

ORIGINAL RESEARCH

Parental knowledge, attitudes, and perceptions regarding myofunctional appliances in Coastal Karnataka, India: a cross-sectional study

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Abstract

Background: The study aimed to evaluate the parental knowledge, attitudes, and perceptions (KAP) regarding the need for and effectiveness of myofunctional appliances in managing skeletal discrepancies among growing children. **Methods:** A cross-sectional descriptive survey was conducted among parents of children aged 7–13 years using a structured online questionnaire. A web-based questionnaire was developed using Google Forms, and 126 parents completed the survey. The calculated sample size was 126 participants. A structured 10-item questionnaire was developed to assess parental knowledge, awareness, attitudes, and perceptions regarding functional orthopedic appliance therapy in children. **Results:** Most parents demonstrated a positive attitude toward myofunctional appliance therapy. Approximately 90.5% of parents were aware of jaw and dental malalignment issues, 81% were willing to allow their child to undergo appliance therapy, and 83.3% believed that treatment timing impacts outcomes. **Conclusions:** The study revealed considerable parental awareness and favourable attitudes toward myofunctional appliances. Enhanced parental education and awareness initiatives are recommended to bridge the gap between awareness and the utilization of orthodontic services.

Keywords

Myofunctional therapy; Orthodontic appliances, parental awareness; Health knowledge, attitudes

1. Introduction

Facial balance and dentofacial harmony are integral to the psychological development, emotional well-being, and social interaction of an individual [1]. Among children and adolescents, increasing societal emphasis on facial appearance has brought early attention to dental and facial aesthetics [2]. An aesthetic smile, symmetrical jaw alignment, and proportional facial structure are now perceived as critical components contributing to self-esteem and personality development from an early age. Consequently, early orthodontic interventions are being increasingly recognized not only for functional rehabilitation but also for enhancing facial esthetics [3].

The most commonly encountered skeletal discrepancy during childhood is Class II malocclusion, which is often characterized by mandibular retrognathism. This condition disrupts occlusal function and compromises facial profile, leading to both physiological and psychological consequences. Class II Division I malocclusion, in particular, presents with a retruded mandible, proclined maxillary incisors, and increased overjet. If left untreated, it can persist into adulthood, adversely affecting oral health [4].

McNamara [5] has emphasized that Class II skeletal

malocclusion is primarily characterized by mandibular retrusion and is more common than maxillary prognathism. This discrepancy may arise due to anatomical variations such as reduced mandibular size or posteriorly positioned condyles. Myofunctional appliances have emerged as an effective non-invasive treatment modality in interceptive orthodontics, especially during the growth phase. These appliances are designed to eliminate dysfunctional muscle activity and guide appropriate growth of the maxillofacial complex. Their functional principle is based on redirecting and stimulating mandibular growth while restraining maxillary excess, thereby achieving skeletal correction through modulation of natural growth patterns [6]. Myofunctional appliances thus play a vital role in achieving facial balance and improving oral function without surgical intervention.

In the present study, the term “myofunctional appliance therapy” primarily refers to functional orthopedic appliances used during growth to modify jaw relationships and correct developing skeletal discrepancies, particularly mandibular retrusion. This includes removable or fixed functional appliances used as part of interceptive orthodontic treatment. Prefabricated myofunctional appliances and habit-breaking appliances are related but distinct categories and are therefore referred to

separately where applicable.

The timing of treatment play a pivotal role in the success of functional therapy. The pubertal growth spurt, typically between 10–13 years in girls and 11–14 years in boys, provides a unique window of opportunity during which skeletal changes can be maximized [7]. Initiating therapy within this period not only reduces the severity of future orthodontic needs but may also prevent the need for invasive procedures in adulthood [8]. However, the effectiveness of myofunctional therapy depends on multiple factors such as patient compliance, proper diagnosis, and most importantly, parental awareness and acceptance. Since children depend on their parents for healthcare decisions, parental knowledge, attitudes, and perceptions of parents regarding skeletal discrepancies and their treatment options significantly influence the initiation, continuation, and success of orthodontic care. Recent evidence also indicates that parental awareness of the importance, timing, and benefits of early orthodontic evaluation remains central to timely interceptive treatment planning [9].

Despite the clinical relevance and effectiveness of myofunctional appliances, a perceptible gap exists in public awareness, particularly among parents regarding their role, benefits, and appropriate timing. Misconceptions, limited access to orthodontic information, and insufficient communication from dental professionals may contribute to delayed or missed opportunities for early intervention. The lack of awareness among caregivers remains a major barrier to timely orthodontic treatment, even when effective appliances are readily available.

In this context, understanding parental perspectives becomes crucial. Assessing their knowledge, attitudes, and perceptions regarding myofunctional therapy provides valuable insight into existing gaps and potential strategies for improvement. Therefore, the present cross-sectional study was designed to evaluate parental knowledge, attitudes, and perceptions regarding myofunctional appliances for the correction of jaw discrepancies in children aged 7–13 years. By exploring parental understanding, beliefs, and readiness for early intervention, this study aims to inform targeted educational initiatives and promote timely orthodontic care planning for growing children.

2. Materials and methods

2.1 Study design and setting

A descriptive, cross-sectional questionnaire-based survey was conducted among parents residing in the Coastal Karnataka region, India. The study aimed to assess their knowledge, attitudes, and perceptions regarding the need for and effectiveness of myofunctional appliances in managing skeletal discrepancies in growing children. Data collection was carried out using an online format to ensure accessibility and convenience for respondents. The study was conducted over a period of 3 months, from 12 September 2025 to 12 December 2025.

2.2 Study population and eligibility criteria

The study population included parents or guardians of children aged 7–13 years. Inclusion criteria were: (i) parents aged

≥18 years, (ii) ability to read and comprehend English, and (iii) voluntary consent to participate. Parents of children with craniofacial syndromes or prior orthognathic treatment were excluded. The survey link was distributed via school and community networks in both urban and semi-urban areas of Coastal Karnataka.

2.3 Sample size determination

Based on a prevalence assumption of 80% parental awareness regarding orthodontic treatment, a precision of 7%, and a 95% confidence level, the minimum calculated sample size was ≈120. Allowing for a small non-response margin, 126 parents completed the questionnaire, fulfilling the desired sample requirement. Participation was entirely voluntary and anonymous.

2.4 Questionnaire design and validation

A structured 10-item questionnaire was developed to assess parental knowledge, attitudes, and perceptions regarding myofunctional appliance therapy. The initial item pool was adapted from previously published questionnaire-based studies evaluating orthodontic awareness and perceptions regarding myofunctional appliance therapy. Items relevant to general orthodontic awareness, treatment timing, jaw-position correction, facial esthetics, abnormal oral habits, and willingness to undergo treatment were retained and modified to suit the objectives of the present study and the local parental population. The wording of the questions was simplified to ensure ease of comprehension among parents and to minimize ambiguity during self-administration.

Content validation was performed by a panel of three orthodontic faculty members with experience in interceptive orthodontics and questionnaire-based research. Each expert independently assessed the questionnaire items for relevance, clarity, simplicity, and appropriateness within the intended knowledge, attitude, and perception domains. The item-level content validity index (I-CVI) was calculated as the proportion of experts rating each item as relevant. Items with an I-CVI ≥0.78 were retained. The scale-level content validity index, calculated as the average of item-level content validity indices across all retained items, was 0.90, indicating satisfactory content validity. Minor wording modifications were made based on expert feedback before pilot testing.

A pilot survey was then conducted among 15 parents who fulfilled the eligibility criteria but were excluded from the final analysis. The pilot study assessed the ease of understanding, feasibility of responses, approximate completion time, and internal consistency of the questionnaire. No major difficulties in comprehension were reported. The Cronbach's alpha value obtained after the pilot study was 0.82, indicating good internal consistency and acceptable reliability of the questionnaire.

2.5 Questionnaire structure

The final survey comprised ten closed-ended questions formulated to evaluate parental knowledge, attitudes, and perceptions regarding myofunctional appliance therapy. The initial section focused on assessing parental attitudes and willingness

to initiate jaw-correction therapy for their children, including whether their child was currently undergoing orthodontic treatment and the extent to which parents believed that an attractive smile influences a child's personality development. The subsequent segment evaluated the knowledge domain, exploring the level of awareness among parents about jaw and dental malalignment problems, their understanding of the appropriateness of orthodontic treatment during the growth phase, their perception of the impact of treatment timing on therapeutic success, and their familiarity with specialized jaw-correction procedures such as myofunctional therapy.

The final component of the questionnaire assessed parental perceptions, examining their beliefs about whether correction of dental malalignment enhances facial appearance, awareness of appliances used to address abnormal oral habits, and their previous experiences with dental visits related to their child's jaw or alignment concerns. All questions were presented in a dichotomous "Yes" or "No" format to facilitate ease of response and allow clear, quantifiable interpretation of data. This structured design enabled systematic evaluation of parental awareness while minimizing ambiguity and response fatigue, thereby improving the overall reliability and validity of the collected data.

2.6 Research questions

Q1: Are you willing to let your child undergo a special jaw position correcting appliance therapy to correct their jaw position problems?

Q2: Is your child undergoing any Orthodontic appliance therapy?

Q3: Do you believe that having a beautiful smile has a positive effect on the development of your child's personality?

Q4: Are you aware of jaw position and dental malalignment problems?

Q5: Do you think that children can undergo Orthodontic treatment during their growth period?

Q6: Do you believe the age at which a patient begins Orthodontic treatment has an impact on how well the therapy goes?

Q7: Are you aware of the need for a special jaw position correction therapy for jaw position problems?

Q8: Can the correction of dental malalignment improve the facial look?

Q9: Are you aware of the existence of appliances to correct abnormal oral habits?

Q10: Did you visit the Dentist at any point for correction of jaw position and dental malalignment problems?

2.7 Data collection procedure

The survey link was disseminated digitally through school WhatsApp groups, dental clinic networks, and community outreach programs. The first page of the form provided a participant information sheet and a mandatory informed consent statement. To maintain data integrity, only one response per device was permitted, and incomplete submissions were restricted through mandatory field settings.

2.8 Data management and statistical analysis

Responses were exported to Microsoft Excel 2021 (Microsoft Corporation, Redmond, WA, USA) and analyzed using IBM SPSS Statistics version 26.0 (IBM Corp., Armonk, NY, USA). Descriptive statistics, including frequencies and percentages, were used to summarize responses to each questionnaire item. Since demographic variables such as parental age, gender, education level, socioeconomic status, and residential setting were not comprehensively recorded, subgroup comparisons and inferential analyses were not performed. The overall pattern of parental knowledge, attitudes, and perceptions was therefore interpreted descriptively based on the proportion of affirmative and negative responses.

2.9 Bias control

Selection bias was minimized by circulating the survey across multiple independent sources to ensure heterogeneity of respondents. Information bias was reduced by keeping the questionnaire short, unambiguous, and self-administered. The anonymous format aimed to reduce social-desirability bias.

3. Results

The distribution of parental responses to the ten knowledge, attitude, and perception questions is presented in Table 1. Of the 126 parents included in the study, 102 respondents (81.0%) expressed willingness to allow their child to undergo jaw-position correction therapy, while 27 respondents (21.4%) reported that their child was currently receiving orthodontic appliance therapy. A high proportion of parents believed that a beautiful smile positively affects personality development (120/126; 95.2%) and that correction of dental malalignment can improve facial appearance (120/126; 95.2%). Awareness of jaw-position and dental malalignment problems was reported by 114 respondents (90.5%), while 117 respondents (92.9%) believed that children can undergo orthodontic treatment during the growth period. In addition, 105 respondents (83.3%) believed that the age at which orthodontic treatment begins influences treatment outcomes, and 111 respondents (88.1%) were aware of appliances used for correcting abnormal oral habits. Previous dental consultation for jaw-position or dental malalignment concerns was reported by 71 respondents (56.3%) (Fig. 1).

4. Discussion

The present cross-sectional survey was conducted to evaluate the knowledge, attitudes, and perceptions of parents regarding myofunctional appliance therapy in the management of jaw position abnormalities among children. The findings of this study suggest generally favorable parental awareness and attitudes toward orthodontic interventions, particularly functional orthopedic appliance therapy during the growth period.

A significant proportion of parents (81%) indicated their willingness to allow their children to undergo jaw position correction therapy, suggesting a favorable outlook toward early orthodontic intervention. This aligns with the findings of Bhu-

TABLE 1. Distribution of parental responses to survey questions assessing knowledge, attitudes, and perceptions toward myofunctional appliance therapy.

Question	Response	Counts	% of Total
Q1: Are you willing to let your child undergo a special jaw position correcting appliance therapy to correct their jaw position problems?	Yes	102	81.0%
	No	24	19.0%
Q2: Is your child undergoing any Orthodontic appliance therapy?	Yes	27	21.4%
	No	99	78.6%
Q3: Do you believe that having a beautiful smile has a positive effect on the development of your child's personality?	Yes	120	95.2%
	No	6	4.8%
Q4: Are you aware of jaw position and dental malalignment problems?	Yes	114	90.5%
	No	12	9.5%
Q5: Do you think that children can undergo Orthodontic treatment during their growth period?	Yes	117	92.9%
	No	9	7.1%
Q6: Do you believe the age at which a patient begins Orthodontic treatment has an impact on how well the therapy goes?	Yes	105	83.3%
	No	21	16.7%
Q7: Are you aware of the need for a special jaw position correction therapy for jaw position problems?	Yes	114	90.5%
	No	12	9.5%
Q8: Can the correction of tooth malalignment improve the facial look?	Yes	120	95.2%
	No	6	4.8%
Q9: Are you aware of the existence of appliances to correct abnormal oral habits?	Yes	111	88.1%
	No	15	11.9%
Q10: Did you visit the Dentist at any point for correction of jaw position and dental malalignment problems?	Yes	71	56.3%
	No	55	43.7%

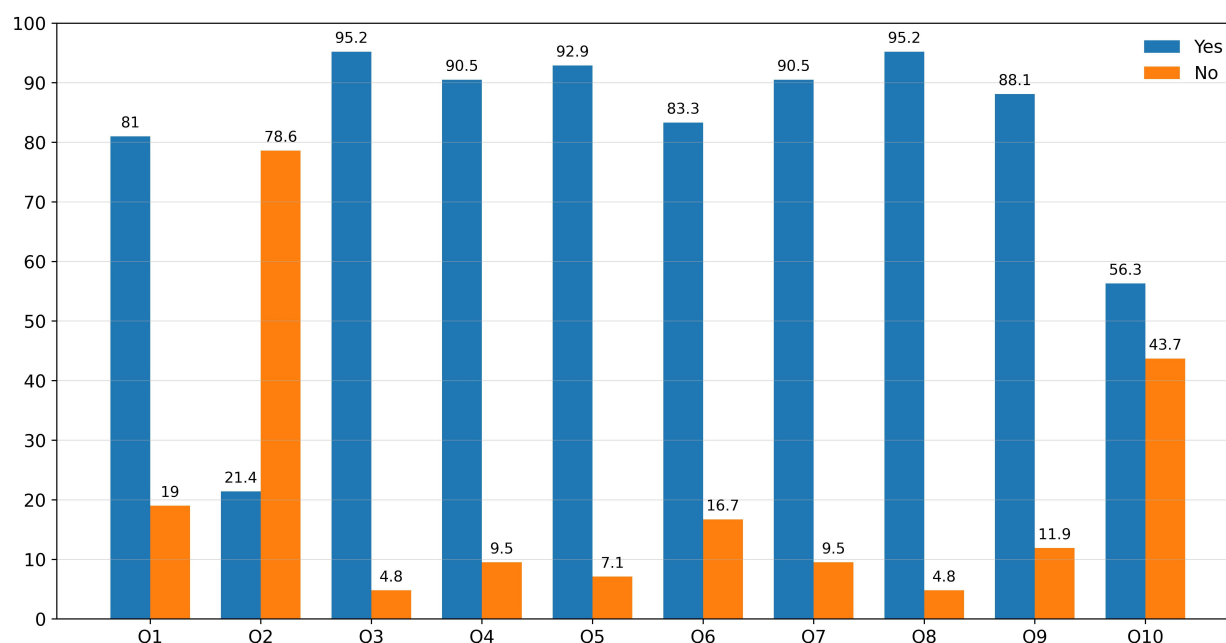


FIGURE 1. Distribution of parental responses regarding knowledge, attitudes, and perceptions toward myofunctional appliance therapy. The Y-axis represents the percentage of responses.

vaneswari Mani *et al.* [8], who reported that 64% of surveyed parents were willing to encourage their children to undergo similar treatment, underscoring the increasing parental interest in early orthopaedic correction. However, despite this encouraging attitude, only 21.4% of children in the current study were found to be undergoing active orthodontic appliance therapy. The finding that 81.0% of parents were willing to consider jaw-position correction therapy, whereas only 21.4% reported that their child was currently undergoing orthodontic appliance therapy, suggests a discrepancy between parental acceptance and actual treatment utilization. However, because the present study did not measure socioeconomic status, affordability, parental education, referral pathways, or access to specialist orthodontic care, the underlying reasons for this gap remain uncertain. Madiraju [10] reported a similar awareness–utilization gap in early orthodontic treatment, with treatment cost, long waiting time, and lack of insurance coverage identified as key barriers to accessing care. Similar findings were reported by Alfuriji *et al.* [11], who found that parental awareness and acceptance play an important role in preventive and interceptive orthodontic treatment decisions, and that demographic and knowledge-related factors may influence acceptance of early intervention.

Parental awareness of jaw-position problems, dental malalignment, and treatment timing is clinically relevant because functional orthopedic therapy is most effective when initiated during appropriate stages of craniofacial growth. In Class II malocclusion associated with mandibular retrusion, appliances such as activators and twin-block appliances are designed to utilize residual growth potential and encourage mandibular advancement. Cozza *et al.* [12] also reported that functional appliances can produce supplementary mandibular growth effects in Class II subjects, although the magnitude of change varies according to appliance type, treatment duration, and study quality. Pachori Y *et al.* [13] emphasized the importance of early intervention in growing individuals with skeletal Class II Division I malocclusion and mandibular deficiency. D'Antò *et al.* [14], in a systematic review of systematic reviews, also reported that functional orthopedic treatment for Class II malocclusion in growing patients can produce measurable treatment effects, although the strength and clinical relevance of the evidence vary across appliance types and study designs. Bidjan *et al.* [15] further reported that functional appliance therapy in Class II malocclusion may influence dentoskeletal and airway-related outcomes, although the evidence should be interpreted cautiously because treatment response varies according to appliance design, growth stage, and study methodology. Pacha *et al.* [16] also compared fixed and removable functional appliances in children with Class II malocclusion and reported that appliance selection should consider not only treatment efficacy but also patient-centered factors such as compliance and acceptability. Therefore, parental understanding of treatment timing may contribute to earlier orthodontic consultation and improved acceptance of interceptive treatment. However, awareness alone does not ensure treatment uptake, as clinical utilization may also depend on diagnosis, referral pathways, affordability, access to specialist care, and child compliance.

Al-Jewair *et al.* [17] reported statistically significant short- and long-term changes in mandibular dimensions following Mandibular Anterior Repositioning Appliance (MARA) therapy in Class II patients, although the clinical magnitude of these changes was limited. This supports the biological rationale for functional orthopedic intervention during growth while also emphasizing that treatment effects should be interpreted in relation to clinical significance, skeletal maturity, appliance type, and patient compliance.

The strong parental emphasis on smile esthetics and facial appearance suggests that psychosocial concerns may influence orthodontic consultation. In growing children, esthetic concerns often overlap with functional and skeletal considerations, particularly when increased overjet, mandibular retrusion, or abnormal oral habits affect facial balance. However, treatment decisions should not be guided by esthetic concern alone and require professional diagnosis, assessment of skeletal maturity, appropriate appliance selection, and evaluation of compliance. Papageorgiou *et al.* [18] reported that prefabricated myofunctional appliances may produce moderate dentoalveolar improvements but may differ from custom-made functional orthopedic appliances in their skeletal and soft-tissue effects. Mohammed *et al.* [19] similarly concluded that prefabricated myofunctional appliances showed lower short-term effectiveness than activator appliances for Class II Division I malocclusion, although the quality of evidence was low and further long-term studies were recommended. Balian *et al.* [20] further reported that prefabricated myofunctional appliances may be associated with overbite reduction in children with deep-bite malocclusion, while their effects on the vertical skeletal pattern appear limited. This reinforces the need to distinguish prefabricated myofunctional appliances from functional orthopedic appliances and habit-breaking appliances.

Awareness of appliances used for correcting abnormal oral habits is also important because persistent oral habits during growth may contribute to the development of malocclusion. However, habit-breaking appliances differ from functional orthopedic appliances, and parental awareness of one category should not be assumed to indicate an understanding of the other. The finding that a proportion of parents had not previously sought dental consultation for jaw-position or dental malalignment concerns suggests a possible awareness–action gap. García *et al.* [21] and Di Spirito *et al.* [22] similarly reported that parental awareness of early orthodontic consultation is associated with parents' perception of dental problems such as overjet, overbite, and malocclusion, highlighting the importance of improving parental recognition of developing orthodontic problems. This should be interpreted cautiously because the present study did not assess clinical need, malocclusion severity, perceived urgency, affordability, or access to orthodontic services.

These observations are consistent with Verulkar *et al.* [23], who reported that awareness of functional jaw orthopedics remains variable and often insufficient. Their review emphasized the need enhanced public education, improved study designs, and validated outcome measures when evaluating awareness of functional orthopedic treatment. In the context of the present study, this supports the need for future research using more representative sampling, demographic stratifica-

tion, and evaluation of factors influencing actual treatment utilization.

Compared with the study by Mani *et al.* [8], the present survey showed a relatively higher proportion of affirmative responses regarding awareness of jaw-correction therapy and willingness to consider treatment. However, direct comparison between studies should be made cautiously because differences in sample characteristics, questionnaire design, survey distribution methods, and regional context may influence response patterns. Since these factors were not directly analyzed in the present study, they should be considered possible explanations rather than definitive conclusions.

5. Limitations

The present study has certain limitations. First, demographic variables such as parental age, gender, educational level, socioeconomic status, and residential characteristics (urban or semi-urban background) were not comprehensively assessed. Therefore, the influence of these factors on parental awareness, perceptions, and treatment-seeking behavior could not be analyzed. Granja *et al.* [24] reported that insufficient parental oral health literacy and lower family income were associated with greater orthodontic treatment need in schoolchildren, highlighting the relevance of including socioeconomic and literacy-related variables in future studies. Second, although the questionnaire assessed whether the child was undergoing orthodontic appliance therapy and whether parents had previously visited a dentist for jaw or dental alignment concerns, it did not capture detailed information regarding the type, duration, or outcome of prior orthodontic treatment. Third, the use of convenience online sampling through school WhatsApp groups, dental-clinic networks, and community outreach channels may have introduced selection bias. Parents with higher educational exposure, better digital access, greater health awareness, or prior interest in dental care may have been more likely to participate, thereby limiting the generalizability of the findings to the wider parental population. Future studies should include demographic stratification and multivariable analysis to identify independent predictors of awareness, acceptance, and actual utilization of functional orthopedic and interceptive orthodontic care. Broader dental-care literature also highlights that barriers to service utilization may include caregiver education, communication with providers, accessibility, professional training, and healthcare-system factors; therefore, future orthodontic awareness studies should assess these variables more directly [25].

The present study suggests that parental perceptions regarding functional orthopedic appliance therapy were generally favorable within the surveyed sample. However, the gap between awareness and clinical implementation remains a critical area for improvement. Educational interventions led by dental professionals, school-based awareness programs, and community outreach initiatives can further empower parents to make informed decisions about their child's orthodontic health during critical developmental periods [26].

6. Conclusions

This study confirms that most parents have a good level of awareness and a positive attitude toward myofunctional appliance therapy. While parental awareness was high, actual treatment uptake remains limited. Bridging this gap requires targeted health education, parental counseling, and proactive engagement by orthodontic professionals to encourage timely assessment and appropriate intervention.

AVAILABILITY OF DATA AND MATERIALS

The data supporting the findings of this study are available from the corresponding author upon reasonable request.

AUTHOR CONTRIBUTIONS

SS—conceptualization; supervision. FS—methodology; data collection. DU—formal analysis; writing—original draft preparation; writing—review and editing. All authors have read and approved the final version of the manuscript.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The study was approved by the Yenepoya Ethics Committee 2, Yenepoya (Deemed to be University), Mangalore, Karnataka, India, under approval number YEC2/2025/151. The study was conducted in accordance with the Declaration of Helsinki. Electronic informed consent was obtained from all participating parents or guardians before completion of the online questionnaire. Participation was voluntary, and no personally identifiable information was collected.

ACKNOWLEDGMENT

The authors thank Yenepoya Dental College, Yenepoya (Deemed to be University), Mangalore, Karnataka, India, for institutional support. The authors also thank all the parents who participated in the study and the school and community networks that assisted in the distribution of the questionnaire.

FUNDING

This research received no external funding.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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How to cite this article: Sandeep Shetty, Dilshad Umar, Fathima Salim. Parental knowledge, attitudes, and perceptions regarding myofunctional appliances in Coastal Karnataka, India: a cross-sectional study. *Journal of Clinical Pediatric Dentistry*. 2026; 50(5): 149-155. doi: 10.22514/jocpd.2026.124.