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Systematic Review
Clinical Pathology

Idiopathic bone cavity of the jaws: an updated analysis of the cases reported in the literature

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Abstract. The aim of this systematic review was to compare the clinical and radiological features of solitary and multiple idiopathic bone cavities (IBCs) reported in the jaws, as well as to identify possible features that may have some influence on the frequency of persistence of IBC following treatment. An electronic search was undertaken in August 2018. Eligibility criteria included publications with sufficient clinical, radiological, and histological information to confirm the diagnosis. A total of 284 publications reporting 1253 IBCs were included. Multiple IBCs affected older patients and female patients more frequently in comparison to solitary IBCs. While trauma was more commonly found in cases of solitary IBC, scalloping around teeth, bone expansion, and persistence of the cavity following treatment were more significantly associated with multiple lesions. The most relevant factors that are suggested to influence the persistence of the cavity are 'surgical access only' in comparison to 'curettage', presence of scalloping around teeth, patients with multiple IBCs, and a larger lesion size. Solitary and multiple IBCs differ in some clinical and radiological aspects and show distinct rates of persistence following treatment. Curettage is the treatment of choice for IBCs compared to surgical access only.

Key words: idiopathic bone cavity; simple bone cyst; traumatic bone cyst; clinical features; persistence following treatment; systematic review.

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The idiopathic bone cavity (IBC), also called a traumatic, simple, solitary, haemorrhagic, extravasation, or unicameral bone cyst, is an intraosseous cavity that is not really a true cyst because it lacks an epithelial lining. This cavity can be either empty or filled with serous or sanguineous fluid[1]. The wide variety of names shows the lack of understanding of the aetiology and pathophysiology of this lesion[2].

The aim of this systematic review was to compare the clinical and radiological features of solitary and multiple IBCs reported in the jaws, as well as to identify possible features that may have some influence on the frequency of persistence following the treatment of these lesions.

Materials and methods

This systematic review followed the guidelines of the PRISMA Statement[3].

Research questions

The study aimed to answer the following questions: (1) Is there any difference in the clinical features of solitary and multiple IBCs? (2) What is the best treatment of choice for IBCs? (3) Is there any factor that could possibly increase the rate of persistence following the treatment of IBCs?

Search strategies

An electronic search without time restrictions was undertaken in August 2018 in the following databases: PubMed/MEDLINE, Web of Science, ScienceDirect, J-STAGE, and LILACS. The following terms were used in the search strategies: (''idiopathic bone cavity'' OR ''solitary bone cyst'' OR ''traumatic bone cyst'' OR ''simple bone cyst'' OR ''hemorrhagic bone cyst'' OR ''haemorrhagic bone cyst'' OR ''unicameral bone cyst'' OR ''extravasation bone cyst'' OR ''idiopathic bone cavities'' OR ''solitary bone cysts'' OR ''traumatic bone cysts'' OR ''simple bone cysts'' OR ''hemorrhagic bone cysts'' OR ''haemorrhagic bone cysts'' OR ''unicameral bone cysts'' OR ''extravasation bone cysts'') AND (mandible OR mandibular OR maxilla OR maxillary OR jaw OR jaws).

Google Scholar was also checked. A manual search of all related oral pathology, maxillofacial, and specialist dental and oral journals was performed. The reference lists of the identified studies and relevant reviews on the subject were also checked for possible additional studies. Publications with lesions identified by other authors as being IBC, solitary bone cyst, traumatic bone cyst, or simple bone cyst, even those not including these terms in the title of the article, were also re-evaluated by one of the review authors (R.S.G.).

Inclusion and exclusion criteria

Publications reporting cases of IBC with sufficient clinical, radiological, and histological information to confirm the diagnosis were included. The definitions and criteria of the World Health Organization Classification of Head and Neck Tumours[1], were used to diagnose a lesion as IBC. IBCs associated with cemento-osseous or fibrous dysplasia were not considered for this study, as they may behave differently from classic IBCs. Cases in which a surgical approach to the suspected IBC for definitive biopsy was not performed were not included, as it would not have been possible to absolutely rule out a large number of cysts and tumours that may occur as a differential diagnosis.

Study selection

The titles and abstracts of all reports identified through the electronic searches were read independently by the authors. For studies appearing to meet the inclusion criteria, or for which data in the title and abstract were insufficient to make a clear decision, the full report was obtained. Disagreements were resolved by discussion between the authors. The clinical and radiological aspects, as well as

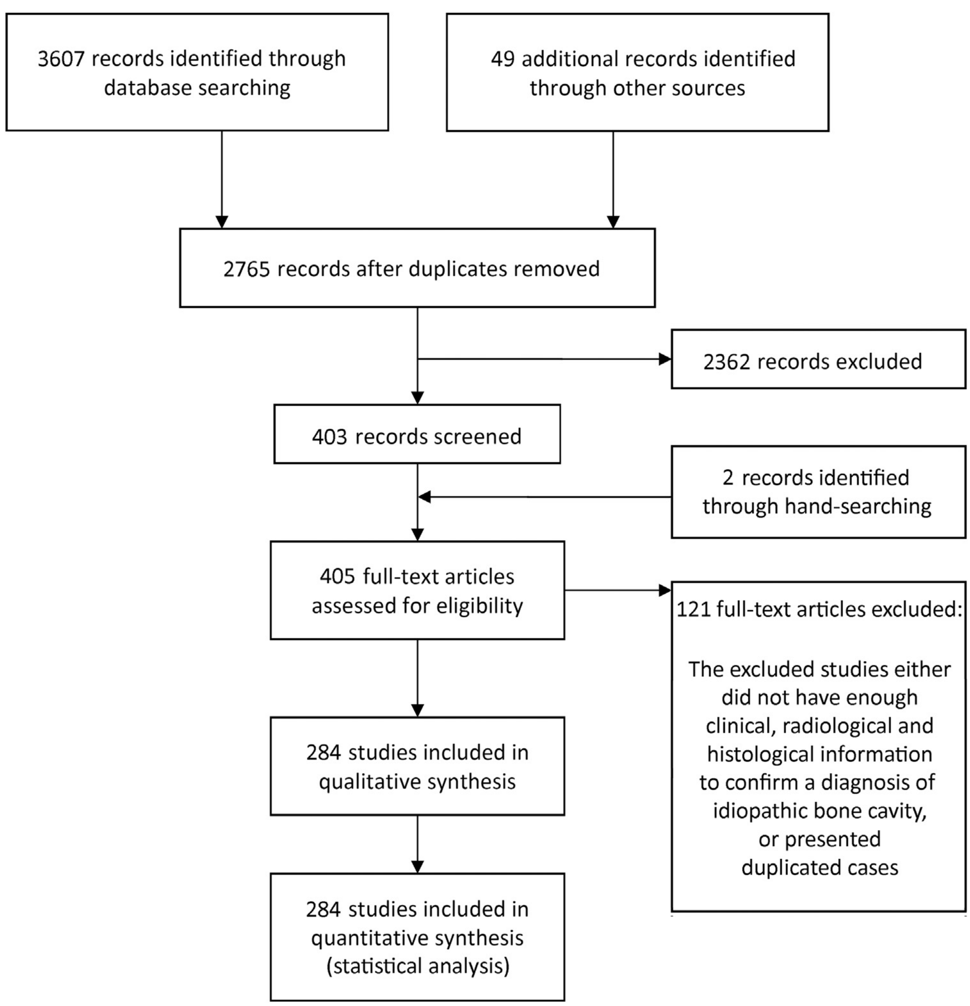

Fig. 1. Study screening process.

Table 1. Demographic and clinical features of the cases of idiopathic bone cavity (IBC) described in the literature.

Variables	Total	Solitary IBC	Multiple IBCs	*P*-value[a]
Number	1253	1129	124[b]	
Age (years), mean ± SD (range)	20.4 ± 10.5 (2–79) (*n* = 1245)	19.7 ± 9.7 (2–79) (*n* = 1121)	26.6 ± 14.7 (10–56) (*n* = 124)	<0.001[g]
Male	19.4 ± 9.0 (3–73) (*n* = 591)	19.2 ± 8.7 (3–73) (*n* = 556)	22.6 ± 12.2 (10–55) (*n* = 35)	0.078[g]
Female	21.5 ± 11.5 (2–79) (*n* = 631)	20.3 ± 10.4 (2–79) (*n* = 544)	28.5 ± 15.4 (11–56) (*n* = 87)	<0.001[g]
P-value[c]	0.075	0.270	0.774	
Sex, *n* (%)				<0.001[h]
Male	592 (48.3)	557 (50.5)	35 (28.7)	
Female	633 (51.7)	546 (49.5)	87 (71.3)	
Unknown	28	26	2	
Jaw, *n* (%)				0.030[i]
Maxilla	45 (3.6)	36 (3.2)	9 (7.3)	
Mandible	1192 (96.4)	1077 (96.8)	115 (92.7)	
Unknown	16	16	0	
Trauma, *n* (%)				<0.001[h]
Yes	199 (25.2)	189 (27.2)	10 (10.3)	
No	592 (74.8)	505 (72.8)	87 (89.7)	
Unknown	462	435	27	
Bone expansion, *n* (%)				0.011[h]
Yes	234 (25.9)	196 (24.6)	38 (36.2)	
No	668 (74.1)	601 (75.4)	67 (63.8)	
Unknown	351	332	19	
Symptomatic, *n* (%)				0.092[h]
Yes	88 (10.5)	71 (9.8)	17 (15.0)	
No	748 (89.5)	652 (90.2)	96 (85.0)	
Unknown	417	406	11	
Pulp vitality[d], *n* (%)				0.361[i,j]
Vital	444 (94.3)	372 (93.7)	72 (97.3)	
Non-vital	14 (3.0)	13 (3.3)	1 (1.4)	
Vital + non-vital[e]	13 (2.8)	12 (3.0)	1 (1.4)	
Unknown	782	732	50	
Cortical bone perforation, *n* (%)				0.592[i]
Yes	19 (3.4)	17 (3.6)	2 (2.2)	
No	544 (96.6)	456 (96.4)	88 (97.8)	
Unknown	690	656	34	
Cortical bone thinning, *n* (%)				0.552[h]
Yes	370 (73.6)	309 (73.0)	61 (76.3)	
No	133 (26.4)	114 (27.0)	19 (23.8)	
Unknown	750	706	44	
Scalloping, *n* (%)				<0.001[h]
Yes	237 (41.7)	182 (37.4)	55 (67.1)	
No	331 (58.3)	304 (62.6)	27 (32.9)	
Unknown	685	643	42	
Triangular/cone shape, *n* (%)				0.518[h]
Yes	28 (8.2)	21 (7.7)	7 (10.1)	
No	312 (91.8)	250 (92.3)	62 (89.9)	
Unknown	913	858	55	
Locularity, *n* (%)				0.077[h]
Unilocular	502 (86.0)	435 (87.0)	67 (79.8)	
Multilocular	82 (14.0)	65 (13.0)	17 (20.2)	
Unknown	669	629	40	
Tooth displacement/unerupted, *n* (%)				0.597[i]
Yes	13 (1.1)	12 (1.1)	1 (0.8)	
No	1169 (98.9)	1046 (98.9)	123 (99.2)	
Unknown	71	71	0	
Tooth root resorption, *n* (%)				0.283[i]
Yes	10 (0.8)	8 (0.8)	2 (1.6)	
No	1172 (99.2)	1050 (99.2)	122 (98.4)	
Unknown	71	71	0	

Table 1 (*Continued*)

Variables	Total	Solitary IBC	Multiple IBCs	*P*-value[a]
Pathological fracture, *n* (%)				0.481[i]
Yes	7 (0.6)	7 (0.6)	0 (0)	
No	1246 (99.4)	1122 (99.4)	124 (100)	
Unknown	0	0	0	
Presence of fluid, *n* (%)				0.777[h]
Yes	325 (46.0)	283 (46.2)	42 (44.7)	
No	381 (54.0)	329 (53.8)	52 (55.3)	
Unknown	547	517	30	
Treatment, *n* (%)				0.462[h,k]
Marsupialization	3 (0.3)	3 (0.4)	0 (0)	
Curettage	641 (66.5)	557 (66.0)	84 (70.0)	
Surgical access only	315 (32.7)	279 (33.0)	36 (30.0)	
Marginal resection	3 (0.3)	3 (0.4)	0 (0)	
Segmental resection[f]	2 (0.2)	2 (0.2)	0 (0)	
Unknown	289	285	4	
Persistence following treatment, *n* (%)				<0.001[h]
Yes	32 (4.6)	19 (3.3)	13 (12.0)	
No	659 (95.4)	564 (96.7)	95 (88.0)	
Unknown	562	546	16	
Follow-up time (months), mean ± SD (range)	22.8 ± 25.3 (1–216) ($n = 487$)	23.5 ± 26.3 (1–216) ($n = 396$)	19.8 ± 20.7 (1–99) ($n = 91$)	0.162[g]
Lesion size (cm), mean ± SD (range)	3.1 ± 1.8 (0.5–14.0) ($n = 380$)	3.0 ± 1.7 (0.6–14.0) ($n = 337$)	3.4 ± 2.1 (0.5–12.0) ($n = 43$)	0.178[g]

SD, standard deviation.
[a] Comparison between solitary and multiple IBCs.
[b] Here the 'number of IBCs' is considered as the statistical unit. There were 124 IBCs in 58 patients: 45 patients presented two IBCs, 11 patients presented three IBCs, and two patients had many (uncountable) IBCs, which here were considered as only one IBC.
[c] Comparison of mean age between male and female patients (Mann–Whitney test).
[d] Concerns the tooth (teeth) directly adjacent to/involved by the idiopathic bone cavity.
[e] Concomitant presence of vital and non-vital teeth adjacent to/involved by the idiopathic bone cavity.
[f] Resection with continuity defect.
[g] Mann–Whitney test.
[h] Pearson's χ^2 test.
[i] Fisher's exact test.
[j] Comparison between 'vital' and 'non-vital'.
[k] Comparison between 'curettage' and 'surgical access only'.

the histological description of the lesions reported in the publications were assessed thoroughly by one of the review authors (R.S.G.), an expert in oral pathology, in order to confirm the diagnosis of IBC.

Data extraction

The following data were then extracted from the publications: patient's sex, age, and race, duration of the lesion prior to treatment, history of previous (local) facial trauma, location of the lesion, size of the lesion (largest diameter), perforation of cortical bone, locularity appearance on radiological examination (unilocular/multilocular), presence of pathological fracture, presence of solitary or multiple lesions in the same patient (the presence of more than one cavity would classify the patient as having multiple lesions), triangular or cone shape of the anterior margin[4], scalloping around the roots of the adjacent teeth, tooth displacement and/or tooth root resorption due to lesion growth, vitality of the teeth adjacent to/involved by the IBC, bone expansion, presence of clinical symptoms, treatment performed, surgical findings (empty cavity or fluid), persistence following treatment, and follow-up period. Authors were contacted for possible missing data.

Analyses

The mean and standard deviation (SD) values and percentages were calculated as descriptive statistics. The Kolmogorov–Smirnov test was used to evaluate the normality of the distribution of the variables, and the Levene test was used to evaluate homoscedasticity. The Student *t*-test or Mann–Whitney test was performed for the comparison of two independent groups, depending on the normality of the data distribution. Pearson's χ^2 test or Fisher's exact test was used to compare categorical variables, depending on the expected count of events in a 2×2 contingency table. The probability of persistence of the cavity following treatment was calculated for certain variables, whenever possible, with the odds ratio (OR) and 95% confidence interval (95% CI). The degree of statistical significance was considered $p < 0.05$. All data were analyzed statistically using IBM SPSS Statistics version 25.0 (IBM Corp., Armonk, NY, USA).

Results

Literature search

The study selection process is summarized in Fig. 1. The search strategy in the databases resulted in 3607 papers (PubMed/MEDLINE, $n = 326$; Web of Science, $n = 881$; ScienceDirect, $n = 2069$; J-STAGE, $n = 102$; LILACS, $n = 229$). Forty-nine additional eligible papers were found in Google Scholar and two papers were identified through hand-searching. Finally, a total of 284 publications were included (readers interested in the list of publications should contact the first author for details).

Description of the studies and analyses

Table 1 presents the patient demographic characteristics and clinical features of all 1253 IBCs: 1129 IBCs as solitary cases and 124 IBCs as multiple cases (in 58 patients). IBCs were equally prevalent in the two sexes, except when only cases of multiple IBC were considered, which showed a higher prevalence in female patients. The mean age of the patients was 20.4 ± 10.5 years (range 2–79 years), and mean age was higher for female patients and for those presenting multiple IBCs. Figure 2 shows the distribution of the lesions according to age, indicating the highest prevalence in the second decade of life. The lesions were far more prevalent in the mandible than in the maxilla, and in the posterior region compared to the anterior region (Figs 3–5).

Common features of the IBCs included a mandibular location, cortical bone thinning, unilocular appearance on radiological examination, and pulp vitality of the teeth adjacent to/involved by the IBC. Fluid inside the cavity was observed in nearly half of the IBCs. Scalloping around the roots of the adjacent teeth was observed in about 40% of the lesions, being more prevalent in patients with multiple IBCs. A history of trauma was more frequently observed for solitary IBC than for multiple lesions. On the other hand, multiple IBCs were more associated with bone expansion, scalloping of the teeth, and persistence after treatment.

The treatment used for the lesions was known in 964 cases, with the most commonly performed being curettage, followed by surgical access only. The duration of follow-up was reported for 487 lesions and was a mean of 22.8 ± 25.3 months (range 1–216 months). The interval from initial treatment to the first persistent lesion following treatment ranged from 3 to 98 months, with a mean interval of 36.1 ± 25.3 months.

Table 2 shows the rate of persistence after treatment according to the treatment performed. A higher rate of persistence after treatment was observed for 'surgical access only' in comparison to 'curettage', and in cases of multiple IBCs in comparison to solitary IBCs.

Table 3 shows the rate of persistence after treatment according to certain variables. The results suggest that the following factors may have an influence on the rate of persistence of the lesion after treatment: 'surgical access only' in comparison to 'curettage', presence of scalloping, presence of multiple IBCs, and a larger lesion size.

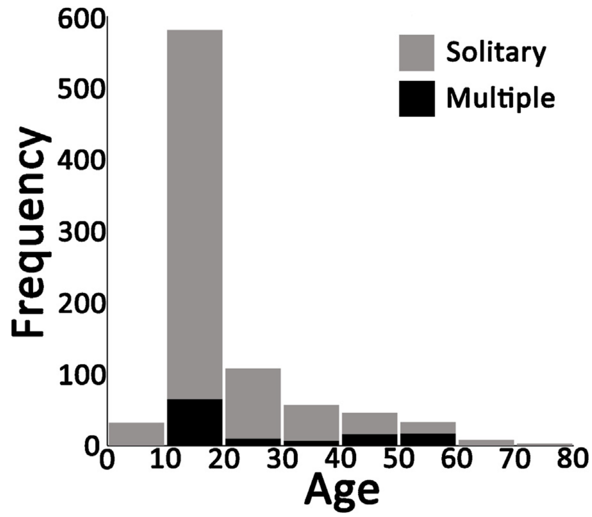

Fig. 2. Distribution of idiopathic bone cavities (IBCs) according to age (for cases with accurately reported patient age, *n* = 868).

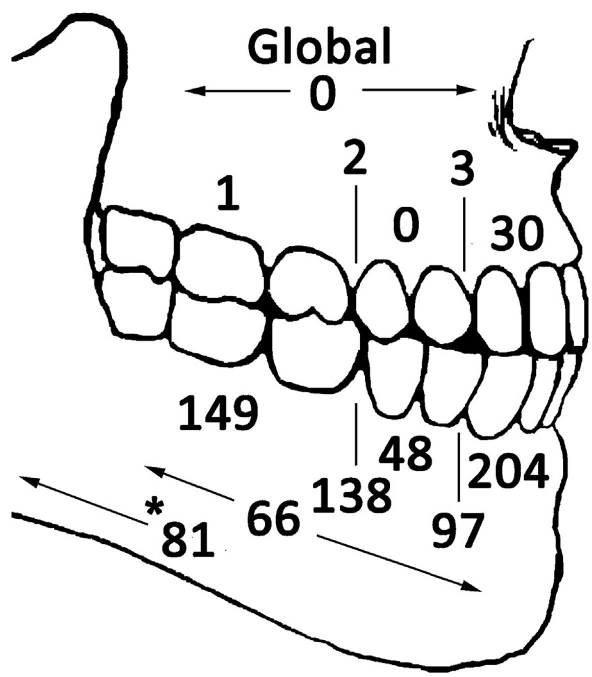

Fig. 3. Topographical distribution of the known precise locations (*n* = 819) of idiopathic bone cavities (IBCs). Cases involving multiple regions (or an entire quadrant) are indicated between arrows. Numbers at the top and bottom of the lines indicate cases involving both adjoining regions: anterior/premolar, premolar/molar. The asterisk (*) indicates the number of lesions from the mandibular body that reached the angle and/or ramus. For the remaining lesions (*n* = 434), the location was the 'maxilla' (*n* = 8), 'mandible' (*n* = 181), 'posterior maxilla' (*n* = 1), 'posterior mandible' (*n* = 79), 'mandibular body' (*n* = 71), 'mandibular angle' (*n* = 11), 'mandibular ramus' (*n* = 42), 'mandibular condyle' (*n* = 24) (three other IBCs also affected the mandibular condyle, but mainly affected the mandibular ramus), and zygomaticomaxillary suture (*n* = 1); the location was not reported for 16 lesions. A total of 129 IBCs crossed the midline. Six IBCs also affected the coronoid process, but mainly affected the mandibular ramus.

Discussion

In this systematic review, an integrated analysis of the available data published in

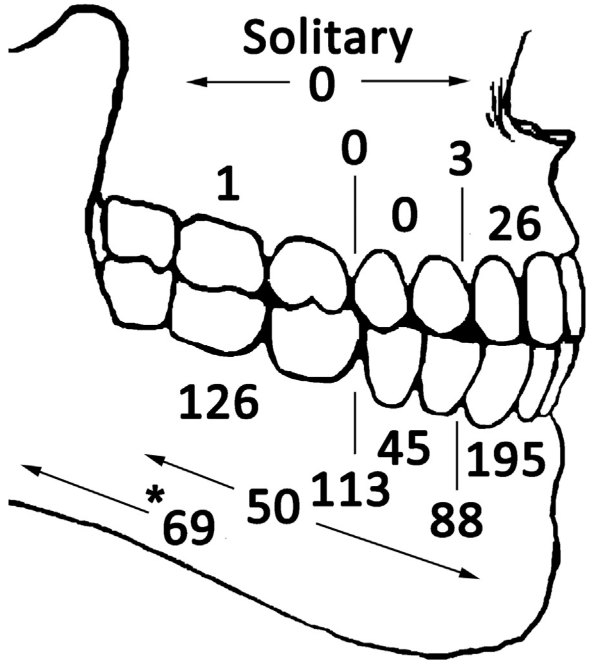

Fig. 4. Topographical distribution of the known precise locations (n = 716) of idiopathic bone cavities (IBCs) in patients with solitary IBCs. Cases involving multiple regions (or an entire quadrant) are indicated between arrows. Numbers at the top and bottom of the lines indicate cases involving both adjoining regions: anterior/premolar, premolar/molar. The asterisk (*) indicates the number of lesions from the mandibular body that reached the angle and/or ramus. For the remaining lesions (n = 413), the location was the 'maxilla' (n = 5), 'mandible' (n = 172), 'posterior maxilla' (n = 1), 'posterior mandible' (n = 75), 'mandibular body' (n = 69), 'mandibular angle' (n = 10), 'mandibular ramus' (n = 40), 'mandibular condyle' (n = 24) (three other IBCs also affected the mandibular condyle, but mainly affected the mandibular ramus), and zygomaticomaxillary suture (n = 1); the location was not reported for 16 lesions. A total of 116 IBCs crossed the midline. Six IBCs also affected the coronoid process, but mainly affected the mandibular ramus.

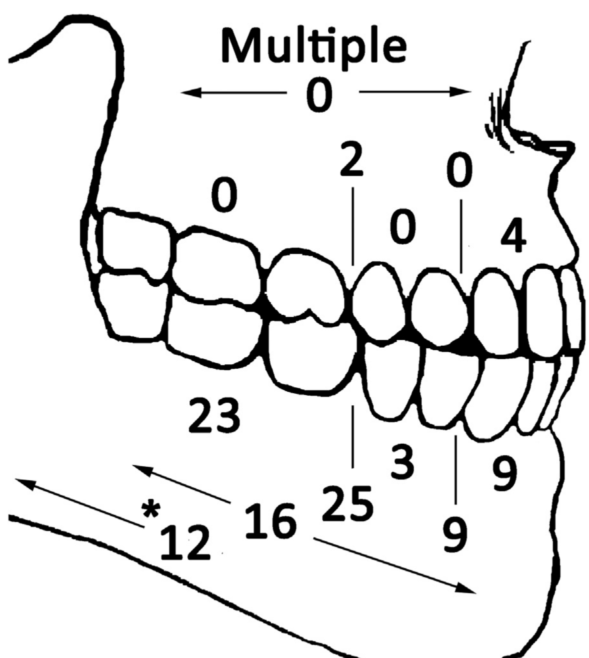

Fig. 5. Topographical distribution of the known precise locations (n = 103) of idiopathic bone cavities (IBCs) in patients with multiple IBCs. Cases involving multiple regions (or an entire quadrant) are indicated between arrows. Numbers at the top and bottom of the lines indicate cases involving both adjoining regions: anterior/premolar, premolar/molar. The asterisk (*) indicates the number of lesions from the mandibular body that reached the angle and/or ramus. For the remaining lesions (n = 21), the location was the 'maxilla' (n = 3), 'mandible' (n = 9), 'posterior mandible' (n = 4), 'mandibular body' (n = 2), 'mandibular angle' (n = 1), and 'mandibular ramus' (n = 2). A total of 13 IBCs crossed the midline.

Table 2. Persistence following treatment, for lesions with available information about treatment and persistence following treatment.

Treatment	Persistence following treatment/total (% persistence)		P-value[a]
	Solitary IBC	Multiple IBCs	
Marsupialization	1/3 (33.3)	–	
Marginal resection	1/3 (33.3)	–	
Curettage	9/400 (2.3)	6/78 (7.7)	0.023[b]
Surgical access only	8/162 (4.9)	7/30 (23.3)	0.003[b]
P-value[c]	0.082[b]	0.033[b]	
Total	19/568 (3.3)	13/108 (12.0)	<0.001[d]

[a] Comparison between solitary and multiple IBCs.
[b] Fisher's exact test.
[c] Comparison between 'curettage' and 'surgical access only'.
[d] Pearson's χ^2 test.

the literature on IBC was performed. As studies in the literature comparing clinical and radiological features of solitary and multiple IBCs are scarce, this analysis was performed first, followed by a study of the factors that may be associated with persistence following treatment. A review of pathological lesions is important because it provides information that can improve diagnostic accuracy, allowing pathologists and surgeons to make informed decisions and refine treatment plans to optimize clinical outcomes[5–10].

In this review, it was observed that most IBCs occur in the mandible, are asymptomatic, do not present bone expansion, present vital teeth that have roots adjacent to/involved by the cavity, are not preceded by a local trauma, do present cortical thinning (but not cortical bone perforation), are unilocular, have a higher prevalence in the posterior mandible, and are discovered in the second decade of life. Moreover, IBCs are equally prevalent in male and female individuals, and about 40% of the IBCs show scalloping around the roots of the adjacent teeth. The clinical and radiological features observed are in accordance with current knowledge about this lesion type and are important to consider during the working diagnosis of bone lesions.

There are many published cases of supposed IBC in which the diagnosis has been incorrect. Furthermore, a considerable number of reports have not differentiated IBC from the cemento-osseous dysplasia associated with IBC. Moreover, the diagnosis of IBC relies on clinical, radiographic, and ultimately, surgical findings. As the radiographic presentation of IBC can mimic other bone lesions, only cases confirmed by biopsy were included in this review. Therefore, some possible IBCs that were not surgically explored were excluded[11–18].

The aetiology of the IBC remains unclear[2]. According to one of the earliest hypotheses on its aetiology, a traumatic event incites medullary haemorrhage and the subsequent failure of the haematoma to organize and be replaced with tissue results in an IBC[19]. This theory has been questioned due to the fact that in most of the cases there has been no history of trauma. The present study found that, when the information was available, only one in every four IBCs was preceded by a traumatic event. Moreover, the incidence of trauma in patients with IBC is no greater than that in the general population[20]. The present authors have no plausible explanation for the higher frequency of trauma in solitary IBC than in multiple IBCs and are uncertain about the biological relevance, if any, of this finding. However, the hypothesis that solitary and multiple IBCs present distinct aetiopathogeneses should be explored further in the future.

When multiple IBCs were compared with solitary IBC, other interesting data were found. Multiple IBCs were more associated with bone expansion and persistence following treatment, which suggests that this clinical form is more aggressive. Multiple IBCs also presented a higher frequency of scalloping of the teeth detected on radiographic examination, but this could be explained by the higher number of teeth affected when more than one lesion is found.

This review identified seven cases that were discovered after a pathological fracture of the jaws, representing only 0.6% of the cases reported in the literature. According to a previous review[21], about 80% of orthopaedic IBCs are discovered because of a pathological fracture, whereas IBCs in the maxillofacial region are usually noted incidentally on panoramic radiographs. This great discrepancy in the diagnosis of an IBC after pathological fracture between the long bones and the jaws is probably due to the fact that children routinely undergo radiography of the jaws for orthodontic treatment or other dental reasons.

Although some IBCs show spontaneous healing, resolution after aspiration of the cavity, or resolution after surgical exploration without curettage, the present study supports curettage as the first treatment of choice. IBCs that were surgically accessed only showed a higher rate of persistence following treatment than lesions that were submitted to curettage. This was especially evident for multiple lesions. This can be explained by the fact that curettage promotes the formation of a blood clot, which is necessary for subsequent bone repair. In fact, curettage is the most widely accepted approach to the management of patients with IBC. Periodic observation of suspected IBCs without surgical intervention is not suggested, because IBCs may continue to enlarge if left untreated and may eventually result in pathological fracture of the affected bone[22].

In addition to curettage and multiple lesions, other clinical and radiological factors were also associated with persistence after treatment. Of note, there was a higher chance of persistence after treatment for larger lesions and those associated with scalloping around the teeth. Larger lesions or those with scalloping around the teeth could make the formation of a sufficient blood clot difficult for bone repair in some circumstances, which could explain the persistence or recurrence of the lesion.

A previous study suggested that cases with absent lamina dura, scalloped margins, nodular bone expansion, internal radiopaque masses, and/or multiple cavities may indicate a higher likelihood of persistence following treatment[23]. Some of these radiographic features were not evaluated in the present study due to the retrospective nature of the review, and also due to the low quality that radiological images usually present on printed paper, which does not allow accurate identification of these features in many cases. For example, only good-quality peri-apical radiographs would allow an adequate evaluation of the absence of lamina dura.

The results of this study should be interpreted with caution because of its limitations. First, all included studies were retrospective reports, which inherently result in errors, with incomplete records. Second, many of the published cases had a short follow-up, which could have

Table 3. Persistence following treatment for idiopathic bone cavity according to different factors, for lesions with available information about both persistence following treatment and the factors included here.

Factor	Persistence following treatment/total (% persistence)	*P*-value	OR (95% CI)	*P*-value
Treatment				
Curettage	15/478 (3.1)	0.008[a]	1	
Surgical access only	15/192 (7.8)		2.616 (1.253, 5.463)	0.010
Jaw				
Maxilla	0/15 (0)	0.479[b]	[c]	–
Mandible	32/660 (4.8)			
History of trauma				
No	20/408 (4.9)	0.141[b]	1	
Yes	2/104 (1.9)		0.380 (0.087, 1.654)	0.197
Bone expansion				
No	14/330 (4.2)	0.083[a]	1	
Yes	11/133 (8.3)		2.035 (0.899, 4.606)	0.088
Cortical bone perforation				
No	21/438 (4.8)	0.576[b]	1	
Yes	1/17 (5.9)		1.241 (0.157, 9.809)	0.838
Scalloping				
No	7/195 (3.6)	0.005[a]	1	
Yes	17/151 (11.3)		3.407 (1.375, 8.445)	0.008
Triangular/cone shape				
No	20/250 (8.0)	0.552[b]	1	
Yes	1/19 (5.3)		0.639 (0.081, 5.037)	0.671
Locularity				
Unilocular	19/370 (5.1)	0.094[b]	1	
Multilocular	6/56 (10.7)		2.217 (0.845, 5.816)	0.106
Tooth displacement/unerupted				
No	32/678 (4.7)	0.537[b]	[c]	–
Yes	0/13 (0)			
Tooth root resorption				
No	31/685 (4.5)	0.248[b]	1	
Yes	1/6 (16.7)		4.219 (0.478, 37.216)	0.195
Presence of fluid				
No	8/219 (3.7)	0.036[b]	1	
Yes	15/179 (8.4)		2.412 (0.999, 5.828)	0.050
Type				
Solitary	19/583 (3.3)	<0.001[a]	1	
Multiple	13/108 (12.0)		4.062 (1.942, 8.498)	<0.001
Age			1	
Increase by 1 year	–	–	1.016 (0.988, 1.044)	0.259
Size			1	
Increase by 1 cm	–	–	1.279 (1.054, 1.552)	0.013

OR, odds ratio; CI, confidence interval.
[a] Pearson's χ^2 test.
[b] Fisher's exact test.
[c] In at least one case, the value of the weight variable was zero. Such cases are invisible to statistical procedures and graphs, which need positively weighted cases.

led to an underestimation of the actual rate of persistence following treatment. However, it is difficult to define what would be considered a short follow-up period for the evaluation of persistence following the treatment of IBCs. Third, many of the cases described were published as isolated case reports or small case series.

In conclusion, solitary and multiple IBCs differ in some clinical and radiological aspects and show distinct rates of persistence following treatment. Curettage is the treatment of choice for the surgical management of IBCs compared to surgical access only.

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