

# Quality and engagement of Instagram content related to mouthguard use in the prevention of sports-related dental trauma: a cross-sectional content analysis

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## Abstract

**Background** Social media platforms have become major sources of health-related information, particularly among children, adolescents, and their caregivers. Instagram, one of the most widely used platforms, hosts a large volume of user-generated content on preventive health topics. Mouthguards are an effective measure for preventing sports-related dental trauma; however, their use remains limited, partly due to insufficient awareness and access to reliable information. Evaluating the quality and engagement of social media content may help identify gaps in preventive oral health communication. Therefore, this study aimed to assess the quality and user engagement of Instagram posts related to mouthguard use in the prevention of sports-related dental trauma.

**Materials and methods** A descriptive cross-sectional content analysis was conducted on publicly available Instagram posts identified using nine predefined hashtags related to mouthguards, sports dentistry, and dental trauma. Posts published between February 2025 and November 2025 were retrospectively analyzed. A total of 90 English-language posts meeting predefined inclusion criteria were included. Content characteristics, post type, and engagement metrics (likes, comments, and follower counts) were recorded. Engagement rate was calculated to enable standardized comparison across accounts. Content quality was evaluated using the Instagram Quality Assessment Tool (IQAT), a structured scoring system specifically developed for this study based on established health information quality criteria. Posts were categorized as promotional, educational, or clinical case content, with clinical case content defined as posts presenting real patient cases, treatment procedures, or clinical outcomes. Non-parametric statistical tests were used to compare content types and assess the relationship between quality and engagement.

**Results** The mean quality score of the analyzed posts was  $9.21 \pm 4.84$ , indicating an overall low level of informational quality. Promotional content accounted for the majority of posts (53.3%), followed by clinical case content (30.0%) and educational content (16.7%). Promotional posts demonstrated significantly lower quality scores ( $6.20 \pm 2.02$ ) compared with educational ( $14.22 \pm 5.04$ ) and clinical posts ( $15.85 \pm 4.38$ ) ( $p < 0.001$ ). No significant correlation was observed between content quality and engagement rate ( $\rho = -0.024$ ,  $p = 0.820$ ), suggesting that higher-quality content did not result in greater user interaction.

**Conclusion** Instagram content on mouthguard use appeared to be predominantly promotional and demonstrated generally limited educational value based on the sampled posts evaluated in this study. Although educational

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and clinical posts demonstrate higher quality, this does not appear to translate into increased user engagement. Greater involvement of dental professionals and academic institutions may help improve the availability and reliability of evidence-based preventive information on social media.

**Keywords** Dental trauma · Mouthguard · Sports dentistry · Instagram · Social media · Content analysis

## Introduction

Sports-related dental trauma represents a clinically significant and largely preventable condition, particularly among children and young athletes [1, 2]. It is considered an important public health concern due to its negative impact on oral health and overall quality of life. Traumatic dental injuries may lead to functional, esthetic, and psychosocial consequences [3]. The reported incidence and prevalence of sports-related dental trauma vary across studies. Rates range from relatively low levels in some epidemiological investigations to higher prevalence among child athletes and participants in contact sports [1, 2, 4]. In these populations, common types of injuries include tooth fractures, avulsions, and luxation injuries [2, 4]. Given that many of these injuries are preventable, the use of protective measures such as mouthguards is essential for reducing their occurrence and severity [5].

Mouthguards are widely recommended as an effective preventive measure for reducing the risk of sports-related dental trauma [5]. Previous studies have shown that mouthguard use reduces the intensity of impact forces transmitted to the teeth and surrounding tissues, thereby lowering the risk and severity of traumatic dental injuries [6, 7]. Despite this evidence, mouthguard use remains suboptimal, particularly among children and young athletes. Studies have reported moderate levels of awareness but relatively low utilization of mouthguards among child athletes [4, 8]. In addition, differences in usage patterns have been observed across sports, with higher usage among combat athletes compared to team sports athletes [9]. Limited awareness, misconceptions, and inadequate education have been identified as key factors contributing to the underuse of mouthguards [10]. The widespread adoption of mouthguards largely depends on public awareness and access to reliable preventive information [4, 10]. With the growing use of digital media for health communication, athletes, parents, coaches, and caregivers increasingly seek health-related information through online platforms [11]. Therefore, the quality of online information may influence knowledge and preventive behaviors regarding sports-related dental trauma [11, 12].

In recent years, social media platforms have become important sources of health-related information. From a theoretical perspective, social media can be considered a key component of modern health communication, influencing how individuals access, interpret, and apply health-related information. In this context, digital health literacy plays an important role in determining users' ability to critically evaluate the accuracy and reliability of online content [11]. Platforms such as Instagram, which emphasize visual and easily consumable content, may further amplify both the dissemination of information and the potential spread of misinformation compared to text-based platforms. Compared with platforms such as YouTube or TikTok, Instagram combines visual communication with relatively stable content visibility and measurable engagement metrics, making it a suitable platform for content analysis [12, 13]. Among these platforms, Instagram is particularly relevant due to its visual format, high user engagement, and widespread use among adolescents and young adults [11, 14]. Within dentistry, Instagram is actively used to share treatment processes as well as educational and informational content. However, the quality and reliability of health-related information shared on social media vary considerably, and the spread of misinformation remains a significant concern [14, 15]. Studies have shown that a substantial proportion of dental-related content on Instagram may be misleading, promotional, or lacking scientific support [16, 17]. In addition, misinformation has been reported to influence user interaction patterns, sometimes attracting greater engagement than accurate information. This is particularly important for preventive topics such as mouthguard use, where inaccurate information may negatively affect health behaviors and risk perception [16].

Although research on dental-related content on social media has increased in recent years, studies specifically evaluating Instagram content related to mouthguard use and the prevention of sports-related dental trauma remain

limited [14, 18]. Unlike previous research that primarily focuses on content quality alone, the present study evaluates both content quality and user engagement. This approach provides a more comprehensive understanding of how information is both presented and received on social media [17, 19]. Accordingly, this study aimed to assess the quality and engagement of Instagram posts related to mouthguard use in the prevention of sports-related dental trauma.

## Materials and methods

### Study design

This descriptive, cross-sectional content analysis aimed to evaluate the quality and engagement of Instagram posts related to sports dentistry. A new Instagram® account ([www.instagram.com](https://www.instagram.com)) was created in December 2025 using incognito mode on a device with no previous browsing history to minimize algorithmic personalization. This account was used exclusively for data collection. Publicly available Instagram posts published between February 2025 and November 2025 were included in the analysis. Data collection was conducted between December 2 and December 15, 2025.

A structured, hashtag-based search strategy was performed using nine predefined hashtags related to sports dentistry and dental trauma (#sportdentistry, #sportsdentists, #dentaltrauma, #dentalinjury, #mouthguard, #sportsmile, #athletesmile, #sportsmouthguard, and #sportaccident). Hashtags were selected according to commonly used terminology in the literature and refined through preliminary exploratory searches to identify frequently used terms related to sports dentistry and dental trauma on Instagram. For each hashtag, both the “Top” and “Recent” tabs were screened, and approximately 20 posts per hashtag were evaluated, resulting in an initial pool of 180 posts. Eligible posts were subsequently identified according to predefined inclusion and exclusion criteria (Fig. 1). The final sample size was considered adequate for exploratory cross-sectional content analysis and was comparable to similar social media-based studies in the dental literature.

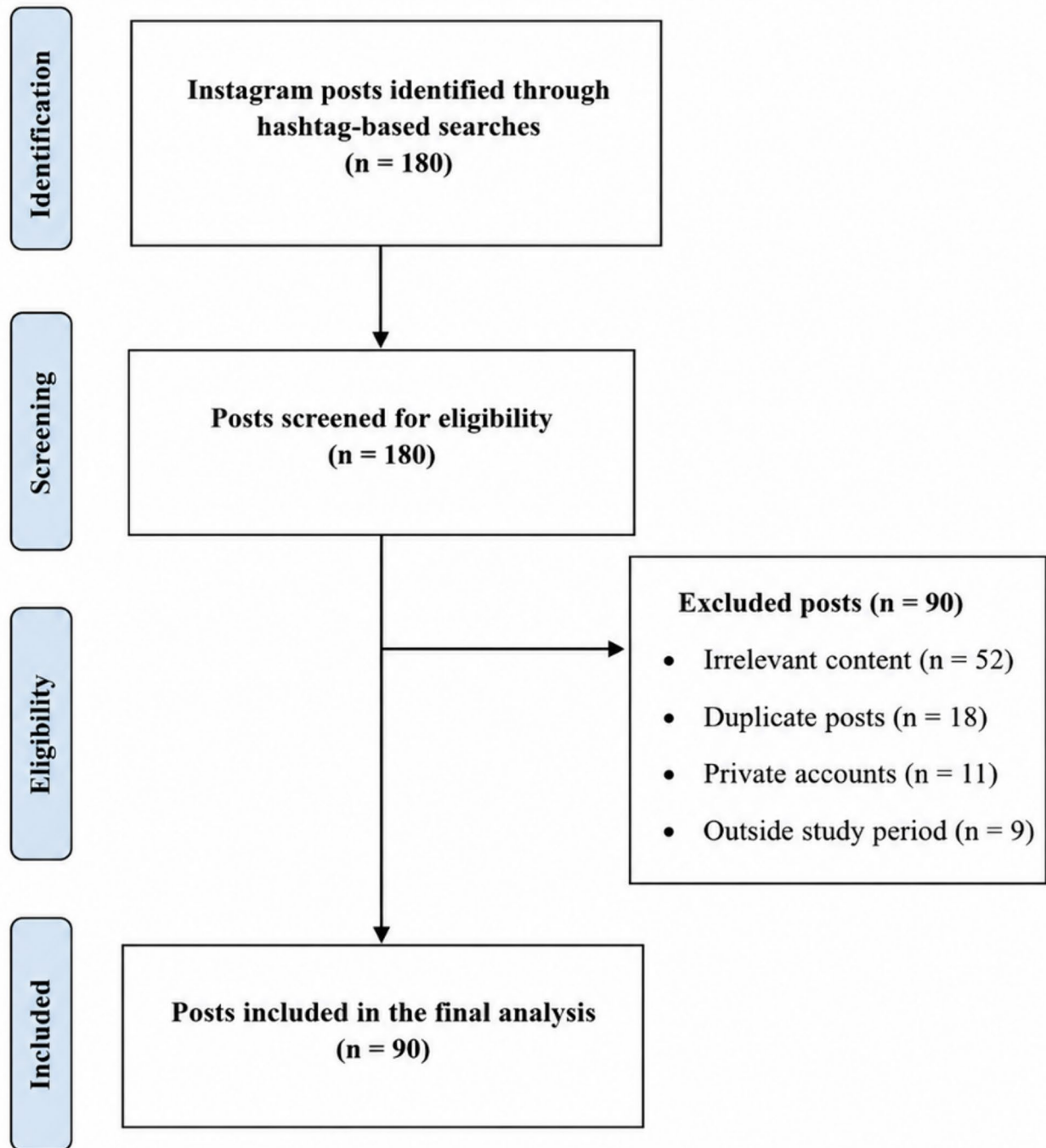
Eligibility criteria were defined prior to data collection. Inclusion criteria comprised publicly accessible English-language posts related to mouthguard use or sports-related dental trauma. Eligible posts were required to contain visual media in the form of photographs, videos, or Reels and to display visible engagement metrics, including the number of likes, comments, and followers. Posts uploaded by healthcare professionals, dental clinics, influencers, brands, scientific societies, or health-related community accounts were considered eligible. Exclusion criteria comprised duplicate posts, content irrelevant to the study topic, private accounts, and posts published outside the predefined study period.

All eligible posts were anonymized, archived, and recorded in a standardized data collection spreadsheet. The following variables were manually extracted: post format (photograph, video, or Reels), uploader type (dentist, clinic, influencer, brand, or health-related community account), hashtag used, content type, and engagement metrics (number of likes, comments, and followers).

Posts were categorized as educational, promotional, or clinical case posts. Educational posts were defined as posts providing explanatory or informative content regarding mouthguard use, dental trauma prevention, or sports dentistry. Promotional posts were defined as posts primarily intended to advertise products, services, clinics, or brands. Clinical case posts were defined as posts presenting real patient cases, treatment procedures, or clinical outcomes related to sports-related dental trauma.

All posts were independently reviewed and coded by two researchers (C.K. and G.Y.D.). Inter-rater agreement for content classification was assessed using Cohen’s kappa coefficient, which demonstrated substantial agreement between the reviewers ( $\kappa=0.85$ ). Any disagreements regarding eligibility or content classification were resolved by discussion and consensus.

An Engagement Rate (%) was calculated for each post using the following formula:



**Fig. 1** Instagram post selection process

$$\text{Engagement Rate} = \left( \frac{(\text{Likes} + \text{Comments})}{\text{Followers}} \right) \times 100$$

This normalization allowed for equitable comparison of user interaction across accounts with varying follower counts. View counts and share metrics were not consistently available across all post formats and account types; therefore, engagement rate calculations were standardized using publicly visible likes, comments, and follower counts.

Post quality was evaluated using the Instagram Quality Assessment Tool (IQAT), which was specifically developed for this study. The tool was conceptually informed by established health information quality frameworks, including the JAMA Benchmark Criteria, DISCERN principles, and evaluation approaches used in previous social media and online health information assessment studies [19–22]. The five assessment dimensions (clarity of purpose, accuracy and reliability, scientific referencing or source attribution, objectivity, and educational and visual value) were selected following a review of the relevant literature and were considered essential components for evaluating the quality of preventive oral health information shared on social media platforms. The preliminary version of the tool was reviewed by the two researchers, both of whom have expertise in pediatric dentistry and dental traumatology. Minor refinements were subsequently made to improve the clarity and relevance of the evaluation domains. No formal external expert panel was convened, and no formal content validation procedure was undertaken. Each dimension was rated on a 5-point Likert scale ranging from 1 (poor) to 5 (excellent), resulting in a total score between 5 and 25.

To assess intra-rater reliability, a subset of posts was re-scored by the same reviewer after a 4-week interval, demonstrating excellent agreement (ICC=0.88).

## Ethical considerations

This study analyzed publicly available online content and did not involve human participants, clinical procedures, or private data. Therefore, ethics committee approval was not required in accordance with institutional and journal guidelines. Only publicly accessible Instagram posts were included, and no interaction with users was performed during data collection. All post URLs were archived anonymously, and no user-identifiable information was disclosed, in accordance with ethical principles for digital and social media research.

## Statistical analysis

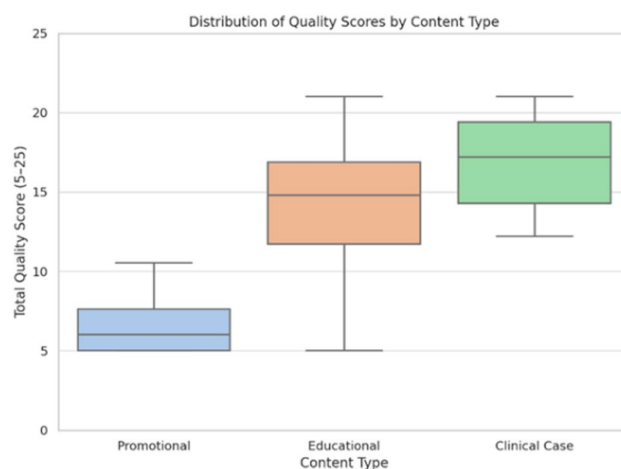
All statistical analyses were performed using IBM SPSS Statistics version 26.0 (IBM Corp., Armonk, NY, USA). Descriptive statistics were calculated as means and standard deviations for continuous variables and as frequencies and percentages for categorical variables. The Shapiro–Wilk test was used to assess normality. As the data were not normally distributed, non-parametric statistical tests were applied. The Kruskal–Wallis H test was employed to compare quality scores across content types. Post-hoc pairwise comparisons were subsequently performed using Mann–Whitney U tests with Bonferroni correction, with statistical significance set at  $p < 0.0167$  for pairwise comparisons. Spearman’s rank correlation analysis was used to examine the relationship between content quality and engagement rate. Statistical significance was otherwise set at  $p < 0.05$ .

## Results

A total of 180 Instagram posts related to sports dentistry were initially identified through hashtag-based searches. Following eligibility screening, 90 posts were excluded because they contained irrelevant content ( $n=52$ ), duplicate posts ( $n=18$ ), private accounts ( $n=11$ ), or were published outside the predefined study period ( $n=9$ ).

**Table 1** Quality scores and engagement rates according to content type ( $n=90$ )

| Content Type  | <i>n</i> | Mean Quality Score $\pm$ SD | Mean Engagement Rate $\pm$ SD |
|---------------|----------|-----------------------------|-------------------------------|
| Promotional   | 48       | 6.20 $\pm$ 2.02             | 3.12 $\pm$ 1.84               |
| Educational   | 15       | 14.22 $\pm$ 5.04            | 2.94 $\pm$ 1.67               |
| Clinical Case | 27       | 15.85 $\pm$ 4.38            | 3.01 $\pm$ 1.73               |

**Fig. 2** Boxplot showing the distribution of total quality scores according to content type

Consequently, 90 eligible posts were included in the final analysis (Fig. 1). All included posts were publicly accessible, published in English, and displayed visible engagement metrics.

### Content quality by content type

The overall mean quality score of the analyzed posts was  $9.21 \pm 4.84$ . Quality scores varied according to content type (Table 1). Promotional posts ( $n=48$ ) demonstrated the lowest mean quality score ( $6.20 \pm 2.02$ ), whereas educational posts ( $n=15$ ) and clinical case posts ( $n=27$ ) demonstrated higher mean quality scores of  $14.22 \pm 5.04$  and  $15.85 \pm 4.38$ , respectively. Mean engagement rates demonstrated limited variation across content categories.

A Kruskal–Wallis H test revealed a statistically significant difference in quality scores among the three content types ( $H=31.09$ ,  $p<0.001$ ). Post-hoc pairwise comparisons using Bonferroni-corrected Mann–Whitney U tests revealed significantly lower quality scores in promotional posts than in both educational and clinical case posts (both unadjusted  $p<0.001$ ). The comparison between educational and clinical case posts yielded an unadjusted  $p$  value ( $p=0.048$ ) and was not statistically significant after Bonferroni correction. Promotional posts demonstrated lower and less variable quality scores and a relatively narrow distribution of scores, whereas educational and clinical case posts exhibited greater variability (Fig. 2).

According to IQAT classification, 53 posts (58.9%) were categorized as low quality, 28 posts (31.1%) as moderate quality, and 9 posts (10.0%) as high quality (Table 2).

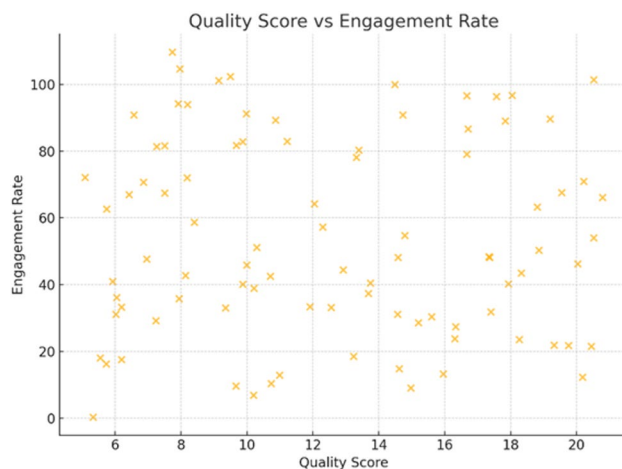
### Association between content quality and user engagement

The relationship between content quality and user engagement was examined using Spearman's rank correlation analysis. No statistically significant correlation was observed between total quality score and engagement rate ( $\rho = -0.024$ ,  $p=0.820$ ) (Table 3; Fig. 3).

**Table 3** Correlation between engagement and quality

| Comparison                        | $\rho$ (Spearman) | $p$ -value |
|-----------------------------------|-------------------|------------|
| Quality Score vs. Engagement Rate | -0.024            | 0.820      |

**Table 2** D  
Quality Cat  
Low  
Moderate  
High



**Fig. 3** Scatter plot showing the relationship between quality score and engagement rate

#### Distribution of posts according to quality category

| Category | <i>n</i> | %    |
|----------|----------|------|
|          | 53       | 58.9 |
|          | 28       | 31.1 |
|          | 9        | 10.0 |

Variations in engagement rates were observed across posts with different quality scores. Engagement rates were widely distributed across all quality score levels, with no apparent linear relationship between content quality and user interaction (Fig. 3).

## Discussion

Sports-related dental trauma represents an important and largely preventable oral health problem [2, 23]. Although mouthguards are recognized as an effective preventive measure against traumatic dental injuries, their use in contact sports remains limited [5, 10]. Social media platforms such as Instagram have become increasingly important sources of oral health information [14, 24]. However, concerns persist regarding the accuracy, scientific basis, and educational value of information shared on these platforms [16, 17]. In addition, previous studies on dental-related social media content have mainly focused on descriptive characteristics or content reliability [17, 25]. In this study, engagement analysis was additionally included to provide a more comprehensive evaluation of both information quality and audience interaction patterns on social media platforms.

Previous studies evaluating dental-related social media content have primarily focused on descriptive analyses or assessments of content reliability across different platforms [13, 17, 19]. Güçyetmez Topal et al. [17] examined Instagram posts related to dental trauma and mainly evaluated their clinical presentation characteristics and informational content [17]. Similarly, studies conducted on YouTube have assessed the reliability and educational quality of dental trauma-related video content using established scoring systems [13, 19]. Unlike these previous investigations, the present study specifically focused on Instagram content related to mouthguard use and sports-related dental trauma while also incorporating engagement analysis. In line with previous reports, our findings demonstrated that Instagram content related to mouthguard use was predominantly promotional and generally of low educational quality. Furthermore, the inclusion of engagement analysis provided additional insight into audience interaction with this type of content.

In the present study, Instagram content related to mouthguard use was found to be predominantly promotional and highly variable in terms of informational quality. Previous studies have shown that dental-related Instagram content frequently contains incomplete educational information, variable content quality, and misinformation [17, 18, 25, 26]. Recent studies have also emphasized the growing role of social media platforms in oral health communication and promotion, particularly among adolescent populations [24, 27]. In addition, Instagram-based oral health studies have reported considerable variability in the usefulness, understandability, and reliability of educational content shared by different types of accounts [28]. These findings further support concerns regarding the standardization and quality of oral health information disseminated through social media platforms. This pattern was also reflected in the present study, where most analyzed posts were promotional in nature and received relatively similar levels of user interaction regardless of their informational quality.

For example, Qazi et al. [25] reported that a substantial proportion of bruxism-related Instagram posts originated from non-professional healthcare accounts, potentially affecting the quality and reliability of shared information [25]. Similarly, Esmaeilzadeh et al. [18] demonstrated that fluoride-related Instagram content frequently included misinformation, unsupported health claims, and conspiracy-related narratives [18]. In this context, the present study examined whether Instagram content related to mouthguard use and sports-related dental trauma provides adequate educational quality. Our results indicate that this content is largely promotional and of low informational quality. These findings suggest that the Instagram content analyzed in the present study may not consistently provide reliable information regarding dental trauma prevention, regardless of user engagement levels.

The absence of a significant association between content quality and user engagement observed in the present study represents a noteworthy finding. This suggests that Instagram users may interact more frequently with visually appealing or promotional content than with evidence-based educational posts. The attention-driven structure of social media platforms may partly explain this pattern, as visually optimized and simplified content is often more compatible with algorithm-based visibility and user interaction dynamics. Previous studies have shown that engagement metrics such as likes, comments, and shares on social media platforms do not always reflect the actual informational value or accuracy of health-related content [11, 26]. Research in the field of health communication has also demonstrated that misleading or oversimplified health messages may attract high levels of user engagement despite their limited reliability [12, 29]. These findings indicate that engagement metrics should not be considered reliable indicators of content quality when evaluating health-related information on social media platforms. The present results may also have potential clinical implications. Users may perceive highly engaged posts as trustworthy regardless of their scientific accuracy, which could potentially influence awareness and decision-making related to sports-related dental trauma prevention. For preventive interventions such as mouthguard use, the widespread visibility of low-quality content may present challenges for the dissemination of evidence-based information. These observations support efforts to improve the quality of preventive oral health information shared through social media platforms.

Mouthguards are an evidence-based and effective preventive measure for reducing sports-related dental trauma. Mouthguard use is a specific and modifiable preventive behavior, highlighting the importance of disseminating accurate and evidence-based information to support preventive oral health practices [30, 31]. However, the limited representation of high-quality educational content on Instagram may represent a barrier to improving awareness and promoting appropriate mouthguard use, particularly among young athletes [4, 31]. Given the widespread use of social media among adolescents and young adults, the predominance of low-quality or promotional content may present challenges for digital injury prevention efforts [24]. These findings highlight the need for greater involvement of dental professionals, academic institutions, and professional organizations in the creation and dissemination of accurate, evidence-based information on social media. Strategically designed educational posts that balance visual appeal with reliable scientific content, combined with professional oversight and improved digital health literacy, may help ensure that social media serves as a supportive rather than misleading tool for the prevention of dental trauma [12, 24]. Such educational content may include practical information regarding mouthguard selection, correct use, maintenance, and the prevention of sports-related dental trauma.

Educational strategies targeting young athletes, parents, coaches, and school-based sports communities may be valuable for supporting awareness and encouraging preventive behaviors.

This study has several limitations that should be considered when interpreting the findings. The analysis was limited to publicly available Instagram posts shared in the English language, which may not reflect content published in other languages or within private accounts. In addition, the final sample consisted of 90 posts, which may not adequately represent the large and continuously changing volume of mouthguard-related content available on Instagram. The inclusion of only English-language posts may also have limited the representation of region-specific communication patterns and cultural differences in oral health content shared on Instagram. In addition, the hashtag-based search strategy may have favored posts with higher visibility or commercial optimization, potentially contributing to the predominance of promotional content observed in the present study. Furthermore, the present study did not distinguish between different types of mouthguards, such as stock, boil-and-bite, and custom-made mouthguards. As the quality and accuracy of information may vary according to the type of mouthguard being discussed, this may have influenced the interpretation of the findings. On the other hand, the cross-sectional design provides an assessment of content at a specific time point and does not capture temporal changes in content quality or user engagement. In addition, engagement metrics were restricted to likes and comments and may not fully represent users' understanding, interpretation, or application of the information. Although the IQAT tool enabled a structured multidimensional evaluation of Instagram content, certain components of content interpretation may still involve subjective judgment, and the platform-specific nature of the tool may limit the generalizability of the findings to other social media platforms. Finally, although efforts were made to minimize algorithmic bias, the complete elimination of platform-specific content filtering cannot be guaranteed. The present study focused specifically on Instagram because of its widespread use in visual health communication and its frequent utilization in oral health-related social media research [14, 24]. In addition, restricting the analysis to a single platform allowed for a more standardized evaluation of content characteristics and user engagement patterns.

Future research should consider longitudinal designs to examine changes in content quality and user engagement over time. Studies including multiple languages and private accounts may provide a more comprehensive understanding of mouthguard-related information shared on social media. In addition, evaluating the potential influence of professionally generated educational content on user awareness and mouthguard use could provide further insights for digital dental trauma prevention strategies. Future studies may also compare oral health-related content across different social media platforms, evaluate differences between professional and non-professional content creators, and investigate the potential associations between misinformation, AI-generated health content, user engagement, and preventive health behaviors.

## Conclusion

Instagram content related to mouthguard use for the prevention of sports-related dental trauma appeared to be largely promotional and demonstrated generally low educational quality based on the sampled posts evaluated in this study. Educational and clinical case-based posts exhibited significantly higher quality than promotional content; however, no association was identified between content quality and user engagement. These findings suggest that engagement metrics alone may not reliably reflect the informational value of oral health-related social media content. The findings may also indicate a potential missed opportunity for preventive communication in sports dentistry through social media platforms. Greater involvement of dental professionals, academic institutions, and professional organizations in the development of evidence-based educational campaigns, content standards, and visually engaging preventive communication strategies may improve the quality and reliability of oral health information shared on social media platforms.

## Abbreviations

IQAT Instagram Quality Assessment Tool

ICC Intraclass Correlation Coefficient

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**Authors' contributions** C.K. contributed to the study conceptualization, literature review, data collection, data analysis, and manuscript writing. G.Y.K. contributed to the study design, data interpretation, and critical revision of the manuscript. All authors read and approved the final version of the manuscript.

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**Data availability** The datasets generated and/or analyzed during the current study are available from the corresponding author upon reasonable request.

## Declarations

**Ethics approval and consent to participate** This study involved the analysis of publicly available online content and did not include human participants, clinical interventions, or private data. Therefore, institutional ethical approval was not required in accordance with institutional and journal guidelines.

**Consent for publication** Not applicable.

**Competing interests** The authors declare no competing interests.

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