are interested in before and after the treatment. However, the quality of this easily accessed information can affect the treatment process of the patients, and indirectly, the physicians. Therefore, studies have been conducted to evaluate the quality of the information on some subjects in dentistry\(^15-18\) and medicine\(^19-24\) provided in YouTube\(^\mathrm{TM}\) videos. To the best of our knowledge, there has been no previous study that has analyzed the quality of the information content in YouTube\(^\mathrm{TM}\) videos related to space maintainers, for which, there is a need for visual information, as it is a subject difficult to explain for dentists and difficult to understand by patients and parents. Furthermore, noted above, as the audiovisual media platforms are watched more every day, videos are added and updated constantly by people or experts. However, the knowledge of the physicians and the patients should be kept up-to-date by comparing it with previous research to see if there is any improvement in the quality of medical content of these new videos.

The aim of this study was to examine the quality of the information presented on YouTube\(^\mathrm{TM}\) for patients wishing to acquire information about space maintainers. Furthermore, we wanted to conduct a research on this constantly updated platform to keep the physicians and the patients’ knowledge up-to-date. The first null hypothesis was that the quality of the videos would be poor in respect of pediatric dentistry, the second that there would be no correlation between the views and number of likes and the quality of the content, and the third hypothesis was that the quality of the content of videos uploaded by dentists or specialists would be better than that of videos uploaded by laypeople.

### Materials and Methods

Videos related to space maintainers were searched on the online video resource of YouTube\(^\mathrm{TM}\) (http://www.youtube.com) up to January 1, 2019. The search term of “space maintainers” was selected as the most used term related to space maintainers according to “Google Trends.”

Using the advanced search option by writing the key word, the videos on YouTube\(^\mathrm{TM}\) were classified according to the “level of relevance.” More than 90% of YouTube\(^\mathrm{TM}\) users click on the first three pages of results to find the information they are looking for, and as 79% of users only look at other pages when the information cannot be found on the first page.\(^25\) The first 120 videos were examined for this study. The source locations (URL) of the videos were backed up and recorded. The videos were first separated into five basic groups according to the person who had uploaded it to the Internet: (1) dentist/specialist, (2) dental clinic/university, (3) layperson, (4) commercial company, and (5) others.

Inclusion criteria for the study were that (1) the video was in the English language; (2) the main content of the video must be about the space maintainer in dentistry, not other topics; and (3) the quality of the video was determined as acceptable (240p or higher).

Exclusion criteria were (1) the video language was not English, (2) there was no sound or written explanation, (3) repeated videos, and (4) the video was determined as laboratory stages.

Each video was watched by one of the researchers (MA), taking the information about space maintainers in the content into consideration. The content quality of the videos was evaluated according to the following parameters:

1. Definition and purpose of space maintainers
2. The time of application
3. The application procedure
4. Benefits
5. Types
6. Side effects
7. Recommendations for use.

Each video was scored according to these parameters, providing a total content score of 1-7. Videos with a total content score of >4 were accepted as high-quality content, and those with a total content score of ≤3 as low-quality content. The video information and quality index (VIQI) were used to evaluate the general quality of each video. The following criteria were examined in the VIQI and were scored from 1 (low quality) to 5 (high quality) using a 5-point Likert-type scale: the flow of information, accuracy of information, quality (use of photographs, animation, reports from members of the public, video headings, and summary), and
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sensitivity (the level of consistency between the title of the video and the content).

After watching all the videos, the following general parameters were recorded for each video: (1) number of views, (2) time since uploading, (3) total number of likes, (4) total number of dislikes, and (5) running time of the video. Interaction with viewers was evaluated by calculating the formulas below using the number of views and likes-dislikes.

\[
\text{Interaction index} = \frac{\text{Number of likes} - \text{number of dislikes}}{\text{Number of views}} \times 100
\]

\[
\frac{\text{Number of views}}{\text{Number of days since uploading}} \times 100
\]

As this study only included data that are available to the public, there was no requirement for ethics committee approval.

**Statistical analysis**

Data obtained in the study were analyzed statistically using SPSS version 25 software (SPSS Inc., Chicago, IL, USA). Conformity of the data to normal distribution was assessed with the Shapiro–Wilk test. To analyze the mean differences between high- and low-quality videos, the independent t-test was applied to data with normal distribution, and the Mann–Whitney U-test to data that did not show normal distribution. The Fisher’s exact test and the Chi-square test were applied to evaluate the video uploader groups and the video content parameters. Correlations between the total content of the videos and VIQI points were examined with the calculation of Pearson’s correlation coefficient. To determine the reliability of the evaluations, ten videos were selected at random and were reevaluated by the same researcher at 2 and 3 weeks after the initial evaluations, and the intraclass correlation coefficient (ICC) was calculated. \( P < 0.05 \) was accepted as statistically significant.

**Results**

Systematic intraexaminer error was not found to be statistically significant. The ICC value showed excellent reliability at mean 0.981 (range: 0.92–0.99).

The first 120 videos on YouTube™ resulting from the search using the term “space maintainers” were watched. A total of 71 videos were excluded with the numerical distributions of the reasons given in Figure 1. The demographic statistical properties of the videos watched are shown in Table 1. The mean running time of the videos related to space maintainers was 407.35 s, and they were watched on YouTube™ by mean 24.76,6.02 people. The mean

![Figure 1: Flowchart diagram of the selection process](image)

| Variables                   | Minimum | Maximum | Mean      | SE     | SD    |
|-----------------------------|---------|---------|-----------|--------|-------|
| Video characteristics       |         |         |           |        |       |
| Duration (s)                | 22      | 6106    | 407.35    | 135.20 | 917.01|
| Days since upload (days)    | 15      | 3462    | 1252.20   | 132.22 | 896.77|
| Total content score         | 1       | 7       | 2.89      | 0.20   | 1.34  |
| Views                       | 1       | 371,735 | 24,766.02 | 11,493.9 | 77,955.29|
| Likes                       | 0       | 1400    | 83.13     | 42.36  | 287.28|
| Dislikes                    | 0       | 87      | 6.00      | 2.68   | 18.18 |
| Comments                    | 0       | 73      | 5.17      | 2.03   | 13.77 |
| Interaction index           | -1.16   | 46.67   | 0.884     | 0.40   | 2.69  |
| Viewing rate                | 0.83    | 31,238.24 | 1157.36  | 685.88 | 4651.82|
| VIQI                        |         |         |           |        |       |
| Flow                        | 2       | 5       | 3.52      | 0.15   | 1.01  |
| Accuracy                    | 3       | 5       | 4.67      | 0.09   | 0.59  |
| Quality                     | 1       | 4       | 2.57      | 0.09   | 1.01  |
| Precision                   | 3       | 5       | 4.61      | 0.15   | 0.58  |
| Total VIQI score            | 9       | 19      | 15.43     | 0.36   | 2.46  |

SE=Standard error of mean, SD=Standard deviation, VIQI=Video information and quality index
distribution of the interaction with viewers was 83.13 likes (range: 0–1400), 6 dislikes (range: 0–87), and 5.17 comments (range: 0–73). The mean VIQI score evaluating the quality of the videos was determined as 15.43 [Table 1].

The analyses of the persons uploading the videos and the content parameters are given in Table 2. The total content score from a maximum of 7 was determined to be mean 2.89 ± 1.34. A total of 31 (67.4%) videos were defined as low quality and 15 (32.6%) as high quality. The majority (n: 13, 28.3%) of the videos on YouTube™ related to space maintainers had been created by dental practitioners, and 6 (40%) of these were evaluated as high quality. Most (n: 8, 25.8%) of the low-quality videos had been uploaded by individuals in the “others” category. When the necessary properties for the video to be related to space maintainers were evaluated, the definition of space maintainers was most mentioned in 32 (69.6%) videos. The property least mentioned was side effects at the rate of 4.3% [Table 2].

When comparisons were made of the references in the videos to application time, procedure, benefits, and recommendations for use, the high-quality videos were determined to be superior (P < 0.05), and no difference was found between high- and low-quality videos in respect of the definition and aim of space maintainers, types, and side effects (P > 0.05) [Table 2].

When the low- and high-quality videos were compared in respect of running time comments, likes, and views, the likes index of the high-quality videos was found to be higher (P = 0.027). No significant difference was determined between the two groups in respect of comments and views percentages (P > 0.05) [Table 3].

The results of the detailed evaluation of the videos in respect of the correlation index are shown in Table 4. While a positive correlation was determined between the total content scores and VIQI and running time and views, no correlation was found with the parameters of likes, dislikes, views, and comments.

### Discussion

The first hypothesis of this study was confirmed as the quality of the videos uploaded to YouTube™ was found to be poor in terms of pediatric dentistry, with a mean score of 2.89. The second hypothesis was partially confirmed as the likes, and views of the videos were not compatible with the quality of the content, as shown by the weak positive correlation of the video content quality points with the likes index (r = +0.206), and no correlation was seen with views percentage (r = −0.110). The third hypothesis stating that videos uploaded by dentists and specialists would be of better quality than those uploaded from other sources were rejected, as no statistically significant difference was determined between the groups of uploaders (P = 0.624).

Many patients and parents currently use social media to acquire more information about treatments. In studies measuring the quality of information available on social media, although some have evaluated other platforms, most researchers have examined YouTube™. From the different social media platforms, the rich visual content of YouTube™ is often used by patients rather than professional scientific platforms, as information is easily accessed. However, the validity of information on YouTube™ has been questioned because of the ease of sharing videos and the lack of standardization of the content of uploaded videos. Therefore, the aim of this study was to evaluate in terms of pediatric dentistry, the quality of the content of videos uploaded to the YouTube™ social platform related to space maintainers.

In pediatric dentistry, the subject of space maintainers is difficult for patients and parents to understand and for

### Table 2: Distribution of YouTube™ videos in high- and low-quality content video groups

| Variables                | Low content (n=31), n (%) | High content (n=15), n (%) | Total (n=46), n (%) | P     |
|--------------------------|---------------------------|----------------------------|---------------------|-------|
| Definition               | 19 (61.3)                 | 13 (86.7)                  | 32 (69.6)           | 0.099† |
| Timing                   | 15 (48.4)                 | 13 (86.7)                  | 28 (60.9)           | 0.022† |
| Procedure                | 3 (9.7)                   | 6 (40.0)                   | 9 (19.6)            | 0.042† |
| Benefits                 | 14 (45.2)                 | 14 (93.3)                  | 28 (60.9)           | 0.003††|
| Types and mechanics      | 16 (51.6)                 | 15 (100.0)                 | 31 (67.4)           | 0.001††|
| Adverse effects          | 0                         | 2 (13.3)                   | 2 (4.3)             | 0.101† |
| Factors to consider      | 9 (0)                     | 3 (20.0)                   | 3 (6.5)             | 0.030† |
| Total content score      | 2.16±0.78                 | 4.40±0.91                  | 0.000***            |       |
| Ownership                |                           |                            |                     |       |
| Dentist/specialist       | 7 (22.6)                  | 6 (40.0)                   | 13 (280.3)          | 0.624††|
| Hospital/university      | 7 (22.6)                  | 1 (6.7)                    | 8 (17.4)            |       |
| Layperson                | 4 (12.9)                  | 2 (13.3)                   | 6 (13.0)            |       |
| Commercial               | 5 (16.1)                  | 2 (13.3)                   | 7 (15.2)            |       |
| Other                    | 8 (25.8)                  | 4 (26.7)                   | 12 (26.1)           |       |
| Total                    | 31 (100.0)                | 15 (100.0)                 | 46 (100.0)          |       |

†Fischer’s exact test, ‡Chi-square test, ‡‡Mann-Whitney U-test, P<0.05 statistical significance from other groups
In the comparison of videos with high- and low-quality content, the references in the videos to application time, method, benefits, and recommendations for use, the high-quality videos were determined to be superior \( (P < 0.05) \), and no difference was found between high- and low-quality videos in respect of the definition and aim of space maintainers, types and side effects \( (P > 0.05) \). The reason for the most frequent references to definition, purpose, and side effects of space maintainers is that answers can be given to the questions which first occur to patients and parents, such
as “what is this appliance?” and “what will happen when I wear this?” “Type of space maintainer factor was rarely mentioned in both groups and there was no significant difference between the two groups. This may be due to the fact that ownerships do not want to bore video viewers with technical informations.”

When the high- and low-quality content videos were compared in respect of likes, running time, comments, and views; the high-quality videos were seen to have a higher likes index ($P = 0.027$) and longer running time ($P = 0.003$) than the low-quality videos. No difference was determined between the two groups in respect of comments and views percentage ($P > 0.05$). When the VIQI was examined, which is a universal video quality evaluation index in respect of visual, audio, and information content, no significant difference was determined between the two groups ($P > 0.05$). This shows that the VIQI is insufficient in the evaluation of medical content, and that not sufficient importance was given to visual content in this study. The reason that there was no difference between the views percentages could have been due to disadvantages such as the high-quality videos having a longer running time, that VIQI was incompatible, not sufficient attention was paid to visual content, and too much information was included in the study. In a study of individuals undergoing lingual orthodontic treatment, Lena et al. compared high- and low-quality videos, and similarly reported that high-quality content videos lasted longer, and there was no difference in the VIQI. In some other studies, views and video classifications have been determined to be useful or misleading.

Although a positive correlation was determined between total content points and the VIQI, running time and views index, there was no correlation with parameters such as likes, dislikes, views, and comments. The mean running time of the videos in the high-quality content group was 13.92 min. As viewers have been seen to lose interest in long videos, it is important that new subjects in the video content are presented within an acceptable time to viewers. This longer running time of the high-quality content videos could have caused viewer reactions reflected in the parameters.

As there is a debate about the medical providers of information obtained online by patients, the vast majority of patients continue to trust their physician more than online information. In addition, when the popularity of YouTube™ is considered, and that it could be used as a possible source of important medical information, patients will most likely welcome being referred to appropriate resources. The videos of nonprofessionals serve the purpose of sharing their own experiences, but videos produced by health-care institutions generally have a more educational content. In the comparison in the current study of the different groups of uploaders of videos related to space maintainers, no statistically significant difference was determined ($P > 0.05$). As there was an extremely low (13%) rate of videos uploaded by nonprofessionals, the content of which was expected to be of low quality, this may have prevented an ideal comparison.

In the analysis of the examined videos, it was seen that in some cases 3–4 years had passed since the video was uploaded. With increased experience and advances in technology and visual effects, the likelihood of more recent videos with better content related to space maintainers was ignored in this study. There should also be an awareness that YouTube™ variables such as views, likes, and dislikes can be manipulated.

**Conclusion**

There is a wide spectrum of information about space maintainers on YouTube™. In general, the content of videos on YouTube™ related to space maintainers’ treatment is lacking. Most videos mention the psychological effects and give basic information, and very few videos refer to the procedure, the benefits, and side effects. Therefore, it can be difficult for patients who wish to acquire information about space maintainers to find high-quality content videos on YouTube™. Dentists should be aware of the information available on the Internet and to minimize the incorrect or incomplete information obtained by patients should direct them to appropriate professional sources of correct and up-to-date information.

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**Conflicts of interest**

There are no conflicts of interest.

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