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Academic and emotional intelligence of orthodontic patients

Knowledge of Dental trauma and impact on tooth movement

Application of temporary anchorage devices

Combined orthodontic and periodontal management: A case report

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Knowledge of Dental Trauma and its Impact on Orthodontic Tooth Movement Amongst Nigerian Orthodontists and Orthodontic Residents.

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Abstract

Background: Knowledge of dental trauma and its impact on orthodontic tooth movement is very important in the management of orthodontic patients. This study aimed to explore the knowledge and current practices among orthodontists practicing in Nigeria in managing orthodontic patients with a history of dental trauma.

Methods: This was a cross-sectional study. Data collection was via self-administered questionnaires. The questionnaires were developed using Google Forms and sent to the WhatsApp group of the Nigeria Association of Orthodontists which contains all the orthodontic residents and consultants in Orthodontics in Nigeria. Only 35 respondents filled out and submitted the form.

Results: The knowledge of respondents about luxation, subluxation, concussion and avulsion were 65.7%, 71.4%, 82.9% and 97.1% correct respectively. Generally, the respondents had good theoretical knowledge of the management of Orthodontic trauma, however, the clinical acumen of respondents in relation to the knowledge of procedures to be done to traumatized teeth during orthodontic treatment was poor. Relatively, very few Orthodontists were conversant with the management of traumatized teeth as more than two thirds of respondents claimed they had not managed any patient with traumatized teeth before. There was a statistically significant difference between the number of orthodontic patients with traumatized teeth being managed by consultants compared to that being managed by registrars.

Conclusion: The respondents demonstrated a good understanding of the dental terms associated with traumatic dental injuries; however, they exhibited a limited understanding of the proper protocols for the orthodontic management of these cases.

Key Words: Dental trauma, Orthodontic management, Nigerian Orthodontists,

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ORIGINAL ARTICLE

Introduction

The job of the orthodontist is the correction of malocclusion and facial disharmony. Some of these malocclusions, especially increased overjet and incompetent lips may predispose the individual to trauma to the anterior teeth in the event of a fall or a blow to the mouth.[1,2] The majority of orthodontic patients are children and adolescents who are regularly involved in contact sports and games. These sports and games further predispose these individuals to dental trauma. The management of these injuries may involve the orthodontist primarily if the patient is undergoing orthodontic care or desires to have orthodontic treatment. The orthodontist may also be called upon to provide secondary care, especially to reposition a tooth displaced due to trauma.[3]

Traumatic dental injuries may occur before and during orthodontic treatment, herefore it is important for this to be elicited during history taking and, or clinical examination to draw up a good treatment plan and carry out appropriate management.[4] Research has shown that traumatized teeth are more susceptible to complications during orthodontic tooth movement.[2] Thus, a previous treatment plan may be altered, making it imperative that the orthodontist be knowledgeable about how to manage such teeth.

The gap in knowledge of the effects of orthodontic treatment on traumatized teeth has been recognized in many parts of the world, leading to a wide variety of studies on this subject.[1,5–8] Indeed, it is imperative that both general practitioners as well as dental specialists acquire this knowledge, lack of which results in inadequate treatment plans as well as further damage to the teeth when treatment is carried out.

In Nigeria, a wide variety of studies have been carried out on traumatic dental injuries in the Nigerian population.[5,9–12] However, there is very limited data on the orthodontic management of these injuries. Thus, this study aimed to explore the knowledge and current practices of orthodontists practicing in Nigeria, regarding orthodontic treatment of patients with a history of dental trauma.

Materials and methods

This was a cross-sectional descriptive study, and the study population comprised of all orthodontists and orthodontic residents in Nigeria. The study was carried out in accordance with the Helsinki declaration and informed consent was obtained from all the study participants. The data were collected using questionnaires designed from Google forms. These Google forms were then posted on the WhatsApp group of the Nigerian Association of Orthodontists. This group contains all the Orthodontists and Orthodontic residents in training in Nigeria. There are currently about 120 orthodontists and orthodontic residents in the country. The data was analyzed using the Statistical Package for Social Sciences (SPSS) version 25. The test of statistical significance was set at 0.05. A copy of the study questionnaire is included in the appendix.

Results

There were a total of 35 respondents, thus the response rate was quite poor with only about 30% of the study population responding. There was a female preponderance, with 22 females (62.9%) responding, compared to 13(37.1%) males. Table 1 shows the demographic distribution of the study participants. The study population comprised of 20(5 consultants and 15 residents.

Table 1: Socio-demographic characteristics of respondents

Variables	Frequency	Percentage
Gender		
Female	22	62.9
Male	13	37.1
Age groups		
21 – 30	3	8.6
31 – 40	11	31.4
41 – 50	14	40.0
51 – 60	6	17.1
> 60	1	2.9
Level of training		
Consultant orthodontist of less than 10 years	15	42.8
Consultant orthodontist of over 10 years	5	14.3

Registrar	4	11.4
Senior registrar	11	31.5
Cadre of practice		
Consultant	20	57.1
Registrar	15	42.9

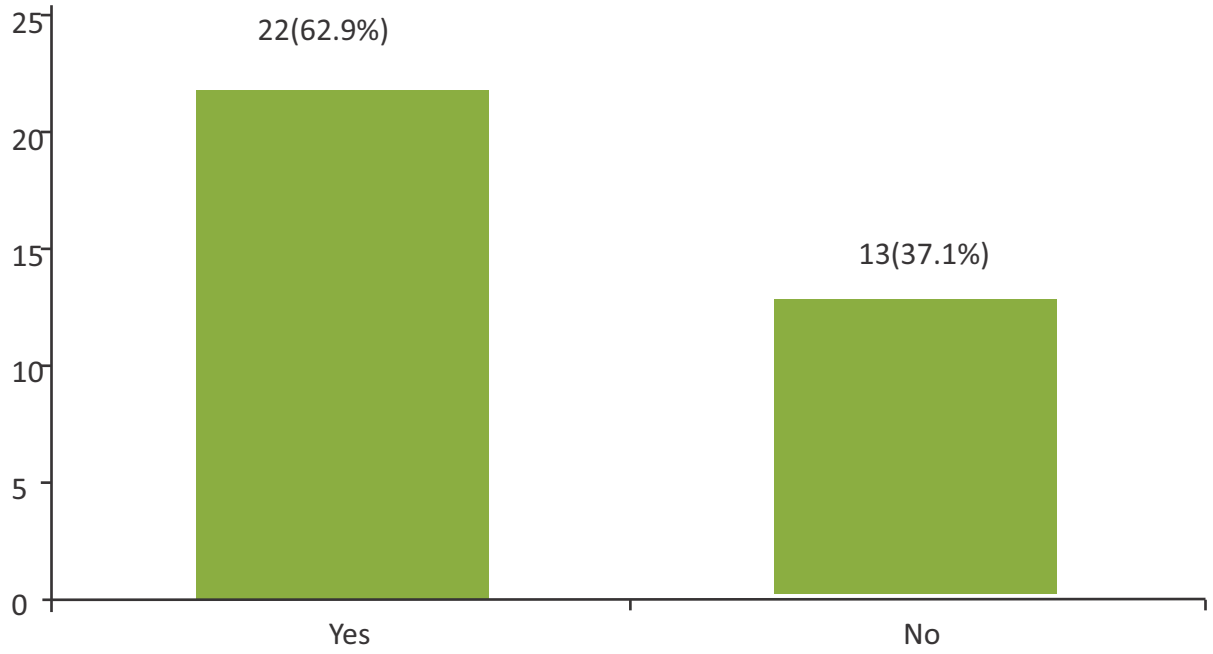

Figure 1: Currently involved in research or teaching in a university

Figure 1 shows that 62.9% are involved in research or are practicing in the teaching Hospital.

Table 2: Knowledge of respondents about three key terms that describe dental trauma namely concussion, luxation and subluxation.

Variables	Concussion (%)	Luxation (%)	Subluxation (%)	None (%)	Don't know (%)
A tooth displacement in a non-axial direction that is accompanied by communition or alveolar socket fracture is called:	4 (11.4)	23 (65.7)	4 (11.4)	3 (8.6)	1 (2.9)
An injury to the tooth- supporting structure with increase in mobility and without tooth displacement is classified as	3 (8.6)	5 (14.3)	25 (71.4)	1 (2.9)	1 (2.9)
An injury to the tooth-supporting structure with an increasing tooth mobility but without significant displacement is classified as	29 (82.9)	1 (2.9)	4 (11.4)	0 (0.0)	1 (2.9)

Table 2 shows the knowledge level of respondents about the terms: luxation, subluxation and concussion which were 65.7%, 71.4% and 82.9% correct respectively. Generally, the respondents had a very good knowledge of these terminologies.

Table 3: Knowledge level of respondents about avulsion and orthodontic management of traumatic dental injuries

Variables	Frequency	Percentage
Displacement of tooth out of alveolus		
Avulsion	34	97.1
Don't know	1	2.9
Least harmful movement to upper incisors with luxation trauma		
Extrusion	7	20.0
Inclination	11	31.4
Intrusion	8	22.9
Rotation	2	5.7
Torque	1	2.9
Translation	4	11.4
Don't know	2	5.7
Procedure to be done on patients who suffered slight dental trauma during orthodontic treatment		
Continue treatment normally	12	34.3
Wait for 30 days	15	42.9
Wait for three months	5	14.3
Don't know	3	8.6
Procedure for patients who suffered dental trauma during orthodontic treatment		
Wait for 6 months	4	11.4
Wait for 30 days	10	28.6
Wait for of three months	16	45.7
Don't know	5	14.3

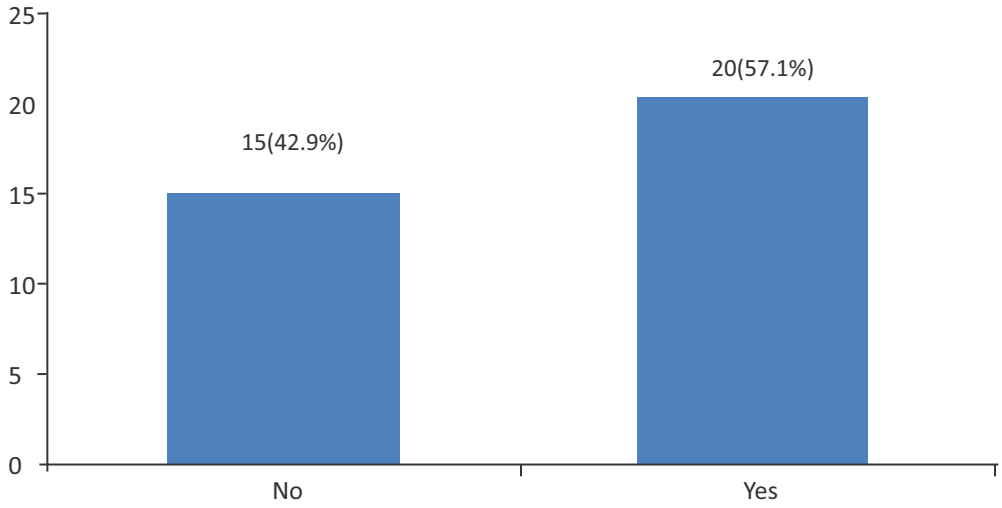

Figure 2: Change in treatment plan after observing a severe lateral luxation trauma to upper incisors after first premolars extraction for anterior-posterior retraction

Figure 2 shows responses to the change of treatment plan after a severe luxation trauma to the upper incisors. Only half of the respondents had a good knowledge and practice of what procedure to carry out.

Table 4: Knowledge of use of radiographs and impacts of trauma on orthodontic tooth movement

Variables	Yes (%)	No (%)
Continuous taking of radiographs of traumatized teeth	32 (91.4)	3 (8.6)
Tooth with root fracture in the apical third can be moved normally	10 (28.6)	25 (71.4)
Traumatized teeth can suffer root resorption with induced dental movement	32 (91.4)	3 (8.6)
The intensity of trauma can influence the prognosis of induced dental movement	34 (97.1)	1 (2.9

Table 4 shows good knowledge about the importance of continuously taking radiographs to assess traumatized teeth. In addition, it also shows that the respondents had a good knowledge of the impact of dental trauma on orthodontic tooth movement, particularly root fracture, root resorption and the inffluen

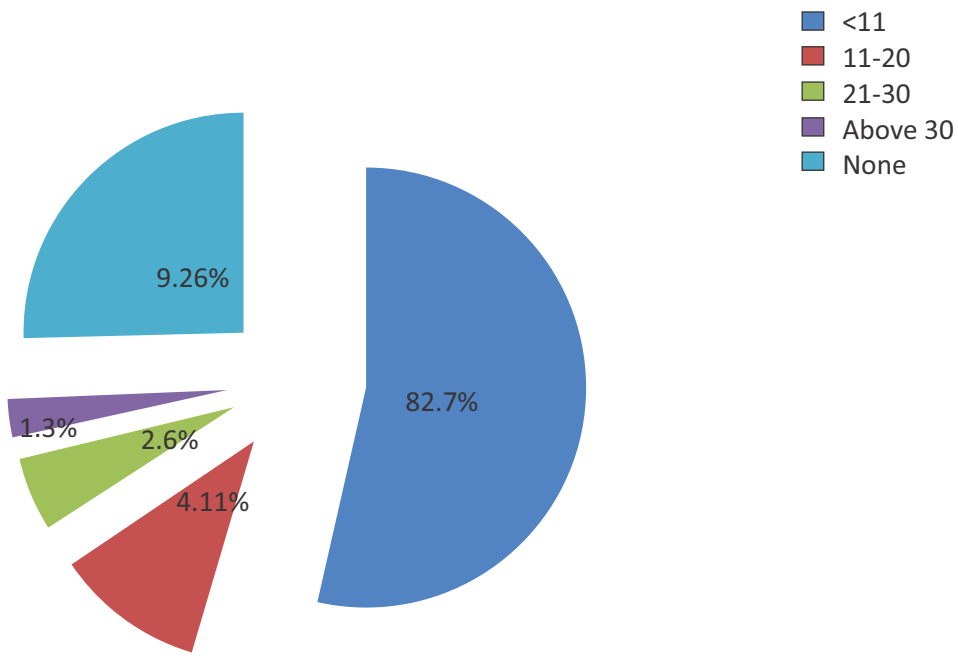

Figure 3: Number of orthodontics patients managed with traumatized teeth

Figure 3 shows that very few Orthodontists were conversant with the management of traumatized teeth. The pie chart reveals that about 80% of Orthodontists claimed they had not managed any patient with traumatized teeth, while about 10 % claimed they have managed less than eleven (11) patients with traumatized teeth.

Table 5: A comparison of treatment experience in the orthodontic management of traumatized teeth.

Variables	Cadre		χ^2	P
	Consultant (%)	Registrar (%)		
Number of orthodontics patients with traumatized teeth managed			13.318	**0.010***
< 11	12 (63.2)	7 (36.8)		
11 – 20	4 (100.0)	0 (0.0)		
21 – 30	2 (100.0)	0 (0.0)		
> 30	1 (100.0)	0 (0.0)		
None	1 (11.1)	8 (88.9)		

Table 5 shows that the orthodontists had a significantly greater experience in the management of traumatized teeth compared to the residents

Discussion

The importance of this study cannot be overemphasized bearing in mind the various ways in which traumatic dental injuries can affect orthodontic treatment.[2] Thus, a good knowledge of this as well as the best clinical practices in managing such conditions is very important to every orthodontic service provider.[3,4]

Generally, the respondents had a good knowledge of the trauma terminologies: luxation, subluxation, concussion and avulsion. This shows that the theoretical knowledge of the respondents was sound and the fact that many of them were involved in research or were practicing in the teaching hospitals may account for this . The respondents also showed adequate knowledge in other areas such as the importance of continuous radiographic assessment; orthodontic management of teeth with apical root fracture; tendency of root resorption by traumatized teeth, and how the intensity of trauma may affect the prognosis of orthodontic tooth movement.

However, the clinical acumen of the respondents in relation to knowledge of procedures to be administered to traumatized teeth during orthodontic treatment was poor. Less than 50%, knew the procedures to carry out and only half of the respondents had adequate knowledge of what procedure to carry out, after a severe luxation trauma to the upper incisors. A limited knowledge of the orthodontic management of traumatized teeth has also been reported in studies carried out in other populations.[1,5,6,8] Furthermore, the findings from those studies, also confirm the finding in this study, that only a minority of the participants knew of the existence of specific guidelines for dealing with these clinical situations, which is quite remarkable. Indeed, guidelines for the orthodontic management of traumatic dental injuries had previously been reported by Sandler et al.[3,4] However, it is important to note that these guidelines were only published in 2020, arising from the absence of clear evidence-based recommendations on how to manage traumatic dental injuries in the literature.[3] This further highlights the fact that this is an aspect of orthodontic care that has received relatively less attention, despite its relative importance bearing in mind the frequency of occurrence of dental traumatic episodes, particularly in children and adolescents.

There was a statistically significant difference between the number of orthodontic patients with traumatized teeth being managed by consultants

compared to that being managed by registrars. This is not surprising based on the differences in clinical experience between both groups. Thus, there is a need to expose the residents to managing a larger proportion of cases with traumatized incisors. This topic should also be included in their revision and update courses to facilitate continuous learning in this area.

One of the major limitations of this study is the very small study sample and the poor response rate of about 30%. A similar finding was also reported in a online study on dental trauma carried out among British orthodontists where a response rate of 14% was recorded, which is much lower than that observed in this study.[1] Thus, it is important to note that in spite of the small sample size, the findings from this study highlight the need for further training of Nigerian orthodontists and orthodontic residents in the orthodontic management of dental trauma.

Conclusion

Nigerian orthodontists and orthodontic residents have a good knowledge of the terms associated with dental trauma, however, there is a limited understanding of the proper protocols and guidelines for the orthodontic management of patients with a history of dental trauma. Thus, there is a need for further training in this regard, to improve their knowledge and clinical practice in this aspect of orthodontic care.

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Study Questionnaire
Knowledge of Dental Trauma and Orthodontic Tooth Movement Amongst Nigerian Orthodontic and Orthodontic Residents.

Part 1 - Professional and Academic Profile

1. Gender Male Female
2. Age 21-30 years 31-40 years 41-50 years 51-60 years 61 years+
3. Level of training: Orthodontic Registrar Orthodontic Senior Registrar Post Fellowship Senior Registrar
   Consultant Orthodontist (less than 10 years post specialist training)
   Consultant Orthodontist (over 10 years post specialist training)
4. Currently involved in research or teaching at a university: Yes No

Part 2 – Knowledge Of Dental Trauma

5. A tooth displacement in a non-axial direction that is accompanied by comminution (crushing) or alveolar socket fracture is classified as: ( ) concussion ( ) subluxation ( ) luxation ( ) avulsion ( ) none ( ) I do not know

6. An injury to the tooth-supporting structures with an increase in mobility and without tooth displacement is classified as:
   ( ) concussion
   ( ) subluxation
   ( ) luxation
   ( ) avulsion
   ( ) none
   ( ) I do not know

7. An injury to the tooth supporting structures without increasing tooth mobility or displacement but with significant sensibility to the percussion, is classified as:
   ( ) concussion
   ( ) subluxation
   ( ) luxation
   ( ) avulsion
   ( ) none
   ( ) I do not know

8. A complete displacement of the tooth out of its alveolus is classified as:
   ( ) concussion
   ( ) subluxation
   ( ) luxation
   ( ) avulsion
   ( ) I do not know

Part 3 - Dental Trauma Versus Orthodontic Data

9. In your opinion, which of the following is the least harmful movement to upper incisors that have suffered a lateral luxation trauma? (choose only one alternative)
( ) intrusion
( ) extrusion
( ) torque
( ) rotation
( ) translation
( ) inclination
( ) none
( ) i don't know

10. In a case of first premolars extraction for anterior-superior retraction, do you change your procedure or treatment plan after observing a severe lateral luxation trauma to the upper incisors?
( ) yes ( ) no

11. In your opinion, which of the following procedures should be used for patients who have suffered a slight dental trauma during orthodontic treatment?
( ) continue the treatment normally
( ) wait for a period of 30 days
( ) wait for a period of 3 months
( ) wait for a period of 6 months
( ) wait for a period of 1 year
( ) I don't know
( ) others. Please, specify

12. In your opinion, which of the following procedures should be used for patients who have suffered severe dental trauma during orthodontic treatment?
( ) continue the treatment normally
( ) wait for a period of 30 days
( ) wait for a period of 3 months
( ) wait for a period of 6 months
( ) wait for a period of 1 year
( ) I don't know
( ) Others. Please, specify

13 Do you continue taking radiographs of the traumatized teeth during treatment?
( ) yes ( ) no

14. In your opinion, can a tooth with root fracture in the apical third be moved normally?
( ) yes ( ) no

15. In your opinion, can traumatized teeth suffer a greater root resorption with induced dental movement?
( ) yes ( ) no

16. In your opinion, can the intensity of the trauma influence the prognosis of induced dental movement?
( ) yes ( ) no