

A Cross-Sectional Survey of Patient and Dentist Attitudes Toward Tele-Orthodontics

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Abstract

This study aimed to evaluate the awareness, attitudes, and readiness of patients, general dentists, and orthodontists toward tele-dentistry, with a particular focus on its utility in diagnostics and emergency care. A cross-sectional survey was conducted among 400 participants, including 200 patients and 200 dental clinicians (100 general dentists, 100 orthodontists). Two validated questionnaires (23 items each) assessed awareness, preferences, and expectations regarding tele-dentistry. Sampling was random for patients attending Yeni Yüzyıl University Orthodontic Department, while clinicians were recruited from private practice settings. Descriptive statistics, chi-square tests, and Spearman correlation were performed using SPSS v25, with $p < 0.05$ considered significant. A total of 45.5% of the patients were unaware of tele-dentistry. Awareness was not associated with educational level ($p > 0.05$). General dentists reported significantly higher previous use of tele-dentistry than orthodontists ($p < 0.001$). Most patients (68.5%) believed tele-dentistry would shorten treatment duration, and 51.5% perceived financial benefits. Differences emerged between clinicians' expectations and patients' willingness to schedule remote initial diagnostic visits ($p = 0.001$). Tele-orthodontics demonstrates potential for improving access to care, particularly in emergencies and rural contexts. However, limited patient awareness remains a critical barrier. While financial and time-saving benefits are acknowledged, clinicians remain cautious about its applicability in orthodontics. Tele-dentistry can complement traditional practice, especially for monitoring and triage, but widespread adoption requires targeted educational campaigns, updated training curricula, and stronger integration of digital health tools.



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Introduction

The integration of digital health into dentistry has advanced significantly. Recent reviews highlight tele-dentistry's role as an inclusive approach across specialties—general dentistry, periodontics, orthodontics, and public health—by improving access to care and enabling remote triage, consultation, and monitoring¹. Tele-dentistry also enhances patient–clinician communication, care quality, and overall patient experience².

In orthodontics, evidence shows that tele-dentistry—especially using systems like Dental Monitoring®—can reduce the number of in-person appointments and shorten refinement phases in aligner therapy, though evidence certainty remains low.³

Furthermore, systematic reviews confirm that digital communication tools—such as reminders and audiovisual messaging—improve oral hygiene and appointment compliance in orthodontic patients.⁴

In rural areas, most low-income families live pay check to pay check, making it challenging for parents to afford orthodontic visits. Additionally, many must travel long distances to find an orthodontist, often missing work or school to attend appointments. As a result, many low-income children go without necessary orthodontic treatment and enter adulthood with dental issues that can negatively impact their quality of life and self-perception.

Tele-orthodontics is also expanding in education: a recent study supports integrating tele-dentistry preparation into orthodontic curricula, emphasizing remote follow-up, monitoring, and interdisciplinary collaboration.⁵

Aim

This study aimed to evaluate awareness, attitudes, and experiences of patients, general dentists, and orthodontists towards tele-dentistry, focusing on its role in remote diagnostics and emergency management.

Materials and Methods

The sample size was determined using G*Power 3, which indicated a minimum of 200 responses per group based on a moderate correlation. The cross-sectional survey included 400 participants: 200 dentists (65.5% male, 34.5% female), subdivided

into 100 orthodontists and 100 general dentists in private practice setting, and 200 randomly selected active patients from the Yeni Yüzyıl University Dental Hospital Orthodontic Department's patient list (29.0% male, 71.0% female). Inclusion criteria comprised patients aged 18–40 years who were undergoing active orthodontic treatment, had regular internet access, and were willing to participate by providing informed consent. Exclusion criteria included patients with systemic or psychological conditions that could interfere with survey participation, those who had previously completed orthodontic treatment, individuals lacking sufficient digital literacy or access to online platforms, and respondents with incomplete or inconsistent questionnaire data.

Two distinct questionnaires were developed as the Professional's Questionnaire (PrQ) and the Patient's Questionnaire (PaQ), designed to explore the correlation between patient awareness and dentist expectations regarding the use of tele-dentistry. Both questionnaires were distributed over a three-month period, from June 16, 2022, to September.¹⁶ 2022. These questionnaires were adapted from a previous study by Boringi *et al.*⁶ and consisted of two sections. Section A collected descriptive information from both dentist and patient groups, while Section B of the PrQ focused on dentists' expectations regarding tele-dentistry use and their perceptions of patients. In the PaQ, Section B examined patient awareness of social media use, familiarity with tele-dentistry, electronic abilities, preferences for future tele-dentistry use, concerns about security and privacy, and their perceived ability to take intraoral photographs using two spoons or fingers (Figure 1). Written consent has been taken from the model used in Figure 1.

Reliability and Validity

Cronbach's α was 0.67 and self-reported validity testing was 0.82. Although α was slightly below the conventional threshold of 0.70, values above 0.60 are acceptable in exploratory social research. This limitation was acknowledged.

Statistical Analysis

Data were analyzed using SPSS v25. Descriptive statistics summarized responses. Chi-square tests examined group differences, while Spearman correlation assessed ordinal relationships. Statistical significance was set at $p < 0.05$.



Fig. 1: Demonstration of how to take intraoral photo using two spoons or fingers.

This questionnaire study did not involve experiments on humans or animals. Written informed consent was obtained from all participants prior to their inclusion in the study. All participants were provided with instructions on completing the survey. The study design conforms to the standards currently applied in the country of origin. Ethical approval was obtained from the Ethics Committee of İstanbul Yeni Yüzyıl University. The study was performed in accordance with the ethical principles of the Declaration of Helsinki and its subsequent amendments.

Results

The results revealed no statistically significant difference between patients' awareness of tele-dentistry and dentists' expectations regarding their patients' prior knowledge of tele-dentistry (Table 1). Among the patients, 45.5% reported that they were unaware of tele-dentistry, while dentists predicted low patient awareness (47%), closely matching actual results.

Table 1: Relation between patients' awareness and dentists' expectations about their patient's knowledge about tele-dentistry.

Patients' awareness about tele-dentistry	Dentists (n=200)		Patients (n=200)		Chi-Square	P-value	Sig.
	n	%	n	%			
Disagree	94	47%	91	45.5%	0.631	0.73	NS
Not sure	55	27.5%	62	31%			
Agree	51	25.5%	47	23.5%			

NS: not significant; *: $p < 0.05$; **: $p < 0.01$; ***: $p < 0.001$.

General dentists reported significantly higher tele-dentistry use than orthodontists ($p < 0.001$) (Table 2).

Tele-dentistry combined with traditional orthodontic treatment was reported as believed to shorten the treatment period by 68.5% of patients (Table 3). Regarding time saving, only 18.5% of patients did not

agree that tele-dentistry would be beneficial in terms of time savings (Table 4). For costs, 19% of patients believed that tele-dentistry would have no impact on saving money, while 29% believed it would save at least a little, and 51.5% thought it would save a significant amount (Table 5).

Table 2: Relation between orthodontists and all other dentists on having treated their patients remotely before.

Have you treated your patients remotely before?	Orthodontists (n=100)	General Dentists (n=100)	Chi-Square	P-value	Sig.
Disagree	75	18	75.886	0.00	***
One Time	2	42			
Agree	23	40			

NS: not significant; *: $p < 0.05$; **: $p < 0.01$; ***: $p < 0.001$.

Table 3: Patients' perception about treatment period while treated remotely in addition to traditional methods.

Do you believe that combining remote care with traditional treatment will shorten your treatment time?	n	Percentage (%)
Yes	137	68.5%
Not sure	0	0
No	63	31.5%
Total	200	100%

Table 4: Patients' perception of time savings when treated remotely.

Do you believe that receiving remote treatment could save you time?	n	Percentage (%)
Totally sure	72	36%
A little	91	45.5%
No	37	18.5%
Total	200	100%

Table 5: Patients' perception of the potential cost savings when treated remotely.

Do you believe that you could save money by receiving remote treatment?	n	Percentage (%)
Yes	59	29.5%
Small saving	103	51.5%
No	38	19%
Total	200	100%

Significant differences were found between clinicians' and patients' expectations for remote initial visits ($p = 0.001$) (Table 6). In both groups, 43.5% participants agreed tele-dentistry could manage minor

emergencies, though dentists expressed greater reservations. (Table 7). Educational level was not significantly associated with awareness ($p > 0.05$).

Table 6: Comparison between patients' preferences for scheduling their initial diagnostic appointment remotely and dentists' expectations regarding these preferences.

Patients' willingness of preferring remote care for initial diagnostic appointment	Dentists (n=200)		Patients (n=200)		Chi-Square	P-value	Sig.
	n	%	n	%			
Disagree	54	27%	69	34.5%	13.458	0.001	***
One Time	58	29%	78	39%			
Agree	88	44%	53	26.5%			

NS: not significant; *: $p < 0.05$; **: $p < 0.01$; ***: $p < 0.001$.

Table 7: Comparison between patients' beliefs regarding their dentist's ability to manage minor emergencies through tele-dentistry and dentists' perceptions of these beliefs.

Ability of dentists to manage minor emergencies through tele-dentistry	Dentists (n=200)		Patients (n=200)		Chi-Square	P-value	Sig.
	n	%	n	%			
Disagree	51	25.5%	25	12.5%	13.401	0.001	***
Some of them	62	31%	88	44%			
Agree	87	43.5%	87	43.5%			

NS: not significant; *: $p < 0.05$; **: $p < 0.01$; ***: $p < 0.001$.

Discussion

Findings echo broader trends: despite high perceived utility, patient awareness of tele-dentistry remains low—paralleling observations in Jeddah, Saudi Arabia, where >70% of patients believed tele-dentistry saves time and money, and >60% of dentists recognized its benefits.⁷

Systematic data from the COVID-19 era show dental practitioners had high awareness (70%) and favourable attitudes (72%) toward tele-dentistry, though actual use remained low (36%).⁸ This mirrors our findings: clinicians support the concept, but uptake was limited—particularly among orthodontists.

Tele-dentistry positively impacts quality of care across settings, with enhanced communication, remote diagnosis, and reduced patient burden.^{2,9}

Evidence from orthodontic studies supports its applicability: tele-dentistry decreases in-person visits, especially in aligner-based therapies.³ Meanwhile,

digital tools like reminders and audiovisual messaging improve patient compliance.⁴

Furthermore, tele-training models for orthodontic care—covering emergency management and interdisciplinary coordination—reinforce the need for remote modalities beyond pandemic-era constraints.⁵

Limitations

This study had limitations: the Cronbach's α was below the commonly accepted threshold of 0.7, reflecting moderate internal consistency. The cross-sectional design precludes causal inference, and convenience sampling may limit generalizability. The results of the study cannot be attributed to the whole dental population. Future multicentre studies with larger samples and qualitative components are warranted.

Conclusion

Tele-dentistry offers a valuable complement to traditional practice, particularly in monitoring, triage,

and emergency care. While patients generally recognize its advantages, limited awareness and clinician hesitancy impede broader adoption. Integrating tele-dentistry into dental curricula, launching public awareness campaigns, and developing user-friendly platforms could accelerate acceptance.

A hybrid model combining in-person and remote care may represent the future of orthodontics, especially for younger, digitally literate populations.

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This research did not involve human participants, animal subjects, or any material that requires ethical approval.

Informed Consent Statement

This study did not involve human participants, and therefore, informed consent was not required.

Clinical Trial Registration

This research does not involve any clinical trials.

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All Tables and Figures used in this manuscript are original to the research and have not been adapted from any other previously published work.

Author Contributions

Reyaam Mutaz Sabri Alrawi: Investigation, Conceptualization, Methodology, Investigation, Resources, Data Curation, Writing - Original Draft, Methodology, Validation, Formal analysis, Goksu Trakyali: Data Curation. Writing - Review & Editing, Visualization, Supervision, Project administration, Writing - Review & Editing.

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