

**Original Article****Clinicopathologic Study of Intra- Osseous Lesions of the Jaws in Southern Iranian Population**Zohreh Jaafari-Ashkavandi <sup>1</sup>, Behrooz Akbari <sup>2</sup><sup>1</sup> Dept. of Oral & Maxillofacial Pathology, School of Dentistry, Shiraz University of Medical Sciences, Shiraz, Iran.<sup>2</sup> Undergraduate Student, School of Dentistry, Shiraz University of Medical Sciences, Shiraz, Iran.**KEY WORDS**

Bone lesions;  
Prevalence;  
Jaws;  
Odontogenic cysts;  
Odontogenic tumors;

**ABSTRACT**

**Statement of the Problem:** It is necessary for surgeons and practitioners to know about relative incidence and clinicopathologic features of lesions for accurate diagnosis and approach of pathologic lesions. Data are limited about overall incidence of intra-osseous lesions of the jaws in Iranian patients.

**Purpose:** This study evaluated the clinicopathologic features of intra- osseous lesions of the jaws in an Iranian population, in a 22-year period.

**Materials and Method:** In this cross- sectional retrospective analytical study, 4500 specimens in a 22- year period were reviewed. Baseline data of all patients with intra- osseous lesions including type and location of lesions as well as patients' age and gender, were collected and analyzed by SPSS software using descriptive analysis and Chi-square test.

**Results:** There were 1121 (25%) intra-osseous lesion. Odontogenic cysts and benign non- odontogenic bone lesions were the most common categories, respectively. The mean age of the patients was 30.1±16, the total male to female ratio was 1.1:1, and the most prevalent location of lesions was posterior of mandible.

**Conclusion:** The results showed baseline information of intra-osseous lesions that were essentially similar to other populations; however, there were a few geographical differences. Further comprehensive studies in other parts of country are required to make a more reliable source of reference for clinicians and surgeons for evaluating and managing their patients more properly.

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**Introduction**

Intra-osseous pathologic lesions of the jaws have a wide spectrum of clinical and histopathologic features from benign to aggressive or malignant lesions that require different managements. [1] These lesions have an imperative significance concerning their direct influence on patients' aesthetics and function; therefore, early diagnosis of these disorders may prevent possible inappropriate interventions. Understanding clinicopathologic features of diseases has a critical role in early diagnosis and accurate management. These clinical parameters va-

ry in different geographic areas and ethnics. [2]

Many pathologic lesions can involve the jaw-bones, such as odontogenic and non- odontogenic cysts, benign and malignant tumors of different origin as well as developmental and reactive lesions. These lesions represent a wide spectrum of symptoms and a range of radiographic features. [3] Classification of these lesions has been done by several authors in different manners based on the tissue origin of the lesions, radiographic features or clinical behavior. One of the most comprehensive classifications is based on considering the pri-

mary origin of the lesion, that categorizes the most of intra- osseous lesions in some groups including odontogenic and non- odontogenic cysts, odontogenic tumors, bone arising lesions, and pulp/ periapical inflammatory lesions. Moreover, some disorders that principally involve the soft tissues can be found in the jaws, including soft tissue and hematopoietic malignant tumors. [3] Many researchers have evaluated the special types of lesions in the maxillofacial area, such as odontogenic or non-odontogenic lesions, cystic or neoplastic disorders or in a special group of patients, such as children or adults. [1-2, 4-7] Most of these studies reported that odontogenic lesions were more frequent than non-odontogenic lesions in the jawbones. [8-9] One study in Iran reported that odontogenic cysts and manifestation of systemic diseases were the most common diseases of the jaws. [9] Another study in United States evaluated radiolucent lesions of the jaws and reported that inflammatory periapical lesions were the most prevalent lesions. [10]

However, studies that have evaluated the incidence of all groups of lesions in a large sample size are scarce. Overview of all groups of pathologic lesions is highly beneficial for clinicians to manage their patients more accurately. In addition, due to the impact of racial and geographic factors on the prevalence and clinicopathologic features of diseases, it is important to evaluate demographic parameters of pathologic lesions in different population groups. The present study aimed to analyze the clinicopathologic features of intra-osseous lesions of the jaws in a 22 years period in an Iranian population.

**Materials and Method**

This retrospective analytical study reviewed the archive of Oral and Maxillofacial Pathology Department from 1991 to 2013. All intrabony lesions with complete clinical data and definite diagnosis were recruited in this

study. Clinicopathologic data regarding the patients' age and gender as well as the location of lesions were recorded according to patients' medical files. All lesions were classified to five groups according to Neville's text book of oral and maxillofacial pathology [3] with a few modifications such as merging odontogenic and non odontogenic cyst together due to the limited number of non odontogenic ones, and placing all malignant tumors in one group, regardless of their origin. These five groups included non-cystic inflammatory lesions, benign bone pathology, malignant tumors, jaw cysts, including odontogenic and non-odontogenic cysts, and odontogenic tumors. Data were analyzed by SPSS 16 software using descriptive analysis. Chi-square test was used for comparing gender and location of the study groups.

**Results**

There were 1121 intra-osseous lesions in the archive of Oral Pathology Department in a period of 22 years, comprising 25% of all cases. Data about the frequency of lesions, patients' age and gender are summarized in Table 1. The most common group of lesions was odontogenic cysts (63% of all cases). There were only five non-odontogenic cysts among all cystic lesions that were merged with odontogenic ones in the group of jaw cysts. Seventy-two cases of odontogenic cysts (10% of odontogenic cysts and 6.4% of all cases) with no definitive diagnosis were reported as non-specified odontogenic cyst. Radicular cyst was the most common diagnosed lesion, followed by dentigerous cyst and odontogenic keratocyst (OKC). Benign bone pathologic lesions and odontogenic tumors were the second and third most common lesions, respectively. Malignant lesions included 2.8% of all cases and osteosarcoma was the most common reported malignancy.

The overall male to female ratio was 1.1:1 that was a non-significant difference based on Chi-square

**Table 1:** Baseline data of all study groups

Groups	N (%)	Age (mean±SD)	M:F	Mand: Max
Cysts	708(63.1)	30.15±15.7	417:288	373:87
Benign bone pathology	178(15.9)	27.8±16.5	68:110	112:64
Odontogenic tumors	133(11.9)	27.1±18.4	58:75	99:28
Inflammatory	70(6.2)	37.8±18.2	32:38	31:39
Malignant tumors	32(2.8)	34.9±17.1	16:15	16:11
Total	1121	30.1±16	591:526*	631:229*

Mand: mandible, Max: maxilla \*: There are some missing data

**Table 2:** Frequency, location and gender distribution of three most common lesions in each study group

Groups (N)	First	Second	Third
Cysts (708)	Radicular	Dentigerous cyst	OKC
N (%)	262(37)	168(23.7)	161(22.7)
(M:F, Mand:Max)	152:109, 111:141	106:60, 91:65	93:68, 128:39
Benign bone path (178)	CGCG	Ossifying fibroma	Fibrous dysplasia
N (%)	63(35.3)	35(19.6)	18(10.1)
(M:F, Mand: Max)	25:38, 39:22	14:21, 19:15	9:9, 2:16
Odontogenic tumors (133)	Ameloblastoma	Odontoma	AOT, Myxoma
N (%)	78(58.6)	30(22.5)	8(6)
(M:F, Mand:Max)	31:45, 69:6	17:13, 18:10	6:10, 10:6
Inflammatory (70)	Periapical granuloma	Osteomyelitis	---
N (%)	56(80)	14(20)	
(M:F, Mand: Max)	27:29, 23:33	5:9, 8:6	
Malignant tumors (32)	Osteosarcoma	Undiff. sarcomas	Lymphoma
N (%)	9(28.1)	6(18.7)	6(18.7)
(M:F, Mand:Max)	6:5, 5:6	4:0, 1:2	1:5, 4:2

Mand: mandible, Max: maxilla, CGCG: Central Giant Cell Granuloma, AOT: Adenomatoid odontogenic tumor, undiff: Undifferentiated, OKC: Odontogenic keratocyst

test ( $p > 0.05$ ). Among all groups, this test showed that only odontogenic cysts and benign bone pathologic lesions had a significant male and female tendency, respectively (both  $p = 0.00$ ). Mandibular involvement was 1.5 times greater than maxilla involvement; posterior jaws were affected 1.3 times more frequently than anterior jaws. These differences were significant by Chi-square test ( $p = 0.00$ ). Table 2 illustrates the location of involvement by each group.

The mean age of the patients was  $30.1 \pm 16$ . Baseline data of three most common lesions of each group and other less common lesions are shown in Table 2 and 3, respectively. The lesions with frequency of  $\leq 3$  are not shown in the tables. They were included 3 cases cementoblastoma, 3 odontogenic fibroma, 2 glandular odontogenic cyst, 2 ameloblastic fibro-odontoma, 2 bone mar-

row defect, 2 ameloblastic carcinoma, 2 undifferentiated carcinoma, 2 Ewing sarcoma, 3 cherubism, 3 desmoplastic fibroma, 2 median mandibular cyst.

**Discussion**

In the present study, 25% of oral and maxillofacial pathologic lesions were located in the jaws. This low incidence of intra-osseous lesions was also reported in 31% of patients constituting Ali [11] and Skiavounou *et al.*'s data in Kuwait and Greece. [5]

In line with all other studies, the results of this study revealed that odontogenic cysts were the most frequent lesions in the jawbones. [7, 11-13] Radicular cyst, dentigerous and OKC were the most common cysts, respectively. Although, radicular cyst was the most frequent odontogenic lesion in many studies, [8,

**Table 3:** Frequency, location and gender distribution of lesions in each study group (except three most common ones)

	M:F	Mand:Max	Total
Cysts: NS-Odontogenic cyst	39:33	46:26	72
LPC	4:0	4:0	4
COC	10:9	9:10	19
Orthokeratinized O.C	7:2	6:3	9
Nasopalatine duct cyst	1:4	0:5	5
Benign bone pathology: Osteoma	3:9	7:5	12
ABC	4:7	8:3	11
TBC	5:12	17:0	17
Osteosclerosis	4:3	4:3	7
COD	1:4	4:1	5
Odontogenic tumors: Ameloblastic fibroma	3:3	4:2	6
Malignant tumors: Chondrosarcoma	0:4	3:1	4
Eosinophilic granuloma	4:0	2:2	4
Other (lesions $\leq 3$ )	9:13	19:7	26
Total <sup>+</sup>	94:105	133:68	201

Mand: mandible, Max: maxilla, NS: non- specified, LPC: Lateral Periodontal Cyst, COC: Calcifying Odontogenic Cyst, ABC: Aneurismal Bone Cyst, TBC: Traumatic Bone Cyst, OC: Odontogenic Cyst, COD: Cement- Osseous Dysplasia  
<sup>+</sup> There are some missing data.

10-11] dentigerous cyst and OKC showed a geographical variation. [4, 9, 12-14]

In this study, about 10% of identified odontogenic cysts had no definite diagnosis. There is an overlap in histopathologic and clinical features of odontogenic cysts, especially in infected cases. The definitive diagnosis is made based on complete clinical and radiographic evaluations together with histopathologic findings plus adequate specimen with appropriate biopsy. The high prevalence of these non-specified odontogenic cysts is mostly due to the incomplete clinical and surgical data, which can amend the accurate incidence of odontogenic cysts. Johnson *et al.* [8] reported 28% of odontogenic cysts, without definite diagnosis.

The present study showed that odontogenic cysts were more common in male patients. In addition, the developmental odontogenic cysts were seen more frequently in posterior of mandible, but radicular cysts were more common in anterior of maxilla. This finding was similar to that of studies conducted in other parts of Iran. [9, 14-15]

In addition, it was noticed that benign bone pathologic lesions were the second most common lesions of the jaws (15.9% of all cases) with the highest prevalence of central giant cell granuloma (CGCG). This is in consistence with the finding of Jamshidi *et al.* [9] in Hamedan that reported odontogenic cysts and benign bone disease as the first and second lesions of the jaws; however, a number of researchers reported odontogenic tumors to be more frequent. [11-12, 16-17]

Some researchers considered OKC as an odontogenic tumor, based on current WHO classification. [11-18] This might be the underlying reason of the increasing frequency of odontogenic tumors. Like the findings of studies carried out on bone pathologic lesions in Australia, Kuwait and America, CGCG was the most common entity. [8, 11, 13] Lie *et al.* reported the highest occurrence of ossifying fibroma. [12] Although limited cases of bone pathologies were reported in Iran, most researchers indicated that fibro-osseous lesions of the jawbones and CGCG were the most common bone pathologic lesions in this area. [9, 15]

Odontogenic tumors were the third common group in this study (11.9%) and ameloblastoma constituted the highest percentage. Having reviewed these tumors in the studies conducted in Australia, Kuwait,

Taiwan, and Iran (more specifically, in Mashhad, a city in Iran), ameloblastoma and odontoma were the most common odontogenic tumors. [7-8, 11-12] This finding was noticed in studies, which took OKC as a tumor. [8, 11] One study in United States reported the higher prevalence of odontogenic fibroma than ameloblastoma. [13]

It is worth mentioning that most intrabony cases found in this study were benign and only 2.8% were malignant lesions. Osteosarcoma accounted for 28.1% of malignancies and 0.8% of all cases had the following lymphomas. Malignant tumors of the jaws constituted a small part of intrabony lesions. For instance, only 7% of samples in Ali *et al.*'s study [11] suffered from malignant tumors of the jaws with predominance of osteosarcoma in the most of studies. [6, 19-20] Kaivisto *et al.*, [13] however, reported lymphoma as the most common intrabony malignancy among radiolucent lesions of the jaws in an American population. Vadillo *et al.* [21] reported that osteosarcoma was the most common malignant jaw tumor among 135 patients with malignant neoplasms. They presented the mean age of 31 years and a slight female predominance. Malignant tumors involved the posterior of jaws, especially mandibular body, more frequently, with equal gender distribution but with more predilections for adults (mean ages of 31.3). Owing to the scarcity of these tumors, there was a large inconsistency about the gender predilections and location of jaw malignancies, as reported by various studies; however, all studies reported that most of the tumors arose in late adolescence and middle age. [6, 21-25]

Intrabony lesions of the jaw were located more frequently in posterior of mandible, followed by anterior maxilla. In addition, compared to females, this, though not significantly, was found more among male patients. In line with Johnson *et al.* and Javadian *et al.* findings, cystic lesions were significantly more prevalent among male patients while intrabony lesions were significantly more frequent in females. [8, 15] One study in New Zealand showed male tendency for all radiolucent jaw lesions except for non- odontogenic bony lesions. [26]

Even though there is a wide disagreement in gender predilection of jaw lesions, all studies have so far confirmed more potential involvement of mandible. [7, 8, 11, 18, 27] It seems that racial and geographic variations affect the clinicopathologic features of jaw lesions.

However, different design of studies and sample size are important effective factors. Most of the studies have described a specific group of lesions or all lesions in a special group of patients. In addition, there is not a uniform and standard method for classifying the lesions among different studies. Therefore, a precise comparison of the studies is difficult.

### Conclusion

The results of this study showed that intrabony lesions of the jaws constituted 25% of oral and maxillofacial lesions. Odontogenic cysts, benign bone pathologic lesions and odontogenic tumors were the most common ones, respectively. Among all cases studied, 2.8% were malignant. Posterior mandible was the most affected location. Demographic data demonstrated some variations in comparison with other studies. Further comprehensive studies in other parts of country are required to constitute a reliable source of reference for clinicians and surgeons for evaluating and or managing their patients more accurately.

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### Conflict of Interest

There is no conflict of interest.

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