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UNCOMPLICATED CROWN FRACTURE AND THERAPEUTIC DECISION OF PRACTITIONERS IN THE ANALAMANGA REGION

Rafalimino HN[1], Radafisolo MEF[2], Rakotonirina FP[1], Andrianjafinoro TH[1], Andriamasinoro RO[2], Ravelomanantsoa JJ[2] , Ramaroson J[1].

1 : Section of Conservative Odontology and Endodontics, IOSTM - University of Mahajanga,
2 : Pediatric Odontology Section, IOSTM - University of Mahajanga
3 : Periodontology subsection, IOSTM - University of Mahajanga,

Corresponding author : Rafalimino Holy Nasandratra[1]
IOSTM. Madagascar BP.98

Summary

A simple crown fracture refers to a crown fracture tooth without compromising the dental pulp. This type of dental trauma is common in the maxillary area. Depending on the extent of the fracture, it may affect only the enamel structure or involve both the enamel and the dentin, without exposing dental pulp. When located in the anterior region, the crown fracture disfigures the facial aesthetic, the smiling and leads to psychosocial, aesthetic, and functional repercussions for the patient. The most common etiology is the patient's fall or a collision during sports or daily activities. Generaly, noninvasive therapeutic involves direct composite crown restoration or the option of reattaching the fractured dental fragment. Invasive management tends toward prosthetic restoration. Nonconservative management leads to tooth extraction. The aim of this research was to describe the therapeutic decision-making process chosen by odontostomatologists practicing in Antananarivo when they faced witha case of simple coronal dental fracture. The results of the cross-sectional descriptive study highlighted the tendency towards invasive therapies.

Key words : *crown fracture, uncomplicated fracture, management decision.*

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1.Introduction

Uncomplicated coronal fracture is defined as an isolated enamel fracture or a simultaneous enamel-dentin fracture without pulpal exposure [1]. According to the literature, the term 'simple coronal fracture' will be used to designate fractures of the enamel structure alone or enamel-dentin structure without pulpal exposure. The term 'complex coronal fracture' will be used to designate coronal fractures simultaneously affecting the enamel, dentin and dental pulp structures [2,3]. A simple coronal fracture is usually caused by direct trauma, tooth wear or bruxism [4].

According to the American Dental Association (ADA), between 26.2% and 44.1% of all dental trauma is caused by coronal fractures and frequently occurs in the maxilla [4,5]. Restoration of loss of dental mineral substance will be important both aesthetically and functionally. Restorative management is multifaceted. Non-invasive restorative management will tend towards direct coronal restoration using composite or bonding of the fractured dental fragment. Less invasive management, which will tend towards prosthetic restoration. Non-invasive management, which tends towards tooth extraction [4], [6,7].

The aim of this study was to describe the therapeutic decision taken by odontostomatologists practising in Antananarivo when faced with a case of uncomplicated fracture of a permanent tooth.

2.Material and Methods

The study was conducted in the Analamanga region, in the city of Antananarivo capital of Madagascar. It was a cross-sectional descriptive study. The duration of the study was fourteen months, from November 2020 to December 2021. An inquest was conducted among forty-eight odontostomatologists practising in Antananarivo during the period May 2021 to August 2021, who had treated at least one patient presenting with a simple coronary fracture in the dental practice. Mode sampling was exhaustive.

All odontostomatologists who had managed at least a single case of uncomplicated crown fracture in the anterior sector, during the study period were included in the study. Odontostomatologists who had managed multiple case of uncomplicated crown fractures or who had managed single uncomplicated coronal fractures by exodontics were excluded from our study. The variables studied focused on the profile of odontostomatologists,

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characteristics of their training, observation on composite use, the therapeutic choice in a case of uncomplicated fracture, and the factors influencing this therapeutic choice. The results were analysed using IBM SPSS 24.0 software. The significance level was defined as p = 0.05.

Out of respect for ethics, the consent of practitioner was obtained, and the survey respected the anonymity of practitioner.

3. Results

- **Study population**

Was composed of 48 odontostomatologists practicing legally in the Analamanga region, who respect inclusion criteria. The sex ratio was 1. The proportion of males was identical of females, which was 50%. [Figure 1].

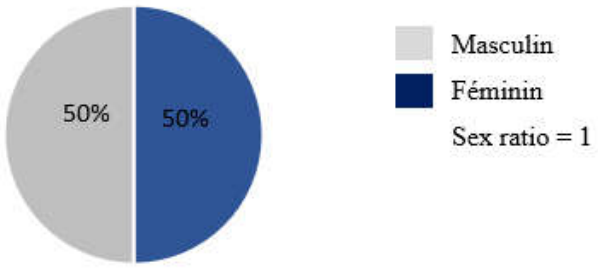

Figure I : Répartition des praticiens enquêtés selon le genre

- **Practitioners' year of practice**

Majority of odontostomatologists surveyed had been practising as odontostomatologists for more than ten years, with a proportion of 68.8% [Table I].

Table I : Distribution of practionners by years of practice

Years of practice	n N=48	%
Less than 2 years	4	8,3
2 to 5 years	6	12,5
6 to 10 years	5	10,4
More than 10 years	33	**68,8**
Total	**48**	**100,0**

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- **Characteristics of training received**

In this study, all training focusing on a restorative technique,respected mimics of natural tooth, preserved dental hard tissus, and respected pulpal vitality were defined as biomimetic restorative training. Majority of practitioners (60.4%) did not have opportunity to attend training in biomimetic restorative dentistry. Only 39.6% of odontostomatologists had the privilege of training in biomimetic restoration [Table II].

Table II : Distibution of practitioners according to training in biomimetic restorative dentistry

Biomimetic restoration training	n N =48	%
yes	19	39,6
No	29	**60,4**
Total	**48**	**100,0**

- **Aesthetic durability of composite restorations**

When Choosing thérapy, the prognosis of treatment efficacy should be evaluated. This evaluation will be necessary in order to assess the efficacy of the technic used. A proportion of 27.59% of practitioners mentioned an aesthetic durability of 2 years. Forty one point thirty-seven pecent (41.38%) of odontostomatologists reported an aesthetic duration of five years. While, 31,04% reported an aesthetic efficacy more than five years. [Table III].

Table III : Distribution of practitioners surveyed according to the aesthetic durability of composite restorations perfomed

Aesthetic durability	n N=29	%
2 years	8	27,58
5 years	12	**41,38**
5 years	9	31,04
Total	**29**	**100,0**

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- **Décision thérapeutique**

Anteriorly located, uncomplicated crown fracture disrupts facial expression, perturb smiling and instigates psychological repercussions for the patient. Social relationships are disrupted. It making speech more complex. Several types of restorative treatment may be chosen, depending on the conviction of the practitioner and the patient's consent. The results this study showed that practitioners tend more towards prosthetic restoration (60.4%) [Table IV].

Tableau IV : Distribution of practitioners surveyed according to the therpeutic decision taken in the management of a simple coronary fracture

Therapeutic decision	n N=48	%
Composite restoration	19	39,6
Prosthetic restoration	29	60,4
Total	**48**	**100,0**

- **Factor influencing the therapeutic decision**

Regarding the relativity between the therapeutic decision and the acquisition of training in biomimetic restorative dentistry, the results showed that the majority (89,5%) of practitioners who opted for the management of a coronal fracture had received theoretical and practical training in biomimetic restorative dentistry. The majority of practitioners (55,2%) who have not been trained in biomimetic coronal restoration have choose prosthetic restoration for the management of uncomplicated crown fracture. The result was significant with the value of p = 0.02 ⟨ 0.05 [Table V].

Tableau V : Distribution of practitioners according to the therapeutic decision and biomimetic restoration training

Therapeutic decision	Biomimetic restoration training					
	Oui		Non		Total	
	n	%	n	%	N	%
Coronal restoration	17	**89,5**	2	10,5	19	100
Prosthetic restoration	13	44,8	16	55,2	29	100

p = 0,02 ⟨0,05

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4.Discussion

Analamanga region was chosen as the study area based on several observations for differents reasons : an increase of rural exodus in Madagascar with a prevalence of 80%, the presence of several major university hospital centers in the region, the rise in cases of dental trauma due to road traffic accidents in Antananarivo, concentration of dental composite suppliers in Antananarivo [8,9,10,11].

This study allowed us to survey 48 legally practicing odontostomatologists in the Analamanga region of Antananarivo. All practitioners who met the inclusion criteria were surveyed.The equal proportion of male and female practitioners resulted in a sex ratio of 1. The majority of practitioners had been practicing for more than ten years, with a proportion of 68.8% [Table I]. Older practitioners prefers working in urban areas. One reason for this preference could be the proximity to high-quality healthcare services in Antananarivo, in case they contract complex general illnesses.This choice could also be influenced by the established operation of their dental clinics [12].

In biomimetic restorative dentistry, Magne P and his collaborators, in 2022, defined these emerging concepts as techniques that restore the biomechanical, structural, and aesthetic integrity of teeth while preserving the remaining healthy biological structures to the greatest extent possible [13]. The application of this concept is particularly relevant when considering patient motivation to save teeth rather than extract them. Another key benefit of biomimetic restorative dentistry lies in its ethical dimension—respecting patient satisfaction with the care provided in the dental office and the affordability of treatment [14,15]. Restoring anterior tooth substance loss by mimicking natural characteristics helps to rebuild the patient's self-confidence and prevents psychological discomfort during smiling and communication [16]. In this study, results showed that practitioners leaned more toward prosthetic restorations (60.4%) [Table IV]. This contrasts with the views of researchers such as Neuber T and Setzer FC in 2008, Martos J et al. in 2017, Jing C and colleagues in 2023, and Tulin T and collaborators in 2025, who emphasized the importance of promoting biomimetic composite restorations.

During this study, the results showed that the majority of practitioners had not the opportunity to attend training in biomimetic restorative dentistry (60.4%). Only 39.6% of the surveyed practitioners reported having had the privilege of attending training

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in biomimetic restoration [Table II]. Yet, according to authors such as Magne P and collaborators, Marniquet S and collaborators, and Alleman D and collaborators, the biomimetic approach is considered a modern restorative method that helps reduce the need for single-unit prosthetic crowns by prioritizing direct composite restorations as a first-line treatment. This type of restoration can restore the natural appearance of the newly treated tooth—biologically, mechanically, functionally, and aesthetically [13], [21,22,23]. This lack of training in biomimetic techniques among odontostomatologists guided the next phase of this research to focus on identifying their observations regarding the aesthetic longevity of composite restorations. The majority of practitioners estimated the aesthetic longevity of a composite restoration to be five years (41.38%) [Table III]. This highlights that practitioners recognize the effectiveness of coronal restoration using the direct technique.The surveyed practitioners demonstrated skill in the aesthetic shaping of restorations. The aesthetic lifespan they reported exceeds that cited by Kane AW and collaborators in 2000 [24]. For the management of a coronal restoration of a simple coronal fracture, the results showed that practitioners tend to opt for prosthetic restoration (60.4%) [Table IV]. However, the literature has discussed the direction of therapeutic decisions made by practitioners toward restoration using the direct biomimetic technique. This result contrasts with the therapeutic decisions made by several authors: Drouri S and collaborators, Escobar LB and collaborators. The popularization of biomimetic restorative dentistry techniques in Madagascar will be crucial for instilling the philosophy of tissue economy during restoration [24,25].

The therapeutic decision-making of odontostomatologists tends toward more invasive therapy. During this research study, the only significant factor influencing the therapeutic decision of practitioners was the acquisition of theoretical and practical training in biomimetic restorative dentistry. The majority (89.5%) [Table V] of practitioners who chose composite coronal restoration for managing a coronal fracture had received both theoretical and practical training in biomimetic restorative dentistry. The majority of practitioners (55.2%) who had not undergone training in biomimetic coronal restoration opted for prosthetic restoration to manage a simple coronal fracture. The result was significant, with a p-value of $0.02 < 0.05$. These results suggest that acquiring training in biomimetic restorative dentistry is a motivating factor for practitioners to choose biomimetic restorative therapy.

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Conclusion

The general objective of this study was to describe the therapeutic decision-making of odontostomatologists practicing in Antananarivo when faced with a case of uncomplicated crown fracture of a permanent tooth. The results indicated that the therapeutic decision of odontostomatologists in the case of a simple coronal fracture tends toward prosthetic restoration, which is more invasive compared to biomimetic composite restoration. The key factor influencing this therapeutic decision was the lack of training in biomimetic restorative dentistry. However, practitioners acknowledged the aesthetic longevity of composite restorations.

The perspective of popularizing this biomimetic concept in Madagascar will be crucial to ensure that dental practice is aligned with the therapeutic gradient, on the one hand, and, on the other hand, this perspective will be considered one of the motivating factors for patients seeking restorative care in terms of cost and quality.

References

1. *Trope M. Endodontic considerations in dental trauma. JI Ingle, eds. Ingle's endodontics 7, USA. 2019 : 373-91.*
2. *Spinas E. A new classification for crown fractures of teeth. Journal of Clinical Pediatric Dentistry. 2002 : 225-31.*
3. *Hecova H, Tzigkounakis V, Merglova V, Netolicky J. A retrospective study of 889 injured permanent teeth. Dent Traumatol . 2010 : 466–75.*
4. *Bissinger R, Müller DD, Reymus M, Khazaei Y, Hickel R, Bücher K and all. Treatment outcomes after uncomplicated and complicated crown fractures in permanent teeth. Clinical Oral Investigation. Germany. 2020 : 1-11.*
5. *Atabek, D, Alaçam, A, Aydintu, Konako G. Retrospective Study of Traumatic Dental Injuries. Dent.Traumatol. Turkey. 2014, 30, 154–61.*
6. *Smithson V. Management of uncomplicated crown fractures in the permanent dentition*
7. *.Clinical. International Dentistry – Africa. 2022 : 14-2.*
8. *Martos J, Pinto KVA, Miguelis TMF, Xavier CB. Management of an uncomplicated crown fracture by reattaching the fractured fragment—Case report. Dent Traumatol. Brazil. 2017;00:1–5.*
9. *Mamiarisoa JEF, Bela C, Mbima C. Impact de l'exode rurale sur le développement agricole à Madagascar. Revue Internationale de la Recherche Scientifique. France : 2024 : 2381.*

IJO - International Journal of Applied Science
(ISSN: 2992-247X) Rafalimino Holy Nasandratra1*
https://ijojournals.com/ Volume 08 || Issue 03 || March, 2025 ||

10. *Ordre National des Odonto-stomatologistes de Madagascar. Annuaire 2016. Madagascar :2016 : 33-4.*
11. *Ministère de la Santé publique de Madagascar. Annuaire des statistiques du secteur santé de Madagascar. Madagascar : 2013 : 1-50.*
12. *Rakotoarivony AE, Rakotoarison RA, Rakotoarimanana FVD'A, Arijaona NA, Rakoto-Alson S, Rakoto FA. Épidémiologie des traumatismes dento-maxillo-faciaux au CENHOSOA Antananarivo. Med Buccale Chir Buccale. France.2014 : 20 : 221-26.*
13. *Arciprete C, Leander SS. Analyse de l'avantage urbain à Madagascar. UNICEF pour chaque enfant. Italy : 2023 : 8.*
14. *Magne P, Belser U. Biomimetic restorative dentistry. Fondamental and basic clinical procedure. Quitenssence. USA : 2022 : (1) : 1-3.*
15. *Gray L, McNeill L, Yi W, Zvonereva A, Brunton P, Mei L. The "business" of dentistry: Consumers' (patients') criteria in the selection and evaluation of dental services. PLoS ONE. Austria. 2021 : 16(8): 1-2.*
16. *Rafalimino HN, Ratsimandresy NN, Randriamalala N, Rakotonirina FP, Andrianjafinoro TH, Ranjarisoa LN, Ramaroson J. Factors influencing the choice of oral health care center by the population of Mahajanga I, Madagascar. India.2024 : (07).15-3.*
17. *Almajed O. Shaping Smiles: A Narrative Review of Crown Advancements in Pediatric Dentistry. Cureus. London.2024 : (1) :1-7.*
18. *Neuber T, Setzer FC. Long-term treatment of a maxillary central incisor with uncomplicated crown fracture : a case report. Endo (Lond Engl). England : 2008 : 247 -56.*
19. *Jing C, Jiahui L, Chunmei L, Xiaojin g, Xiaoe Zhao, Guangtai Song. Treatment outcomes of permanent teeth with uncomplicated and complicated crown fractures and factors associated with pulp survival: A retrospective study.Dental traumatology. Willey.China. 2024 : 306-15*
20. *Tulin T, Pınar SE, Tulin I, Cansu OO, Melek DT. Management of crown fractures with different pulp treatments and Re-attachment technique : case series. BMC Oral Health. Turkey. 2025 : 25 :489.*
21. *Le Roux O. L'intérêt de la biomimetisme en pratique quotidien. Clinic.Dentoscope. France : 2000.50-6.*
22. *Marniquet S, Tirlet G. No-post, No-crown.Formes de préparation contemporaines pour les restaurations adhésives. L'information dentaire. France : 2017 : 16-5.*
23. *P Magne _ J Goldberg _ D Edelhoff, J-F Gu¨th. Composite Resin Core Buildups With and Without Post for the Restoration of Endodontically Treated Molars Without Ferrule. _Operative Dentistry. USA : 2016, 41-1, 64-75.*

IJO - International Journal of Applied Science
(ISSN: 2992-247X) Rafalimino Holy Nasandratra1*
https://ijojournals.com/ Volume 08 || Issue 03 || March, 2025 ||

24. *Alleman D, Nejad M, Alleman C. The protocols of biomimetic restorative dentistry: 2002 to 2017. Inside Dentistry. 2017 ;13(6):64- 73.*

25. *Drouri S, Karami M,Benkiran I. Restauration directe de la dent antérieure fracturée : approche biomimétique. Rev Odont Stomat. Maroc. 2015 ;44:214-32.*

26. *Escobar LB, Da Silva LP, Monteiro PM. Fracture resistance of fiber reinforced composite restorations : a systematic review and meta-analysis. Polymer (Basel). Portugal.2023 (18) : 3802.*