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Original article

Public Perceptions Toward the Ideal Age for Initiating Orthodontic Treatment: A Cross-sectional Survey in Az-Zawiyah City, Libya

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Abstract
The optimal timing for initiating orthodontic treatment remains a subject of debate among clinicians, yet community-level awareness on this topic remains understudied, particularly in North Africa. This study aimed to evaluate the perceptions and attitudes of the general population in Az-Zawiyah City, Libya, regarding the ideal age for initiating orthodontic treatment. A descriptive cross-sectional survey was conducted online in November 2025 using a structured, self-administered questionnaire distributed via social media platforms. A convenience sample of 915 participants was recruited, including orthodontic patients, members of the general public, parents, and students aged 10–68 years. The questionnaire assessed participants' demographic data, prior orthodontic experience, perceived ideal treatment age, and attitudes toward early intervention. Data were analyzed using descriptive statistics and the chi-square goodness-of-fit test ($p < 0.05$) with SPSS 27. The majority of respondents (53.6%) were aged 21–30 years, and 63.3% had no prior orthodontic treatment. The most frequently endorsed ideal treatment age was case-dependent (29.8%), followed by 15–18 years (26.2%) and 10–14 years (25.2%). Only 5.8% believed treatment should begin before age 10. Regarding early intervention, 37.3% strongly supported it, and 28.3% supported it conditionally, while 24.2% preferred to wait. All response distributions were statistically significant ($p < 0.001$). The community in Az-Zawiyah City holds generally positive attitudes toward orthodontic treatment and supports early intervention when problems are clearly visible. However, knowledge gaps persist regarding specific timing thresholds and clinical indications for early screening. These findings underscore the need for targeted public health education and enhanced collaboration between pediatric dentists and orthodontists in Libya.
Keywords. Orthodontic Treatment Timing, Early Orthodontic Intervention, Community Perceptions, Malocclusion, Cross-sectional Survey.

Introduction

Enhancing dental function and facial aesthetics has consistently remained a primary objective of orthodontic treatment. With increasing awareness, patients today place significant emphasis on achieving optimal esthetic outcomes, and orthodontic therapy plays a vital role in guiding craniofacial growth and improving overall facial harmony. While treatment duration is largely dictated by the individualized treatment plan, it is also influenced by biological and behavioral factors, including patient compliance, malocclusion severity, and the timing of intervention [1,2].

The determination of the optimal timing for initiating orthodontic treatment remains a topic of ongoing debate. Despite significant progress in diagnostic technologies and therapeutic methodologies, there is still no consensus among orthodontic professionals regarding the most appropriate stage for commencing intervention [3,4]. Although the American Association of Orthodontists recommends that initial orthodontic evaluation should occur by the age of seven, a considerable number of practitioners prefer to delay active treatment until the eruption of all permanent teeth, typically around the age of twelve [4].

From a clinical standpoint, the consideration of early versus late treatment has been extensively studied, particularly for Class II malocclusion. A recent systematic review by Dinu et al. (2025), analyzing eleven randomized controlled trials and observational studies, found that eight of these studies reported statistically significant advantages favoring early orthodontic intervention, particularly in skeletal growth, maxillary arch development, and airway dimensions. The review concluded that early treatment, when timed appropriately with craniofacial growth phases, can reduce the need for extractions and complex multi-phase therapy, though individualized planning remains essential [5].

Similarly, a scoping review by Hamidaddin (2024) found that early intervention was not universally superior in terms of overall effectiveness or cost-benefit ratio, and recommended that it be reserved for specific conditions with clear psychosocial or skeletal benefits [4]. A German S3 clinical practice guideline further concluded that while most malocclusions can be effectively managed across different dentition stages, early intervention is particularly indicated for pronounced skeletal Class II and III anomalies and transverse discrepancies [3]. Studies on interceptive orthodontic treatment needs among children have further demonstrated that a significant proportion of pediatric patients — up to 35% in some populations — present with conditions requiring early intervention, with posterior crossbite and harmful oral habits being the most prevalent findings [6].

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Beyond clinical considerations, patient knowledge, attitudes, and perceptions play an important role in shaping when and whether individuals seek orthodontic care. Research has shown that patients with better knowledge of orthodontic treatment tend to have more positive attitudes and improved compliance, which in turn influences clinical outcomes [2]. However, community-level awareness regarding the optimal timing of orthodontic treatment remains understudied, particularly in the Arab world and North Africa.
The objective of this study is to evaluate the perceptions and attitudes of the general population in Az-Zawiyah City, Libya, regarding the optimal age for initiating orthodontic treatment, through a cross-sectional community survey.

Methods

This study employed a descriptive cross-sectional survey design to assess perceptions and opinions regarding the optimal age for initiating orthodontic treatment.

Study setting and duration

The survey was conducted online in Az-Zawiyah City, Libya, in November 2025.

Study population and sampling

A convenience sample of 915 participants completed the questionnaire, comprising a mix of orthodontic patients, members of the general public, parents, and students. Respondents' ages ranged from approximately 10 to 68 years. The survey link was distributed via social media platforms and messaging applications, and participation was voluntary.

Data collection tool

Data were collected using a structured, self-administered online questionnaire created and distributed through Google Forms. The questionnaire consisted of six items: (1) respondent's current age, (2) prior history of orthodontic treatment, (3) perceived ideal age to begin orthodontic treatment, (4) attitude toward early orthodontic intervention when clear problems appear in children, (5) an open-ended rationale for the response to item 4, and (6) an optional open-ended item for sharing general opinions or experiences with orthodontic treatment.

Ethical considerations

Participation was voluntary, and informed consent was implied by completion of the survey. Responses were collected anonymously through Google Forms, and confidentiality of participant data was maintained throughout.

Statistical Methods

The data were coded and entered into a statistical analysis program for processing. Descriptive statistics, including frequencies and percentages, were used to summarize participants' demographic characteristics and their responses to all survey items. To examine differences in response distributions and to determine whether the observed frequencies deviated significantly from expected values, the chi-square test of goodness of fit was applied to the categorical variables. Statistical significance was evaluated using a *p*-value threshold of < 0.05. All analyses were conducted using SPSS 27.

Results

A total of 915 participants completed the survey. Respondents' ages ranged from approximately 10 to 68 years, reflecting a broad community sample including patients, general public members, parents, and students. This distribution indicates that the majority of respondents were concentrated in age groups typically regarded as more receptive to orthodontic assessment and treatment.
Results in (Table 1) show that most participants fell within the young adult age range.

Table 1. Age of the participants

Age	Count	%
10-20 years	184	20.1%
21-30 years	490	53.6%
31-40 years	136	14.9%
41-50 years	74	8.1%
More than 50 years	31	3.4%
Total	915	100.0%

Prior orthodontic treatment

The majority of respondents (63.3%) had never previously undergone orthodontic treatment, while 21.9% had, and 14.9% reported they were considering it in the future.

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As shown in (Table 2), a significant difference was observed in participants' responses regarding prior or potential orthodontic treatment, $x^2 = 375.941$, $p < 0.001$.

Table 2. Have you ever had orthodontic treatment (braces)?

Answer	Count	%	Chi square	P value
Yes	200	21.9%	375.941	< 0.001
No	579	63.3%		
Think of it in future	136	14.9%		
Total	915	100.0%		

Perceived ideal age for initiating orthodontic treatment

When asked about the ideal age to begin orthodontic treatment, 25.2% of respondents selected 10 to 14 years as the optimal period, followed by 26.2% who preferred 15 to 18 years, and 29.8% who indicated that timing depends on the individual case. A smaller proportion (12.9%) preferred treatment after age 18, while 5.9% favored initiation before 10 years of age.

(Table 3) illustrates participants' perceptions regarding the ideal age to begin orthodontic treatment. The distribution of responses differed significantly from what would be expected by chance, $x^2 = 190.044$, $p < 0.001$.

Table 3. In your opinion, what is the ideal age to start orthodontic treatment?

Answer	Count	%	Chi square	P value
Before 10 years	53	5.8%	190.044	< 0.001
10-14 years	231	25.2%		
15-18 years	240	26.2%		
After 18 years	118	12.9%		
Differ by case	273	29.8%		
Total	915	100.0%		

Attitudes toward early orthodontic intervention

Regarding support for early treatment when clear problems appear in children, 37.3% strongly supported early intervention, and 28.3% supported it in some cases only. A minority (10.3%) preferred to wait until the child is older, while 24.2% were unsure.

As presented in (Table 4), participants showed significant variation in their views on initiating early orthodontic treatment when clear dental problems appear, $x^2 = 138.722$, $p < 0.001$.

Table 4. Do you support starting early in the treatment of children when clear problems appear?

Answer	Count	%	Chi square	P value
No. better wait	221	24.2%	138.722	< 0.001
I am not sure	94	10.3%		
Yes, in some cases	259	28.3%		
Yes, I strongly agree	341	37.3%		
Total	915	100.0%		

Reasons given for attitudes toward early treatment

Among those who supported early intervention, the most commonly cited reasons included prevention of future complications, better outcomes during the growth period, reduced need for complex treatment later, improvement of the child's self-confidence, and prevention of bullying related to dental appearance. Those who preferred to wait cited concerns about the child's ability to comply with treatment requirements, incomplete dental development, and the expectation that some issues may self-correct.

Personal experiences

Of the 324 respondents who chose to share personal experiences, the majority described positive outcomes with orthodontic treatment, with several noting improvements in self-confidence and dental appearance. A small number reported negative experiences, including dissatisfaction with treatment results or compliance difficulties.

Discussion

This study sought to evaluate community awareness and attitudes regarding the optimal timing of orthodontic treatment among the general population of Az-Zawiyah City, Libya. A total of 915 participants responded to the survey, with the majority (53.6%) falling within the 21–30 age group, followed by those aged 10–20 years (20.1%). This demographic profile is consistent with findings from other community-based

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surveys, in which younger adults tend to dominate response samples due to greater digital engagement and heightened interest in dental aesthetics [2]. The predominance of younger respondents may also reflect growing awareness of orthodontic issues among this age cohort in the Libyan context, where access to information through social media and peer networks is increasingly influential.

Regarding prior orthodontic experience, the majority of participants (63.3%) had never undergone orthodontic treatment, while only 21.9% reported previous experience with braces. An additional 14.9% expressed openness to treatment in the future. This pattern suggests a significant gap between the recognized need for orthodontic care and actual treatment uptake in this population. The low treatment rate may be attributable to limited specialist availability, financial constraints, or insufficient awareness about the benefits of timely intervention — barriers that are commonly reported in developing regions and underserved communities [2]. Nevertheless, the notable proportion expressing future intent indicates a positive shift in public receptiveness toward orthodontic care.

When asked about the ideal age to initiate orthodontic treatment, the most frequently chosen response was that timing "differs by case" (29.8%), suggesting that a meaningful proportion of the community has developed a nuanced understanding of orthodontic decision-making. This finding is clinically encouraging and aligns with the consensus expressed in contemporary orthodontic guidelines, which emphasize that the ideal treatment timing must be individualized based on the type and severity of the malocclusion, the patient's growth stage, and the specific treatment objectives [3,4]. However, a combined 51.4% of respondents favored initiation during adolescence — either between 10–14 years (25.2%) or 15–18 years (26.2%) — reflecting a widespread perception that orthodontic treatment is primarily an adolescent concern. Only 5.8% believed treatment should begin before age 10, pointing to limited awareness among the public regarding the potential benefits of early interceptive intervention.

This finding warrants attention in light of evidence from the clinical literature. The American Association of Orthodontists recommends that children receive their first orthodontic evaluation by age seven, as this allows early identification of developing skeletal and dental anomalies during the mixed dentition phase (4). A German S3 clinical practice guideline concluded that most malocclusions can be managed effectively across different dentition stages; however, early intervention is specifically indicated for pronounced Class II and Class III skeletal anomalies and transverse discrepancies, conditions where treatment efficacy diminishes significantly if delayed beyond the active growth period [3]. A recent systematic review by Dinu et al. further reported that eight of eleven included studies found statistically significant advantages for early orthodontic intervention, particularly with respect to skeletal growth modification, maxillary arch development, and airway dimensions [5]. Despite this, the present study found that only a small minority of community members were aware of the potential benefits of pre-adolescent treatment, indicating a disconnect between clinical evidence and public knowledge.

Concerning attitudes toward early intervention when clear dental problems are evident, the results were more positive. A combined 65.6% of participants either strongly agreed (37.3%) or conditionally agreed (28.3%) that early treatment is appropriate when obvious problems are present. Only 24.2% preferred waiting, and 10.3% were undecided. This distribution indicates that the general public in Az-Zawiyah City is broadly supportive of proactive orthodontic management, particularly when the need is visible and apparent. These findings are broadly consistent with results from KAP (Knowledge, Attitude, and Practice) studies conducted in other regions, which have similarly found that patients tend to endorse treatment when its necessity is clearly perceived [2]. The qualitative responses further reflect an understanding of the biological rationale for early treatment — particularly the adaptability of the growing jaw — as well as the psychological benefits of correcting dental anomalies in childhood, including improved self-esteem and reduced risk of bullying.

At the same time, participants who preferred a more cautious approach raised valid concerns about children's readiness for orthodontic appliances, compliance with oral hygiene, and the importance of individualized assessment. These concerns resonate with findings in the clinical literature. Skidmore et al. demonstrated that poor oral hygiene and appliance-related issues such as bracket breakages significantly prolonged treatment duration [1], while Mathew et al. found that a substantial proportion of patients failed to consistently alter their dietary habits during active treatment [2]. Melo et al. similarly identified patient compliance factors — specifically missed appointments and appliance breakages — as the most significant predictors of treatment time variability in adult patients [7]. Together, these studies underscore the importance of readiness and cooperation in determining the success of early intervention, and help contextualize the community's cautious sentiments.

The epidemiological context also supports the need for greater early orthodontic awareness in Libya. A prospective study of Italian schoolchildren found that 35.5% of children aged 4–10 years required interceptive orthodontic treatment, with posterior crossbite (36.3%) and harmful oral habits (29.5%) as the most prevalent conditions [6. Given that the prevalence of malocclusion is similarly high across Mediterranean and North African populations, and that timely interception of crossbites, oral habits, and skeletal discrepancies can meaningfully reduce the burden of comprehensive treatment later in life, the limited public awareness regarding early orthodontic screening in Az-Zawiyah is particularly concerning.

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Early identification and correction of these conditions during the primary or mixed dentition phases — before the palatal suture begins to ossify and skeletal plasticity diminishes — is far more effective than delayed management [8,9].

The overall pattern of responses points to a community that is generally receptive to orthodontic care but lacks specific knowledge about the evidence-based rationale for early screening and intervention. While participants showed awareness that timing should be case-specific and that early treatment can benefit children with visible problems, fewer appreciated the clinical threshold of age seven as a benchmark for initial evaluation, or understood the specific malocclusion types for which early treatment is particularly advantageous. This gap between general receptiveness and specific knowledge has been documented in similar community surveys and reflects the need for targeted public health messaging [2].

Several limitations of this study should be acknowledged. The sample was predominantly composed of younger adults, which may limit generalizability to older segments of the Libyan population. The survey design relied on self-reported perceptions rather than clinical assessments, and the cross-sectional nature of the study precludes causal inference. Furthermore, as the study was conducted in a single city, findings may not be representative of other regions of Libya with differing socioeconomic and educational profiles. Future research should incorporate broader geographic coverage, validated questionnaire instruments, and clinical data to provide a more comprehensive picture of orthodontic awareness and treatment-seeking behavior across Libya.

In conclusion, this study reveals that the community in Az-Zawiyah City holds generally positive attitudes toward orthodontic treatment and supports early intervention when dental problems are visible. However, knowledge gaps persist regarding the specific indications and timing thresholds for early orthodontic evaluation. These findings highlight a clear need for public health education campaigns, improved collaboration between pediatric dentists and orthodontists, and earlier integration of orthodontic screening into routine childhood dental care in Libya.

Conclusions

Most participants recognize the importance of early orthodontic assessment, especially during active growth phases. Experiences with braces vary widely, but interest in future treatment remains relatively high. Perceptions of the ideal treatment age are diverse, yet a case-by-case approach is the most commonly favored. Strong support exists for early intervention when clear dental problems appear, though opinions vary based on perceived severity, maturity, and individual readiness. The overall pattern indicates a balanced understanding of the benefits of early treatment and the need for individualized clinical decision-making.

Conflicts of Interest

The authors declare no conflicts of interest.

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