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Behind the Smile: Evaluating the Orthodontic Emergency Knowledge among General Practitioners

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ABSTRACT

Orthodontic emergencies, such as broken brackets, displaced appliances, protruding archwires, and associated soft tissue injuries, are common occurrences during orthodontic treatment. The effective management of these complications is critical to prevent patient discomfort, appliance damage, and potential delays in treatment. This study aimed to assess the knowledge, clinical preparedness, and self-perceived confidence of general dental practitioners (GDPs) in managing orthodontic emergencies. A structured and pre-validated questionnaire was developed and distributed through Google Forms to GDPs across diverse geographical regions. A total of 150 responses were collected and analyzed. The questionnaire addressed practitioner demographics, educational background, exposure to orthodontic emergency scenarios, and levels of confidence in handling them. The results indicated that while 78% of respondents had encountered orthodontic emergencies in their clinical practice, only 54% reported feeling confident in managing them. The most significant gaps in knowledge were observed in the management of trauma-related appliance dislodgement and temporary solutions for broken archwires. Furthermore, only 41% of participants had received formal training or continuing dental education (CDE) focused on orthodontic emergency care. Notably, 87% of practitioners expressed a willingness to pursue further training in this area. The study underscores a pressing need to integrate orthodontic emergency management into undergraduate dental education and continuing professional development (CPD) initiatives. Enhancing the clinical competence of GDPs in managing orthodontic emergencies is essential, particularly in regions where immediate access to orthodontic specialists may be limited.

Keywords: Orthodontic emergencies, General dental practitioners, Dental education, Clinical preparedness, Continuing dental education

INTRODUCTION

Orthodontics is a vital specialty in dentistry that focuses on the diagnosis, prevention, and correction of malpositioned teeth and jaws. In recent decades, the global demand for orthodontic treatment has surged, driven by increased awareness, better access to care, and rising aesthetic expectations among patients of all ages [2]. Orthodontic treatment is no longer limited to functional improvement but is increasingly sought for boosting confidence and social acceptance through enhanced smile aesthetics.

With more patients undergoing orthodontic treatment, there has been a proportional rise in orthodontic emergencies - ranging from broken brackets and dislodged appliances to protruding wires, mucosal injuries, and trauma-related complications. Although not life-threatening, these situations can cause significant pain and anxiety, and if not addressed promptly, can disrupt treatment progress [3].

While such emergencies are ideally managed by orthodontists, patients often seek help from general dental practitioners (GDPs), particularly when emergencies occur outside clinic hours or in areas lacking access to orthodontic specialists[4]. In such cases, GDPs serve as the first line of care, especially in rural and underserved regions.

However, many GDPs may not feel adequately trained to manage these situations. Undergraduate curricula often emphasize the theoretical principles of orthodontics but offer limited exposure to real-world emergency scenarios[4]. Additionally, continuing dental education (CDE) programs commonly focus on restorative or endodontic topics, often neglecting orthodontic emergencies[5].

Compounding this issue is the fact that orthodontic emergencies can sometimes involve trauma particularly in younger patients with protrusive incisors, who are more prone to injuries[6]. Poor management of such cases can lead to long-term complications like root resorption or altered treatment timing[7]. GDPs, therefore, must be able to recognize and manage such emergencies effectively, even if temporarily, until the patient can be referred.

The COVID-19 pandemic further underscored this need, as GDPs had to step in when specialist services were suspended or inaccessible[2]. These extraordinary circumstances reinforced the importance of broad clinical competence among general practitioners.

Previous research highlights a moderate to low level of preparedness among GDPs in managing orthodontic complications[3]. Specific gaps are consistently reported in dealing with bracket debonding, wire impingement, and appliance trauma[8,9]. Additionally, concerns about medico-legal accountability may further discourage GDPs from intervening in orthodontic emergencies[10].

In this context, the current study - "Behind the Smile: Evaluating Orthodontic Emergency Knowledge Among General Practitioners"- aims to assess the awareness, confidence, and clinical readiness of GDPs to handle orthodontic emergencies. By identifying existing gaps, this research aims to inform improvements in education and training that will support safer and more effective orthodontic care across general practice setting

METHODOLOGY

This descriptive cross-sectional study was conducted to evaluate the level of knowledge, awareness, and preparedness of general dental practitioners (GDPs) in managing orthodontic emergencies. The primary objective was to assess the understanding of common orthodontic complications among GDPs, identify gaps in their clinical training, and evaluate their confidence in handling such situations. Ethical clearance for the study was obtained from the Institutional Ethics Committee of Krishna Vishwa Vidyapeeth. All participants were provided with an information sheet outlining the objectives, voluntary nature of participation, and assurance of confidentiality. Informed consent was obtained digitally at the beginning of the survey.

Inclusion Criteria:
The study population includes licensed GDPs with a minimum of one year of clinical experience.

Exclusion Criteria:
Orthodontists and postgraduate orthodontic residents were excluded to ensure that the responses reflected the perspective of general practitioners.

A total of 150 responses were collected using a non-probability convenience sampling method. The required sample size was calculated assuming a 95% confidence interval, 5% margin of error, and a 50% expected rate of adequate knowledge, resulting in a target of at least 120 respondents. The final sample exceeded this number, enhancing the reliability of the findings.

Data were collected using a structured and pre-validated questionnaire prepared in Google Forms. The questionnaire was disseminated digitally through email, WhatsApp, Telegram groups, and other social media platforms frequented by dental professionals. Participants were also encouraged to share the form within their networks to improve reach through snowball sampling. The questionnaire was designed after an extensive literature review and expert consultation.

The questionnaire comprised knowledge-based questions designed to assess the ability of practitioners to identify and manage common orthodontic emergencies. These included scenarios such as broken brackets, protruding archwires, dislodged bands, soft tissue injury caused by Orthodontics is a vital specialty in dentistry that focuses on the diagnosis,

prevention, and correction of malpositioned teeth and jaws. In recent decades, the global demand for orthodontic treatment has surged, driven by increased awareness, better access to care, and rising aesthetic expectations among patients of all ages[2]. Orthodontic treatment is no longer limited to functional improvement but is increasingly sought for boosting confidence and social acceptance through enhanced smile aesthetics.

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In this context, the current study - “Behind the Smile: Evaluating Orthodontic Emergency Knowledge Among General Practitioners” - aims to assess the awareness, confidence, and clinical readiness of GDPs to handle orthodontic emergencies. By identifying existing gaps, this research aims to inform improvements in education and training that will support safer and more effective orthodontic care across general practice setting, and complications related to removable retainers or fixed appliances. Respondents were asked to select the most appropriate responses based on their clinical experience and judgment and it also focused on self-assessed confidence and attitude towards managing orthodontic emergencies.

The content validity of the questionnaire was ensured through expert review by a panel comprising two orthodontists, two general dentists, and one dental academician. A pilot study was conducted among 10 general dentists to evaluate the clarity, comprehensiveness, and feasibility of the questionnaire. Feedback was incorporated to refine the final version before dissemination.

Upon completion of the data collection period, responses were compiled and exported to Microsoft Excel and subsequently analyzed using SPSS software version 26. Associations between practitioner characteristics and knowledge or confidence levels were evaluated using chi-square tests for categorical variables and independent sample t-tests where appropriate. A p-value below 0.05 was regarded as indicative of statistical significance. This methodology allowed for a robust evaluation of the current state of knowledge and readiness among general practitioners in managing orthodontic emergencies, highlighting potential areas for curriculum development and continuing education.

RESULTS

A total of 150 general practitioners participated in the survey assessing their knowledge and confidence in managing various orthodontic emergencies. The questionnaire comprised ten structured questions addressing common emergency scenarios, and responses were recorded in a binary format (Yes/No).

Response Analysis

The responses revealed a mixed yet generally affirmative outlook toward handling orthodontic emergencies by non-specialists:

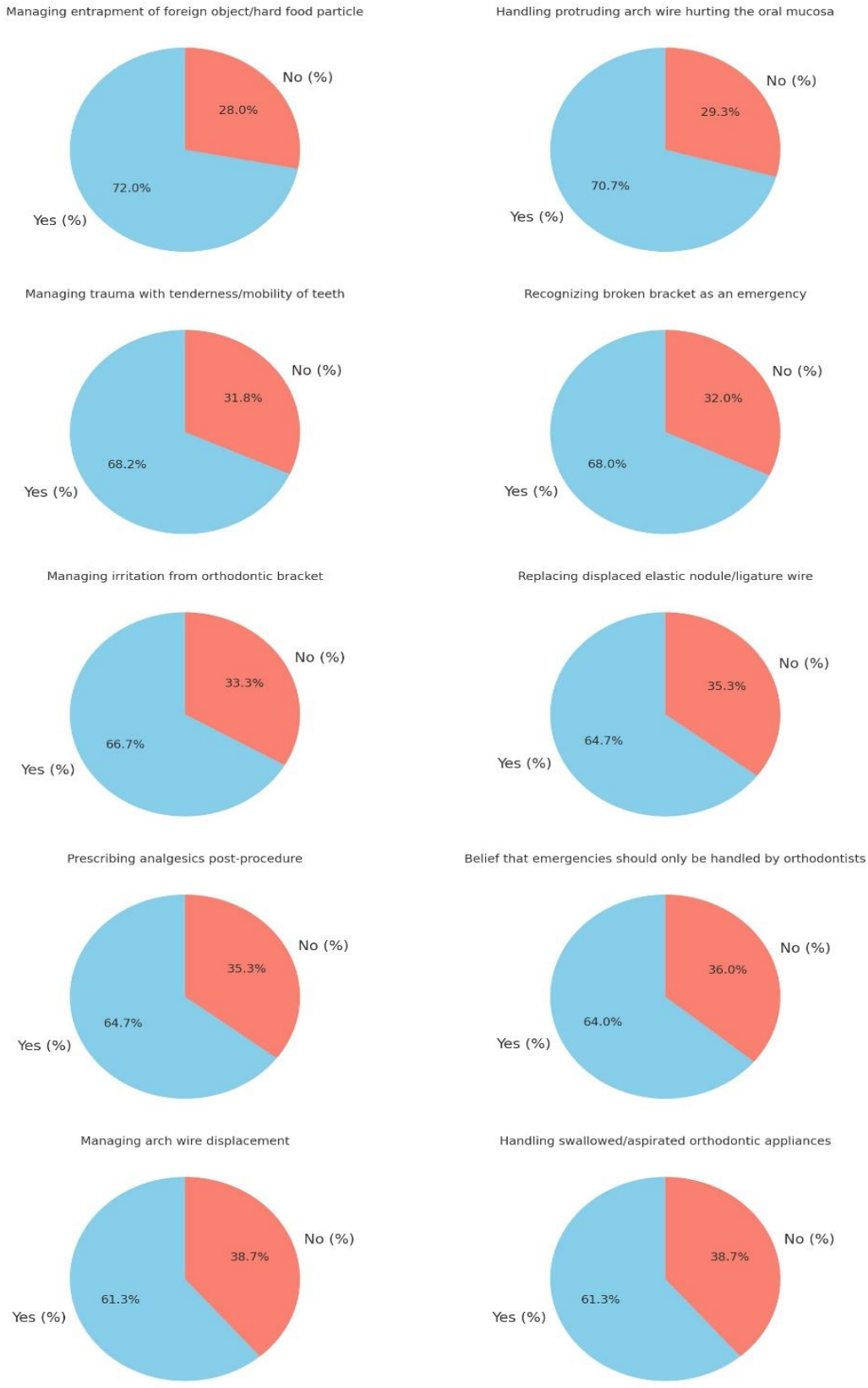
72.0% of respondents indicated confidence in managing cases involving entrapment of foreign objects or food particles.
70.7% felt capable of resolving protruding arch wires irritating the oral mucosa.
68.7% were confident in handling trauma-related tooth mobility and tenderness, and 68.0% considered a broken bracket to qualify as an emergency.
66.7% expressed awareness about managing mucosal irritation due to orthodontic brackets.
Around 64.7% of practitioners reported being able to replace displaced elastic modules or ligature wires and agreed it was advisable to prescribe analgesics post-procedure.
64.0% believed orthodontic emergencies should not be reserved for orthodontists alone and could be handled by general practitioners as well.

However, only 61.3% felt competent to manage arch wire displacement, and the same percentage indicated readiness to handle cases involving swallowed or aspirated appliances.

Summary Table

Scenario	Yes (%)	No(%)
Managing entrapment of foreign object/hard food particle	72.0	28.0
Handling protruding arch wire hurting the oral mucosa	70.7	29.3
Managing trauma with tenderness/mobility of teeth	68.7	32.0
Recognizing broken bracket as an emergency	68.0	32.0
Managing irritation from orthodontic bracket	66.7	33.3
Replacing displaced elastic nodule/ligature wire	64.7	35.3
Prescribing analgesics post-procedure	64.7	35.3
Belief that emergencies should only be handled by orthodontists	64.0	36.0
Managing arch wire displacement	61.3	38.7
Handling swallowed/aspirated orthodontic appliances	61.3	38.7

Graphical Representation



The visual data analysis reveals that a substantial proportion of general dental practitioners express confidence in managing various orthodontic emergencies, as evidenced by a predominance of affirmative (Yes) responses across the survey. This overall trend suggests a generally positive perception of their readiness to handle routine orthodontic complications such as protruding archwires, broken brackets, and loose bands. However, the distribution of responses also indicates notable variability in confidence levels, particularly when practitioners are faced with less common or potentially high-risk situations - such as the accidental ingestion or aspiration of orthodontic appliances. These scenarios elicited more cautious or negative responses, highlighting areas where clinical uncertainty remains. This contrast underscores the need for targeted educational interventions to enhance practitioner preparedness for rare but critical orthodontic emergencies. The cumulative pie chart illustrating this response distribution supports these findings by showing a dominant proportion of affirmative responses, yet it also emphasizes the importance of strengthening training in more complex and infrequent emergency situations.

DISCUSSION

As orthodontic treatments become more common and accessible, the ability of general dental practitioners (GDPs) to handle orthodontic emergencies is increasingly important. This study offers valuable insights into how well-prepared GDPs are in this area - highlighting both strengths in practical knowledge and areas needing improvement.

One of the most encouraging findings is the strong confidence GDPs show in managing everyday orthodontic issues. A majority reported feeling capable when dealing with mechanical problems like bracket irritation, protruding wires, and food impaction. Specifically, 72% felt comfortable managing food entrapment, and 70.7% were confident in addressing protruding archwires. These numbers are consistent with earlier studies and reflect the important role GDPs play in addressing minor orthodontic problems - often involving simple, non-invasive solutions such as wire trimming, wax application, or hygiene advice. These are well within the scope of general dental practice and serve to reassure patients quickly without needing a referral.

However, the picture isn't all positive. The study also uncovered significant gaps in preparedness when it comes to more serious or high-risk orthodontic emergencies. Only 68.7% of practitioners felt confident in managing trauma-related mobility of appliances or teeth, and even fewer - just 61.3% - felt prepared to handle situations involving ingestion or aspiration of orthodontic components. These scenarios, though less frequent, can pose serious health risks, including airway obstruction or internal injuries. The lower confidence levels here suggest a shortfall in both dental education and real-world exposure to such emergencies. It highlights a clear need for enhanced training, particularly in the form of hands-on CPD modules and emergency simulations.

Another interesting aspect of the study was the divided perspective among practitioners about the role of GDPs in orthodontic emergencies. While 64% believed these cases don't always require a specialist, a significant number were unsure or disagreed. This uncertainty may stem from concerns about legal boundaries or fear of compromising long-term treatment plans. Many GDPs might feel comfortable offering temporary relief but hesitate to make decisions that could impact the course of specialist treatment. This emphasizes the importance of having clear referral protocols and open communication between general practitioners and orthodontists.

The study also looked at how GDPs approach pharmacological management, particularly pain control. About 64.7% agreed with prescribing analgesics when needed. This shows a balanced approach: recognizing the importance of patient comfort while avoiding unnecessary or excessive medication use - especially opioids or NSAIDs, which come with potential risks. This aligns well with current dental guidelines encouraging judicious prescribing practices.

In summary, the findings show that general dental practitioners are generally well-prepared to handle minor orthodontic emergencies, but there's a clear need to strengthen training in managing more complex, high-risk situations. As the field of orthodontics evolves and more patients receive treatment in community settings, it's essential to equip GDPs with the knowledge and confidence to act safely and effectively. Investing in targeted education both at the undergraduate level and through ongoing professional development will help ensure that patients receive timely, appropriate care, and that GDPs are empowered to be effective first responders in orthodontic emergencies.

CONCLUSION

The findings of this study confirm that while general dental practitioners frequently encounter orthodontic emergencies, their readiness to manage more complex scenarios is limited. Though most feel confident with basic orthodontic care,

structured training in emergency scenarios especially trauma management, appliance aspiration, and wire dislodgement is lacking.

Integrating orthodontic emergency management into dental curricula and continuing education programs is vital. Simulated case-based training and clinical decision-making modules can greatly enhance practitioner competence, patient care, and interdisciplinary collaboration. Closing this knowledge gap will strengthen the role of GDPs in ensuring consistent and effective orthodontic care especially when specialist access is limited.

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