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The Frequency of Intraosseous Lesions of Jaws of Patients Referred to the Pathologic Centers of Zanjan from 2013 to 2024

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ABSTRACT

Introduction: The jaw bones are susceptible to a variety of lesions. Understanding the prevalence and distribution of these lesions is crucial for informing preventative strategies within healthcare settings. This study aimed to evaluate the prevalence of intraosseous jaw lesions in a population referred to diagnostic and therapeutic centers in Zanjan, Iran, between 2013 and 2024.

Materials and Methods: This study employed a cross-sectional descriptive analytical design. This cross-sectional study, conducted in Zanjan in 2023, utilized structured data sheets to collect information on patients with intraosseous lesions. The collected data included demographic details (age, gender), lesion location, radiographic characteristics, and histopathological diagnosis. We applied Chi-square and Monte Carlo tests for statistical analysis.

Results: A total of 325 intraosseous lesions were reported in our study. A total of 214 intraosseous lesions were reported in this study. The most common group of lesions was inflammatory periapical lesions (49.5%), and the most common lesion was radicular cyst (26.6%). The mandible was the most common site of involvement (51.9%), and the most common clinical presentation was asymptomatic (83.2%). In both jaws, the most common group of lesions was inflammatory periapical lesions (61.2% in the maxilla and 38.7% in the mandible). No significant differences were observed in the distribution of lesion frequency based on gender or age group ($p > 0.05$).

Conclusion: This study contributes valuable data on the prevalence and distribution of intraosseous lesions within an Iranian population. These findings establish baseline information that can inform the development and implementation of preventative therapeutic protocols within healthcare facilities at the community level.

Keywords: Jaw; Odontogenic cyst; Bone lesions; Periapical granuloma; Radicular cyst.

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Introduction

Intraosseous jaw lesions encompass a diverse spectrum of clinical and histopathological characteristics, ranging from benign to aggressive or malignant, necessitating distinct management approaches [1]. These lesions hold significant importance due to their direct impact on patients' aesthetics and functionality. Therefore, early diagnosis of these disorders can potentially avert inappropriate interventions. Understanding the clinico-pathological features of these diseases plays a pivotal role in timely diagnosis and accurate management. Clinical parameters exhibit variations across geographical regions and ethnicities [2]. Researchers have extensively investigated specific types of jaw and facial lesions, including odontogenic and non-odontogenic lesions, cystic and neoplastic disorders, and lesions in distinct patient groups such as children or adults [1,4]. Reported studies consistently indicate a higher prevalence of odontogenic lesions compared to non-odontogenic lesions within the jawbone [5,6].

The maxilla and mandible form the primary bones of the oral cavity, serving essential structural, protective, masticatory, and aesthetic functions. These bones are susceptible to a diverse range of lesions, including developmental, reactive/inflammatory, cystic, tumorous, and tumor-like lesions. Notably, some of these lesions are unique to this anatomical region, with entities such as odontogenic cysts and odontogenic tumors not observed elsewhere in the body [7]. The jawbones are susceptible to a wide range of pathological lesions, including odontogenic and non-odontogenic cysts, benign and malignant tumors of diverse origins, as well as developmental and reactive lesions. These lesions manifest with a spectrum of clinical symptoms and radiographic features. Classification of these lesions has been undertaken by various authors using different approaches based on tissue origin, radiographic characteristics, or clinical behavior. One of the most comprehensive classifications considers the primary origin of the lesion, categorizing the majority of intraosseous lesions into groups such as odontogenic and non-odontogenic cysts, odontogenic tumors, bone-derived lesions, and inflammatory pulp/periapical lesions. Additionally, some disorders primarily affecting soft tissues, such as soft tissue malignancies and hematopoietic malignancies, can also be found in the jaws. Developmental odontogenic lesions originate from tissues involved in tooth development, such as dentigerous cysts and odontogenic keratocysts. Developmental non-odontogenic lesions arise from tissues not involved in tooth formation, including conditions like fibrous dysplasia and central giant cell granuloma [8]. Since the publication of the histological typing of odontogenic tumors in 1971, numerous revisions have been made due to a better understanding of the nature and biological behavior of these jaw lesions. These revisions occurred in 1992, 2005, and most recently in 2017. We have classified the lesions into developmental odontogenic cysts, developmental non-odontogenic cysts, inflammatory periapical lesions, benign non-odontogenic bone lesions, and odontogenic tumors. These classifications are based on histopathological and clinical criteria as per WHO guidelines [9,10].

Extensive research has been conducted on intraosseous jaw lesions; however, the majority of these studies have focused on specific lesion groups, such as odontogenic or non-odontogenic cysts [7,11-17] or odontogenic or non-odontogenic tumors [18-21]. Others have investigated specific patient populations, such as children [22-24] or patients in particular geographic regions [7,11,12,14,25-28]. Bone tissue is susceptible to a wide range of genetic, metabolic, inflammatory, and pathological disorders, including cysts and tumors. Understanding the prevalence, clinical presentation, and demographic characteristics of intraosseous lesions within a specific population can aid in accurate diagnosis. Geographical and racial factors significantly influence lesion prevalence. Early detection of these lesions is crucial for improving prognosis. Therefore, dentists must be aware of the prevalence of lesions in their practice region. The present study aimed to determine the prevalence of intraosseous jaw lesions in Zanjan, Iran, where such an investigation had not been previously conducted.

Materials and Methods

Sample and data collection

The present study was conducted based on the retrospective analysis of histopathological records of intrasseous jaw lesions patients referred to the pathologic centers of Zanjan between 2013 and 2024. This study was approved by the Human Research Ethics Committee of the Faculty of Dentistry, Zanjan University of Medical Sciences (IR.ZUMS.REC.1402.285).

Sample size calculation

The sample size was determined based on previous epidemiological studies of intraosseous jaw lesions and statistical power analysis. Using a confidence level of 95% and a margin of error of 5%, the required sample

size was calculated using Cochran's formula for categorical data. Given the estimated prevalence of jaw lesions from prior studies, a minimum of 200 cases was deemed necessary to achieve adequate statistical power for subgroup analysis. The final sample size of 214 cases was selected to ensure sufficient representation across demographic and lesion categories.

Inclusion criteria

1. Histopathology records of intraosseous lesions.

2. Files with complete clinical and demographic information.

Exclusion criteria

1. soft tissue pathologies associated with superficial erosion of the underlying bony structures.

2. Files with missing or incomplete data.

From the patients' medical records, we extracted the following demographic data: age and sex. Additionally, we collected details regarding the presenting clinical features, including lesion location, type, and any reported symptoms.

Statistical Analysis

Descriptive statistical analysis was performed. Categorical data were summarized using frequencies and percentages. Chi-square and Fisher's exact tests were used for statistical analysis, and in cases where expected values were too low, the Monte Carlo test was applied. We used SPSS 22.0 software (IBM Inc., Chicago, IL, USA) for statistical analysis. The statistical significance level was set at $p < 0.05$.

Results

We found 214 cases of interosseous lesions of jaw. Prevalence of intra-osseous jaw lesions was predominant in males (54.2%) as compared to females (45.8%). The majority of the lesions were observed in 21-35 and 36-50 age groups, with about 33.2% and 29.4%, respectively. The most common disease group and diagnostic pathology are periapical inflammatory lesions and radicular cysts with 49.5% and 26.6%, respectively. The most frequently involved site was mandible with a frequency percentage of (51.9%), in posterior dimension (57.5%), the left dimension (50.5%) and anterior mandible (14%). Most of the lesions were asymptomatic (83.2%) and after that, swelling and pain were considered the most common clinical symptoms of the lesions. No significant matching was observed between the two groups in terms of lesion distribution across demographic categories ($p > 0.05$) (Table 1). Additionally, the figure 1 illustrates the relative frequency of different lesion types observed in the study, with radicular cysts and periapical granulomas being the most common. Table 2 presents the sitewise distribution of intraosseous jaw lesions, expressed in both frequency and percentage. Among all the lesions, the largest group of lesions seen in the maxilla is periapical inflammatory lesions, with a frequency of 61.2%. In the mandible, the most common group of lesions is periapical inflammatory lesions with a frequency of 38.7%. Considering that we have zero data (for example, the nasopalatine cyst is not seen in the mandible), the Monte Carlo test was used, but the difference was not significant ($P = 0.068$).

Table 3 presents the sitewise distribution of diagnostic pathology of lesions, expressed in both frequency and percentage. The most common lesion in maxilla and mandible is radicular cyst with frequency of 29.1% and 24.3%, respectively. The second most common lesion in the maxilla is periapical granuloma with frequency (23.3%), and the second most frequent lesion in the mandible is Odontogenic keratocyst with frequency (14.4%). This time, in the Monte Carlo test, the difference in the frequency of lesions based on pathology diagnosis was significant ($P = 0.001$).

Table 4 summarizes the distribution of intraosseous jaw lesions by sex. Periapical inflammatory lesions are the most common type, affecting both women (51%) and men (48.3%). Developmental odontogenic cysts represent the second most prevalent lesion type in both groups (20.4% in women and 28.4% in men). Notably, there is no statistically significant difference ($p = 0.151$) in lesion frequency between men and women based on the chi-square test. Table 5 details the distribution of lesions by sex based on their pathological diagnoses. Radicular cysts are the most frequent lesion in women (25.5%), followed by periapical granulomas (19.4%) and dentigerous cysts (11.2%). In men, radicular cysts are also the most common (27.6%), followed by periapical granulomas (15.5%) and dentigerous cysts (14.7%). The chi-square test revealed no statistically significant difference in lesion frequency between men and women ($p = 0.263$). The distribution of intraosseous jaw lesions in different age groups is given in Table 6. Periapical inflammatory lesions represent the most prevalent type of bone lesion across all age groups. Notably, the Chi-square test revealed no significant difference in lesion type distribution between different age groups ($p = 0.151$). The distribution of diagnostic pathology in different age groups is given in

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Table 6. Radicular cysts consistently rank as the most prevalent type of lesion across all age groups. Interestingly, the second most common lesion exhibits an age-related pattern: periapical granulomas hold this position in individuals under 51 years (including those under 21, 21-35, and 36-50 years old), while dentigerous cysts become the runner-up for those above 51. It's noteworthy that despite these variations in the second most frequent lesion type, the Chi-square test revealed no statistically significant difference in overall lesion frequency between different age groups (p = 0.263) [34].

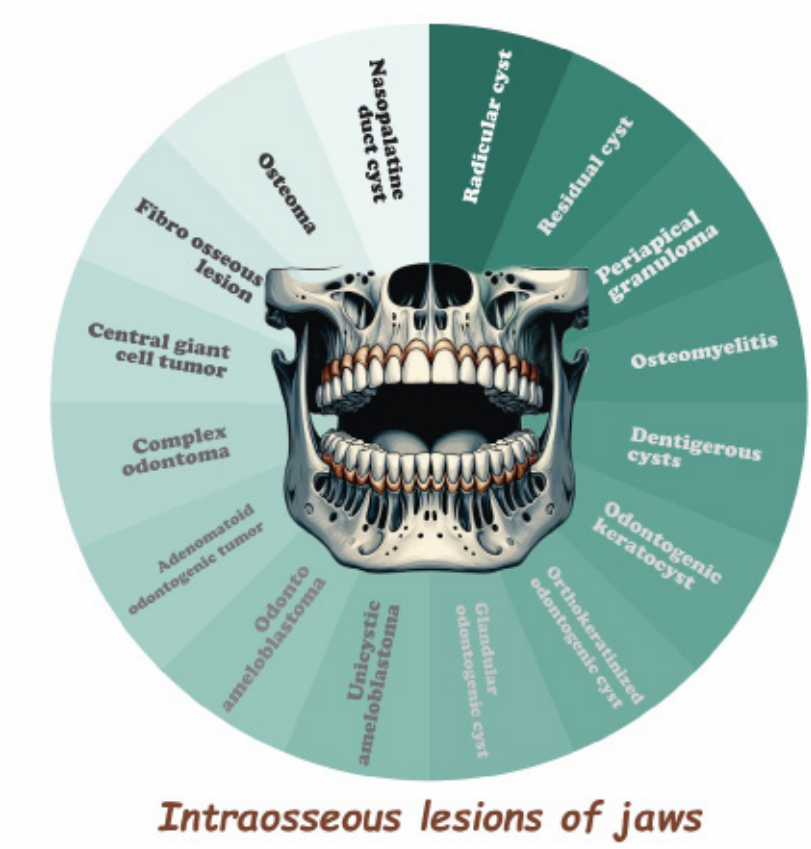

Figure 1. Distribution of intraosseous lesions of the jaws, including odontogenic and non-odontogenic lesions.

Table 1. Summary of demographic data.

Variable	*Total Number*	*Percentage*
Gender		
Female	*98116*	*45.8%*
Male		*54.2%*
Age		
<21	*47*	*22%*
21-35	*71*	*33.2%*
36-50	*63*	*29.4%*
>50	*33*	*15.4%*
Disease		
Inflammatory periapical lesions	*106*	*49.5%*
Developmental ododntogenic cysts	*53*	*24.8%*
Odontogenic tumors	*30*	*14%*
Benign non odontogenic bone lesions	*18*	*8.4%*
Developmental lesions	*7*	*3.3%*

Variable	Total Number	Percentage
Diagnostic Pathology		
Radicular cyst	57	26.6%
Residual cyst	11	5.1%
Periapical granuloma	37	17.3%
Osteomyelitis	2	0.9%
Dentigerous cysts	28	13.1%
Odontogenic keratocyst	21	9.8%
Orthokeratinized odontogenic cyst	3	1.4%
Glandular odontogenic cyst	1	0.5%
Unicystic ameloblastoma	13	6.1%
Odonto ameloblastoma	10	4.7%
Adenomatoid odontogenic tumor	1	0.5%
Complex odontoma	5	2.3%
Central giant cell granuloma	7	3.3%
Fibro osseous lesion	10	4.7%
Osteoma	1	0.5%
Nasopalatine duct cyst	7	3.3%
Site		
Mandible	111	51.9%
Maxilla	103	48.1%
Clinical Symptoms		
No symptoms	178	83.2%
Pain	11	5.1%
Swelling	18	8.4%
Fistula	6	2.8%
Wound	1	0.5%
Anterior-posterior dimension of jaws		
Anterior	91	42.5%
Posterior	123	57.5%
Left-right dimension of jaws		
Left	108	50.5%
Right	106	49.5%

Table 2. Frequency of site wise distribution of various intraosseous jaw lesions*.

Lesion		Maxilla	Mandible	P-value
Inflammatory periapical lesions	Count	63	43	0.068
	Percentage	61.2%	38.7%	
Developmental ododntogenic cysts	Count	18	35	
	Percentage	17.5%	31.5%	
Odontogenic tumors	Count	10	20	
	Percentage	9.7%	18%	
Benign non odontogenic bone lesions	Count	5	17	
	Percentage	4.9%	117%	

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Lesion		Maxilla	Mandible	P-value
Developmental lesions	Count	7	0	0.068
	Percentage	6.8%	0	

* The Fisher's exact test was applied for cases where expected cell counts were low, providing a more accurate assessment of statistical significance.

Table 3. Frequency of site wise distribution of diagnostic pathology.

Lesion		Maxilla	Mandible	P-value
Radicular cyst	Count	30	27	0.001
	Percentage	29.1%	24.3%	
Residual cyst	Count	8	3	
	Percentage	7.8%	2.7%	
Periapical granuloma	Count	24	13	
	Percentage	23.3%	11.7%	
Osteomyelitis	Count	1	1	
	Percentage	1.0%	0.9%	
Dentigerous cysts	Count	13	15	
	Percentage	12.6%	13.5%	
Odontogenic keratocyst	Count	5	16	
	Percentage	4.9%	14.4%	
Orthokeratinized odontogenic cyst	Count	0	3	
	Percentage	0.0%	2.7%	
Glandular odontogenic cyst	Count	1	0	
	Percentage	1.0%	0.0%	
Unicystic ameloblastoma	Count	3	10	
	Percentage	2.9%	9.0%	
Odonto ameloblastoma	Count	4	6	
	Percentage	3.9%	5.4%	
Adenomatoid odontogenic tumor	Count	1	0	
	Percentage	1.0%	0.0%	
Complex odontoma	Count	2	3	
	Percentage	1.9%	2.7%	
Central giant cell granuloma	Count	2	5	
	Percentage	1.9%	4.5%	
Fibro osseous lesion	Count	2	8	
	Percentage	1.9%	7.2%	
Osteoma	Count	0	1	
	Percentage	0.0%	0.9%	
Nasopalatine duct cyst	Count	7	0	
	Percentage	6.8%	0.0%	

Table 4. Distribution of intraosseous jaw lesions based on sex.

Lesion		Female	Male	P-value
Inflammatory periapical lesions	Count	50	56	0.151
	Percentage	51%	48.3%	
Developmental ododntogenic cysts	Count	20	33	
	Percentage	20.4%	28.4%	
Odontogenic tumors	Count	14	16	
	Percentage	14.3%	13.8%	
Benign non odontogenic bone lesions	Count	12	6	
	Percentage	12.2%	5.2%	
Developmental lesions	Count	2	5	
	Percentage	2%	4.3%	

Table 5. Distribution of diagnostic pathologic lesions based on sex.

Lesion		Female	Male	P-value
Radicular cyst	Count	25	32	0.263
	Percentage	25.5%	27.6%	
Residual cyst	Count	5	6	
	Percentage	5.1%	5.2%	
Periapical granuloma	Count	19	18	
	Percentage	19.4%	15.5%	
Osteomyelitis	Count	1	1	
	Percentage	1%	0.9%	
Dentigerous cysts	Count	11	17	
	Percentage	11.2%	14.7%	
Odontogenic keratocyst	Count	8	13	
	Percentage	8.2%	11.2%	
Orthokeratinized odontogenic cyst	Count	0	3	
	Percentage	0	2.6%	
Glandular odontogenic cyst	Count	1	0	
	Percentage	1%	0	
Unicystic ameloblastoma	Count	4	9	
	Percentage	4.1%	7.8%	
Odonto ameloblastoma	Count	5	5	
	Percentage	5.1%	4.3%	
Adenomatoid odontogenic tumor	Count	1	0	
	Percentage	1%	0	
Complex odontoma	Count	3	2	
	Percentage	3.1%	1.7%	
Central giant cell granuloma	Count	4	3	
	Percentage	4.1%	2.6%	
Fibro osseous lesion	Count	8	2	
	Percentage	8.2%	1.7%	
Osteoma	Count	1	0	
	Percentage	1%	0	
Nasopalatine duct cyst	Count	2	5	
	Percentage	2%	4.3%	

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Table 6. Distribution of intraosseous jaw lesions in different age groups.

Lesion		<21	21-35	36-50	>50	P-value
Inflammatory periapical lesions	Count	21	33	37	15	0.151
	Percentage	44.7%	46.5%	58.7%	45.5%	
Developmental ododntogenic cysts	Count	14	21	9	9	
	Percentage	29.8%	29.6%	14.3%	27.3%	
Odontogenic tumors	Count	8	12	7	3	
	Percentage	17%	16.9%	11.1%	9.1%	
Benign non odontogenic bone lesions	Count	4	5	5	4	
	Percentage	8.5%	7%	7.9%	12.1%	
Developmental lesions	Count	0	0	5	2	
	Percentage	0	0	7.9%	6.1%	

Table 7. Distribution of diagnostic pathology of lesions in different age groups.

Lesion		<21	21-35	36-50	>50	P-value
Radicular cyst	Count	13	17	20	7	0.263
	Percentage	27.7%	23.9%	31.7%	21.2%	
Residual cyst	Count	0	2	5	4	
	Percentage	0	2-8%	7.9%	12.1%	
Periapical granuloma	Count	8	13	12	4	
	Percentage	17%	18.3%	19%	12.1%	
Osteomyelitis	Count	0	2	0	0	
	Percentage	0	2.8%	0	0	
Dentigerous cysts	Count	6	12	4	6	
	Percentage	12.8%	16.9%	6.3%	18.2%	
Odontogenic keratocyst	Count	6	7	5	3	
	Percentage	12.8%	9.9%	7.9%	9.1%	
Orthokeratinized odontogenic cyst	Count	2	1	0	3	
	Percentage	4.3%	1.4%	0	1.4%	
Glandular odontogenic cyst	Count	0	1	1	2	
	Percentage	0	1.4%	1.6%	6.1%	
Unicystic ameloblastoma	Count	5	5	1	2	
	Percentage	10.6%	7%	1.6%	6.1%	
Odonto ameloblastoma	Count	2	4	3	1	
	Percentage	4.3%	5.6%	4.8%	3%	
Adenomatoid odontogenic tumor	Count	0	1	0	0	
	Percentage	0	1.4%	0	0	
Complex odontoma	Count	1	1	3	0	
	Percentage	2.1%	1.4%	4.8%	0	
Central giant cell granuloma	Count	3	2	4	3	
	Percentage	6.4%	2.8%	6.3%	9.1%	
Fibro osseous lesion	Count	1	2	4	3	
	Percentage	2.1%	2.8%	6.3%	9.1%	
Osteoma	Count	0	0	1	0	
	Percentage	0	0	1.6%	0	
Nasopalatine duct cyst	Count	0	0	5	2	
	Percentage	0	0	7.9%	6.1%	

Discussion

This study investigated the distribution of benign intraosseous lesions in the jaws according to age, sex, lesion location, clinical presentation, anteroposterior and left-right jaw dimension, pathological diagnosis, and age group. Our study found the highest prevalence of lesions in males aged 21-35 years, consistent with previous research [15,26,28]. This differs from Silva et al. [29], who reported a peak in older populations, likely due to their focus on elderly patients. The observed increase in periapical inflammatory lesions during the third decade might be associated with higher sugar intake from sweets and snacks. Conversely, tooth extractions and potential dietary changes motivated by concerns about obesity, diabetes, and cardiovascular diseases in older adults could explain the decrease in lesions observed in this age group. Periapical inflammatory lesions, particularly radicular cysts, emerged as the most prevalent type in our study. This aligns with previous research [5,26,27,30,31] identifying radicular cysts as the most frequent jaw lesion. Notably, the ranking of the second and third most common lesions varied across studies, including dentigerous cysts, odontogenic keratocysts, periapical granulomas, chronic apical periodontitis, odontomas, unspecified odontogenic cysts, and simple bone cysts. Periapical granuloma was the second most common periapical inflammatory lesion after radicular cyst. Many cases of periapical granuloma may have been excised without histopathological examination, leading to an apparent underreporting of its prevalence. Similarly, Razavi et al. reported a high prevalence (49.9%) of periapical inflammatory lesions, with radicular cysts being the most frequent (39%).

Mandibular involvement was the most common, and interestingly, the absence of symptoms was the most frequent clinical manifestation. Regarding location within the mandible, the posterior and left sides showed the highest prevalence of lesions. These findings align with previous studies by Dehghanzadeh et al. [32], who reported a higher incidence in the lower jaw (71.6%), Ashkanvand et al. [1], and Tandon et al. [33], who observed similar trends. Additionally, Razavi et al. [34] found the back of the lower jaw to be a common location for lesions, mirroring our results. Periapical inflammatory lesions dominated in both jaws. Notably, radicular cysts were the most prevalent lesion type in the maxilla, while periapical granuloma held the top spot in the mandible. These findings are consistent with previous research by Jamshidi et al. [6], Jones et al. [7], Koseoglu et al. [35], and Açikgöz et al. [36], who reported the anterior maxilla as a common location for radicular cysts, mirroring our results. Similarly, Jamshidi et al. [6] also observed periapical granuloma as the most frequent lesion in the mandible, aligning with our study's findings. Periapical inflammatory lesions, particularly radicular cysts, were the most prevalent type in both men and women. This aligns with some prior studies [6,35,37] reporting a higher prevalence of radicular cysts in males. However, Jones et al. [7] observed a similar frequency between sexes. Further investigation is needed to understand any potential sex-related factors influencing the development of these lesions.

In all age groups, the most common group of lesions was periapical inflammatory lesions, and in all age groups, the most common lesion was radicular cyst. However, no significant difference was observed in the frequency distribution of lesions based on age group. Similar to our results, in the study by Dehimi et al., the frequency of lesions in young adult patients (20-35) and elderly patients (<50) was not significantly different. The comparison of the frequency of lesion types in Dihemi's study showed that in the first decade, the frequency of radicular cyst compared to periapical granuloma is more than in the second and third decades. These results confirm that the transformation of periapical granuloma into radicular cyst occurs in a short period of time [38].

This study has several strengths, including its large sample size, which provides a robust dataset for evaluating the prevalence of intraosseous jaw lesions. Additionally, the use of standardized histopathological criteria and statistical validation ensures the reliability of the findings. However, some limitations should be acknowledged. The retrospective nature of the study may introduce selection bias, as cases without complete histopathological records were excluded. Furthermore, the reliance on archived medical records may have led to incomplete clinical information for certain patients. Additionally, the absence of long-term follow-up data limits the ability to assess lesion recurrence or progression. Despite these limitations, this study provides valuable epidemiological insights that can inform future research and clinical decision-making.

Conclusion

Our present study revealed distinct patterns in prevalence and distribution. Young adults (21-35 years old) presented with the highest incidence, potentially associated with increased sugar consumption during this developmental stage. Interestingly, males exhib-

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ited a slightly higher frequency of lesions compared to females, suggesting a possible link to oral hygiene habits. However, further investigation is necessary to elucidate any sex-based biological factors that might contribute to this observation. Periapical inflammatory lesions emerged as the most prevalent type, with radicular cysts being the dominant subtype. Notably, the lower jaw and posterior regions demonstrated the highest concentration of lesions. These findings are largely consistent with previous research and underscthe importance of incorporating preventive strategies and regular dental screenings to reduce the incidence of bony jaw lesions.

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Conflict of Interest

There is no conflict of interest to declare.

References

[1] Ashkavandi ZJ, Sheshdeh ZA, Kamali F. Orofacial pathologic lesions in children and adolescents: a clinicopathological study in southern Iran. IJ pediatrics. 2014; 24(3):307.

[2] Osterne RLV, de Matos Brito RG, Alves APNN, Cavalcante RB, Sousa FB. Odontogenic tumors: a 5-year retrospective study in a Brazilian population and analysis of 3406 cases reported in the literature. Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontology. 2011; 111(4):474-81.

[3] Saghravanian N, Jafarzadeh H, Bashardoost N, Pahlavan N, Shirinbak I. Odontogenic tumors in an Iranian population: a 30-year evaluation. J Oral Sci. 2010; 52(3):391-6.

[4] Jones A, Franklin C. An analysis of oral and maxillofacial pathology found in children over a 30-year period. IJOCPD. 2006; 16(1):19-30.

[5] Johnson NR, Savage NW, Kazoullis S, Batstone MD. A prospective epidemiological study for odontogenic and non-odontogenic lesions of the maxilla and mandible in Queensland. Oral surgery, oral medicine, oral pathology and oral radiology. 2013; 115(4):515-22.

[6] Jamshidi S, Shojaei S, Roshanaei G, Modabbernia S, Bakhtiary E. Jaw intraosseous lesions biopsied extracted from 1998 to 2010 in an Iranian population. Iranian Red Crescent Medical Journal. 2015; 17(6).

[7] Jones A, Craig G, Franklin C. Range and demographics of odontogenic cysts diagnosed in a UK population over a 30-year period. Journal of Oral Pathology & Medicine. 2006; 35(8):500-7.

[8] Damm DD, Bouquot JE, Neville B, Allen C. Oral and maxillofacial pathology. Chap. 2002; 1:66.

[9] Speight PM, Takata T. New tumour entities in the 4th edition of the World Health Organization Classification of Head and Neck tumours: odontogenic and maxillofacial bone tumours. Virchows Archiv. 2018; 472:331-9.

[10] El-Naggar AK, Chan JK, Rubin Grandis J, Slootweg PJ. WHO classification of head and neck tumours. (No Title). 2017.

[11] Ochsenius G, Ortega A, Godoy L, Peñafiel C, Escobar E. Odontogenic tumors in Chile: a study of 362 cases. Journal of oral pathology & medicine. 2002; 31(7):415-20.

[12] Soluk-Tekkesin M, Cakarer S, Aksakalli N, Alatli C, Olgac V. New World Health Organization classification of odontogenic tumours: impact on the prevalence of odontogenic tumours and analysis of 1231 cases from Turkey. BJOMS. 2020; 58(8):1017-22.

[13] Kreidler JF, Raubenheimer EJ, van Heerden WF. A retrospective analysis of 367 cystic lesions of the jaw—the Ulm experience. Journal of Cranio-Maxillofacial Surgery. 1993; 21(8):339-41.

[14] Del Corso G, Righi A, Bombardi M, Rossi B, Dallera V, Pelliccioni G, et al. Jaw cysts diagnosed in an Italian population over a 20-year period. International journal of surgical pathology. 2014; 22(8):699-706.

[15] Muzio LL, Mascitti M, Santarelli A, Rubini C, Bambini F, Procaccini M, et al. Cystic lesions of the jaws: a retrospective clinicopathologic study of 2030 cases. Oral surgery, oral medicine, oral pathology and oral radiology. 2017; 124(2):128-38.

[16] Da Silva L-P, de Souza L-B. Epidemiologic study of odontogenic and non-odontogenic cysts in children and adolescents of a Brazilian population. Medicina oral, patologia oral y cirugia bucal.

2018; 23(1):e49.

[17] Tamiolakis P, Thermos G, Tosios KI, Sklavounou-Andrikopoulou A. Demographic and clinical characteristics of 5294 jaw cysts: a retrospective study of 38 years. Head and neck pathology. 2019; 13(4):587-96.

[18] Adebayo ET, Ajike SO, Adekeye EO. A review of 318 odontogenic tumors in Kaduna, Nigeria. JOMS. 2005; 63(6):811-9.

[19] Jing W, Xuan M, Lin Y, Wu L, Liu L, Zheng X, et al. Odontogenic tumours: a retrospective study of 1642 cases in a Chinese population. IJOMS. 2007; 36(1):20-5.

[20] Mascitti M, Togni L, Troiano G, Caponio VCA, Sabatucci A, Balercia A, et al. Odontogenic tumours: a 25-year epidemiological study in the Marche region of Italy. European Archives of Oto-Rhino-Laryngology. 2020; 277:527-38.

[21] Silveira FM, Soares Macedo CC, Vieira Borges CM, Mauramo M, Uchoa Vasconcelos AC, Soares AB, et al. Odontogenic tumors: An 11-year international multicenter study. 2020.

[22] Saxena S, Kumar S, Pundir S. Pediatric jaw tumors: Our experience. Journal of Oral and Maxillofacial pathology. 2012; 16(1):27-30.

[23] Urs AB, Arora S, Singh H. Intra-osseous jaw lesions in paediatric patients: a retrospective study. Journal of Clinical and Diagnostic Research: JCDR. 2014; 8(3):216.

[24] Sharma P, Kocher V, Soni K, Ghosh R, Garg B, Kumar S. Incidence and prevalence of head and neck pathological spectrum in a pediatric population. Journal of Craniofacial Surgery. 2020; 31(4):e394-e7.

[25] Daley TD, Wysocki GP, Pringle GA. Relative incidence of odontogenic tumors and oral and jaw cysts in a Canadian population. Oral Surgery, Oral Medicine, Oral Pathology. 1994; 77(3):276-80.

[26] Ali MA. Biopsied jaw lesions in Kuwait: a six-year retrospective analysis. Medical Principles and Practice. 2011; 20(6):550-5.

[27] Silva K, Alves A, Correa M, Etges A, Vasconcelos A-C, Gomes A-P, Tarquinio S. Retrospective analysis of jaw biopsies in young adults. A study of 1599 cases in Southern Brazil. Medicina Oral, Patología Oral y Cirugía Bucal. 2017; 22(6):e702.

[28] Monteiro L, Santiago C, Do Amaral B, Al-Mossallami A, Albuquerque R, Lopes C. An observational retrospective study of odontogenic cyst s and tumours over an 18-year period in a Portuguese population according to the new WHO Head and Neck Tumour classification. Medicina Oral, Patologia Oral Y Cirugia Bucal. 2021; 26(4):e482.

[29] Silva LP, Serpa MS, Sobral APV, Arruda JAA, Silva LVO, Noronha MS, et al. A retrospective multicentre study of cystic lesions and odontogenic tumours in older people. Gerodontology. 2018; 35(4):325-32.

[30] Dhanuthai K, Chiramanaphan K, Tevavichulada V, Tangwongwarachai S, Chantarangsu S. Intraosseous jaw lesions: A 25-year experience. Journal of Oral and Maxillofacial Pathology. 2022; 26(4):595.

[31] Araujo JP, Lemos CA, Miniello TG, Alves FA. The relevance of clinical and radiographic features of jaw lesions: A prospective study. Brazilian oral research. 2016; 30:e96.

[32] Dehghanzadeh A, Aminzadeh A, Khodarahmi MJ, Shafazand MH. Prevalence and Clinical Features of Biopsied Jaw Lesions in an Iranian Population Patient in During a Period of 7 Years. JIDS. 2022.

[33] Tandon P, Shah S, Dadhich A, Saluja H, Chauhan H. Incidence and distribution of jaw pathologies among 0–15 years age group at a tertiary rural health-care center of Maharashtra: A retrospective study of 10 years. Contemporary Clinical Dentistry. 2020; 11(1):39-45.

[34] Razavi SM, Ansari M, Khalesi S. A 25-year retrospective epidemiological study of intra-osseous lesions of jaw bones in Isfahan population, Iran. Journal of Oral Health and Oral Epidemiology. 2019; 8(2):68-73.

[35] Koseoglu BG, Atalay B, Erdem MA. Odontogenic cysts: a clinical study of 90 cases. J Oral Science. 2004; 46(4):253-7.

[36] Acikgoz A, Uzun-Bulut E, Ozden B, Gunduz K. Prevalence and distribution of odontogenic and nonodontogenic cysts in a Turkish population. Med Oral Patol Oral Cir Bucal. 2012; 17(1):e108-15.

[37] Tortorici S, Amodio E, Massenti MF, Buzzanca

 DOI: 10.18502/jcr.v13i1.21480

ML, Burruano F, Vitale F. Prevalence and distribution of odontogenic cysts in Sicily: 1986-2005. J Oral Sci. 2008; 50(1):15-8.

[38] Deyhimi P, Khalesi S, Arefkhani E. Comparative study of the prevalence of radicular cysts and periapical granulomas in young and elderly adult patients referred to Isfahan dental school. JDM. 2021; 34:46-54.