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Evaluation of the Quality, Reliability and Usability of YouTube about 'Guided Tissue Regeneration'

Youtube'daki 'Yönlendirilmiş Doku Rejenerasyonu' ile İlgili Videoların Kalitesinin, Güvenilirliğinin ve Kullanılabilirliğinin Değerlendirilmesi

ABSTRACT

Objectives

The aim of this study was to evaluate the quality, reliability and usability in student education of videos on YouTube about Guided Tissue Regeneration (GTR).

Materials and Methods

The YouTube platform was searched on 22 July 2024 using the term GTR. The first 500 videos were initially evaluated, and 131 videos were included in the study. For all videos, the duration of the video, total number of views, number of likes and dislikes, the number of streams to date since the time of upload, the source of uploads, and the subject of the video were recorded. The viewer interaction index, video power index, and view rate were calculated. The Global Quality Scale (GQS) was used to evaluate the quality of the videos, and the Modified DISCERN tool and Usefulness Scores were analyzed to evaluate reliability.

Results

Statistically significant, positive relationships were found between the number of views, number of likes, number of followers, video duration, and GQS. Significant, positive relationships were found between DISCERN and Usefulness Scores and video duration. No statistically significant relationships were found between the video upload source and the GQS, Usefulness and DISCERN scores.

Conclusion

It was observed that videos about GTR on YouTube are not of sufficient quality and reliability for the education of dentistry students or for patient information. Students and patients should be made aware that not all information they obtain from online video sources is completely accurate.

Key Words

DISCERN, GQS, Guided tissue regeneration, Usefulness score, YouTube

ÖZ

Amaç

Çalışmamızda YouTube'deki 'Yönlendirilmiş Doku Rejenerasyonu' ile ilgili videoların kalitesini, güvenilirliğini ve öğrenci eğitiminde kullanılabilirliğini değerlendirmeyi amaçladık.

Gereç ve Yöntemler

Çalışmamızda 22 Temmuz 2024'te "Yönlendirilmiş Doku Rejenerasyonu" arama terimi kullanılarak YouTube'da bir arama yapıldı. İlk 500 video ön değerlendirmeye alındı ve 131 video çalışmaya dahil edildi. Tüm videolar için videonun süresi, toplam görüntüleme sayısı, beğeni ve beğenme sayısı, yükleme zamanında bugüne kadar geçen süre, yükleme kaynağı ve videonun konusu kaydedildi. İzleyici etkileşim endeksi, video güç indeksi ve görüntüleme oranı hesaplandı. Videoların kalitesi değerlendirmek için Küresel Kalite Ölçeği (GQS), güvenilirliğini değerlendirmek için Değiştirilmiş DISCERN aracı ve Faydalılık Puanları analiz edildi.

Bulgular

Görüntülenme sayısı, beğeni sayısı, takipçi sayısı, video süresi, ile GQS arasında istatistiksel olarak anlamlı, pozitif yönlü ilişkiler bulunmuştur. DISCERN ve Yararlılık Puanı ile video süresi arasında anlamlı, pozitif yönlü ilişkiler görüldü. Video yükleme kaynağı ile GQS, Usefulness ve DISCERN Skorları arasında istatistiksel olarak anlamlı ilişkiler elde edilmemiştir.

Sonuç

YouTube'daki YDR videolarının içeriğinin diş hekimliği öğrencilerinin eğitimi ve hasta bilgilendirilmesi için yeterli kalite ve güvenilirliğe sahip olmadığı gözlemlenmiştir. Öğrencilere ve hastalara çevrimiçi video kaynaklarından elde ettikleri tüm bilgilerin tamamen doğru olmadığı konusunda farkındalık kazandırılmalıdır.

Anahtar Sözcükler

Yönlendirilmiş doku rejenerasyonu, GQS, DISCERN, Yararlılık puanı, Youtube

INTRODUCTION

Regeneration is defined as a biophysiological process in which tissues regain function and structure like the original form (1). In the periodontal tissue regeneration procedure, placement of material functioning as a barrier over the defect prevents entry of the gingival connective tissue cells to the defect area and thus, it is aimed to obtain proliferation of cells organized from the periodontal ligament. Guided tissue regeneration (GTR) is currently accepted as an effective regeneration technique for periodontal tissues (2,3). Guided bone regeneration (GBR) is a surgical technique that provides new bone formation using barrier membranes. It has been reported that the migration of different cells to the wound region in the repair process of bone defects with this technique can be prevented with the use of a mechanical barrier (4,5). Therefore, the aim of GBR is to prevent the migration of non-osteogenic cells (epithelial cells and fibroblasts) to the defect region, and obtain proliferation within the defect of osteoprogenitor cells, which show a slower migration capacity (6,7). The basic biology in this technique of bone regeneration has allowed it within a short time to take a place among the bone regeneration techniques of maxillofacial, implantology, and regenerative periodontal surgery (1).

In the past, most people obtained medical information that they needed about any health-related complaint or symptom from healthcare providers. However, with the developments and spread of the Internet, many people now use Internet-based communication resources to access health-related information (8). The significant extent of the widespread use and free accessibility of the Internet has increased the desire of people to obtain information on their own at the expense of face-to-face professional consultations.8 YouTube is an extremely popular website, which can be easily accessed and on which thousands of new videos are uploaded each day, and millions of videos are watched each day (10,11). As one of the most popular and dynamic video platforms by far, YouTube offers everybody the freedom to publish videos. It currently contains millions of different videos from music videos to video blogs and from original videos to educational videos. Videos can be uploaded to YouTube directly by individuals. The site presents users with great freedom in terms of uploading videos, commenting, and sharing (12). However, YouTube was established for entertainment and social purposes, not for patient and student education, and there is still no effective control mechanism for health education (13). YouTube videos do not undergo peer evaluation and therefore, Internet users searching YouTube for health information can encounter incorrect and potentially misleading content. Many studies have evaluated YouTube content from various medical and dentistry perspectives and there has been reported to be significant heterogeneity in the quality of the information provided (14-21). Although there are studies in the literature that have evaluated the quality of some health practices presented on YouTube, to the best of our knowledge there has been no

previous study that has evaluated the quality of videos related to GTR on YouTube. Therefore, the aim of this study was to evaluate the quality, reliability and usability in student education of videos on YouTube about 'Guided Tissue Regeneration'. Our null hypothesis was that the characteristics of the uploader have no effect on the quality of the information in the video content.

MATERIALS AND METHODS

This was a cross-sectional study analyzing the educational content of videos on the YouTube platform. As no human or animal subjects were used, Ethics Committee approval was not required. No patient information was used in the study, so there was no requirement for patient informed consent.

Sample size calculation

The sample size was calculated using G*Power 3.1.9.4 analysis program (Heinrich-Heine-Universität Düsseldorf, Germany). With an alpha type 1 error of 0.05, a study power of 95%, and an effect size of 0.50, the minimum required sample size was calculated to be 45. In our study, a total of 131 videos were included following the screening of 500 videos.

Study design

On 22 July 2024, a search was made of YouTube using the English language search term, Guided Tissue Regeneration. To collect accurate data, a new YouTube user account was set up without any search history or saved videos. Using the default settings on YouTube and no filter (the only default setting filter was for relevance), the first 500 videos were screened, and the relevant videos were saved to the playlist.

The study exclusion criteria were defined as videos with no sound and/or subtitles, videos shorter than 1 minute in length, those that were not in English, that were not relevant to the subject and/or that explained a different procedure, repeated videos, and those which were advertisements and/or introductory for the video uploader for the purpose of likes. After the examination of these videos accessible to everyone, 369 videos were excluded in accordance with the study exclusion criteria. The remaining 131 videos were included in the study, were re-evaluated when necessary, and recorded on a document (Supplement 1). The flowchart of the search strategy is shown in Figure 1.

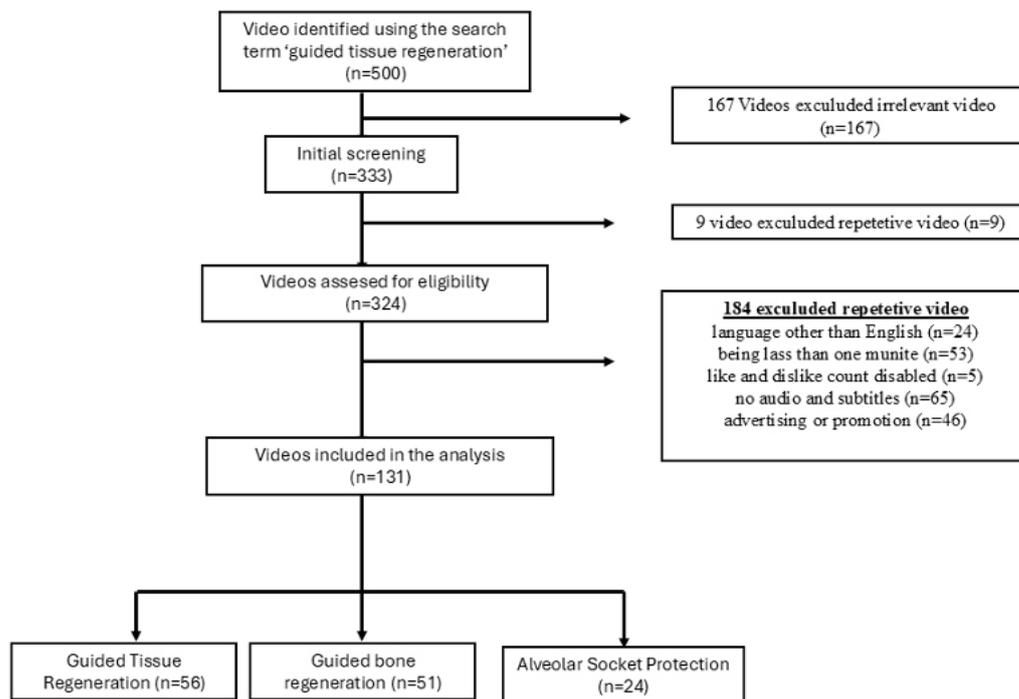


Fig. 1. Flowchart of the search strategy

A record was made for each video of the duration (minutes), total number of views, number of likes and dislikes, the time since upload, source of upload, and the video subject. The source of the video upload was separated as physicians and non-physicians. The subjects of the videos were recorded as guided tissue regeneration, guided bone regeneration, and socket protection. The viewer interaction index (22), video power index (23), and view rates (22) were calculated using the formulas below.

- Interaction Index = $\frac{\text{likes-dislikes}}{\text{views}} \times 100\%$
 - Video Power Index = $\frac{\text{likes rate} \times \text{views rate}}{100}$
 - View rate = $\frac{\text{views}}{\text{number of days since upload}} \times 100\%$
- To evaluate the reliability of the videos, the modified version of the DISCERN tool, developed by Charnock et al., was used. (24) The modified DISCERN reliability tool consists of 5 items with a Yes or No response. Each Yes is scored as 1 point and each No as 0 points, to give a total score in the range of 0-5 points. Higher points indicate higher reliability.

GQS was used to evaluate the quality of information provided, the quality of the video, accessibility of the information, and the benefit to patients (25). The content quality is scored from 1-5, with a score of 5 points indicating the highest quality. More information about the GQS system is shown in Figure 2.

Score	Definition
1	Poor quality, poor flow of the video, most information missing, not at all useful for patients
2	Generally poor quality and flow, some information listed but many important topics missing, of very limited use to patients
3	Moderate quality, suboptimal flow, some important information 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 are not listed. useful for patients
5	Excellent quality and flow, very useful for patients

Fig 2. Global Quality Scale (GQS)

The Usefulness for Students Score (26) of YouTube videos was evaluated under 8 headings of Definition, Indications, Contra-indications, Advantages, Procedure Applied, Complications, Postoperative, Prognosis and Survival, with content for each scored as 1 point to give a total score in the range of 0-8 points. A score of 0-2 points is interpreted as misleading and weak video content (1) not including information about the 8 areas evaluated. A score of 3-5 points is interpreted as a moderate level (2) giving a positive message about GTR but insufficient in some areas. A score of 6-8 points indicates excellent (3) video content providing students with detailed, valid, and accurate information.

The Usefulness points were determined according to the quality and flow of the content;

Weak (1): poor quality, weak flow, missing and insufficient information.

Moderate (2): moderate quality, insufficient flow, insufficient information about the content.

Excellent (3): excellent quality and flow, comprehensive and very useful information.

The accuracy of scientific information was evaluated according to the American Periodontology Academy and the European Periodontology Federation Consensus Reports and was explained with reference to the literature. The videos were evaluated by 2 periodontologists (EB, EÇÖ). Disagreements between the periodontologists in the scoring of a video were resolved by discussing with reference to literature until consensus was reached. Each author independently performed the evaluation, and their scores were subsequently analyzed for interrater reliability using Cohen's kappa statistics. The analysis revealed substantial agreement between the authors, with kappa coefficients of 0.901 for the GQS, 0.948 for the DISCERN, and 0.922 for the Usefulness scores.

Statistical analysis

Data obtained in the study were analyzed statistically using IBM SPSS vn. 25 software. Descriptive statistics were stated as mean \pm standard deviation (SD), median, minimum and maximum values for continuous variables and as number (n) and percentage (%) for categorical variables. Conformity of the data to normal distribution was assessed with the Shapiro-Wilk test. In comparisons of three or more independent groups of data not showing normal distribution, the Kruskal Wallis test was used. To determine from which group a difference originated, post-hoc corrected Bonferroni tests were applied. In the examination of relationships between continuous measurements not showing normal distribution, Spearman correlation analysis was applied. Kendal's Tau correlation analysis was used in the examinations of relationships between sequential and continuous measurements. In the evaluation of relationships between categorical variables, the Pearson Chi-square test was used when the sample size assumption was met (expected value >5). The value of $P < 0.05$ was accepted as statistically significant.

RESULTS

The data of the descriptive characteristics of the videos included in the study are shown in Table 1. The relationships between GQS, Usefulness, and DISCERN scores and the video characteristics are shown in Table 2.

A statistically significant, positive, and low-level correlation was determined between the number of views, number of likes, number of followers, video duration, viewing rate, and video power index and the GQS ($r=0.180$; $r=0.158$; $r=0.166$; $r=0.181$; $r=0.182$; $r=0.212$, respectively, $p<0.05$). The relationship between the Usefulness points and the number of followers and the video duration was determined to be statistically significant, positive, and low-level ($r=0.164$; $r=0.245$, respectively, $P < 0.05$). A statistically significant, positive, and low-level correlation was determined between the DISCERN score and the number of followers and video duration ($r=0.133$; $r=0.223$, respectively, $P < 0.05$).

The correlations between the video characteristics are shown in Table 3. A statistically significant, positive, moderate-high level relationship was determined between the number of views and the number of likes, number of dislikes, number of followers, viewing rate and video power index ($r=0.836$; $r=0.659$; $r=0.664$; $r=0.950$; $r=0.899$, respectively, $P < 0.05$). A statistically significant, positive, high-level relationship was determined between the viewing rate and the video power index ($r=0.946$, $P < 0.05$).

The video characteristics according to the video upload source are shown in Table 4. There was no statistical significance between the video characteristics according to the video upload source ($P > 0.05$). The distributions and relationships between the GQS, Usefulness, and DISCERN scores of the videos according to the upload source are shown in Table 5.

Table 1. Distribution of videos according to their descriptive features

	Min.-Max.	Mean±S.S(Median)	
Number of views	1-677000	18705.05±74134.87(1300)	
Number of likes	0-3900	129.02±436.44(13)	
Number of dislikes	0-199	4.85±19.36(0)	
Time since upload (months)	9-306	61.19±40.33(48)	
Number of followers	1-1220000	22917.22±108914.91(2720)	
Video duration (sec)	60-6329	846.16±1282.83(328)	
Interaction İndex	-14.29-18	1.7±3.21(0.95)	
Viewing Rate	0.14-74181.25	2540.67±9247.41(226.36)	
Like Ratio	0-100	87.47±30.57(100)	
Video Power İndeks	0-73388.65	2435.17±9047.2(184.44)	
		n	%
Issues	Guided Tissue Regeneration	56	42.7
	Guided Bone Regeneration	51	38.9
	Alveolar Socket Protection	24	18.3
GQS	Score 1	13	9.9
	Score 2	19	14.5
	Score 3	32	24.4
	Score 4	44	33.6
	Score 5	23	17.6
Usefulness Score	Poor	20	15.3
	Moderate	72	55.0
	Excellent	39	29.8
DISCERN	1	24	18.3
	2	51	38.9
	3	28	21.4
	4	17	13.0
	5	11	8.4
Source of video	Dentist/Periodontologist	73	55.7
	Not Dentist/ Periodontologist	58	44.3

Table 2: Relationships between GQS, Usefulness and DISCERN scores and video features

		GQS	Usefulness	DISCERN
Number of views	r	0.180	0.062	0.082
	p	0.006*	0.368	0.212
Number of likes	r	0.158	0.088	0.046
	p	0.016*	0.205	0.489
Number of dislikes	r	0.139	0.064	0.076
	p	0.061	0.419	0.313
Time since upload (months)	r	-0.007	-0.012	-0.012
	p	0.921	0.865	0.862
Number of followers	r	0.166	0.164	0.133
	p	0.011*	0.018*	0.043*
Video duration (sec)	r	0.181	0.245	0.223
	p	0.006*	<0.001*	0.001*
Interaction İndex	r	-0.014	0.040	-0.020
	p	0.832	0.563	0.757
Viewing Rate	r	0.182	0.073	0.084
	p	0.005*	0.288	0.199
Like Ratio	r	-0.014	-0.012	-0.044
	p	0.852	0.875	0.548
Video Power İndeks	r	0.212	0.103	0.089
	p	0.001*	0.135	0.173

r: Kendal's Tau coefficient, *p<0,05

Table 3. Relationships between video features

		Number of likes	Number of dislikes	Time since upload (months)	Number of followers	Video duration (sec)	Interaction Index	Viewing Rate	Like Ratio	Video Power Indeks
Number of views	r	0.836	0.659	0.319	0.664	0.159	-0.209	0.950	-0.225	0.899
	p	<0.001*	<0.001*	<0.001*	<0.001*	0.070	0.017*	<0.001*	0.010*	<0.001*
Number of likes	r		0.645	0.085	0.613	0.250	0.238	0.858	-0.057	0.918
	p		<0.001*	0.333	<0.001*	0.004*	0.006*	<0.001*	0.517	<0.001*
Number of dislikes	r			0.216	0.526	0.181	-0.147	0.625	-0.632	0.618
	p			0.013*	<0.001*	0.038*	0.094	<0.001*	<0.001*	<0.001*
Time since upload (months)	r				0.036	-0.234	-0.384	0.038	-0.123	0.031
	p				0.687	0.007*	<0.001*	0.664	0.160	0.726
Number of followers	r					0.286	-0.044	0.695	-0.249	0.634
	p					0.001*	0.616	<0.001*	0.004*	<0.001*
Video duration (sec)	r						0.189	0.233	0.013	0.276
	p						0.030*	0.007*	0.881	0.001*
Interaction Index	r							-0.088	0.536	0.030
	p							0.319	<0.001*	0.731
Viewing Rate	r								-0.189	0.946
	p								0.031*	<0.001*
Like Ratio	r									-0.042
	p									0.636

r: Spearman Correlation coefficient, *p<0,05

Table 4. Distribution and comparison of relevant features of videos according to video upload source

	Dentist/Periodontologist	Not Dentist/Periodontologist	Test Statistics	p
	Mean±S.D.(Median)	Mean±S.D.(Median)		
Number of views	22843.64±85586.61(1400)	13496.12±56854.43(1200)	-0.229	0.819
Number of likes	149.01±495.91(20)	103.84±350.16(10)	-0.988	0.323
Interaction Index	1.78±2.64(0.95)	1.61±3.83(0.96)	-0.394	0.694
Viewing Rate	2758.2±8799.97(150.44)	2266.88±9852.82(226.96)	-0.410	0.682
Like Ratio	88.56±29.34(100)	86.1±32.26(100)	-0.043	0.966
Video Power Indeks	2629.27±8520.72(150.44)	2190.87±9739.71(204.62)	-0.209	0.835

Mann Whitney U test

No statistically significant relationships were determined between the video upload source and the GQS, Usefulness, and DISCERN scores ($P > 0.05$).

The distribution of video characteristics according to GQS scores is shown in Table 6. Statistically significant differences were determined in the number of views, number of likes, number of followers, video duration, viewing rate, and video power index according to GQS scores ($P < 0.05$). The number of views and number of followers of videos with a score of 5 points were found to be significantly higher than those of videos with a score of 1 point ($p=0.005$, $p=0.023$). The viewing rate and video power

index scores were significantly higher in videos with a score of 5 than in those with a score of 1 point ($p=0.002$, $p=0.002$).

The distribution of video characteristics according to Usefulness scores is shown in Table 7. Statistically significant differences were determined in the number of followers and video duration according to the Usefulness scores ($P < 0.05$). The number of followers of videos with an excellent Usefulness score was found to be statistically significantly higher than that of videos with a moderate Usefulness score ($p=0.012$), and of videos with a poor and moderate Usefulness score ($p=0.005$, $p=0.008$).

Table 5. Distributions of relevant features of videos and their relationships according to video upload source

		Dentist/Periodontologist			Not Dentist/Periodontologist			Test Statistics	p
		n	%	%K.	n	%	%K.		
GQS	Scor 1	5	38.5	6.8	8	61.5	13.8	7.094	0.131
	Scor 2	7	36.8	9.6	12	63.2	20.7		
	Scor 3	17	53.1	23.3	15	46.9	25.9		
	Scor 4	29	65.9	39.7	15	34.1	25.9		
	Scor 5	15	65.2	20.5	8	34.8	13.8		
Usefulness Score	Poor	11	55.0	15.1	9	45.0	15.5	4.364	0.113
	Moderate	35	48.6	47.9	37	51.4	63.8		
	Excellent	27	69.2	37.0	12	30.8	20.7		
DISCERN	1	10	41.7	13.7	14	58.3	24.1	5.467	0.243
	2	27	52.9	37.0	24	47.1	41.4		
	3	17	60.7	23.3	11	39.3	19.0		
	4	10	58.8	13.7	7	41.2	12.1		
	5	9	81.8	12.3	2	18.2	3.4		

Pearson Chi Square tests, %: Line percentage, %K.: Column percentage for source

Table 6. Distributions and comparison of video features according to GQS scores

	GQS	.Mean±S.S.(Median)	Test Statistics	p
Number of views	Scor 1	1597.46±3057.57(115)	12.405	0.0151*
	Scor 2	10187.32±19650.99(1900)		
	Scor 3	10513.47±27550.61(1500)		
	Scor 4	22714.77±102824.95(1100)		
	Scor 5	39137.13±98073.85(3900)		
Number of likes	Scor 1	12.15±17.85(5)	9.688	0.046*
	Scor 2	80.21±121.61(19)		
	Scor 3	87.69±229.48(12.5)		
	Scor 4	165.14±608.14(10.5)		
	Scor 5	223.78±540.01(33)		
Number of followers	Scor 1	1672.46±2001.13(527)	12.195	0.016*
	Scor 2	93016.95±278378.84(3048)		
	Scor 3	11813.56±27917.76(1055)		
	Scor 4	9364.32±11518.28(4397.5)		
	Scor 5	18392.52±15909.14(26000)		
Video duration (sec)	Scor 1	204.77±185.26(120)	13.922	0.008*
	Scor 2	645.47±1138.51(314)		
	Scor 3	575.84±960.13(278.5)		
	Scor 4	1312.5±1690.46(452)		
	Scor 5	858.43±970.29(411)		
Interaction İndex	Scor 1	2.51±7.68(0.87)	0.284	0.991
	Scor 2	2.07±3.21(1.19)		
	Scor 3	2.07±3.2(0.9)		
	Scor 4	1.25±1.26(0.93)		
	Scor 5	1.31±1.21(1.11)		
Viewing Rate	Scor 1	247.88±551.46(24.21)	14.428	0.006*
	Scor 2	1116.5±2052.45(328.54)		
	Scor 3	1427.15±3420.93(196.93)		
	Scor 4	2527.25±10205.9(141.28)		
	Scor 5	6587.99±16057.3(668.84)		
Like Ratio	Scor 1	77.69±42.46(100)	1.166	0.884
	Scor 2	81.64±37.04(100)		
	Scor 3	86.55±33.31(100)		
	Scor 4	88.55±28.92(100)		
	Scor 5	97.06±5.68(100)		
Video Power İndeks	Scor 1	242.22±554.01(23.52)	14.948	0.005*
	Scor 2	1003.48±1978.05(150.44)		
	Scor 3	1359.95±3266.94(162.12)		
	Scor 4	2470.94±10045.9(136.18)		
	Scor 5	6284.9±15691.36(603.93)		

Kruskal Wallis test. Bonferroni test, * $p < 0,05$

The distribution of video characteristics according to DISCERN scores is shown in Table 8. Statistically significant differences were determined in video duration according to the DISCERN scores ($P < 0.05$). The video duration

was determined to be significantly longer in videos with a DISCERN score of 5 points compared to those with scores of 1, 2, and 3 points ($p=0.001$, $p=0.001$, $p=0.0022$, respectively).

Table 7. Distribution and comparison of video features according to usefulness scores

	Usefulness Scores	Mean±S.S.(Median)	Test Statistics	p
Number of views	Poor	13642.5±33887.15(911.5)	0.821	0.663
	Moderate	23790.69±94321.81(1650)		
	Excellent	11912.33±38670.55(1300)		
Number of likes	Poor	101.8±285.74(9)	1.758	0.415
	Moderate	159.81±552.29(12.5)		
	Excellent	86.13±191.86(19)		
Number of followers	Poor	21862.55±40072.11(2815)	10.062	0.007*
	Moderate	27429.67±145392.15(974.5)		
	Excellent	15127.41±13469.93(10600)		
Video duration (sec)	Poor	334.15±321.17(261)	12.905	0.002*
	Moderate	570.22±880.34(296.5)		
	Excellent	1618.15±1799(765)		
Interaction Index	Poor	2.09±3.98(0.86)	0.321	0.852
	Moderate	1.88±3.75(0.87)		
	Excellent	1.19±0.75(1.11)		
Viewing Rate	Poor	1894.31±4287.82(240.01)	1.184	0.553
	Moderate	3093.74±11763.26(176.76)		
	Excellent	1851.08±4850.6(259.38)		
Like Ratio	Poor	81.92±36.11(100)	1.105	0.576
	Moderate	86.87±32.71(100)		
	Excellent	91.43±22.65(100)		
Video Power İndeks	Poor	1770.41±4105.45(98.28)	2.257	0.323
	Moderate	3027.1±11615.96(162.12)		
	Excellent	1683.28±4243.61(259.38)		

Kruskal Wallis test. Bonferroni test. *p<0,05

Table 8. Distributions and comparison of video features according to DISCERN scores

	DISCERN	Mean.±S.S.(Median)	Test Statistics	p
Number of views	Scor 1	14773.92±31987.03(745)	2.709	0.608
	Scor 2	25540.18±110801.22(1500)		
	Scor 3	9115.71±18285.31(1850)		
	Scor 4	26000.24±58932.84(2200)		
	Scor 5	8726.73±22745.91(1000)		
Number of likes	Scor 1	109.25±261.37(12.5)	2.053	0.726
	Scor 2	155.71±639.06(13)		
	Scor 3	98.93±205.97(11)		
	Scor 4	144.35±245.63(19)		
	Scor 5	101.27±240.16(17)		
Number of followers	Scor 1	24251.04±55921.56(3528)	6.250	0.181
	Scor 2	8975.35±14639.01(1008)		
	Scor 3	57069.54±228484.93(4980)		
	Scor 4	12087.88±13638.11(4700)		
	Scor 5	14449.73±12493.47(7970)		
Video duration (sec)	Scor 1	526.5±836.91(253)	22.728	<0.001*
	Scor 2	554.29±886.35(306)		
	Scor 3	599.46±1146.63(231)		
	Scor 4	1655.41±1981.09(624)		
	Scor 5	2274.09±1348.68(2662)		
Interaction Index	Scor 1	3.24±4.99(0.96)	1.556	0.817
	Scor 2	1.47±3.53(0.83)		
	Scor 3	1.31±1.43(1.1)		
	Scor 4	1.14±0.74(0.97)		
	Scor 5	1.3±0.93(1)		
Viewing Rate	Scor 1	1776.03±3905.69(88.07)	2.511	0.643
	Scor 2	3386.02±13837.53(224.79)		
	Scor 3	1909.5±4079.82(340.15)		
	Scor 4	2849.79±5960.01(299.72)		
	Scor 5	1418.48±3119.45(242.08)		
Like Ratio	Scor 1	93.32±20.98(100)	0.816	0.936
	Scor 2	81.53±37.73(100)		
	Scor 3	86.69±31.35(100)		
	Scor 4	96.95±5.76(100)		
	Scor 5	89.63±29.83(100)		
Video Power İndeks	Scor 1	1684.62±3725.78(88.07)	3.332	0.504
	Scor 2	3325.78±13669.78(184.44)		
	Scor 3	1838.32±3996.1(174.3)		
	Scor 4	2496.48±4886.52(272.47)		
	Scor 5	1368.02±2976.21(242.08)		

Kruskal Wallis test, Bonferroni test, *p<0,05

DISCUSSION

The aim of this study was to evaluate the utility of YouTube videos in the field of periodontology. Quality points were used to measure the utility of content related to guided tissue regeneration (GTR) operations in both student education and patient information. To the best of our knowledge, this is the first study to have evaluated the content of YouTube videos related to GTR. A total of 131 videos were analyzed in the study, and the results demonstrated that the YouTube videos contained useful information related to GTR, but it was not determined to be sufficient for use in either student education or patient information. Additionally, the null hypothesis that uploaders of GTR-related videos on YouTube do not affect the content quality of the videos was accepted.

The Internet is an easily accessible and comprehensive information source. YouTube is different from other social media platforms as it contains more attractive visual content. In this respect, YouTube is the Internet site most preferred by students and patients for the acquisition of information on a subject (10,13,27). During the education process, dentistry faculty students can benefit from YouTube videos with visual content in the acquisition of information about surgical methods to be applied to patients. Some researchers, especially in studies of medical students, have encouraged the use of YouTube videos (27). YouTube videos have been shown to contribute to education on subjects such as anatomy, diagnosis and treatment of diseases, surgical methods, basic life-saving methods, and protection against infectious diseases (10,13,27). In recent years, YouTube has often been used to acquire knowledge on health-related subjects, as it can be accessed easily by patients, is easy to use, and there are no costs (13). Therefore, patients and students often research subjects on YouTube (27). In a study in the literature that researched the effects of YouTube videos on the preferences and perceptions of students, it was concluded that the use of YouTube had a positive effect on the education and learning process (27). In another study by Azer *et al.* (28) information about cardiovascular mechanisms was compared in textbooks and YouTube videos, and it was shown that the use of YouTube could be an ideal resource.

Wu *et al.* (29) evaluated the quality of videos about gingival bleeding and reported that 14.02% of the videos had excellent quality points, 55.4% had moderate points, and 30.84% had poor points. In many other studies, the quality of YouTube videos has been similarly evaluated, and the information content has been shown to be weak (12,30,31). In the current study, the quality of the videos related to GTR was determined to be excellent at 29.8%, moderate in 55% and poor in 15.3%. Although the rate of videos evaluated as excellent in this study was higher than that of other studies, there must be an increase in awareness that all the information obtained by students from online video sources is not completely accurate. Of the videos examined in this study, 73 (55.7%) were uploaded

by a dentist/periodontologist and 58 (44.3%) were from a source not in dentistry/periodontology. In the study by Wu *et al.*, most videos ($n=69$, 64.48%) were seen to have been uploaded by dental practitioners/specialists, and the Usefulness points of the videos were evaluated as excellent in 14.02%, moderate in 55.4%, and poor in 30.84%. In the current study, the Usefulness points of the videos related to GTR were evaluated as excellent in 29.8%, moderate in 55%, and poor in 15.3%. The current study findings were like those of Wu *et al.*, in that many video uploaders were doctors and most of the Usefulness scores were evaluated as moderate.

Like the current study, Yavuz *et al.* (32) and Kurian *et al.* (33) also evaluated video quality and reported that the videos were uploaded at a high rate by dentists/specialists. As a result of the study by Yavuz *et al.* evaluating the quality of videos related to accelerated orthodontic treatment, the Usefulness score of the videos examined was reported to be excellent at a high rate (32). The high quality of the evaluated videos was attributed to them having been uploaded by specialists, and thus Yavuz *et al.* stated that the uploading of videos by specialists increased the quality of videos and was therefore beneficial for patient education. In contrast, in the study by Kurian *et al.*, the quality of videos related to fixed implant-supported prostheses was shown to be low (33). The reason for this was said to be that these videos had been uploaded by dentists not only for patient information, but to introduce a product and for advertising purposes. The low quality of videos uploaded by companies is due to the aims generally being for product launch, advertising or marketing, and there is insufficient medical information. Although there was no significant difference in the quality and Usefulness scores according to the source of upload of the YouTube videos related to GTR in the current study, the Usefulness scores of the videos uploaded by doctors were found to be higher. In a study by Menziletoğlu *et al.* (26) evaluating the quality of YouTube videos about dental implants, there was similarly reported to be no significant difference between the Usefulness points and the upload source and interaction index. Gas *et al.* (34), evaluated 97 videos related to Botox and reported that video quality was not affected by the video upload source, like the current study. It will be beneficial for dentists to make greater efforts to provide more comprehensive information about GTR on YouTube. If the quality of the videos and content of the videos uploaded on YouTube is increased, it will be able to become a more useful platform for both patients and students.

The content of the videos related to GTR on YouTube in this study was determined to usually be “indications” and “procedures applied”. There was determined to be very little content about potential complications, contra-indications, prognosis and survival rates in the videos evaluated. Essentially the content of the YouTube videos had been prepared in a way that would positively affect treatment, and the subjects of potential complications, contra-indi-

cations, prognosis and survival rates were seen to be not much mentioned in the videos. This demonstrates that the video content has been designed to persuade the general population to have treatment. Incorrect and insufficient related to GTR in YouTube videos can affect the attitudes and decisions of patients towards treatment. Therefore, it is important that the quality of YouTube videos containing health-related information is controlled. It has been recommended that social networks are monitored or the information in video content is controlled by healthcare specialists and public institutions to be able to prevent the sharing of incorrect health-related content on social media platforms (29). However, no such practice has been developed to date (29,35). Nevertheless, YouTube could offer the feature of a certificate evaluating the quality of videos uploaded by dentists and professional associations. Videos meeting the certification standards could be given an official grade and users could be informed that the information related to dental procedures in these videos is from a reliable source (29). When users are then searching for answers to questions related to GTR, the officially certified videos could be presented first. For dentists to be able to recommend high quality, reliable videos on YouTube to patients, YouTube must provide a service as a reliable source of dental information. On this basis, healthcare professionals must be aware of the information on the Internet, should check the reliability of YouTube videos and recommend correct sources to patients. If health-related videos were evaluated for quality and content before being uploaded to the Internet, this problem could be eliminated, and patients would be able to obtain correct information on the subjects for which they are looking.

For the training or further self-development of dentists and doctors, YouTube videos are a source with the advantages of being cost-free and easily accessible from mobile devices or desktop computers (36). It has also been said that YouTube videos could be useful for ongoing professional training in addition to the patient information education method (37). For ongoing professional education videos to be useful, the content must be based on scientific results and the images must present scientific facts (37). According to the DISCERN criteria, 38.9% of the videos related to GTR on YouTube in this study used reliable information sources and 21.4% were seen to present balanced and unbiased information. However, information presented on social media sites is generally incomplete and without references (38). Therefore, users must confirm the reliability and quality of the information. In addition, the information presented to members of the profession should be different from that explained to patients as the public.

The duration of videos graded as excellent in this study according to the Usefulness points was seen to be significantly longer. There was determined to be a statistically significant positive correlation between video duration and the GQS, Usefulness points, and DISCERN score. This result was thought to be, since the content could be

explained more as the length of the video increased. Similar results were reported by Wu et al. as longer videos were seen to have higher mean DISCERN, Usefulness and GQS points, and longer videos were better quality and more reliable (29). However, in another study by Ajumobi et al., it was shown that videos shorter than 4 minutes were more specific and attracted a broader mass (17). Delli *et al.* (39) reported the video duration found to be useful for viewers was approximately 7 minutes. In another previous study, video length was determined to influence the decision to watch or not watch the video (40). Therefore, when producing videos, attention must be paid to both the video content and video duration to be able to attract the attention of users and to be more educational.

In this study, a statistically significant, positive correlation was determined between the GQS and the number of views, number of likes, number of followers, video duration, viewing rate, and video power index. From these findings it can be said that high-quality videos on YouTube were viewed more and had more likes. However, no significant relationship was determined between the Usefulness points and the total views, which could show that a low number of students viewed videos with high information content. This result could have been affected by factors such as advertising and the number of followers. As a result of the analyses in this study, there were found to be statistically significant positive, moderate-high level correlations between the number of views and the number of likes, viewing rate and video power index. This was attributed to the formulas used to calculate the viewing rate and video power index.

There were some limitations to this study, primarily that results could vary depending on the key words used in the search. In addition, as YouTube is a dynamic platform, the search results could change according to the date and time, as many videos are added and removed every day. A third limitation was that YouTube videos are selected according to the memory of cookies in a previous search and/or the results of previous searches on that computer. This results in different video lists presented to each person searching for YouTube videos. Finally, the search was only made of English language videos, and searches made in other languages will result in different video lists.

CONCLUSION

The results of this study demonstrated that of the videos related to GTR on YouTube, there were observed to be videos of insufficient quality and reliability for patient information or for the education of dentistry students. As the Usefulness points of the videos did not change according to the uploading source, it would be of great benefit for dentists to make more effort to provide more comprehensive information about GTR on YouTube. Students should have greater awareness of which sources should be searched for and that all the information obtained from online video sources is not completely correct. If videos uploaded onto YouTube were to be controlled in respect of content and quality, it could become a more useful platform for both patients and students.

Ethics Committee Approval

As no human or animal subjects were used, Ethics Committee approval was not required. No patient information was used in the study, so there was no requirement for patient informed consent.

Author contribution statement

Conceptualization and design: E.B.; Acquisition of data: E.Ç.Ö., E.B.; Analysis data: E.Ç.Ö., E.B.; Writing: E.B.; Critical revision: E.Ç.Ö., E.B.; All authors read and approved of the final manuscript.

Conflict of Interest

The authors have no relevant financial or non-financial interests to disclose.

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