

## Live-Video Versus Video Demonstration Methods: Dental Students' Preferences During the COVID-19 Pandemic

Halenur BİLİR <sup>1</sup>, Ceren AYGÜZEN <sup>2</sup>

### ABSTRACT

**Aim:** Due to the COVID-19 pandemic, the method of education has changed in dental education as in all other schools. The purpose of this study is to evaluate live-video demonstrations and video demonstrations in the dental anatomy and morphology course in terms of students' learning preferences during the COVID-19 pandemic process.

**Material and Methods:** The upper right canine tooth was carved from soap with a live-video demonstration in the preclinical laboratory the week before distance education started. After the distance education started, a video demonstration was prepared for the carving of the lower canine tooth from soap and sent to students via e-mail. The students who watched both demonstrations were asked to carve these teeth from soap. A survey was conducted via Google Forms to get students' opinions about the demonstration types and distance education by asking 11 Likert-type questions. The level of significance for statistical analysis was set at  $p<0.05$ .

**Results:** 51 first year preclinical students (31 female, 20 male) participated to this study. The mean age of students was  $19.43 \pm 1.01$  years old. There was no statistically significant difference between the demonstration types in terms of students' learning preferences, the type of device used by students for distance learning and the selection of the demonstration type.

**Conclusion:** Although there was no difference between the types of demonstration in terms of students' learning preferences during the COVID-19 pandemic, students mostly preferred the video demonstrations if they are in the same environment with the instructor periodically.

**Keywords:** Dental education; distance education; pandemic.

### Canlı-Video Demonstrasyonlarına Karşı Video Demonstrasyonları: COVID-19 Pandemi Sürecinde Diş Hekimliği Öğrencilerinin Öğrenme Tercihleri

#### ÖZ

**Amaç:** COVID-19 salgını nedeniyle diğer tüm fakültelerde olduğu gibi diş hekimliği eğitiminde de eğitim metodları değişmiştir. Bu çalışmanın amacı, COVID-19 salgını sürecinde dental anatomi dersinde öğrencilerin öğrenme tercihleri açısından canlı-video demonstrasyonları ve video demonstrasyonlarını değerlendirmektir.

**Gereç ve Yöntemler:** Üst sağ kanin dişi uzaktan eğitim süreci başlamadan bir hafta önce prelinik laboratuvarında canlı-video demonstrasyonu ile sabundan kazıma yöntemiyle elde edilmiştir. Uzaktan eğitim başladıktan sonra alt sağ köpek dişi için sabundan kazıma yöntemiyle elde edilmesi için video gösterimi hazırlanarak öğrencilere e-posta yoluyla gönderildi. Her iki demonstrasyonu da izleyen öğrencilerden bu dişleri sabundan kazıma yöntemiyle elde etmeleri istendi. Google Formlar aracılığıyla, öğrencilerin demonstrasyon türleri ve uzaktan eğitim hakkında fikirlerini almak için 11 adet Likert tipi soru sorarak bir anket yapılmıştır. İstatistiksel analiz için anlamlılık seviyesi  $p<0.05$  olarak belirlendi.

**Bulgular:** Bu çalışmaya 51 tane (31 kız, 20 erkek) 1. sınıf diş hekimliği öğrencisi katıldı. Öğrencilerin yaş ortalaması  $19,43 \pm 1,01$ 'dir. Öğrencilerin öğrenme tercihleri açısından demonstrasyon türleri arasında, öğrencilerin uzaktan eğitim için kullandıkları cihaz tipinin demonstrasyon türü seçimi açısından istatistiksel olarak anlamlı bir farkı yoktur.

**Sonuç:** COVID-19 salgını sırasında öğrencilerin öğrenme tercihleri açısından demonstrasyon türleri arasında bir fark

1 İstanbul Medeniyet University, Faculty of Dentistry, Department of Prosthodontics, İstanbul, Turkey

2 İstanbul Medipol University, School of Dentistry, Department of Prosthodontics, İstanbul, Turkey

olmamasına rağmen, öğrenciler en çok eğitmenle belirli aralıklarla bir araya geldikleri video demonstrasyonu yöntemini tercih etmişlerdir.

**Anahtar Kelimeler:** Uzaktan öğrenim; diş hekimliği eğitimi, pandemi.

## INTRODUCTION

Dental anatomy and morphology course introduces the anatomical and morphological characteristics of dentition to students. This course combines theoretical knowledge and psychomotor skill development. It aims to reflect the dental anatomy knowledge of students to practice and to increase their manual and finger dexterity with carving practices. The most preferred technique for teaching tooth structure at the preclinical part of this course is soap or wax carving (1-3).

A traditional method for teaching carving consists of a live or live-video demonstration of a tooth form from soap. The instructor explains the anatomical features and carves tooth from soap with special instruments. In this process, students observe the instructor in the preclinical laboratory. After the demonstration, students start to carve the soap and the instructor checks the tooth that students have carved from soap (2,4).

The changes in technology have influenced students' access to information. Their learning requirements are provided by the internet enabled devices at any time. Mobile technology that accelerates and facilitates access to information offers advantages over traditional education methods because it provides information at different parts of a student's education (5,6). The learning environments supported by smart phones, tablets, laptops and desktop computers allow to develop technological innovations in education (7). Current students are generally aware of effective learning methods for themselves and adapt to innovation easily. They expect to reach useful information within efficient time in a comfortable learning environment (8). The environments and social conditions for learning have a direct impact on students' motivation which is required for learning.

The digital learning opportunities have improved with the rapid development of technology. It has required the incorporation of the traditional teaching model with technological learning tools in higher education (7,9). In dental education, the video demonstration method also has been used as an alternative teaching tool to live or live-video demonstration (10,11). The video demonstration method provides visual and audio expression and also gives the possibility to review the action multiple times (11). Nevertheless, this method cannot enable the instructor - student interaction which is available in live demonstrations.

Although classical dental education system consists of face to face instructor - student relationships and live demonstrations in the preclinical laboratory predominantly (4), technology had to be used more in education with the necessity of increasing social distance due to COVID-19 (12). The aim of this study is to compare dental students' preferences between live-video demonstrations and video demonstrations in soap carving for the dental anatomy and morphology course and to

examine the effect of the type of device they use on these preferences in the COVID-19 pandemic period.

## MATERIAL AND METHODS

This study was approved by the Ethics Committee of Istanbul Medipol University with the reference number 10840098-604.01.01-E.14694. 51 first year preclinical students participated in this study. Students were informed about the details of the study before the study started. Informed consent forms were signed for those who volunteered to participate in this study. Inclusion criteria of the study were: being first-year dental students, taking dental anatomy and morphology courses and being volunteers to participate in the study. The exclusion criterion of the study was: being under the age of 18.

In the week before distance education started, the maxillary canine lecture was given and then the practical session was carried out with a live-video demonstration of the instructor while students were watching it from their monitor in the preclinical laboratory. The instructor detailed the anatomical features of the maxillary canine and showed the tooth carving technique from soap with carving instruments. The template of the tooth on the checkered paper was used to determine the outline of the tooth (13). First, the template was put on the soap for mesial, distal, labial and palatal sides of the tooth and then the outline of the tooth was drawn according to this template. The location of the cusp tips and root were marked. According to these reference lines and points on the soap, the instructor sculpted the tooth structure while explaining each step. After the demonstration, the template of the tooth on the checkered paper was distributed to students. They were asked to carve maxillary central canine from soap. Students were allowed to ask questions and present their work during the session to the instructor. They also used the 3D dental anatomy application from their phones to help visualize the shape of the tooth.

The courses in the 2020 Spring term have been completed with distance learning. Theoretical lectures were delivered with the application called "Zoom" synchronously, while practical lectures were delivered with recordings of video demonstration asynchronously. After the mandibular canine lecture was given with distance learning, students received a video demonstration prerecorded by the same instructor via e-mail. Students were told to watch the demonstration from any internet enabled electronic device they had. The video demonstration was recorded using the same video camera as in the live-video demonstration projected to students' monitors. Students were able to watch the instructor's hands performing with the same point of view as the live-video demonstration. Instructional content of the video was held the same way as the live-video demonstration. They were asked to carve mandibular canine from soap. Students were suggested to watch the video as many times as they needed, but they weren't allowed to ask questions during sessions. They used the template of the tooth on the checkered paper and the 3D dental anatomy application as well.

The preference of these two demonstration methods by students was measured through survey conducted on

Google Forms. The survey was sent to students via email. The questionnaire was prepared by the same instructor who conducted the course protocol and was assessed by another faculty member experienced in this field. The first section of questionnaire contains the demographic data of participants (gender, age), their usage habits of electronic devices and the internet. The second section consist of five Likert-type questions about preferences and opinions for live-video and video demonstration methods, and the third section consist of six Likert-type questions about distance learning with a scale (1=strongly disagree, 2=disagree, 3=uncertain, 4=agree, 5=strongly agree).

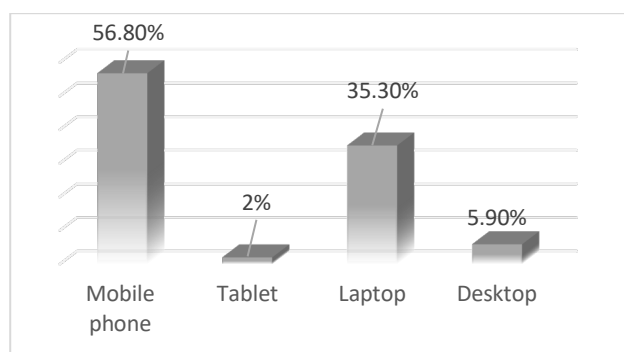
### Statistical analysis

The data were analyzed with IBM SPSS, Version 23. The suitability to normal distribution of the data was analyzed using the Shapiro-Wilk test. Mann-Whitney U test was used to compare quantitative data that were not normally distributed. In addition, independent two samples t-test was used. One-way ANOVA test was used to compare normally distributed data of three and more groups. Analysis results were presented as mean  $\pm$  standard deviation and median (minimum- maximum) for quantitative data and as frequency (percentage) for categorical data. The significance level was taken as  $p < 0.05$ .

## RESULTS

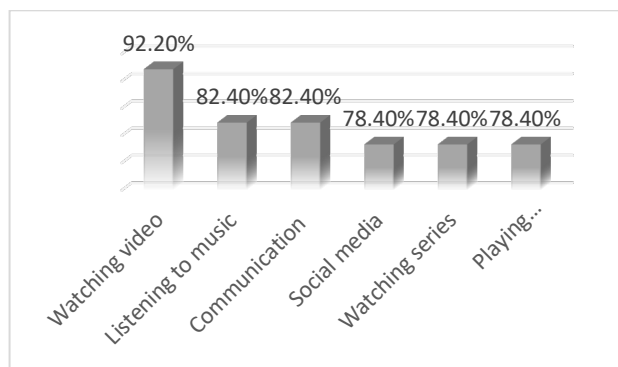
51 first year preclinical students participated in this study. 60.8% (n=31) of the participants were female and 39.2% (n=20) of the participants were male. The mean age of students was  $19.43 \pm 1.01$  years old. The internet usage time for females was  $4.66 \pm 2.42$  hours and for males it was  $4.19 \pm 2.30$  hours. There was no statistically significant difference between genders in terms of the duration of using the internet ( $p=0.627$ ).

56.8% (n=29) of the students used mobile phones and 2% (n=1) of students used tablets for watching the video demonstration. 35.3% (n=18) of students used laptops and 5.9% (n=3) of students used desktops for watching the video demonstration. 58.8% (n=30) of students preferred application-based devices. However, 41.2% (n=21) of the students preferred computer-based devices. Figure 1 shows the distribution of the devices used for watching the video demonstration in distance learning.



**Figure 1.** Distribution of the devices used for watching the video demonstration in distance learning (application-based devices: 58.8%, computer-based devices: 41.2%)

The students also used their devices for distance education in different activities. 92.2% (n=47) of the students used the devices for watching videos, 82.4% (n=42) of the students used the devices for listening to music and communication, 78.4% (n=40) of the students used the devices for social media and watching series, 62.7% (n=32) of the students used the devices for playing computer games and 31.4% (n=16) of the students used the devices for listening to podcasts. Figure 2 shows the usage areas of devices used for video demonstration in distance learning.



**Figure 2.** The usage areas of devices used for distance learning (%)

The comparison of students' preferences for demonstration types is given in the Table 1. There was no statistically significant difference between the live-video demonstration option and the video demonstration option ( $p=0.666$ ), the live-video demonstration option and the video demonstration with the instructor at regular intervals option ( $p=0.453$ ) and the video demonstration option and the video demonstration with the instructor at regular intervals option ( $P=0.788$ ).

Students' views on gaining experiences with the live-video demonstration and the video demonstration are given in Table 2. Even though the students thought that the experience they gained during the live-video demonstration ( $3.780 \pm 0.901$ ) was more than during the video demonstration ( $2.860 \pm 0.917$ ), there was no statistically significant difference between the two demonstration methods ( $p=0.280$ ). 72.6% (n=37) of the students agreed or strongly agreed that they preferred the live-video demonstration because they had the opportunity to ask questions to the instructor. 82.3% (n=42) of the students agreed or strongly agreed that they preferred the video demonstration because it was possible to pause and watch the video again.

The comparison of students' preferences on the demonstration methods (live-video demonstration, video demonstration or video demonstration with the instructor at regular intervals) depending on the use of computer-based and application-based devices is given in Table 3. There was no statistically significant difference between the students' use of computer-based or application-based devices in terms of choosing the live-video demonstration ( $p=0.667$ ), the video demonstration ( $p=0.693$ ) or the video demonstration with the instructor at regular intervals ( $p=0.760$ ).

**Table 1.** Comparison of students' preferences: live-video or video demonstration

	Mean±SD	Median (Min-Max)	Strongly disagree	Disagree	Uncertain	Agree	Strongly agree	P-value
1- I prefer only the live-video demonstration.	3.16±0.880	3 (1-5)	2 (3.9%)	9 (17.6%)	20 (39.2%)	19 (37.3%)	1 (2%)	0.666 (1-2) <sup>1</sup>
2- I prefer only the video demonstration.	2.55±1.05	2 (1-5)	8 (15.7%)	18 (35.3%)	16 (31.4%)	7 (13.7%)	2 (3.9%)	0.453 (1-3) <sup>2</sup>
3- I prefer the video demonstration if I am in the same environment with the instructor periodically.	3.76 ±0.97	4 (1-5)	1 (2%)	4 (7.8%)	13 (25.5%)	21 (41.2%)	12 (23.5%)	0.788 (2-3) <sup>3</sup>

Median (minimum-maximum) is for responses on the five-point scale (1=strongly disagree, 2=disagree, 3=uncertain, 4=agree, 5=strongly agree). Significant was set at  $P<0.05$  based on One-Way ANOVA test. SD: Standart deviation. <sup>1</sup>Comparison of students preferences between live-video demonstration and video demonstration (1-2), <sup>2</sup>Comparison of students preferences between live-video demonstration and video demonstration with the instructor at regular intervals (1-3), <sup>3</sup>Comparison of students preferences between video demonstration and video demonstration with the instructor at regular intervals (2-3)

**Table 2.** Comparison of students' views about their experiences from live-video or video demonstration

	Mean (±SD)	Median (Min-Max)	Strongly disagree	Disagree	Uncertain	Agree	Strongly agree	P-value
The experience which I gained during live-video demonstrations is more effective on my education.	3.780 (±0.901)	4 (2-5)	-	6 (11.8%)	9 (17.6%)	26 (51%)	0 (19.6%)	0.280
The experience which I gained during video demonstrations is more effective on my education.	2.860 (±0.917)	3 (1-5)	1 (2%)	20 (39.2%)	17 (33.3%)	11 (21.6%)	2 (3.9%)	

Median (minimum-maximum) is for responses on the five-point scale (1=strongly disagree, 2=disagree, 3=uncertain, 4=agree, 5=strongly agree). Significant was set at  $P<0.05$  based on One-Way ANOVA test. SD: Standart deviation.

**Table 3.** Comparison of the effect of computer-based or application-based devices on students' preferences

	Desktop computer and laptop (Mean±SD) (Median Min-Max)	Mobile phones and tablet (Mean±SD) (Median Min-Max)	P-value
I prefer only the live-video demonstration.	3.15 ± 0.88 3 (2 - 4)	3.25 ± 0.65 3 (2 - 4)	0.667
I prefer only the video demonstration.	2.62 ± 1.24 2 (1 - 5)	2.5 ± 0.9 2.5 (1 - 4)	0.693
I prefer the video demonstration if I am in the same environment with the instructor sometimes.	3.71 ± 0.96 4 (2 - 5)	3.8 ± 1 4 (1 - 5)	0.760

Although one third of the students (33.3%) agreed on the statement "I find distance learning positive as I don't need to carry course materials.", one third of the students (33.3%) disagreed to this opinion. Nearly one third of the students (37.3%) were uncertain about the statement "I do not find distance learning safe due to possible dangers of the internet (viruses, cyber attacks, etc.)", a quarter of the students (25.5%) agreed on this statement. Nearly half of the students agreed and strongly agreed on the statement "I do not find distance learning efficient because I cannot focus as in the preclinical laboratory."

Half of the students (agreed: 45.1%, strongly agreed: 5.9%) found the "Zoom" application sufficient for distance learning. Most of the students (agreed: 49, strongly agreed: 7.8%) believed that increasing the screen size of the device they used for distance learning (computer, tablet or mobile phone) contributed more to their learning process. One third of the students (33.3%) disagreed on the statement "My standard internet consumption exceeds with distance learning." Figure 3 shows students' opinions about distance learning.

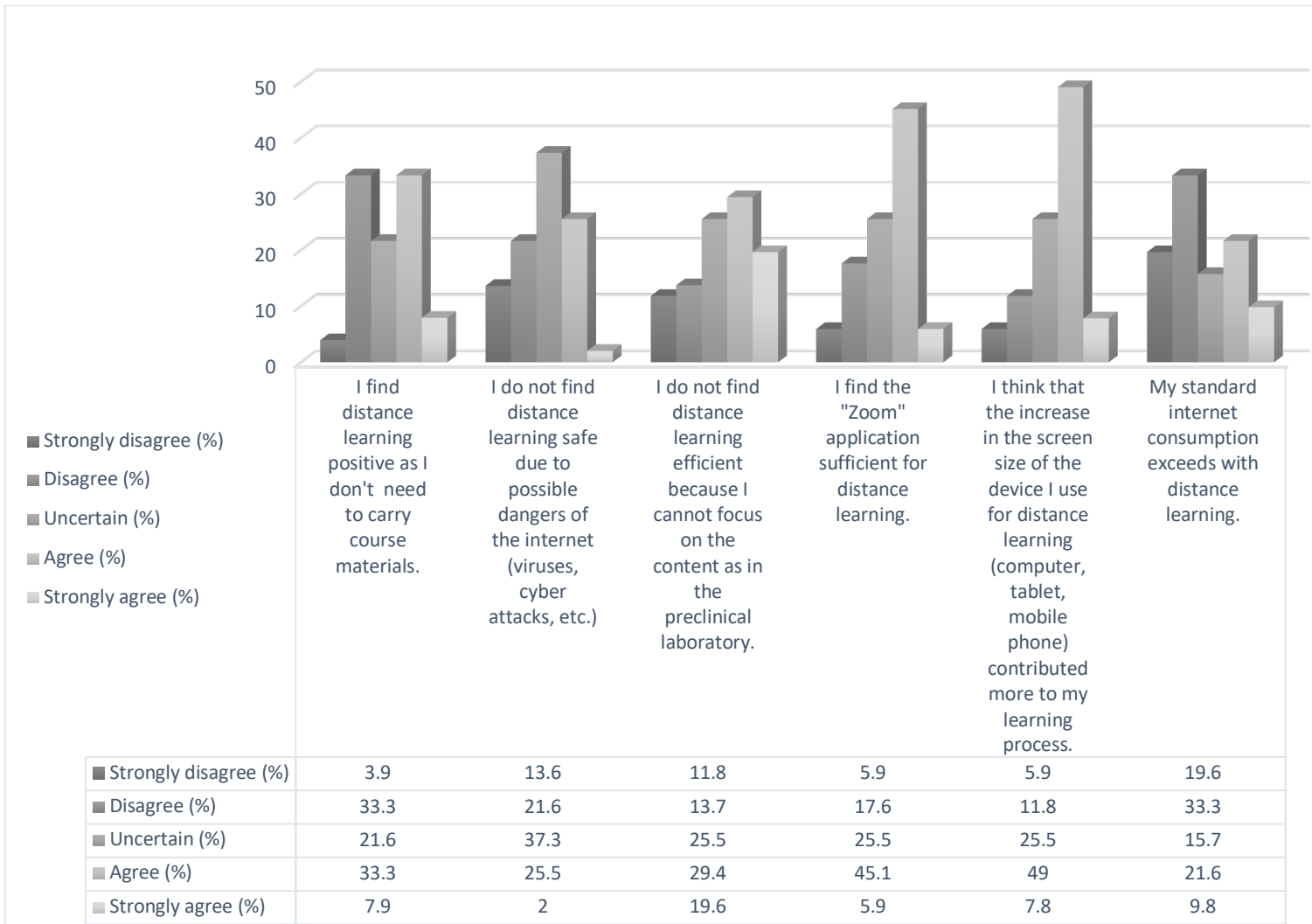


Figure 3. Students' opinions about distance learning (%)

**DISCUSSION**

The present study investigated the learning preferences of preclinical students in the dental anatomy and morphology course during the COVID-19 pandemic. The results of this study indicate that there was no difference between students' preferences of live-video demonstration or video demonstration in the dental anatomy and morphology course. Besides, the computer-based devices or application-based devices used in distance education didn't affect this result.

Before the COVID-19 pandemic, instead of dividing the students into small groups, demonstrations were recorded live with the camera while the instructor was performing the demonstration and reflected on the students' monitors synchronously at the preclinical laboratory. Although live-video demonstrations were similar to video demonstrations, students could not take them home and watch them again. As stated by Packer et al. (10) there are some disadvantages of dividing students into small groups for a live demonstration; the instructor not being able to provide the same information to all groups, the training not being standard and students not being able to follow the lecture from the same angle. If there are only

live demonstrations instead of live-video demonstrations, where each student has equal opportunity to follow the practical lessons from the same angle, supporting them with video demonstrations increases students' success, as indicated in the study of Aragon et al. (14).

In several studies (10,14-20), live demonstration and video demonstrations were compared in preclinical and clinical applications in dental education. Only one of these studies compared live-video demonstration and video demonstration in orthodontic emergency applications (18). To our knowledge, our study is the first to compare live-video demonstration and video demonstration in soap carving practice in a dental anatomy and morphology course.

In the current study, there is no statistically difference between the demonstration methods. However, the students mostly preferred the video demonstration with the instructor at regular intervals, which is similar to the hybrid education model. The video demonstration method is the least preferred by students. The students couldn't predict how the education model would continue in the possibility of the pandemic prolongation. It is thought that they made these choices because they were worried

that the training would continue only with video demonstrations and they were also worried about not being in the same environment with their instructor. In addition, the scores of the statement “The experience which I gained during live-video demonstrations is more effective on my education” were higher than the scores of the video demonstrations. According to most of the students (72.6%, n=37), the live-video demonstration provides the opportunity to ask questions to the instructor and this advantage of live-video demonstration may have caused this result.

“Zoom” application is frequently used in many education meetings and webinars during the COVID-19 pandemic. Although this application was only used in theoretical courses in our education during the pandemic process, the opinions of the students were asked about the “Zoom” application. According to our study, students found the “Zoom” application sufficient for distance learning.

Many different devices are used by students in distance education. Although computer-based devices such as laptops and desktops restrict the movement, application-based devices such as tablets and phones give freedom of movement. This study stated that students' having computer-based devices or application-based devices did not affect students' preferences on the demonstration type.

In the study of Packer et al. (10) in which the laboratory stages of removable partial dentures were evaluated, the students preferred live demonstrations which is inconsistent with our study. This difference may be due to the fact that the video quality was not as high it is today in the previous study which was conducted in the early 2000s and the generation in the early 2000s was not using video in their daily lives as much as the present generation.

Thilakumara et al. (16) instructed the 3rd year dental students to do the laboratory stages of arranging artificial teeth with a procedural video in one group and a live demonstration in the other group. In 7 out of 10 statements, students preferred the video demonstration. The students preferred the video demonstration especially when explanations were not required. This was due to the fact that the viewpoint in video demonstrations was better than live demonstrations divided into small groups. In our study, there was no problem with the viewpoint of live-video demonstration since the demonstration was recorded on video and projected on the students' screens in the preclinical laboratory. The reason why it differs from the results of our study may be due to this factor.

In another study, Alqahtani et al. (15) compared the live and procedural video demonstrations in Adam's clasp bending practice. There was no difference between the two demonstration methods in terms of preferences of students, which is consistent with our results. Students found the video demonstrations successful in terms of the ease of understanding only one question in the questionnaire. Atik et al. (17) evaluated a live-video demonstration and a live demonstration by performing vestibular arch bending. There was no difference between the two demonstrations except one question in the questionnaire applied to students. Interest in watching the video again in the live demonstration group was more than the live-video demonstration. This result was due to

the fact that the live demonstration could not be watched again. In our study, most of the students (82.3%, n=42) preferred the video demonstration because it was possible to pause and watch the video again, consistent with this study.

The study performed by Gorucu-Coskuner et al. (18) is similar to our study because they compared a live- video demonstration with a video demonstration. They compared the effectiveness of live-video and video demonstration methods in training dental students in orthodontic emergency applications. Consistent with this study, they found no significant differences between the two demonstration methods. However, students stated that using both demonstrations together would increase success. The students found that a small screen was a negative aspect of the live-video demonstration in this study. Moreover, in this study, increasing the screen size of the device they used for distance learning contributed more to their learning process.

In this study, carving of the upper canine was selected for live-video demonstration and carving of the lower canine was selected for video demonstration. The reason of why the study was not planned on the same tooth is that the previous experiences of the students on the same tooth would cause a bias.

This study has some limitations. First, the soap carvings could not be evaluated by the instructor. For this reason, it wasn't clear how accurately the students made the carvings as a result of both demonstrations. Furthermore, anterior group teeth were carved in this study. In future studies, posterior group teeth may be added as well. This study was carried out in a single institution. The scope of the study can be expanded by including more faculties in future studies.

## CONCLUSION

In the COVID-19 pandemic, there was no difference in terms of students' learning preferences between live-video demonstration and video demonstration in the dental anatomy and morphology course. However, the students preferred the video demonstration with the instructor at regular intervals. Even if the students continued their education with video demonstrations, they wanted to meet their instructor at regular intervals and wanted the instructor-student interaction. Students' use of computer-based or application-based devices had no effect on their learning preferences.

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