Content available at: https://www.ipinnovative.com/open-access-journals

Journal of Oral Medicine, Oral Surgery, Oral Pathology and Oral Radiology

Journal homepage: www.joooo.org

Original Research Article

Alveolo-dental trauma: Epidemiological, clinical and therapeutic aspects at Centre Hospitalier Universitaire Yalgado Ouédraogo

Wendpouiré Patrice Laurent Guiguimdé[1,2]*, Wendkuni Jocelyne Valérie Garé[1,2], Jean Patrice Bayala[3], Wendpouloumdé Aimé Désiré Kaboré[1,2], Tarcissus Konsem[1,2]

[1]*Dept. of Odontostomatology and Maxillofacial Surgery, Yalgado Ouédraogo University Hospital, Ouagadougou, Burkina Faso*
[2]*Health Sciences Training and Research Unit, University Joseph Ki Zerbo, Ouagadougou, Burkina Faso*
[3]*Dept. of Stomatology and Maxillofacial Surgery, Centre Hospitalier Régional de Ziniaré, Ziniaré, Burkina Faso*

ARTICLE INFO

Article history:
Received 07-02-2024
Accepted 27-03-2024
Available online 17-06-2024

Keywords:
Alveolar- dental trauma
Epidemiology
Clinical
Therapeutic

ABSTRACT

Introduction: TAD constitutes one of the most frequent and urgent reasons in the stomatology and maxillofacial surgery (S/CMF) department. This study aimed to contribute to improving the management of alveolar-dental trauma at CHU-YO.

Materials and Methods: This was a retrospective case series study, based on the clinical files of patients who underwent TAD and admitted to the S/CMF department of the CHU-YO during the period of study from July 1, 2022 to June 30, 2023. Data were collected from collection sheets and patient files during this period.

Results: 100 cases of TAD were collected in the S/CMF department of the CHU-YO. These TADs were relatively frequent. The age group of 15 to 30 years was the most affected (51%). Male predominance was clear (64%). ACRs were the greatest providers of alveolar-dental trauma (84%). Dislocations were predominant (51%) and the elective site was the upper jaw (61%). Medical treatment consisted mainly of antibiotics (100%), analgesics (97%), anti-inflammatories (71%) and topical uses of oral antiseptics (100%). The most commonly performed surgical treatment was soft tissue sutures. Restraints using Duclos arch ligatures were the subject of the majority of cases of orthopedic treatment (46%). Evolution was good in 84% of cases. Dental mobility (4%) and alveolitis (4%) dominated the table of complications.

Conclusion: Reducing ACR, which involves significant road prevention, would undoubtedly contribute to reducing the incidence of alveolar-dental trauma. Strengthening the technical platform and interdisciplinary collaboration of the department of odontostomatology and maxillofacial surgery could improve patient care at the CHU-YO.

1. Introduction

Alveolar-dental trauma (ADT) is defined as local lesions caused by the violent action of an external agent on the dental arch, generally associated with partial or total dislocation of a tooth or group of teeth, with the exception of para-physiological trauma.[1,2] These TADs are very often associated with maxillofacial trauma, which may be isolated or associated with other localizations, presenting integumentary or skeletal lesions.[3] According to the World Health Organization (WHO), the prevalence of ADD is high in Africa, particularly in poor communities, and the situation is set to worsen in the coming years.[4] In Burkina Faso, ADD is one of the most frequent and urgent reasons for odontological consultations.[5,6] It

* *Corresponding author*.
E-mail address: guiguimdew@gmail.com (W. P. L. Guiguimdé).

https://doi.org/10.18231/j.jooo.2024.017

seems clear, however, that the incidence and prevalence of TAB are significantly underestimated. In fact, when treating polytrauma patients, the priority is to treat life-threatening injuries, and dental lesions are taken into account secondarily. Alveolodental trauma takes a wide variety of clinical forms, impacting facial aesthetics, dental occlusion and masticatory function, but rarely threatening life. Their morphological and functional consequences can be considerable if left untreated. Technical facilities are obsolete, making it difficult to treat them, which is why prevention is so important. Against this backdrop, we set out to study the epidemiological, clinical and therapeutic aspects of these conditions in the Department of Odontostomatology and Maxillofacial Surgery at the Centre Hospitalier Universitaire Yalgado Ouédraogo (CHU-YO), with a view to improving the effectiveness of treatment.

2. Materials and Methods

This was a cross-sectional descriptive study with retrospective collection, in the Department of Odonto-stomatology and Maxillofacial Surgery at CHU-Y, over a one-year period from: July 1, 2022 to June 30, 2023. All patients with a diagnosis of alveolar-dental trauma treated at CHUYO and with a usable clinical record and consultation form were included in the study. Data were collected using a specially designed data collection form. Variables studied included sociodemographic characteristics (age, sex, profession, place of residence), etiological aspects (road traffic accident, sports accident, brawl, domestic accident, fall from height), clinical aspects (consultation time, oral examination) and therapeutic aspects (type of treatment, evolution and type of complications). Data entry and analysis were performed using Epi info 7 software, French version 7.2.2.6.

3. Results

3.1. Epidemiological data

A total of 100 patients meeting the inclusion criteria during the study period were identified, with an average monthly incidence of TAD of 8.33 cases and a peak incidence of 25 cases (25%) in December (Figure 1).

3.2. Socio-demographic data

Males accounted for 64% of cases, with a sex ratio of 1.77. The age range [15 to 30 years] represented 51%. The extremes ranged from 3 to 64 years. The average age was 26.27. The informal sector accounted for 41% of patients and pupils/students for 30%; 62% of patients lived in urban areas. Table 1 shows the patients' socio-demographic characteristics.

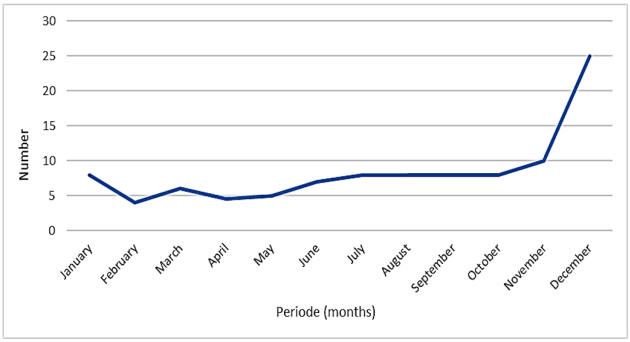

Figure 1: Monthly change in number of TADs (n=100)

3.3. Clinical and paraclinical data

3.3.1. Circumstances of occurrence

Eighty-four cases (84%) of TADs were due to road traffic accidents (RTAs), and 8 cases (8%) to domestic accidents (Figure 2).

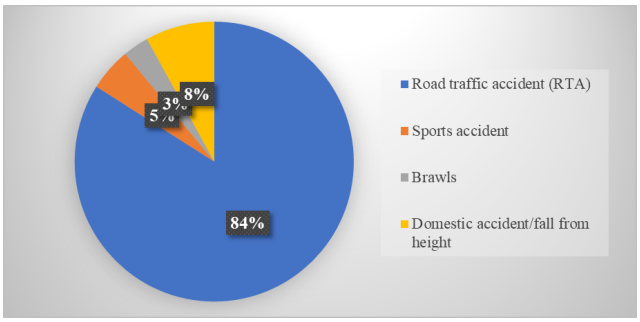

Figure 2: Circumstances of TAD occurrence (n=100)

3.3.2. Lesion characteristics

The maxilla was involved in 61% of cases. Dental dislocation accounted for 51% of cases (Table 2).

3.3.3. Teeth affected by TAD and type of TAD

The upper permanent central incisors were most affected by TAD, followed by the lateral incisors (Figure 3). The maxillary central incisor dominated the types of temporary teeth affected (Figure 4). Alveolar fracture was the most common alveolar-dental fracture (ADF) (Figure 5). Dental avulsion dominated in 19.6% of dislocations (Figure 6).

3.3.4. Associated lesions and further investigations

The majority of associated lesions were soft tissue lesions (98%) (Table 3).

Panoramic radiographs were requested in 87% of cases, and CT scans in 13%.

3.3.5. Treatment data

Therapeutic aspects are presented in Table 4.

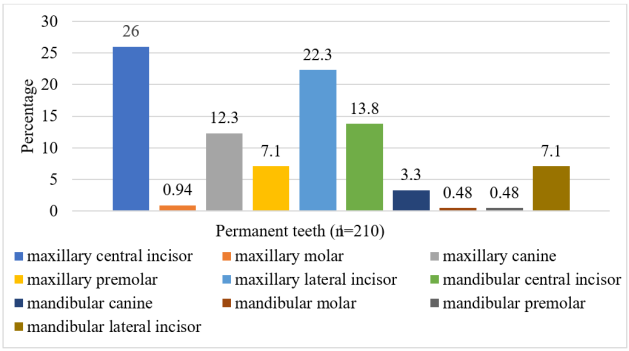

Figure 3: Types of permanent teeth affected

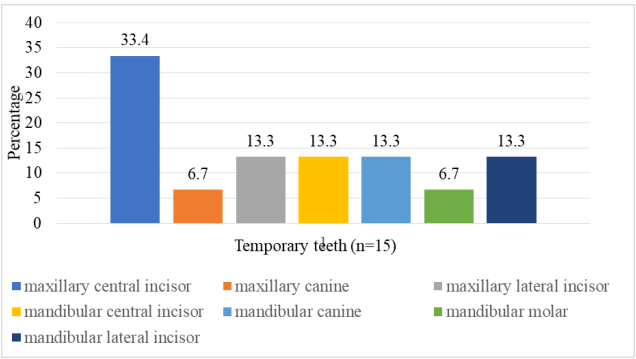

Figure 4: Types of temporary teeth affected

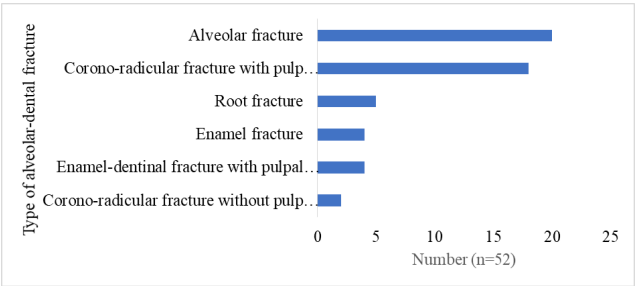

Figure 5: Distribution of alveolar-dental fractures

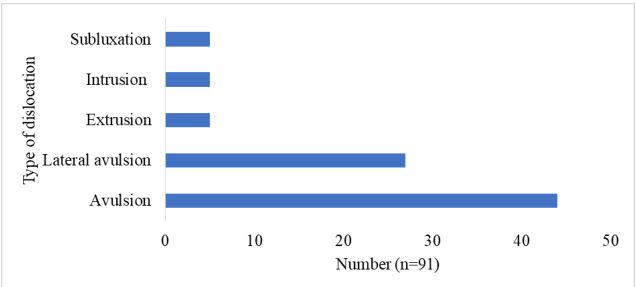

Figure 6: Distribution of dental luxations

Table 1: Socio-demographic characteristics of patients

Variable/ modality		Number (n =100)	Percentage (%)
Gender			
	Male	64	64,0
	Feminine	36	36,0
Age range			
	[0-15]	14	14,0
	[15-30]	51	51,0
	[30-45]	29	29,0
	[45 et plus]	6	6,0
Socio-professional activities			
	Informal sector	41	41,0
	Pupil/Student	30	30,0
	Private sector	12	12,0
	Public sector	8	8,0
	Unemployed	7	7,0
	Housewife	2	2,0
Place of residence			
	Urban	62	62,0
	Rural	38	38,0

Table 2: Site of trauma and clinical forms

Variable/ modality	Number (n=100)	Percentage (%)
Site of trauma		
Maxillary	61	61,0
Mandible + maxilla	24	24,0
Mandible	15	15,0
Clinical forms		
Dislocation	51	51,00
Alveolar-dental fracture and dislocation	25	25,00
Alveolar-dental fracture	24	24,00

Table 3: Associated lesions

Variable/ modality	Number (n=100)	Percentage (%)
Soft tissue injury	98	0,98
Mandibular fracture	11	0,11
Maxillary fracture	1	0,01

4. Discussion

The limitations of our study are primarily inherent in its descriptive and retrospective nature. There is also the fact that the study took place in a single center, limiting the number of cases. The first of its kind in Burkina Faso, this study will certainly be useful for future work, as it provides epidemiological, clinical and therapeutic data. The results of this work could also guide the appropriate interventions to be deployed in terms of training and improved practices in the management of ADD in Burkina Faso.

Table 4: Therapeutic aspects of DAT

Variable/ modality	Number (n=100)	Percentage (%)
Medical treatment		3,68
Antibiotics	100	1
Oral antiseptics	100	1
Analgesics	97	0,97
Anti-inflammatories	71	0,71
Surgical treatment		1,86
Sutures	99	0,99
Reduction	55	0,55
Avulsion	26	0,26
Abstention/Monitoring	5	0,05
Relocation	1	0,01
Orthopedic treatment		0,54
Duclos arch ligature retainer	46	0,46
Ligation wire restraint	8	0,08
Evolution		1
Favorable	84	84,0
Not favorable	16	16,0
Complications		0,14
Dry socket	4	0,04
Dental mobility	4	0,04
Pulp necrosis	3	0,03
Dental joint disorder	3	0,03

The frequency of TAD is high in the month of December in the present study, at 25%. The study by Palakina et al[7] in Togo reports similar trends. This high frequency of TADs is recorded during the festive season, when economic activity reaches its peak. In addition, this period is hectic because of the school vacations, with the arrival of many pupils and students in town, resulting in numerous journeys.

Our findings regarding the male sex (64%) in TAD are similar to those of Marko et al[8] and Parkins et al,[9] who reported 64.1% and 62.55% male sex respectively in their studies. This could be explained by the more aggressive nature of male subjects. We also note that in Burkina Faso, the growing use of motorcycle cabs and their involvement in RTAs may be one explanation. Indeed, most of these vehicles are driven by young adult males. Moreover, young people are exposed to violent games.[2]

The age group most affected was 16 to 30 years, with a rate of 51% and an average age of 26.27 years. Dia Tine et al[10] in Senegal reported a rate of 78%. Sybille et al[11] in France found a lower rate. Our results could be explained by the fact that Burkina Faso's working population is young.

The informal sector and pupils/students were the most represented in the study, at 41% and 30% respectively. Oryopokou[12] in Côte d'Ivoire in 2013 reported in his study a greater involvement of pupils/students with a rate of 63.88%. In Burkina Faso, the massive use of two-wheeled vehicles by pupils and students to get to educational establishments, as well as the development of the commercial sector, may justify this rate. Indeed, the poor development of public transport means that the majority of pupils/students have to travel either on foot or on two-wheeled vehicles, often ignoring or neglecting the highway code and not wearing a full-face helmet.

In this series, the majority of patients (62%) lived in urban areas. This urban frequency can be explained, on the one hand, by the fact that the majority of cars and 2-wheelers are concentrated in cities. On the other hand, assaults are frequent in big cities, where crime is on the rise.

Road traffic accidents (RTAs) accounted for 84% of these injuries, followed by domestic accidents/falls from heights (8%). This finding confirms the consensus in the literature that RTAs are the leading cause of TAD worldwide.[13,14] Muller et al[15] in France found 55.60% of cases, while Bali et al[16] in India reported 71.9% of TADs related to RTAs. This could be due to the increase in the number of cars on the road, with the failure to wear seatbelts, the development of the market for two-wheeled vehicles, the failure to observe road safety rules and the poor state of the roads. To this could be added the use of doping products (narcotics) by machine drivers.

The maxilla was the most affected, accounting for 61% of TAD cases. Similar results were reported by Traoré[17] in Mali and Dia Tine et al[10] in Senegal. This may be linked to the low bone density of the maxilla and its position relative to the mandible. Indeed, its anatomical position in front of the facial mass makes it a natural bumper.

The permanent dentition was most affected, compared with the temporary dentition. The most affected teeth were the maxillary central incisors, followed by the maxillary lateral incisors. These results concur with those of Thamer et al. (2016)[18] in Canada, who also reported 49.26% involvement of the permanent dentition. This could be explained by the fact that the patients concerned were adolescents and adults, who constitute the stratum most exposed to road traffic accidents, brawls and sports accidents. The anterior position of the maxillary incisors on the arch makes them highly exposed to impacts.

Among the 100 cases of TAD, dental dislocation was the most frequent (51%). Bah et al (2023) report lower proportions in Guinea.[2] In our series, however, avulsions accounted for 19.6%. The work of Traoré[18] in Mali shows a lower proportion of 2.5%. The high prevalence of dislocations in our series is due to the violence of the impact, its direction and above all to the periodontal status of the teeth concerned.[2]

The most common associated injuries were soft tissue injuries (98% of cases), followed by mandibular fractures (11%). The extent of the trauma will also affect the soft tissues, which are not protected by personal protective equipment such as helmets and mouthguards for certain sports.

Panoramic radiography was performed in 87% of cases. Like the present work, a Malian study showed that dental

panoramic radiographs were performed in the majority of cases of TAD.[12] This result can be explained by the fact that in our study, we encountered trauma involving several teeth at once, and even associated with lesions such as mandibular or maxillary fractures. In addition, dental panoramic radiography is accessible, easy to perform and affordable. On the other hand, like the work of Foche et al,[19] that of Naye also showed greater use of retroalveolar radiography compared with panoramic radiography.[4] Our result could be explained not only by the unavailability of retroalveolar radiography in the department, but also by the degree of involvement, which often requires a panoramic view for decision-making.

All patients (100%) received medical-surgical treatment in our series. All also benefited from systematic antibiotic therapy and topical use of oral antiseptics. Analgesic treatment was provided for 97% of cases. These results are similar to those of Bah et al.[2] and its explanation lies in the objective of the treatment which is to relieve and prevent infectious complications, because alveolodental lesions are always accompanied by a gingival breach which can be a microbial entry point. Soft tissue sutures (lips, tongue, cheeks, gums) represented 99% of cases, followed by reductions (55%), then avulsions with 26% of cases. Restraints by ligatures to the Duclos arches were the most performed (46%), followed by cases of restraint by ligature wire (8%). Guiguimdé et al.[20] in Burkina Faso, found 52% alveolar-dental contention while Sybille et al.[11] in 2013 in Switzerland reported 80.9% of cases. This frequency of reduction by splinting could be explained by the ease of the technique, its affordable cost, but also because it constitutes the treatment of choice in cases of partial dislocations.

Our results, considered favorable in 84% of cases, are similar to those of Bah et al[2] in Mali, who showed 99% of cases to have a good outcome. If managed early, the prognosis for DAT is generally good. Non-favorable results are observed in cases of delayed consultation, self-medication, traditional treatments and financial difficulties in paying for care. Moreover, patients with poor periodontal health and oral hygiene have a poor prognosis. It should also be noted that most trauma patients are rushed by the Brigade Nationale des Sapeurs-Pompiers to the emergency departments of health facilities, from where they are referred to the odontostomatology and maxillofacial surgery department when their hemodynamic condition stabilizes. However, other patients come to us with infectious complications. In such cases, medical and surgical treatment is essential. To prevent accidents, we need to step up our efforts to raise awareness among road users. Practitioners must scrupulously adhere to therapeutic protocols, which not only save lives, but also restore masticatory function and aesthetics to traumatised patients.[20] To achieve this, the dental surgery department needs to be restored to full working order, so that appropriate and optimal dental therapies, which were lacking in this study, can be implemented.

5. Conclusion

Dental trauma is a public health problem in Burkina Faso, and is one of the main reasons for consultation in the Department of Odonto-stomatology and Maxillofacial Surgery at CHU-YO. Their frequency in the 15-30 age group merits particular attention, and a substantial reduction in the incidence of this pathology calls for increased awareness-raising among road users to prevent accidents.

6. Source of Funding

None.

7. Conflict of Interest

None.

References

1. Perrin D, Ahossi V, Larras P. Marion Paris; 2005.
2. Bah AT, Diallo OR, Bah A, Diop A, Kourouma A, Bah FBY. Alveolar-dental trauma: Epidemiological, clinical and therapeutic aspects at the Donka National Hospital. *Afr J Dent Implantol*. 2021;20:43–53.
3. Tardif A, Misino J, Peron JM. Dental and alveolar trauma. *EMC-Dent*. 2004;1(2):159–78.
4. Hanadi SL. Assessment of School-Teachers' Knowledge and Attitude toward The Management of Traumatic Dental Injuries in Makkah. *J Umm Al-Qura Univ Med Sci*. 2023;p. 27–34.
5. Konsem T, Millogo M, Coulibaly A, Ili V, Ouédraogo R, Ouédraogo D. Maxillofacial trauma from road traffic accidents involving two-wheeled vehicles at the Yalgado Ouédraogo University Hospital Center (CHU-YO): Epidemiological aspects and anatomo-clinical. *Odonto-Stomatol Trop*. 2018;41:53–8.
6. Millogo M, Sanfo M, Idani M, Dargani MF, Coulibaly A, Konsem T. Loss of maxillofacial substances of traumatic origin at the Yalgado Ouédraogo University Hospital Center. *Ann Chir Plast Esthet*. 2022;68(2):162–6.
7. Palakina A, Guiguimdé W, Adam S, Hemou P, Pegbessou E, Betenora B, et al. Oral trauma: Epidemiological aspects of dento-maxillo-mandibular fractures in 102 cases collected at the Sylvanus Olympio University Hospital (CHU-SO) in Lomé. *Rev Col Odont-Stomal Afr Chir Maxilo-fac*. 2016;23(3):47–54.
8. Marko M, Miroslav S, Dinko I, Van M, Darko M. Assessment of oromaxillofacial trauma according to sex, age, cause and type of trauma. *Current Stomatol*. 2015;49(4):340–7.
9. Parkins G, Boamah MO, Avogo D, Nuamah IK. Maxillofacial and concomitant injuries in multiple injured patients at Korle bu teaching Hospital, Ghana. *West Afr J Med*. 2014;33(1):51–5.
10. Dia ST, Ba A, Barry CG, Kounta B, Yones Y, Kebe NDF, et al. Clinical aspects of maxillary and dental trauma. Odontostomatol chir maxillo-fac. *Odontostomatol Chir Maxillo-fac*. 2005;2(1):7–14.
11. Opsahl-Vital S. Management of complex dental trauma in a young person. *Réal Clin*. 2003;14(1):59–70.
12. Oryopokou A. Maxillofacial trauma at Bouaké University Hospital: About 137 cases; 2013.
13. Flavio B, Gabriel K, Andrea F. Dental trauma in adults in Switzerland. *Dent Traumatol*. 2009;25(2):181–4.
14. Al C, Bezerrra P, Kalencar CR, Moura C. Anterior dental trauma in Brazilian children aged 7 to 12 years. *Traumatol Chir Maxillo-fac*. 2009;25(2):198–202.
15. Muller M, Bolla M, Ionesco-Benaiche N, Jasmin JC. Alveolar-dental trauma and socio-economic context. *Med Sci Int J*. 2015;4(3):2650–

63.
16. Bali R, Pasvee S, Garga A, Dhiiion G. A comprehensive study on maxillofacial trauma conductect. *J Inj Viol Res*. 2013;5:108–16.
17. Traoré BG. Alveolo-dental trauma and associated lesions at the Somine Dolo Hospital in Mopti (HSDM): About 40 cases. Bamako: Bamako University of Science and Technology; 2015.
18. Thamer A, William P, Tarek E. Prevalence of traumatic dental injuries in patients attending university of Alberta Emergency Clinic. *Op Dent J*. 2016;10:315–21.
19. Foche AN, Bushabu FN, Mana CM, Haruna R, Masin SS, Nsudila M, et al. Occurrence of alveolar-dental trauma at university clinics in Kinshasa: Second part, preliminary study of 93 cases. *Pan Afr Med*. 2018;29:50.
20. Guiguimdé WLP, Garé J, Nokam A, Bayala J, Ouattara B, Bougoum S, et al. Therapeutic and progressive aspects of dento-maxillo-facial trauma in the city of Ouagadougou. *Health Sci Dis*. 2023;24(10):65–70.

Author biography

Wendpouiré Patrice Laurent Guiguimdé, - https://orcid.org/0009-0002-3383-7598

Wendkuni Jocelyne Valérie Garé, - https://orcid.org/0000-0002-0833-764X

Jean Patrice Bayala, - https://orcid.org/0000-0002-1360-524X

Wendpouloumdé Aimé Désiré Kaboré, Professor https://orcid.org/0000-0003-4220-9534

Tarcissus Konsem, Professor https://orcid.org/0009-0003-3423-5545

Cite this article: Guiguimdé WPL, Garé WJV, Bayala JP, Kaboré WAD, Konsem T. Alveolo-dental trauma: Epidemiological, clinical and therapeutic aspects at Centre Hospitalier Universitaire Yalgado Ouédraogo. *J Oral Med, Oral Surg, Oral Pathol, Oral Radiol* 2024;10(2):93-98.