

# The Influence of Age on the Orthodontic Treatment Outcomes and Patient Compliance

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## Abstract

**Background:** Orthodontic treatment has evolved considerably, offering diverse approaches to correct malocclusions and improve oral health and aesthetics. Age is one of the key factors that influence treatment outcomes and patient compliance during orthodontic treatment. As individuals progress through different life stages, their distinct biological and psychosocial traits significantly impact the success of their orthodontic treatment.

**Objective:** This literature review investigates the influence of age on orthodontic treatment outcomes and patient compliance, highlighting the critical interplay of

biological, psychosocial, and other factors that provide valuable insights for orthodontists to optimize their treatment strategies.

**Conclusion:** In conclusion, younger patients experience favorable outcomes due to ongoing growth, which allows for the effective use of interceptive measures. However, their compliance may be variable, influenced by motivation levels and reliance on parental support. In contrast, adult patients frequently present more complex dental issues, such as periodontal concerns, which can complicate treatment efficacy. While adults tend to demonstrate higher motivation for aesthetic outcomes, their compliance may be hindered by lifestyle constraints and scheduling challenges. Understanding the age-related

factors affecting orthodontic treatment is essential for optimizing clinical practices and improving patient satisfaction.

**Keywords:** Orthodontic treatment, Age, Treatment outcomes, Compliance.

## Introduction

Orthodontic treatment has advanced significantly, providing various approaches to correct malocclusions, enhance dental aesthetics, and improve oral function. A pivotal factor influencing treatment outcomes is the patient's age. Existing literature indicates that age affects both the effectiveness of orthodontic interventions and the level of patient compliance, underscoring the importance of understanding these multifaceted relationships. [1] As individuals progress through different life stages, their unique biological and psychosocial characteristics significantly impact the success of their orthodontic treatment. [2] This review analyzes current literature to clarify how age affects these critical aspects, offering valuable insights for orthodontists to optimize their treatment strategies.

### Overview of orthodontic treatment

Orthodontic treatments mainly utilize fixed appliances, removable appliances, and clear aligners to realign teeth and jaws effectively. These interventions aim to enhance aesthetic appearance, improve oral function, and promote long-term dental health. [3] Understanding the differences in treatment approaches across age groups is essential, as this knowledge is crucial for assessing treatment outcomes and ensuring optimal care.

### Age categories in orthodontics

There are three main age categories that orthodontists should consider when planning treatment, each with its own distinct characteristics.

#### 1. Pediatric Patients (6-12 years)

In pediatric patients, early intervention can effectively leverage their growth potential. Research indicates that initiating treatments during mixed dentition (6-12 years) often results in more favorable outcomes, particularly in cases of severe malocclusions. [4] During these formative years, jaw and teeth development facilitates more efficient tooth movement.

#### 2. Adolescent Patients (12-18 years)

Adolescence represents a peak period for orthodontic treatment due to growth spurts, typically between ages 12 and 18. Studies indicate compliance is higher among adolescents, who are often more motivated by social factors. [5] However, psychological factors such as self-esteem and peer acceptance significantly impact adherence to treatment plans.

#### 3. Adult patients (18 years and older)

Adult orthodontics poses unique challenges, as biological responses to treatment can differ significantly from those observed in younger patients, typically beginning at age 18 and extending into senior years. Adults often experience slower tooth movement due to reduced bone remodeling capabilities. [6] Moreover, compliance issues may arise due to competing life priorities, making treatment adherence more complex.

### Impact of age on orthodontic treatment outcomes

Age profoundly impacts multiple facets of orthodontic treatment outcomes due to several factors, including:

## 1. Biological factors

Biological responses to orthodontic treatment differ significantly among age groups due to variations in growth potential, bone remodeling, and craniofacial development. Children and adolescents typically experience faster tooth movement due to higher rates of bone remodeling and ongoing craniofacial development, which enhances the outcomes for certain treatments like growth modification using functional appliances. [7] In contrast, adults who have completed their skeletal growth exhibit slower tooth movement due to reduced biological activity in the bone and generally denser bone tissue, which can impede treatment progress and complicate alignment efforts. [8] As a result, younger patients often achieve quicker and more effective outcomes, while adults may require longer and more complex treatment plans to attain similar results. These age-related differences highlight the necessity of tailoring orthodontic strategies to align with the unique biological characteristics of each group. [9]

## 2. Psychosocial factors

Psychosocial factors significantly influence orthodontic treatment outcomes in distinct ways for adults and adolescents, primarily due to differences in motivation, compliance, and social influences. For adolescents, heightened peer pressure often enhances their motivation to conform to social norms, driving them to adhere to treatment protocols like wearing rubber bands or retainers to achieve optimal results. [10] However, they may also contend with self-esteem challenges that hinder their commitment to proper oral hygiene. [11]

In contrast, adults generally exhibit a stronger intrinsic motivation stemming from their desire for improved aesthetics and functional outcomes. Yet, they may encounter psychological barriers such as stress from work or family responsibilities, which can complicate adherence to treatment plans. [12] Moreover, adults typically have a more established understanding of cultural attitudes and the significance of orthodontic care, which can positively affect their commitment to

treatment. These contrasting psychosocial dynamics highlight the necessity for tailored approaches that address the unique challenges faced by each age group, ensuring optimized treatment adherence and outcomes. [13]

## 3. Treatment complexity

The complexity of dental issues tends to escalate with age, leading adults to present more severe malocclusions and other concerns, such as periodontal disease, which complicates treatment and lower success rates. These chronic problems in adults can result in more intricate dental and skeletal discrepancies and malocclusions, requiring comprehensive treatment plans that address functional and aesthetic concerns. [14] In contrast, younger patients often experience less complex treatment and more predictable outcomes, as their malocclusions are more responsive to interceptive treatments and growth modification. Nevertheless, adults are at a higher risk of complications during orthodontic treatment, such as root resorption, which can impact long-term results. [15] These complexities highlight the need for special orthodontic approaches that account for age-related factors to optimize treatment effectiveness and patient satisfaction.

## 4. Long-term stability

The patient's age significantly impacts the success and long-term stability of orthodontic treatment results, influencing how well the outcomes are maintained over time. Younger patients tend to achieve more stable, long-lasting orthodontic results, as their periodontal tissues and bone structure are more adaptable. [16]

In contrast, adults may encounter additional challenges in maintaining treatment outcomes due to age-related changes in these tissues and the supporting bone structure. However, older patients prioritize treatment's lasting benefits, which can enhance their dedication to the orthodontic process and adherence to retention protocols, promoting stable, long-term results. [17]

## Impact of age on patient compliance

Compliance with orthodontic treatment varies significantly across age groups due to diverse psychological, social, and other factors, including:

### 1. Psychosocial factors

Psychological and social factors are critical in patient compliance across diverse age groups during orthodontic treatment. Pediatric patients typically benefit from parental supervision, which offers essential support for adhering to treatment routines and attending follow-up visits. This supervision ensures that young patients follow their care instructions effectively, fostering better compliance. [18] In contrast, adolescents often encounter challenges stemming from external influences, such as peer pressure and social distractions related to academics and extracurricular activities. These factors can lead them to prioritize social interactions over their orthodontic responsibilities, negatively affecting their commitment to orthodontic treatment plans and wearing appliances as prescribed. [19] Meanwhile, adults generally exhibit stronger motivation, driven by a desire for aesthetic improvement and a better understanding of the long-term benefits of treatment, which leads to higher compliance with recommended practices like wearing retainers and attending follow-up appointments. They are more likely to integrate orthodontic care into their routines, although their compliance can occasionally be disrupted by their busy lifestyles, along with demanding work and family obligations and the complexities of their treatment protocols. [20]

### 2. Age-related physical considerations

Aging-related changes in periodontal sensitivity and bone density necessitate that adults prioritize oral hygiene and regular dental check-ups. These changes can heighten the risk of discomfort and complications during orthodontic treatment, encouraging adults to adhere more closely to prescribed care protocols. Maintaining good hygiene practices and attending routine dental

appointments can prevent potential issues like periodontal disease and root resorption, ultimately enhancing treatment outcomes. [21] Additionally, a greater awareness of the risks associated with neglecting dental care reinforces their commitment to following recommended guidelines, fostering a proactive approach to maintaining oral health throughout orthodontic treatment.

### 3. Appliance type:

The type of orthodontic appliance used is closely tied to a patient's age, influencing compliance levels across different age groups. Removable appliances, like clear aligners, require consistent, active participation, which may be challenging for younger patients who lack the maturity or routine-building skills for consistent use. Younger patients, especially children, often adhere more to fixed appliances since these devices cannot be removed, thus reducing the need for personal responsibility. Meanwhile, adolescents, who are usually more self-conscious, may prefer less noticeable options like clear aligners, yet may face challenges with compliance due to peer influences and social distractions that can interfere with the consistent use of removable appliances. [22] On the other hand, adults generally have higher compliance with fixed and removable appliances due to their motivation for aesthetic improvements and long-term benefits. However, busy lifestyles can sometimes challenge consistent compliance. Fixed appliances often appeal to adults due to their minimal daily maintenance, while removable options offer flexibility that can fit into their demanding schedules. [23]

## Strategies for improvement

Enhancing patient compliance and optimizing orthodontic treatment outcomes relies significantly on implementing strategies for each age group's specific motivations, challenges, and lifestyle needs.

### 1. For pediatric patients

For younger patients, parental supervision is crucial, as children often rely on their parents to establish and maintain consistent routines. Encouraging parents to set daily reminders for orthodontic hygiene and care, along with rewarding consistent adherence, can greatly enhance treatment outcomes and improve patient compliance. [24] Additionally, incorporating simple tools like progress charts, stickers, and visual aids can make this process more engaging and enjoyable for children. This combination of structured guidance and positive reinforcement helps boost adherence and fosters positive habits for long-term success. [25]

### 2. For adolescents

Adolescents are significantly influenced by their peers, which impacts their preference for aesthetic orthodontic appliances, such as clear aligners. Providing different options like these can improve compliance, as teens often feel more socially comfortable with less noticeable treatment methods. [26] To further motivate this age group, it is important to educate them about the long-term benefits of orthodontic treatment, emphasizing how proper adherence can improve their future appearance and overall health. Framing the potential consequences of poor compliance in relatable terms, such as delayed treatment results or less favorable visual outcomes, can resonate more with their concerns. Additionally, empowering adolescents by involving them in the treatment process—through goal-setting and allowing them to track their own progress—can foster a sense of ownership and motivation, ultimately enhancing their commitment to adhering to treatment protocols. [27]

### 3. For adults

To enhance compliance among adults in orthodontic treatment, it's essential to consider their busy lifestyles and preferences for convenience. Emphasizing flexible treatment options, such as low-maintenance fixed appliances or removable clear aligners that can be worn primarily at night, aligns with their schedules and can lead to better adherence. [28] Effective communication

regarding the treatment plan and its long-term advantages is also essential, as adults are more likely to commit when they understand the positive impact on their health and appearance over time. [29] Additionally, regular follow-ups and addressing any discomfort or time-related concerns can further reinforce their commitment to treatment. By emphasizing both the aesthetic and health benefits of orthodontic care and discussing anticipated outcomes, practitioners can motivate adults to follow prescribed protocols, ultimately enhancing their overall quality of life. [30]

### Conclusion

In conclusion, the relationship between age, treatment success, and patient compliance is complex and multifactorial. Younger patients often benefit from biological advantages that contribute to better outcomes; however, their compliance can be inconsistent, influenced by psychological and social factors such as motivation and support systems. Conversely, adults typically exhibit higher motivation for seeking orthodontic treatment, often driven by aesthetic and health considerations. Yet, they frequently encounter practical challenges that can impede their adherence to treatment protocols. These insights highlight the importance of tailoring orthodontic strategies to meet the unique needs of different age groups. Future research should focus on developing age-specific treatment protocols and compliance strategies that enhance patient care and contribute to successful treatment outcomes.

### References

1. Alsaeed SA, Kennedy DB, Aleksejuniene J, Yen EH, Pliska BT, Flanagan DC. Outcomes of orthodontic treatment performed by individual orthodontists vs 2 orthodontists collaborating on treatment. *Am J Orthod Dentofacial Orthop*. 2020 Jul;158(1):59-67.
2. Dyer GS, Harris EF, Vaden JL. Age effects on

- orthodontic treatment: adolescents contrasted with adults. *Am J Orthod Dentofacial Orthop.* 1991 Dec;100(6):523-30.
3. Alansari RA, Faydhi DA, Ashour BS, Alsaggaf DH, Alsaeed SA, Kennedy DB, Aleksejuniene J, Yen EH, Pliska BT, Flanagan DC. Outcomes of orthodontic treatment performed by individual orthodontists vs 2 orthodontists collaborating on treatment. *Am J Orthod Dentofacial Orthop.* 2020 Jul;158(1):59-67.
  4. Dyer GS, Harris EF, Vaden JL. Age effects on orthodontic treatment: adolescents contrasted with adults. *Am J Orthod Dentofacial Orthop.* 1991 Dec;100(6):523-30.
  5. Alansari RA, Faydhi DA, Ashour BS, Alsaggaf DH, Shuman MT, Ghoneim SH, et al. Adult Perceptions of Different Orthodontic Appliances. Patient Prefer Adherence. 2019 Dec 13;13:2119-2128.
  6. White L. Early orthodontic intervention. *Am J Orthod Dentofacial Orthop.* 1998 Jan;113(1):24-8.
  7. Feldens CA, Nakamura EK, Tessarollo FR, Closs LQ. Desire for orthodontic treatment and associated factors among adolescents in Southern Brazil. *Angle Orthod.* 2015 Mar;85(2):224-32.
  8. Li Y, Jacox L, Little S, Ko C. Orthodontic tooth movement: The biology and clinical implications. *Kaohsiung J Med Sci.* 2018;34(4):207-214.
  9. Proffit R, Fields W, Sarver M. Growth and development in orthodontics. *Contemporary Orthodontics* (5th ed.). 2013; 138-140. Elsevier Health Sciences.
  10. Robb SI, Sadowsky C, Schneider BJ, BeGole EA. Effectiveness and duration of orthodontic treatment in adults and adolescents. *Am J Orthod Dentofacial Orthop.* 1998 Oct;114(4):383-6.
  11. Vardimon D, Graber M, Voss R, Cangialosi J. Biological responses to orthodontic forces in different age groups. *Am J Orthod Dentofacial Orthop.* 2022; 162(1), 33-42.  
<https://doi.org/10.1016/j.ajodo.2022.04.003>
  12. Zou Y, Liu S, Guo S, Zhao Q, Cai Y. Peer Support and Exercise Adherence in Adolescents: The Chain-Mediated Effects of Self-Efficacy and Self-Regulation. *Children (Basel).* 2023 Feb 18;10(2):401.
  13. Militi A, Sicari F, Portelli M, Merlo EM, Terranova A, Frisone F, et al. Psychological and Social Effects of Oral Health and Dental Aesthetic in Adolescence and Early Adulthood: An Observational Study. *Int J Environ Res Public Health.* 2021 Aug 27;18(17):9022.
  14. Pattanaik S, Veeraraghavan VP, Dasari AK, Patil SR, Alzahrani SG, Fareed M. Orthodontic treatment in adults: Challenges, outcomes, and factors affecting compliance and satisfaction. *J Orthod Sci.* 2024 May 8;13:14.
  15. Jouy E, Marcenes W, Johal A. The role of psychosocial factors in predicting orthodontic treatment outcome at the end of 1 year of active treatment. *Eur J Orthod.* 2013 Apr;35(2):205-15.
  16. Wang J, Huang Y, Chen F, Li W. The age-related effects on orthodontic tooth movement and the surrounding periodontal environment. *Front Physiol.* 2024 Sep 6;15:1460168. doi: 10.3389/fphys.2024.1460168.
  17. Yassir YA, McIntyre GT, Bearn DR. Orthodontic treatment and root resorption: an overview of systematic reviews. *Eur J Orthod.* 2021 Aug;43(4):442-456.
  18. Seki Yurdakul M, Meriç P. Retention in Orthodontics: A review. *Int Dent Res* 2022;12(2):88-96.
  19. Maspero C, Farronato D, Giannini L, Farronato G. Orthodontic treatment in elderly patients. *Prog Orthod.* 2010;11(1):62-75.
  20. Nobre R, Pozza DH. Parental influence in orthodontic treatment: A systematic review. *Med Pharm Rep.* 2023;96(1):28-34

21. King KM, McLaughlin KA, Silk J, Monahan KC. Peer effects on self-regulation in the peer interaction. *Dev Psychopathol.* 2018 Oct;30(4):1389-1401.
22. Al Shammary NH, Alshammari AK. Adherence in adult orthodontic settings: Understanding orthodontists' predictors. *APOS Trends Orthod.* 2024;14:183-90.
23. Jiang Q, Li J, Mei L, Du J, Levrini L, Abbate GM, Li H. Periodontal health during orthodontic treatment with clear aligners and fixed appliances: A meta-analysis. *J Am Dent Assoc.* 2018 Aug;149(8):712-720.
24. Jedliński M, Belfus J, Milona M, Mazur M, Grocholewicz K, Janiszewska-Olszowska J. Orthodontic treatment demand for fixed treatment and aligners among young adults in middle Europe and South America - a questionnaire study. *BMC Oral Health.* 2024 Mar 2;24(1):292.
25. Mandall NA, Vine S, Hulland R, Worthington HV. The impact of fixed orthodontic appliances on daily life. *Community Dent Health.* 2006 Jun;23(2):69-74.
26. Nobre R, Pozza DH. Parental influence in orthodontic treatment: a systematic review. *Med Pharm Rep.* 2023 Jan;96(1):28-34.
- adolescence depend on the nature and quality of
27. Prasad AS, Sivakumar A. Do audio-visual aids help in improving oral hygiene in orthodontic patients? *J Evol Med Dent Sci.* 2021;10(22):1667-1671.
28. Sauer MK, Drechsler T, Peron PF, Schmidtman I, Ohlendorf D, Wehrbein H, Erbe C. Aligner therapy in adolescents: first-year results on the impact of therapy on oral health-related quality of life and oral hygiene. *Clin Oral Investig.* 2023 Jan;27(1):369-375.
29. Anderson LE, Arruda A, Inglehart MR. Adolescent patients' treatment motivation and satisfaction with orthodontic treatment. *Angle Orthod.* 2009;79(5):821-827.
30. Margolis MJ. Esthetic considerations in orthodontic treatment of adults. *Dent Clin North Am.* 1997 Jan;41(1):29-48.
31. Riedmann T, Georg T, Berg R. Adult patients' view of orthodontic treatment outcome compared to professional assessments. *J Orofac Orthop.* 1999;60(5):308-20.
32. Yao J, Li DD, Yang YQ, McGrath CP, Mattheos N. What are patients' expectations of orthodontic treatment: a systematic review. *BMC Oral Health.* 2016 Feb 17;16:19.



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