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The role of psychology and communication skills in orthodontic practice: a systematic review

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Abstract

Effective communication and psychological strategies are integral to orthodontic practice, influencing patient satisfaction, adherence, and overall treatment outcomes. This systematic review, conducted in accordance with PRISMA guidelines and registered with PROSPERO (ID: CRD42024560432), examined the role of these strategies in orthodontic care and their integration into educational curricula. A comprehensive search identified studies focusing on communication and psychological interventions in orthodontics. The findings emphasize that patient-centered communication enhances understanding, adherence, and satisfaction. Structured approaches, such as personalized follow-up reminders and digital tools like social media, have shown significant improvements in patient engagement. Psychosocial factors, including anxiety and body image concerns, were identified as critical barriers to adherence, necessitating tailored psychological support and empathy-based communication. Additionally, gaps in orthodontic education were identified, with recommendations for integrating simulations, interprofessional education, and ongoing training into curricula to address these challenges. This review underscores the importance of addressing the psychological and communicative dimensions of orthodontic care, providing actionable recommendations for enhancing patient outcomes and optimizing educational practices. Future research should explore the long-term impact of these strategies and assess their effectiveness across diverse populations.

Keywords Orthodontics, Communication skills, Psychology, Patient-centered care, Orthodontic education

Background

Orthodontic practice, while deeply rooted in the science of dental correction, increasingly demands a comprehensive understanding of the psychological and communicative dynamics that influence patient care [1, 2]. The interaction between orthodontists and patients extends

beyond the mere application of clinical techniques; it encompasses the management of patient expectations, alleviating anxiety, and fostering trust and cooperation [3–5]. The success of orthodontic treatment often hinges on the precision of the technical work and the quality of the relationship between the practitioner and the patient [6]. Effective communication is essential in explaining complex treatment plans, setting realistic expectations, and ensuring patients adhere to long-term treatment regimens [7]. Moreover, understanding the psychological factors that affect patients—such as fear, motivation, and self-esteem—can significantly enhance the overall treatment experience and outcomes [8, 9].

Despite the clear benefits, the current landscape of orthodontic education places disproportionate

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emphasis on technical skills at the expense of developing these crucial interpersonal abilities. The curriculum in many dental schools prioritizes the mechanical aspects of orthodontics, leaving little room for training in psychology and communication [10]. This gap in education has significant implications for the future of orthodontic practice, as new graduates may find themselves ill-equipped to manage the psychosocial aspects of patient care. Patients today are more informed and have higher expectations regarding the care they receive, making it imperative that orthodontists are not only technically proficient but also skilled in managing patient interactions and emotions [11].

The rationale for integrating psychology and communication into the orthodontic curriculum is clear. As the field of healthcare shifts towards a more holistic, patient-centered approach, the role of these skills in enhancing patient care cannot be overstated. Properly trained orthodontists can better manage patient concerns, increase treatment adherence, and improve patient satisfaction—all of which are key factors in successful outcomes [5, 9]. By fostering these competencies during their training, orthodontists will be better prepared to navigate the complex interpersonal dynamics that are inherent in patient care, ultimately leading to a more satisfying and effective practice [11].

Research on the integration of psychological and communication skills in orthodontics has identified these abilities as critical to improving patient satisfaction, adherence to treatment plans, and overall success. However, studies addressing this intersection remain fragmented, with limited exploration of how such training can be systematically incorporated into orthodontic curricula [5, 9]. While existing literature highlights the theoretical importance of these skills, actionable strategies for their implementation and their impact on clinical practice have not been adequately synthesized.

This systematic review addresses these gaps by evaluating the importance of psychology and communication skills in orthodontic practice and providing evidence-based recommendations for their integration into orthodontic education. By systematically synthesizing evidence across diverse studies, this review aims to advance understanding of how these competencies can enhance patient care, treatment adherence, and practitioner satisfaction. Additionally, the findings seek to inform future educational strategies, ensuring that orthodontic training evolves to balance technical excellence with strong interpersonal skills. This dual focus is essential for developing well-rounded practitioners equipped to meet the complex demands of modern patient-centered care.

Methods

This systematic review adhered to PRISMA guidelines to ensure comprehensive and transparent reporting. The review protocol was registered with PROSPERO (ID number: CRD42024560432). The selection of studies adhered to well-defined PICOS criteria. The population included orthodontic patients, with interventions focusing on communication and psychological strategies implemented in orthodontic practice or training. Comparisons included studies evaluating different communication and psychological methods or the absence of such interventions. Outcomes of interest encompassed measures of patient satisfaction, adherence, and psychological impacts. Eligible study designs included randomized controlled trials, observational studies, and qualitative research, reflecting the broad range of evidence relevant to the review's objectives.

A comprehensive literature search was conducted across multiple databases, including PubMed, the Cochrane Library, ERIC, and CINAHL. Search terms included combinations of “orthodontic practice,” “psychology,” “communication skills,” “patient management,” and “educational curriculum.” In addition to database searches, reference lists of relevant articles and gray literature were reviewed to identify additional studies meeting the inclusion criteria.

Data were extracted using a standardized form by two independent reviewers to ensure accuracy and consistency. Extracted data included study design, participant characteristics, psychological and communication training details, outcomes measured, and main findings. This structured approach facilitated a comprehensive analysis of the identified educational practices. The risk of bias in the included studies was assessed using established tools. The Cochrane Risk of Bias Tool was utilized for randomized controlled trials, while observational studies were evaluated using the Newcastle-Ottawa Scale. Two independent reviewers conducted these assessments, and any discrepancies were resolved through discussion with a third reviewer. A narrative synthesis was conducted to summarize the findings qualitatively, highlighting key themes and patterns across studies.

Results

The initial search yielded 526 records from various databases, with an additional 455 records removed before screening. Following the screening process, 71 records were assessed for relevance, resulting in 1 record being excluded. Reports were sought for retrieval for the remaining 70 records, of which 8 were not retrieved. Ultimately, 62 reports were assessed for eligibility, leading to the exclusion of 41 reports due to reasons such as lack

of relevance (29 reports), absence of full text (3 reports), and unsuitable methodology (9 reports). Consequently, 21 studies were included in the final review (Fig. 1).

The risk of bias for the included observational studies was assessed using the Newcastle-Ottawa Scale (NOS) summarized in Table 1. The total scores ranged from 5 to 9, indicating varying levels of methodological quality among the studies. Alhaija et al. [12] received the highest score [9], indicating a low risk of bias across all domains. In contrast, several studies, including Choudhry et al. [13] and Mehra et al. [14], scored 5, reflecting a higher risk of bias in certain domains, particularly in selecting the non-exposed cohort and follow-up length.

For the randomized controlled trials (RCTs), the Cochrane Risk of Bias tool was employed (Table 2). Al-Silwadi et al. [24] and Cozzani et al. [25] exhibited a

generally low risk of bias across most domains, except for the blinding of participants and personnel in Al-Silwadi et al. [24], which was rated as high risk. Le Fouler et al. [26] had unclear risk in several domains, including random sequence generation, allocation concealment, and blinding of outcome assessment, indicating potential biases that could affect the study's validity.

The included studies varied in their design, participant characteristics, interventions, and outcomes measured (Table 3). The observational studies primarily focused on the role of psychological and communication skills in orthodontic practice, with outcomes such as patient satisfaction, treatment adherence, and practitioner communication competence. The RCTs investigated specific interventions to improve these skills and their impact on clinical outcomes.

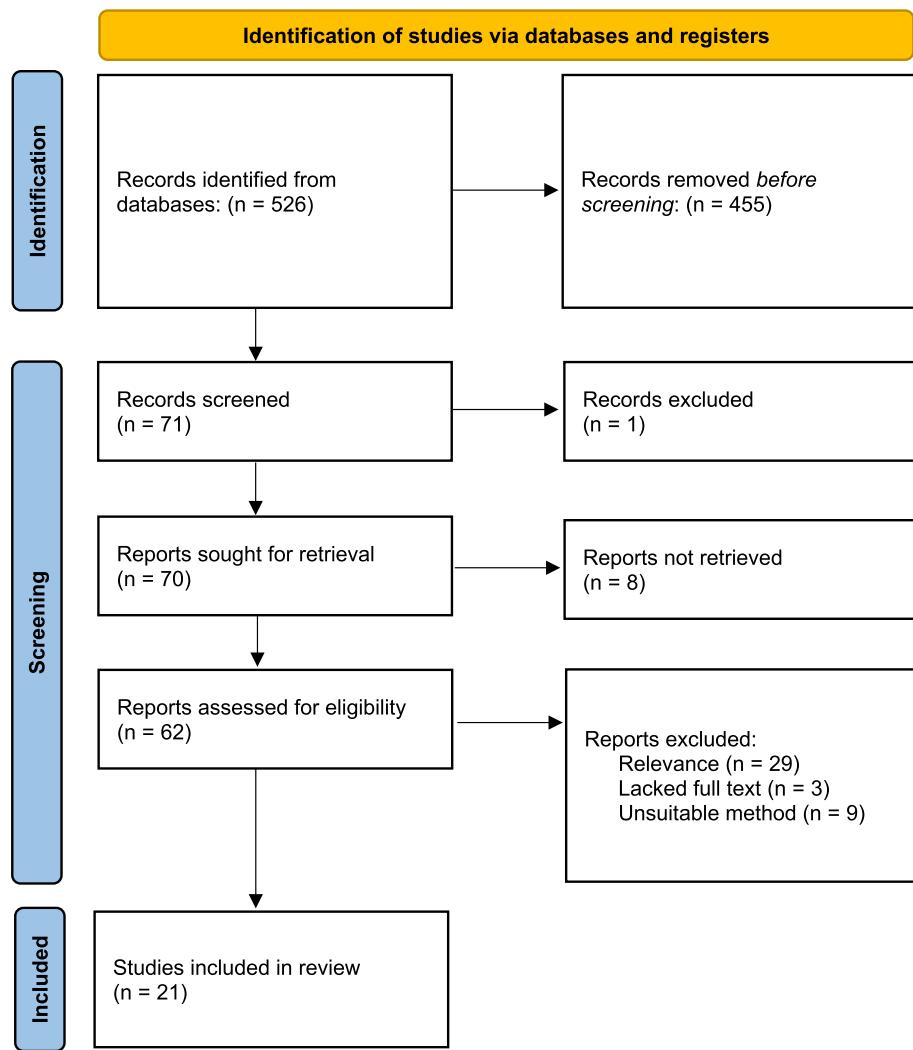


Fig. 1 PRISMA flow diagram

Table 1 Articles included in the review

Study	Representativeness of the Exposed Cohort	Selection of the Non-Exposed Cohort	Ascertainment of Exposure	Outcome Not Present at Start	Comparability of Cohorts	Assessment of Outcome	Follow-Up Length	Adequacy of Follow-Up	Total Score
Alhaija et al. (2018) [12]	1	1	1	1	2	1	1	1	9
Al-Jobair and Al-Mutairi (2015) [15]	1	0	1	1	2	1	1	1	7
AlKharafi et al. (2014) [16]	1	0	1	0	2	1	1	1	7
Amado et al. (2008) [17]	1	0	1	1	2	1	1	1	8
Bibona et al. (2015) [18]	1	0	1	1	2	1	0	0	6
Brown and Inglehart (2011) [19]	1	0	1	1	2	1	0	0	6
Catt et al. (2018) [20]	1	0	1	1	2	1	1	1	8
Choudhry et al. (2017) [13]	1	0	1	0	2	1	0	0	5
Mehra et al. (1998) [14]	1	0	1	0	2	1	0	0	5
Randall and Dhar (2023) [21]	1	0	1	0	2	1	0	0	5
Stonehouse-Smith et al. (2022) [1]	1	0	1	0	2	1	0	0	5
Taibah (2018) [22]	1	0	1	0	2	1	0	0	5
Zhao et al. (2024) [23]	1	0	1	1	2	1	0	0	6

Table 2 Articles included in the review

Study	Random Sequence Generation	Allocation Concealment	Blinding of Participants and Personnel	Blinding of Outcome Assessment	Incomplete Outcome Data	Selective Reporting	Other Sources of Bias
Al-Silwadi et al. (2015) [24]	Low	Low	High	Low	Low	Low	Low
Cozzani et al. (2016) [25]	Low	Low	Low	Low	Low	Low	Low
Le Fouler et al. (2021) [26]	Unclear	Unclear	High	Unclear	Unclear	Low	Low

Discussion

The role of communication in patient satisfaction and adherence

Effective communication is fundamental to orthodontic practice, significantly influencing patient satisfaction, treatment adherence, and clinical outcomes. Studies

Table 3 Articles included in the review

Authors	Year of Publication	Methodology	Population	Intervention / Observation	Results
Allnaja, et al.	2018	Cross-sectional	297 orthodontic patients	Understanding of periodontal health and awareness	Age, attitudes, and the duration of orthodontic treatment influence awareness levels about periodontal health.
Al-Jobair and Al-Mutairi	2015	Longitudinal	116 dental students	Views on techniques for guiding pediatric behavior	Mixed opinions highlighted the need for improved training in guiding children's behavior.
AlKharafi, et al.	2014	Cross-sectional	145 orthognathic surgery patients	Pretreatment information needs and psychological support	There is a strong demand for thorough information and psychological support before surgery.
Al-Silwadi, et al.	2015	Randomized controlled trial	60 orthodontic patients	Utilizing social media to enhance oral hygiene knowledge	Social media effectively boosts oral hygiene knowledge, with notable score increases in those receiving the intervention.
Amado et al.	2016	Cross-sectional	70 orthodontic patients	Examining personality traits and cooperation in orthodontic treatment	Found links between certain personality traits and levels of cooperation during orthodontic care.
AnbuSelvan, et al.	2013	Literature review	General orthodontic patients	Overview of effective patient communication strategies	Effective patient communication is vital for building confidence, enhancing rapport and cooperation, and reducing misunderstandings.
Bibona et al.	2019	Cross-sectional	137 orthodontists and 144 general dentists	Communication practices and preferred methods	Gaps and preferences in communication were identified, emphasizing the need for personalized approaches.
Brown and Ingelhart	2011	Cross-sectional	135 orthodontic residents and 568 active members of the AAO	Experiences in orthodontic care among underserved groups	Highlighted significant disparities and the need for customized communication strategies for these populations.
Catt et al.	2018	Cross-sectional	Orthognathic patients	Communication's role in quality of life for orthognathic surgery patients	Effective communication correlates positively with better quality of life outcomes in patients undergoing orthognathic surgery.
Chiang et al.	2023	Mixed methods	36 general patients and 5 orthodontists	Simulation-based communication training for dentists	The training program significantly improved patient satisfaction and communication skills within the intervention group.
Choudhry et al.	2017	Cross-sectional	286 dental graduates	Professionalism in dentistry: perspectives	Diverse perspectives were noted, emphasizing the importance of maintaining professionalism in patient care.
Cozzani et al.	2016	Randomized controlled trial	84 orthodontic patients	Impact of oral hygiene instruction compliance on treatment outcomes	Good communication leads to higher compliance with oral hygiene instructions, improving treatment outcomes.

Table 3 (continued)

Authors	Year of Publication	Methodology	Population	Intervention / Observation	Results
Cserzé et al.	2022	Qualitative	19 dentists, 13 dental care professionals, and 19 individuals from the public	Professionalism in dental practice: perceptions	Underlined the importance of ongoing professional development and ethical practice in dentistry.
Le Fouler et al.	2021	Randomized controlled trial	90 adolescents undergoing orthodontics	Comparing three methods of teaching oral hygiene	Visual and kinesthetic methods proved more effective than auditory methods for teaching oral hygiene.
Mehra et al.	1998	Cross-sectional	1262 orthodontists	Evaluating and managing patient expectations	Managing expectations is crucial for achieving patient satisfaction.
Randall and Dhar	2023	Cross-sectional	7013 pediatric dentists	Non-drug methods for guiding pediatric behavior	Common practices and challenges in behavior management in pediatric dentistry were identified.
Soldo et al.	2020	Quasi-experimental	62 adolescents	Effects of oral hygiene instructions on plaque levels	A significant reduction in plaque levels was observed following structured oral hygiene instructions.
Stonehouse-Smith, et al.	2022	Cross-sectional	55 clinicians and 204 patients	Best practices in clinical communication	Effective communication is linked to higher patient satisfaction and better adherence to treatment plans.
Tabah	2018	Cross-sectional	504 dental patients	Factors affecting professionalism in dental practice	Emphasized the role of professionalism in fostering patient trust and satisfaction.
Wong et al.	2018	Prospective cross-sectional qualitative	26 adult orthodontic patients	Determinants of satisfaction with orthodontic treatment	Key factors influencing satisfaction include communication, staff professionalism, and the treatment environment.
Zhao et al.	2024	Cross-sectional	498 adult orthodontic patients	Evaluating risk communication and psychosocial factors	OHEC significantly improved risk awareness, with depression and anxiety positively linked to risk concerns and avoidance behaviors.

consistently highlight that patient-centered communication fosters better understanding of treatment plans and enhances adherence rates [1]. Cooperative relationships, built on clear communication, play a critical role in achieving successful orthodontic outcomes [3]. Patients who feel informed and actively involved in treatment decisions also report greater satisfaction and compliance with orthodontic instructions, resulting in more favorable clinical outcomes [27].

Evidence emphasizes the effectiveness of structured communication strategies. For example, the use of social media for patient education improved adherence to oral hygiene protocols and increased patient satisfaction by providing accessible, clear, and consistent information [24]. Similarly, personalized follow-up reminders, such as text messages, enhanced compliance with orthodontic treatment plans, showcasing the value of direct and targeted communication methods [25]. These interventions demonstrate the potential of digital tools to bridge communication gaps, especially for younger or tech-savvy patients.

Other studies further underscore the importance of communication in building trust and fostering collaboration. Empathetic interactions, where orthodontists actively listen and tailor their communication to patient needs, have been associated with improved patient engagement and adherence [1]. Empathetic communication can be particularly useful in managing expectation during long-term treatments [19]. Simplifying complex medical information into patient-friendly language can also significantly reduce confusion and increase compliance, particularly in long-term orthodontic treatments [27]. Trust and cooperation between orthodontists and patients are strengthened when communication is empathetic and consistent, as shown by research emphasizing the importance of establishing rapport throughout treatment [5]. By adopting patient-centered strategies and leveraging digital tools, orthodontists can not only enhance patient experiences but also achieve better clinical outcomes. This underscores the importance of addressing individual needs through empathetic and structured communication.

Challenges in orthodontic communication

Barriers to effective communication in orthodontic practice often hinder patient understanding and engagement. One common challenge is the use of overly technical language, which can make it difficult for patients to comprehend their treatment options and plans [1]. For example, patients may struggle to grasp the specifics of orthodontic procedures when discussions are dominated by jargon, leading to confusion and reduced adherence to treatment protocols [27]. Additionally, some

orthodontists dominate conversations, limiting opportunities for patient input and questions. This lack of patient involvement in decision-making processes can result in feelings of alienation and decreased satisfaction [1].

Interprofessional communication presents its own challenges, particularly in complex cases requiring collaboration with other healthcare professionals. Inconsistent communication methods, such as reliance on email or written reports by orthodontists versus phone calls preferred by general dentists, can result in miscommunication or delays in sharing critical patient information [18]. Ensuring alignment among all involved professionals is crucial for optimizing patient outcomes and preventing potential complications [7].

Addressing these challenges requires orthodontists to adopt simplified, patient-friendly language and encourage active participation in treatment discussions. Studies suggest that fostering two-way communication not only enhances patient understanding but also builds trust and cooperation, key components of successful orthodontic care [27]. Moreover, implementing consistent communication protocols between healthcare providers can facilitate timely and coordinated care, reducing the risk of errors or misunderstandings in complex cases [7, 18].

Psychosocial factors influencing orthodontic outcomes

Psychosocial factors, including anxiety, depression, and body image concerns, significantly impact patient adherence and satisfaction with orthodontic treatment. Patients with higher levels of anxiety often demonstrate lower compliance with prescribed regimens, highlighting the need for orthodontists to address these underlying psychological barriers [12, 23]. Managing anxiety before and during procedures such as orthognathic surgery has been shown to improve patient experiences and treatment outcomes [16]. Similarly, body image concerns can affect a patient's willingness to engage in or continue treatment, particularly when long-term results are uncertain [28].

Personality traits, such as perfectionism or low self-esteem, further influence patient cooperation. Studies have shown that patients with perfectionist tendencies may have heightened concerns about treatment outcomes, leading to increased anxiety and reduced adherence [17]. Incorporating psychological evaluations into routine care enables orthodontists to identify patients at risk of non-compliance due to these factors and provide targeted support, such as reassurance and tailored communication strategies [21].

Social support systems also play a pivotal role in treatment success. Patients with strong familial or peer support are more likely to adhere to treatment plans, as these networks provide encouragement and accountability

[29]. Psychological support provided throughout treatment can significantly reduce anxiety and improve adherence, particularly in complex orthodontic cases [20].

Adopting cautious and individualized approaches to patient communication enhances adherence and satisfaction, particularly in long-term treatment regimens [14]. Orthodontists must not only recognize these challenges but also actively incorporate strategies such as motivational interviewing and empathy-based communication to reduce patient anxiety and improve adherence [30]. Cultural considerations, as highlighted in studies addressing diverse patient populations, further influence treatment adherence and outcomes [22].

Educational implications for orthodontic training

The integration of communication and psychological skills into orthodontic training is essential for preparing practitioners to meet the complex demands of modern patient-centered care. Current orthodontic curricula often prioritize technical proficiency, leaving graduates underprepared to manage the psychosocial aspects of patient care [10]. This gap has significant implications, as effective communication and emotional intelligence are critical for fostering trust, enhancing adherence, and achieving successful outcomes [7, 13].

Hands-on demonstrations with patients have been shown to improve their understanding and compliance with treatment protocols [26]. Simulated patient interactions, for instance, provide students with opportunities to practice empathetic communication and receive immediate feedback, improving their ability to navigate real-world patient scenarios [7, 28]. Additionally, the use of digital tools, such as Oral Health Education Comics (OHEC), has been shown to enhance communication skills by helping students simplify complex information into accessible formats for patients [23].

Interprofessional education also plays a critical role in fostering effective collaboration between orthodontists and other healthcare professionals. Training programs that include team-based scenarios or joint sessions with medical and dental professionals have been shown to improve communication across disciplines, reducing miscommunication and ensuring coordinated care [13, 18]. These collaborative experiences prepare students to navigate multidisciplinary teams in their future practices.

Ongoing professional development is equally important. Regular workshops and online training modules on communication and psychological care enable orthodontists to stay current with emerging best practices and address evolving patient expectations [15]. Programs focusing on conflict resolution, delivering difficult news, and managing patient anxiety are particularly valuable for improving practitioner confidence and patient outcomes.

By embedding communication and psychological training into both initial education and continuing professional development, orthodontic programs can better equip practitioners to deliver patient-centered care. These skills are as critical as technical proficiency in ensuring successful treatment outcomes and should be emphasized throughout the curriculum [13, 15].

Future directions

While this review highlights the critical role of communication and psychological skills in orthodontic practice, several gaps in the current literature warrant further exploration. One key area is the long-term impact of communication training on patient outcomes. Although existing studies demonstrate immediate benefits, such as improved adherence and satisfaction, research is needed to determine whether these effects persist over the course of multi-year orthodontic treatments [23, 28].

Another avenue for future investigation is the relationship between specific psychological factors and treatment adherence. For instance, while anxiety and body image concerns are well-documented, additional studies could explore how traits like perfectionism or resilience influence compliance and satisfaction [17, 21]. Identifying these relationships may inform the development of tailored interventions to address diverse patient needs more effectively.

The integration of digital tools into orthodontic care also presents opportunities for innovation. Research into how newer technologies—such as telehealth platforms, mobile applications, or gamified patient education tools—can enhance communication and engagement is particularly timely [23, 24]. Such studies could guide the adoption of technology-driven approaches to improve accessibility and efficiency in patient care.

Finally, future work should examine the effectiveness of interdisciplinary education and collaboration. Understanding how joint training programs impact communication between orthodontists and other healthcare professionals could provide valuable insights into optimizing team-based care and improving patient outcomes [13, 18].

By addressing these gaps, future research can build on the findings of this review, further advancing the role of communication and psychological skills in orthodontics. Such efforts are essential for fostering a holistic, patient-centered approach to care that balances technical expertise with interpersonal proficiency.

Limitations

This review did not directly assess clinical outcomes, which may limit its applicability to treatment success metrics. However, its emphasis on psychological and

communication factors provides valuable insights into addressing patient-centered challenges in orthodontic practice. Variability in study design and quality, as reflected in the risk of bias assessment, may have influenced the interpretation of findings, with observational studies being more prone to confounding than randomized controlled trials. Publication bias is another potential limitation, as formal statistical assessments were not conducted, despite efforts to minimize its impact by searching multiple databases. Additionally, the heterogeneity of study populations, interventions, and outcomes limits the generalizability of the findings. Future research should prioritize standardized methodologies and reporting to enhance the robustness and applicability of evidence in this area.

Conclusions

This systematic review underscores the essential role of effective communication and psychological support in orthodontic practice, highlighting their impact on patient satisfaction, adherence, and overall outcomes. Addressing psychosocial factors, such as anxiety and body image concerns, through patient-centered care is crucial for achieving clinical success and emotional well-being. Orthodontic education should incorporate interdisciplinary training in communication and psychological strategies, led by specialists in organizational and behavioral psychology. By drawing on evidence-based practices from psychology research, this training can ensure practitioners are equipped with scientifically grounded approaches to meet the complex needs of their patients. Integrating these skills into both practice and education will advance the field of orthodontics toward delivering holistic, patient-centered care.

Authors' contributions

Martin Baxmann conceptualized the study and was also in charge of data curation, formal analysis, investigation, methodology, writing—original draft preparation, and writing—review and editing. Zoltán Baráth and Krisztina Kárpáti provided supervision.

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Data availability

No datasets were generated or analysed during the current study.

Declarations

Ethics approval and consent to participate

Not applicable.

Consent for publication

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Competing interests

The authors declare no competing interests.

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