

# Virtual Clinics & Brick-and-Mortar: Patient Insights on Orthodontic Care in Jeddah

Riyad Ali S AlMaqboul<sup>1</sup>, Ahmad Abdullatif Bokhari<sup>2</sup>, Manal Nasser alotaibi<sup>3</sup>, Kholood Abdullah H Alsomali<sup>4</sup>, Basmaa laheq alharbi<sup>5</sup>, Sarah Ahmed Mabruk Ahmed<sup>6</sup>, Lina Mohammed Ashi<sup>7</sup>, Azza adil ramadan<sup>8</sup>, Afaf Masoud Alrefai<sup>9</sup>, Asmaa Atallah Alfaidi<sup>10</sup>, Daniah Osama Sabeh<sup>11</sup>, Nassrain Khalid Alharbi<sup>12</sup>

1. Orthodontist King Fahd Hospital- Virtual Clinic
2. Orthodontist King Fahd Hospital- Dental Center
3. Medical Doctor King Fahd hospital - Virtual Clinic
4. Dental Assistant King Fahd Hospital- Virtual Clinic
5. Dental assistant King Fahd Hospital- Virtual Clinic
6. Dental Assistant King Fahd Hospital- Dental Center
7. Dental Assistant King Fahd Hospital- Dental Center
8. Dental Assistant King Fahd Hospital- Dental Center-
9. Dental Assistant King Fahd Hospital- Dental Center
10. Dental Assistant King Fahd Hospital- Dental Center
11. Specialist Dental assistant King Fahd Hospital- Al-Marwa PHC
12. Medical Doctor King Fahad Hospital - Virtual Clinic

## Abstract

This study explores patient satisfaction with orthodontic care in Jeddah, comparing virtual clinics and traditional brick-and-mortar setups. Utilizing a structured questionnaire, data from 384 patients were analyzed to assess the impact of clinic type on treatment experiences, compliance, and satisfaction. Virtual clinics were noted for their convenience and accessibility, especially during the COVID-19 pandemic, while traditional clinics excelled in providing comprehensive assessments and fostering strong doctor-patient relationships. Results revealed that virtual clinics significantly improved appointment adherence and retainer compliance, with 99% of patients finding tele-orthodontics user-friendly. However, traditional clinics maintained a higher satisfaction level for complex cases requiring face-to-face interaction. Overall, the findings underscore the complementary roles of virtual and traditional clinics in orthodontic care, emphasizing the need for hybrid models tailored to patient preferences and treatment requirements.

## Aim of the Work

This study aims to evaluate and compare patient satisfaction levels between virtual orthodontic clinics and traditional brick-and-mortar clinics in Jeddah. The research seeks to identify key factors influencing treatment experiences, such as accessibility, compliance, doctor-patient communication, and clinical outcomes, to inform the development of optimized care models. By analyzing patient feedback through structured questionnaires, the study aims to highlight the strengths and limitations of each clinic type, providing evidence-based recommendations for integrating virtual and traditional approaches in orthodontic practice.

## Introduction

**Orthodontic** issues in children and adolescents are diverse, with malocclusions being the most prevalent. These issues can significantly impact oral health, aesthetics, and function, necessitating timely intervention. The most common orthodontic problems include various types of malocclusions, crowding, spacing, and specific dental anomalies. Understanding these issues is crucial for effective treatment planning and improving long-term oral health outcomes. Common Orthodontic Issues. Malocclusions: Class I malocclusion is the most common, with a prevalence

of around 51.9% in children and adolescents (Ridder et al., 2022). Class II malocclusion, characterized by prominent upper front teeth, affects about 23.8% of this population (Ridder et al., 2022). This condition is particularly common in 12-year-olds in the UK, affecting about a quarter of this age group (Batista et al., 2018) (Thiruvengkatachari et al., 2013). Class III malocclusion, although less common, still affects a significant portion, with a prevalence of 6.5% (Ridder et al., 2022). Crowding and Spacing: Crowding is a prevalent issue, particularly in adolescents, with studies indicating it as the most common orthodontic finding (K & S, 2021). It affects both upper and lower dental arches, with 14.3% of adolescents experiencing crowding in the upper segments (Gábris et al., 2000). Spacing issues, although less common than crowding, are also significant, with 10.4% of adolescents experiencing spacing in the upper segments (Gábris et al., 2000). Bite Issues: Overbite and open bite are common concerns. Overbite was the most frequently altered occlusal parameter in a study from Southern Italy, with a prevalence of 24.5% (Luzzi et al., 2017). Crossbites, both anterior and posterior, are also prevalent, with posterior crossbite affecting 9.0% of children (Ridder et al., 2022). Other Dental Anomalies: Hypodontia (missing teeth) and hyperdontia (extra teeth) are less common but notable issues, with prevalences of 6.8% and 1.8%, respectively (Ridder et al., 2022). Ectopic eruption and impacted teeth are also observed, affecting 5.4% and 4.9% of children, respectively (Ridder et al., 2022).

Treatment Considerations: Early vs. Late Treatment: Early intervention is often recommended for certain conditions, such as Class II malocclusion, to reduce the risk of incisal trauma (Batista et al., 2018) (Thiruvengkatachari et al., 2013). However, the decision to treat early or wait until adolescence depends on the specific condition and its severity (Martonffy, 2015). The use of clear aligners and functional appliances is gaining popularity due to their effectiveness and patient satisfaction (Koaban et al., 2024). Role of Pediatricians and Preventive Strategies: Pediatricians play a crucial role in early detection and referral for orthodontic evaluation, which is recommended by age 7 (Martonffy, 2015). Awareness among healthcare providers can facilitate timely intervention and improve outcomes (Luzzi et al., 2017). While the prevalence of orthodontic issues in children and adolescents is high, the approach to treatment varies based on individual needs and the specific condition. Early intervention can be beneficial for certain malocclusions, but it is essential to weigh the benefits against the potential for self-correction in some cases. The choice of treatment, whether early or late, should be tailored to the patient's unique circumstances, considering both functional and aesthetic outcomes.

**Virtual clinics**, particularly in the context of orthodontic treatment, have emerged as a viable alternative to traditional clinics, especially during the COVID-19 pandemic. The comparison between virtual and traditional clinics in terms of patient satisfaction with orthodontic treatment outcomes reveals several insights. Virtual clinics, through tele-orthodontics and teledentistry, offer enhanced patient compliance and satisfaction due to their convenience and accessibility. However, traditional clinics still hold certain advantages in terms of direct patient interaction and comprehensive assessments. The following sections delve into the specifics of patient satisfaction in both settings. Patient Satisfaction in Virtual Clinics: Convenience and Accessibility: Virtual clinics provide significant convenience, reducing the need for travel and allowing patients to attend appointments from their homes. This was particularly beneficial during the COVID-19 pandemic, as it minimized exposure risks (Wall et al., 2021) (Kayalar, 2023). Patient Compliance: Tele-orthodontics has been shown to improve patient compliance significantly. For instance, adherence to scheduled appointments increased by 30%, and compliance with wearing orthodontic appliances rose from 14 to 22 hours per day (Almoammar, 2024). Patient Acceptance: A study on tele

orthodontics reported that 99% of patients found the system easy to use, and 91% expressed willingness to use remote consultations in the future (Henein et al., 2022). Satisfaction Scores: In a study comparing phone clinics to conventional clinics, virtual consultations received high satisfaction scores, with a mean of 9.08/10 on the Likert scale (Wall et al., 2021). Patient Satisfaction in Traditional Clinics: Direct Interaction: Traditional clinics offer face-to-face interactions, which can enhance the quality of care and patient satisfaction. The doctor-patient relationship is a crucial factor in patient satisfaction, as highlighted in a systematic review (Almasri et al., 2024). Comprehensive Assessments: Traditional clinics allow for comprehensive assessments, including physical examinations and imaging, which are sometimes necessary for accurate diagnosis and treatment planning (Henein et al., 2022). Treatment Outcomes: Both clear aligners and traditional braces in conventional settings have shown high levels of occlusal correction, with similar treatment outcomes in terms of the PAR and IOTN indices (Korotkova, 2024). Comparative Insights: Effectiveness: Both virtual and traditional clinics have been found to be effective in delivering orthodontic care. A meta-analysis indicated that virtual consultations are as effective as traditional in-person consultations for certain patient populations ("The efficacy of remote virtual care in comparison to traditional clinical visits for elective orthopedic patients: A meta-analysis of prospective randomized controlled trials", 2022) (McDonnell et al., 2021). Patient Preferences: While virtual clinics offer convenience, some patients still prefer face-to-face interactions for initial consultations and complex cases, as they provide a sense of reassurance and thoroughness (Kayalar, 2023). In conclusion, virtual clinics have proven to be a valuable addition to orthodontic care, offering high levels of patient satisfaction due to their convenience and ability to enhance compliance. However, traditional clinics remain essential for comprehensive assessments and maintaining strong doctor-patient relationships. The choice between virtual and traditional clinics may ultimately depend on individual patient needs and preferences, as well as the specific requirements of the orthodontic treatment.

**Questionnaires** play a crucial role in assessing patient satisfaction with orthodontic treatment outcomes by providing structured and quantifiable insights into patients' perceptions, experiences, and satisfaction levels. These tools are essential for understanding the multifaceted nature of patient satisfaction, which encompasses aesthetic, functional, and psychological dimensions. By employing questionnaires, orthodontists can gather valuable feedback that informs treatment planning and enhances patient-centered care. The following sections detail the specific roles and benefits of using questionnaires in this context.

Understanding Patient Perceptions and Motivations: Questionnaires help identify the primary motivations for seeking orthodontic treatment, such as aesthetic concerns, which are often the main driver for patients (Shukla et al., 2024). They assess patients' understanding and acceptance of treatment plans, revealing that while many patients comprehend the necessity of treatment, acceptance and compliance can vary (Bhutada et al., 2024). Tools like the Q-methodology allow for the exploration of subjective factors, such as motivation and compliance, which are critical for successful treatment outcomes (Peeva, 2024). Measuring Satisfaction and Treatment Outcomes: Patient-reported outcome measures (PROMs) and patient-reported experience measures (PREMs) are integral in evaluating satisfaction with treatment procedures and outcomes, highlighting the importance of self-perceived aesthetics and functional improvements (Santiwong et al., 2022) ("The implementation of PROMs/PREMs in the assessment of orthodontic treatment outcomes: A questionnaire survey", 2022). Systematic reviews indicate that patient satisfaction is generally high, particularly with fixed appliances, and is influenced by the quality of care and doctor-patient relationships (Almasri et al., 2024). Cross-cultural adaptations of satisfaction

questionnaires, such as the Arabic and Brazilian Portuguese versions, ensure that these tools are valid and reliable across different populations (Alansari, 2024) (Alvarenga et al., 2023). Enhancing Patient-Centered Care: Questionnaires facilitate a patient-centered approach by capturing diverse patient experiences and expectations, which can guide orthodontists in tailoring treatments to individual needs (Peeva, 2024). They provide insights into the psychological impacts of treatment, such as increased self-esteem and confidence, which are significant predictors of overall satisfaction (Santiwong et al., 2022). By identifying areas of dissatisfaction, such as treatment costs or discomfort with certain appliances, orthodontists can address these issues to improve patient experiences (Marusamy et al., 2024). Validating and Adapting Assessment Tools: The development and validation of multi-item questionnaires, such as the 58-item orthodontic patient satisfaction questionnaire (PSQ), ensure comprehensive assessment of satisfaction across various dimensions (Alansari, 2024). The adaptation of these tools to different cultural contexts, as seen in the Brazilian and Arabic versions, underscores the importance of culturally sensitive assessments (Alvarenga et al., 2023). While questionnaires are invaluable for assessing patient satisfaction, it is important to recognize their limitations. The quality of evidence from studies using these tools can vary, and there is a need for high-quality clinical studies to further validate their findings (Almasri et al., 2024). Additionally, while questionnaires provide quantitative data, qualitative insights from interviews or open-ended questions can complement these findings by capturing the nuances of patient experiences. Overall, questionnaires are a vital component of orthodontic practice, offering a structured means to enhance patient satisfaction and treatment outcomes.

## **Methods & results**

### **Executive Summary:**

This report presents the findings of a study conducted on a sample of patients who underwent orthodontic treatment. Data was collected via phone interviews, where patients were asked about their experiences during and after treatment. The sample size consisted of 384 patients. The collected data covers various aspects, including personal information, reasons for seeking treatment, general satisfaction, pain and discomfort experiences, compliance with retainer usage post-treatment, and Doctor-patient relationship.

The results show that the majority of patients were satisfied with the outcomes of their orthodontic treatment, particularly in terms of improved dental appearance, chewing ability, and facial aesthetics. Additionally, patients expressed high satisfaction with their interactions with the orthodontists. However, some challenges, such as pain after treatment and issues with retainer usage, were noted, highlighting areas for possible improvement in patient care and treatment protocols.

### **Sample Size and Data Collection Method:**

The data was collected from a sample of 384 patients through phone interviews. The data was collected from a sample of 384 patients through phone interviews for traditional and virtual clinics. This method allowed for accurate and reliable responses from patients regarding their personal experiences with orthodontic treatment.

**Statistical Methods Used:**

**1. Frequency Distribution:**

Frequency distributions were calculated for all studied variables, such as gender, age group, education level, reasons for seeking treatment, and satisfaction levels. This helped in understanding the general distribution of the data and identifying the most represented categories.

**2. Percentages:**

Percentages were used to indicate how frequently each category appeared, such as gender distribution or levels of satisfaction with the treatment. This approach provided clear, easily understandable results based on percentages for each category.

**3. Graphs and Tables:**

Graphs and tables were used to visually present the data. These included pie charts and bar charts, which helped to display the distribution of the data in a way that made it easier to identify trends and patterns.

**Results**

**Section 1: Personal data of the patients**

The table shows a relatively balanced gender distribution among the patients, with males representing 47.1% (181) and females 52.9% (203). Regarding age groups, the largest proportion of patients is in the 21-30 years range, which accounts for 45.1% (173), followed by those over 30 years, who make up 37% (142). Only 4.7% (18) of the patients are under 15 years old. When looking at educational background, the majority of patients (66.7%, 256) have a university degree or higher, while 25.3% (97) have completed high school. Concerning waiting times, the most significant group waited between 1-2 years (47.1%, 181), followed by those who waited more than two years (30.7%, 118). Lastly, regarding treatment completion, 43% (165) of patients have not yet finished their treatment, while the remaining patients are distributed across different treatment duration periods, ranging from less than a year to more than three years.

*Table 1 Demographic and Treatment Details*

	N (%)
Gender	
Male	181 (47.1%)
Female	203 (52.9%)
Age Group	
<15 years	18 (4.7%)
15-20	51 (13.3%)
21-30	173 (45.1%)
>30 years	142 (37%)
Education Level	
Primary	12 (3.1%)
Secondary	19 (4.9%)
High School	97 (25.3%)

University or Higher	256 (66.7%)
Waiting List Duration	
Less than 6 months	48 (12.5%)
From 6 months to 1 year	37 (9.6%)
From 1-2 years	181 (47.1%)
More than 2 years	118 (30.7%)
Treatment Completion Date	
Less than a year	29 (7.6%)
From one year to less than two years	94 (24.5%)
From two years to less than three years	73 (19%)
Three years or more	23 (6%)
Treatment has not yet ended	165 (43%)

## Section 2: Reasons for Seeking Orthodontic Treatment

The primary reason most patients sought orthodontic treatment was to improve the aesthetic appearance of their teeth, with 89.1% (342) citing it as their main reason. Other common reasons included improving chewing ability (38%), following doctor recommendations (32.8%), and addressing speech issues (25.3%). A very small percentage, 2.1% (8), mentioned other reasons, reflecting that the majority of patients prioritize aesthetic concerns in their decision to undergo orthodontic treatment.

### Reasons for Treatment

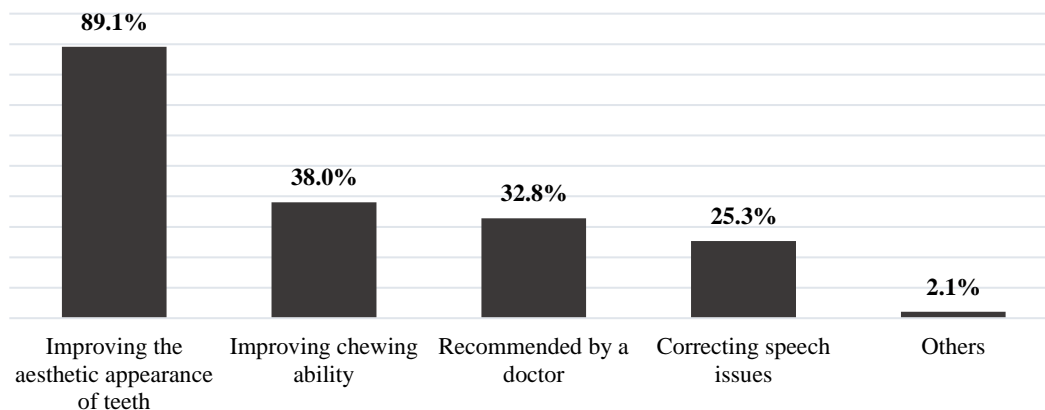


Figure 1 Reasons for Treatment

## Section 3: General Satisfaction with Treatment

Overall, patients expressed high satisfaction with various aspects of their orthodontic treatment. Most patients were highly satisfied with the alignment of their teeth post-treatment (88.5%, 340) and the improvement in their facial appearance (86.5%, 332). Additionally, 88% (338) were satisfied with the improvement in chewing ability, while 85.4% (328) were pleased with the ease of cleaning their teeth after treatment. Regarding the treatment's overall duration, 77.3% (297)

were satisfied, indicating that the majority of patients felt the treatment time was reasonable. Furthermore, 80.5% (309) were satisfied with the waiting times during appointments, suggesting that the clinic maintained an efficient appointment schedule.

Table 2 Satisfaction with Treatment Aspects

Degree of satisfaction with orthodontic treatment	Dissatisfied N (%)	Neutral N (%)	Satisfied N (%)
Alignment of teeth after treatment	14 (3.6%)	30 (7.8%)	340 (88.5%)
Improvement in facial appearance	15 (3.9%)	37 (9.6%)	332 (86.5%)
Improvement in chewing ability	12 (3.1%)	34 (8.9%)	338 (88.0%)
Ease of cleaning teeth after treatment	14 (3.6%)	42 (10.9%)	328 (85.4%)
Overall treatment duration	23 (6%)	64 (16.7%)	297 (77.3%)
Frequency of monthly visits	18 (4.7%)	64 (16.7%)	302 (78.6%)
Waiting time during appointments	23 (6%)	52 (13.5%)	309 (80.5%)

When patients were asked to rate the overall results of their orthodontic treatment, 81% (311) expressed satisfaction, while a small portion, 0.8% (3), were dissatisfied. This indicates that the vast majority of patients were pleased with the outcome of their treatment, highlighting a generally positive experience overall.

### Overall Treatment Rating

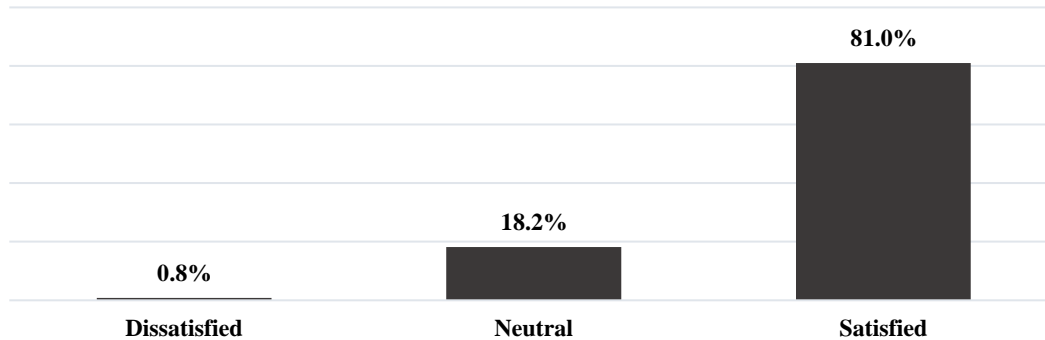
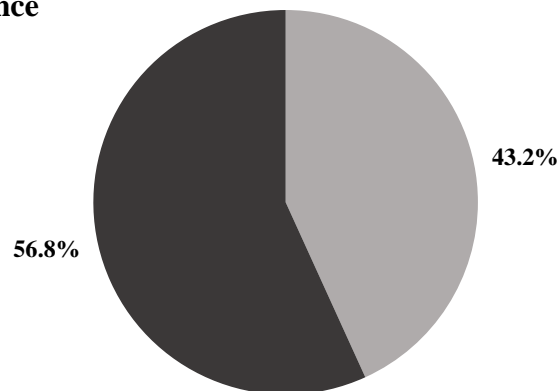


Figure 2 Overall Treatment Rating

### Section 4: Pain and Discomfort Experience

Regarding pain during or after the treatment, 56.8% (218) of patients reported experiencing some level of pain. Among those, 40.1% (154) indicated that the pain lasted for only one day, while 15.4% (59) experienced pain for a few days. A small percentage, 1.3% (5), experienced pain for more than a week, suggesting that while the majority of patients had a brief period of discomfort, a few faced prolonged pain.

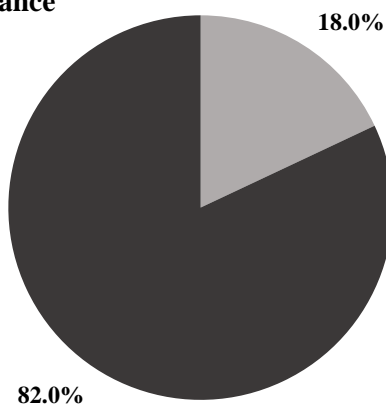
### Pain Experience



*Figure 3 Pain Experience*

Regarding retainer use after treatment, 82% (315) of patients adhered to using their retainer, while 18% (69) did not. The reasons for non-compliance varied, including issues like discomfort with the retainer, forgetfulness, or broken or lost retainers. Additionally, some patients felt that the retainer was unnecessary or that their treatment period had not yet been completed. These insights emphasize the importance of addressing patient concerns regarding the retainer to improve long-term adherence.

### Retainer Usage Compliance



*Figure 4 Retainer Usage Compliance*

## Section 5: Doctor-Patient Relationship

The table reflects a generally positive doctor-patient relationship. A significant majority of patients, 96.4% (370), reported that the doctor thoroughly explained the treatment plan before starting. Furthermore, 93% (357) of patients felt that their doctor clearly answered their questions,

and 90.9% (349) praised the doctor's kindness during sessions. Additionally, 83.6% (321) of patients were satisfied with the transparency about the treatment duration, and 86.5% (332) appreciated the explanation about the importance of using the retainer post-treatment. These results suggest that patients had a strong sense of trust and satisfaction with their doctor's approach, which likely contributed to the overall positive experience with their orthodontic care.

*Table 3 Doctor's Interaction with the Patient*

How would you rate the doctor's interaction with you	No N (%)	Sometimes N (%)	Yes N (%)
Explaining the treatment plan before starting	7 (1.8%)	7 (1.8%)	370 (96.4%)
Clearly answering your questions	14 (3.6%)	13 (3.4%)	357 (93%)
Treating you kindly during sessions	22 (5.7%)	13 (3.4%)	349 (90.9%)
Transparency about treatment duration	39 (10.2%)	24 (6.3%)	321 (83.6%)
Explaining the importance of using the retainer post-treatment	21 (5.5%)	31 (8.1%)	332 (86.5%)

## **Discussion:**

### **Section 1: Personal Data of Patients**

The demographic data of the study's 384 patients revealed a balanced gender distribution, with females (52.9%) slightly outnumbering males (47.1%), and a predominant age group of 21–30 years (45.1%). This demographic skew aligns with trends in orthodontic treatment preferences, where young adults seek treatment primarily for aesthetic and functional corrections (Nagamine et al., 1986). Additionally, 66.7% of participants held university degrees, indicating that higher education may correlate with greater awareness of orthodontic care benefits, consistent with findings by Al-Omiri and Alhaija (2006). The waiting times reported, with 47.1% waiting 1–2 years, highlight logistical challenges in accessing orthodontic care, a common issue also reported by Loke (2002) in similar healthcare settings. Interestingly, 43% of patients had not completed their treatment, suggesting either prolonged treatment durations or potential adherence issues, underscoring the need for optimized scheduling and follow-up systems to enhance treatment efficacy and patient satisfaction.

### **Section 2: Reasons for Seeking Orthodontic Treatment**

Aesthetic concerns were the primary motivation for treatment, with 89.1% of patients citing improved dental appearance as their main goal. This aligns with findings by Hershon and Giddon (1980), who emphasized the importance of facial aesthetics in self-image and confidence. Functional concerns, such as improved chewing ability (38%) and speech correction (25.3%), were secondary yet significant motivators, corroborating the psychosocial and physiological benefits highlighted by Kiyak et al. (1985). A smaller percentage (32.8%) pursued treatment based on doctor recommendations, indicating a strong reliance on healthcare advice for initiating orthodontic care. The dominance of aesthetic motivations reflects cultural and societal pressures for ideal facial profiles, consistent with observations in diverse populations (Berscheid et al., 1973).

### **Section 3: General Satisfaction with Treatment**

High satisfaction rates were reported for teeth alignment (88.5%), facial aesthetics (86.5%), and chewing ability (88%), echoing findings from Alnasyan et al. (2017) and Kiyak et al. (1985), which underscored the transformative impact of orthodontics on functional and aesthetic outcomes. The positive perception of treatment duration by 77.3% of patients reflects an effective management of patient expectations, though satisfaction with monthly visits (78.6%) and appointment waiting times (80.5%) indicates room for improvement. Interestingly, dissatisfaction rates were below 7% for most parameters, demonstrating the general success of the treatment processes. However, logistical aspects like clinic schedules and time efficiency remain key areas for enhancing the patient experience, a trend observed in studies by Loke (2002).

### **Section 4: Pain and Discomfort Experience**

Pain was reported by 56.8% of patients, with most experiencing discomfort for a day (40.1%) or a few days (15.4%), findings that align with Lew's (1993) observations of transient pain during orthodontic care. Only 1.3% experienced prolonged pain exceeding a week, suggesting effective pain management protocols for the majority but highlighting the need for targeted interventions for outliers. These results are consistent with Bergius et al. (2000), who emphasized pain's impact on compliance and satisfaction. Retainer adherence was achieved by 82% of patients, though 18% reported non-compliance due to discomfort or perceived irrelevance, a trend that aligns with Gazit-Rappaport et al. (2010). Addressing such issues through personalized follow-up plans and patient education is essential for sustaining treatment outcomes.

### **Section 5: Doctor-Patient Relationship**

The doctor-patient relationship was highly rated, with 96.4% of patients appreciating clear treatment explanations and 93% satisfied with answers to their questions, reinforcing the findings by Sinha et al. (1996) on the importance of communication in orthodontic care. Kindness during treatment (90.9%) and transparency about retainers (86.5%) were key contributors to the positive experiences reported, highlighting the role of empathy and honesty in building trust. Nonetheless, logistical concerns, such as delays and duration estimates, affected satisfaction for a minority, consistent with observations by O'Connor (2000). These results suggest that while technical proficiency is crucial, interpersonal skills significantly enhance patient satisfaction and compliance.

### **Conclusion**

The study demonstrates that both virtual and traditional orthodontic clinics offer distinct advantages, with virtual clinics excelling in convenience and compliance, while traditional clinics provide comprehensive assessments and enhanced doctor-patient interactions. Virtual clinics significantly increased appointment adherence and satisfaction during the pandemic, offering a viable alternative for routine follow-ups and consultations. However, traditional clinics remain indispensable for complex orthodontic cases requiring in-person evaluations. The results suggest that a hybrid model integrating the strengths of both clinic types could improve patient satisfaction and treatment outcomes, catering to diverse patient needs and preferences. Future research should focus on optimizing such models and evaluating their long-term effectiveness in various clinical settings.

## References

- Alansari, R. (2024). Orthodontic patient satisfaction: Validation of an Arabic patient satisfaction questionnaire. *APOS Trends in Orthodontics*. [https://doi.org/10.25259/apos\\_38\\_2024](https://doi.org/10.25259/apos_38_2024)
- Almasri, A. M. H., Hajeer, M. Y., Ajaj, M. A., Almusawi, A. O. A., Jaber, S. T., Zakaria, A. S., & Alam, M. K. (2024). Patient Satisfaction Following Orthodontic Treatment: A Systematic Review. *Cureus*. <https://doi.org/10.7759/cureus.65339>
- Almoammar, S. (2024). The Role of Tele-Orthodontics in Enhancing Patient Compliance and Treatment Monitoring. *Journal of Pharmacy and Bioallied Sciences*. [https://doi.org/10.4103/jpbs.jpbs\\_368\\_24](https://doi.org/10.4103/jpbs.jpbs_368_24)
- Alnasyan, N. S., & Alfayez, N. A. (2017). Evaluation of patient satisfaction with orthodontic treatment in Qassim region. *International Journal of Medical and Health Research*, 3(12), 77–82.
- Al-Omiri, M. K., & Abu Alhaja, E. S. (2006). Factors affecting patient satisfaction after orthodontic treatment. *Angle Orthodontist*, 76, 422–431.
- Alvarenga, R. N., Paiva, S. M., Flores-Mir, C., Bernabé, E., & Abreu, L. G. (2023). Satisfaction with orthodontic treatment: cross-cultural adaptation and validation of an instrument for the Brazilian Portuguese language. *Dental Press Journal of Orthodontics*. <https://doi.org/10.1590/2177-6709.27.6.e2220471.oar>
- Batista, K. B., Thiruvengkatachari, B., Harrison, J. E., & O'Brien, K. D. (2018). Orthodontic treatment for prominent upper front teeth (Class II malocclusion) in children and adolescents. *Cochrane Database of Systematic Reviews*. <https://doi.org/10.1002/14651858.CD003452.PUB4>
- Bergius, M., Kiliardis, S., & Berggren, U. (2000). Pain in orthodontics: A review and discussion of the literature. *Journal of Orofacial Orthopedics*, 61, 125–137.
- Bhutada, P. B., Maroore, P., Kangane, S., Nakhate, T., & Nair, S. (2024). Understanding, acceptance and compliance of patients towards orthodontic treatment: Questionnaire survey on ongoing cases. *IP Indian Journal Of Orthodontics And Dentofacial Research*. <https://doi.org/10.18231/j.ijodr.2024.017>
- Gábris, K., Márton, S., & Madléna, M. (2000). Orthodontic anomalies in adolescents. *Fogorvosi Szemle*.
- Gazit-Rappaport, T., Haisraeli-Shalish, M., & Gazit, E. (2010). Psychosocial reward of orthodontic treatment in adult patients. *European Journal of Orthodontics*, 32, 441–446.
- Henein, C., Seager, L., Carter, L. A., & Deeming, G. (2022). Teleorthodontics: a patient and orthodontist perspective. *Orthodontic Update*. <https://doi.org/10.12968/ortu.2022.15.4.199>
- Hershon, L. E., & Giddon, D. B. (1980). Determinants of facial profile self-perception. *American Journal of Orthodontics*, 78, 279–295.
- K, M., & S, A. K. (2021). Assessment of Need for Orthodontic Treatment in Adolescents. *Annals of Medical and Health Sciences Research*.
- Kayalar, E. (2023). Applications and effectiveness of teledentistry in orthodontic practice during the COVID-19 restrictions. *Journal of the World Federation of Orthodontists*. <https://doi.org/10.1016/j.ejwf.2023.04.002>
- Kiyak, H. A., McNeill, R. W., & West, R. A. (1985). The emotional impact of orthognathic surgery and conventional orthodontics. *American Journal of Orthodontics*, 88, 224–234.
- Koaban, A., Alharbi, S., Al-Shehri, A. Z., Al-Shamri, B. S., Aburazizah, M. F., Al-Qahtani, G. H., Al-Wusaybie, L. H., Alkhalifa, L. B., Al-Saad, M. M., Al-Nehab, A. A., & Al-Halimi, F. M. (2024).

Current Trends in Pediatric Orthodontics: A Comprehensive Review. *Cureus*.  
<https://doi.org/10.7759/cureus.68537>

- Korotkova, Y. S. (2024). Comparison of patient satisfaction and treatment outcomes between clear aligners and traditional braces in orthodontic treatment. *Ukrains'kij Stomatologičnij Al'manah*. <https://doi.org/10.31718/2409-0255.3.2024.11>
- Lew, K. K. (1993). Attitudes and perception of adults towards orthodontic treatment in an Asian community. *Community Dental and Oral Epidemiology*, 21, 31–35.
- Luzzi, V., Ierardo, G., Corridore, D., Carlo, G. D., Giorgio, G. D., Leonardi, E., Campus, G.-G., Campus, G.-G., Voza, I., Polimeni, A., & Bossù, M. (2017). Evaluation of the orthodontic treatment need in a paediatric sample from Southern Italy and its importance among paediatricians for improving oral health in pediatric dentistry. *Journal of Clinical and Experimental Dentistry*. <https://doi.org/10.4317/JCED.54005>
- Martonffy, A. I. (2015). Oral health: orthodontic treatment. *FP Essentials*.
- Marusamy, K. O., Ramasamy, S., Fitaihi, E. J., Fallatah, R. M., & Althahafi, D. (2024). Treatment Satisfaction and Quality of Life Changes in Patients Receiving Conventional Fixed Orthodontic Appliances and Clear Aligner Therapy: A Questionnaire Based Cross-sectional Study. *Journal of Clinical and Diagnostic Research*. <https://doi.org/10.7860/jcdr/2024/67939.19689>
- McDonnell, J. M., Ahern, D. P., Ross, T. D., Gibbons, D., Synnott, K., & Butler, J. S. (2021). The efficacy of remote virtual care in comparison to traditional clinical visits for elective orthopaedic patients: A meta-analysis of prospective randomised controlled trials. *Surgeon- Journal of The Royal Colleges of Surgeons of Edinburgh and Ireland*. <https://doi.org/10.1016/J.SURGE.2021.02.008>
- Nagamine, T., Kobayashi, T., Hanada, K., & Nakajima, T. (1986). Satisfaction of patients following surgical-orthodontic correction of skeletal Class III malocclusion. *Journal of Oral and Maxillofacial Surgery*, 44, 944–948.
- O'Connor, P. J. (2000). Patients' perceptions before during and after orthodontic treatment. *Journal of Clinical Orthodontics*, 34(10), 591–592.
- Peeva, Y. B. (2024). Subjective Factors in Orthodontic Treatment, Q-Methodology as a Tool to the Assessment of Motivation, Compliance and Satisfaction in Orthodontic Treatment: Quaestiones Morales et Ethical Communications (ex lat). *Journal of Medical Research and Surgery*. <https://doi.org/10.52916/jmrs244147>
- Ridder, L. D., Aleksieva, A., Willems, G., Declerck, D., & Llano-Pérula, M. C. de. (2022). Prevalence of Orthodontic Malocclusions in Healthy Children and Adolescents: A Systematic Review. *International Journal of Environmental Research and Public Health*. <https://doi.org/10.3390/ijerph19127446>
- Santiwong, P., Sommaluan, K., Mokkalak, S., Rachuratchata, C., Rattanaopas, T., & Sipiayruk, K. (2022). The Implementation of PROMs/PREMs in the Assessment of Orthodontic Treatment Outcomes: A Questionnaire Survey. *Journal of International Society of Preventive and Community Dentistry*. [https://doi.org/10.4103/jispcd.JISPCD\\_275\\_21](https://doi.org/10.4103/jispcd.JISPCD_275_21)
- Shukla, J. B., Srivastava, K., Tikku, T., Khanna, R., Verma, S., & Maurya, R. P. (2024). Patients perception of orthodontic treatment - A questionnaire based study. *IP Indian Journal Of Orthodontics And Dentofacial Research*. <https://doi.org/10.18231/j.ijodr.2024.038>
- Sinha, P. K., Nanda, R. S., & McNeil, D. W. (1996). Perceived orthodontist behaviors that predict patient satisfaction. *American Journal of Orthodontics and Dentofacial Orthopedics*, 110, 370–377.

- The efficacy of remote virtual care in comparison to traditional clinical visits for elective orthopaedic patients: A meta-analysis of prospective randomised controlled trials. (2022). Surgeon-Journal of The Royal Colleges of Surgeons of Edinburgh and Ireland. <https://doi.org/10.1016/j.surge.2021.02.008>
- The implementation of PROMs/PREMs in the assessment of orthodontic treatment outcomes: A questionnaire survey. (2022). Journal of International Society of Preventive and Community Dentistry. [https://doi.org/10.4103/jispcd.jispcd\\_275\\_21](https://doi.org/10.4103/jispcd.jispcd_275_21)
- Thiruvengkatahari, B., Harrison, J. E., Worthington, H. V., & O'Brien, K. D. (2013). Orthodontic treatment for prominent upper front teeth (Class II malocclusion) in children. Cochrane Database of Systematic Reviews. <https://doi.org/10.1002/14651858.CD003452.PUB3>
- Wall, B., Daly, P., Dunnill, A., Osan, J., & Brogan, K. (2021). Is Virtual Clinic the Way Forward: Patient Satisfaction Comparing Phone Clinic vs. Conventional Clinic. <https://doi.org/10.21203/RS.3.RS-193370/V1>