

# Gingival Cysts of Adults: Retrospective Analysis from Two Centers in South Brazil and a Review of the Literature

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## Abstract

Gingival cysts of adults are rare developmental cysts, with an incidence of 0.3% among all odontogenic cysts. They are benign, well-defined nodules located on the attached gingiva with a fluid-filled appearance. The aim of the present study was to perform an analysis of gingival cysts in adults diagnosed at an oral pathology laboratory and a hospital pathology service in order to determine the frequency of occurrence of this lesion, and to perform a literature review to correlate the present findings with those described in the literature. This study emphasizes the low frequency of gingival cysts in adults and the importance of gathering clinical, radiographic and histopathological information to define the final diagnosis.

**Key words:** *Odontogenic cysts, gingival cysts of adults, gingival lesions*

## Introduction

Gingival mucosa is under constant irritation from masticatory forces, minor trauma, plaque, calculus and iatrogenic factors. The most common gingival lesions represent tissue reactions to these irritant factors (Buchner *et al.*, 2010). In addition, gingival growths can be the result of underlying systemic disease or drug-induced stimulus (Rossmann, 2011). Gingival lesions have been grouped into types, and the most common are inflammatory, reactive, developmental and neoplastic lesions (Effiom *et al.*, 2011).

Odontogenic lesions, presented as soft tissue growths, can originate from remnants of the dental lamina, known as rests of Serres, located in a supraperiosteal position in the gingiva (Giunta, 2002; Manor *et al.*, 2004; Kelsey *et al.*, 2009). Peripheral odontogenic neoplasms are rare and represent 1.5% of all diagnosed gingival lesions (Manor *et al.*, 2004). Among odontogenic cysts, gingival cysts of adults (GCA) are the only lesions that are exclusive to soft tissue (Neville *et al.*, 2008) and

illustrate a rare developmental cyst, with a low incidence of 0.3% among all odontogenic cysts (Ochsenius *et al.*, 2007). The aim of the present study was to perform an analysis of gingival cysts of adults diagnosed at an oral pathology laboratory and in a hospital pathology service to define the frequency of this lesion, and also perform a literature review and correlate the findings of the present study with those described in literature.

## Materials and methods

A retrospective analysis was performed at two diagnostic centers of a university in southern Brazil. The histopathological records from 1994 to 2013 of the Clinics Hospital Pathology Service and the histopathological records from 2000 to 2013 of the Oral Pathology Laboratory were retrieved. Data on gender, age, race, location, radiographic and surgical aspects were retrieved, and slides stained with hematoxylin and eosin were reviewed by an experienced pathologist to confirm the histopathological diagnosis.

The MedLine electronic database was searched in English and without a time (year) limitation for any publication about GCA. The search strategy combined MeSH with free text words. The MeSH terms used were “odontogenic cysts, periodontal cysts, gingival diseases” and gingival cyst of adult/gingival cyst of adults were

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used as keywords. Articles with a case report or case series of GCA were included and data concerning gender, age, race, location, radiographic and surgical aspects were retrieved.

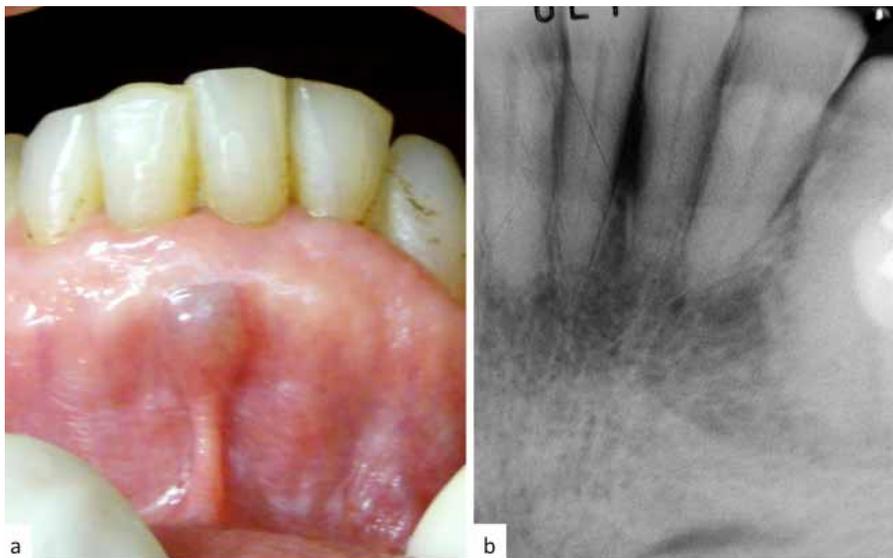
## Results

Between 2000 and 2013, 12,971 specimens of oral lesions were submitted for histopathological examination at the Oral Pathology Laboratory of the School of Dentistry. In this time period, one case of GCA (Case 1) was diagnosed in this center, representing 0.007% of all diagnosed cases. At the Pathology Service of Clinics Hospital of Porto Alegre, between 1994 and 2013, 6,222 specimens of oral lesions were submitted for histopathological examination. In this time period one case was diagnosed as GCA (Case 2) representing 0.01% of all diagnosed cases.

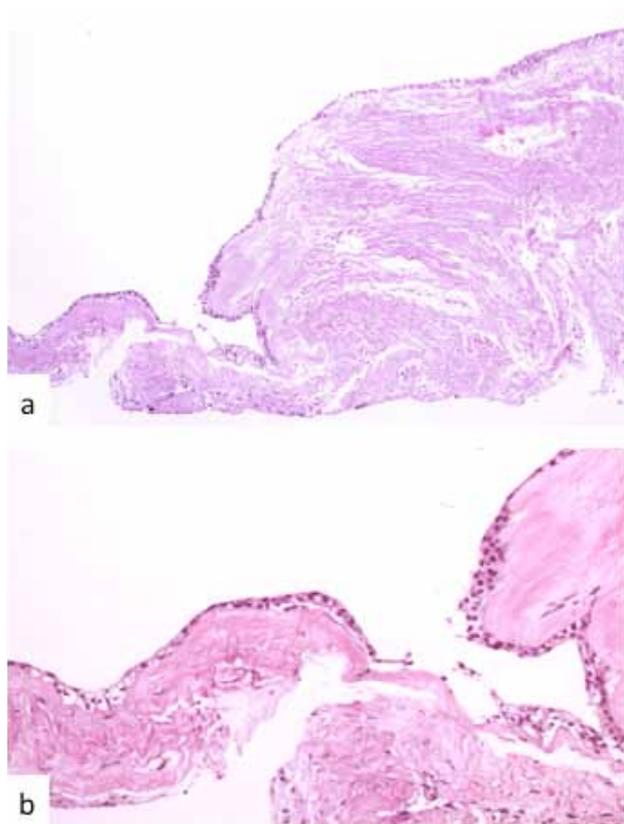
**Case 1:** A 60-year-old Caucasian female patient was referred to Oral Pathology Service of the School of Dentistry presenting with a solitary nodule with a fluid-filled appearance. The first diagnostic hypothesis was of GCA; however, other benign lesions were not excluded because GCA is a very unusual lesion. The differential diagnosis of nodular lesions in gingiva, as in the present case, included peripheral ossifying fibroma, peripheral giant cell granuloma, pyogenic granuloma and peripheral odontogenic keratocyst. An excisional biopsy under local anesthesia was performed and the specimen was submitted for histopathological analysis. The histopathological exam showed a cystic space cov-

ered by an epithelium lining consisting of cuboidal and squamous cells with few layers and focal thickenings, confirming the diagnosis of GCA.

**Case 2:** A 75-year-old Caucasian female patient was referred to the Oral Medicine Department at the Clinical Hospital of the Federal University of Rio Grande do Sul for control of burning mouth syndrome. During the intraoral examination a solitary nodule situated on the mucogingival junction in the area of the lower incisors was noted (*Figure 1a*). The lesion was asymptomatic, firm, slightly depressible, presented with a smooth surface, bluish color and was 5 mm in diameter. The patient could not remember any trauma, recent or past, in this area. Pulp testing indicated that both incisors adjacent to the lesion were vital and no radiograph image was observed (*Figure 1b*). The main diagnostic hypothesis was GCA, as a lateral periodontal cyst (LPC) was excluded from the differential diagnosis based on the absence of a radiographic finding. An excisional biopsy under local anesthesia was performed. During the surgical procedure, an erosion on the bone surface was noted, leading to root exposure at the mesial part of the lower central incisors. As the defect provoked by the lesion was small, the surgeon decided not to perform any specific treatment in the area. The specimen was submitted for histopathological analysis, which confirmed the diagnosis of GCA (*Figure 2a* and *2b*). One year follow-up revealed no recurrence and the patient reported no symptoms.



**Figure 1. Illustration of Case 2. a) Solitary and asymptomatic nodule at the mucogingival junction presenting with a smooth surface and bluish color. b) Radiographic image of lower incisor region revealed no bone involvement.**



**Figure 2. Illustration of Case 2. a) Histopathological aspects of the surgical specimen revealed a cystic space covered by an epithelium lining that consisted of cuboidal and squamous cells (H&E, 100 X); b) a few layers with focal thickenings (H&E, 200X).**

## Literature review

A literature review found 157 cases of GCA reported in the English language (Table 1). Concerning sex and race, there is no pronounced predilection: the male:female ratio was 1:1.43 and the white:black ratio was 1:0.76. The mean age was 49.10 years old, ranging from 18 to 78 years. The mandible was more affected than the maxilla, representing 78.87% of all cases. Radiograph involvement was absent in 78.43% of cases, and bone involvement was present in 47.29% of the cases.

## Discussion

GCA is an uncommon developmental cyst that occurs in either the free or attached gingival soft tissue. GCA are believed to have an odontogenic derivation (Malali *et al.*, 2012) without an inflammatory origin. Potential odontogenic tissue origins include remnants of the dental lamina (cell rests of Serres; Kelsey *et al.*, 2009; Malali *et al.*, 2012). The present study performed a retrospective analysis of two centers in South Brazil and also a literature review concerning GCA. Our results confirmed that GCA represents a very rare lesion with a

frequency in biopsy services of around 0.01%, (Buchner *et al.*, 1979; Manor *et al.*, 2004).

The typical aspect of GCA described in the literature is similar to both cases presented herein, and consists of a well-defined oval to round, firm and elevated nodule located on the attached gingiva. Usually this lesion presents with slow growth and may not show any symptoms. Most lesions are small, ranging from 0.5 cm to 1 cm in diameter, and often appeared fluid-filled (Sato *et al.*, 2007; Kelsey *et al.*, 2009; Malali *et al.*, 2012). The literature review performed in this study demonstrates that there is no predilection regarding sex and race for this lesion; however, a pronounced preference for the mandible was noticed. The age of patients ranged from 18 to 78 years old, but most cases were in adults in the 4<sup>th</sup> and 5<sup>th</sup> decade of life; no case report was found in the English literature of GCA in childhood. GCA can produce a radiographic radiolucency as a result of pressure resorption of the adjacent bone caused by the lesion (Manor *et al.*, 2004); however, less than 20% of all cases described in the literature presented a radiographic image.

Based on clinical aspects the differential diagnosis of GCA includes other lesions presenting as gingival swellings such as fibroma, peripheral ossifying fibroma (POF), peripheral giant cell granuloma (PGCG), pyogenic granuloma (PG) and bone lesions situated in the periapical area (Kelsey *et al.*, 2009). Fibroma can be distinguished based on its clinical aspect of a nodular lesion with a firm consistency and the same color as surrounding tissue (Neville *et al.*, 2008). Both POF and PGCG have a periodontal ligament origin; they are usually located near the gingival margin and present with a firm consistency (Neville *et al.*, 2008; Barot *et al.*, 2013). Pyogenic granuloma represents an exuberant growth of vessels associated with trauma and has a bleeding tendency (Singh *et al.*, 2013). Periapical lesions, either inflammatory or tumoral, can eventually cause cortical disruption and present with soft tissue manifestations (Khanna *et al.*, 2011). Clinicians often include mucocoele incorrectly as a differential diagnosis because of the fluid appearance of the GCA; however, mucocoeles do not occur in the attached gingiva (Giunta, 2002). Despite being a rare lesion, clinicians make a correct clinical diagnosis 50% of the time (Giunta, 2002) given that the clinical aspects of this lesion are very distinctive.

The most important lesion to establish a differential diagnosis is lateral periodontal cyst (LPC). The LPC is also a development odontogenic cyst and the GCA is considered to be the soft tissue counterpart of the LPC (Neville *et al.*, 2008). The main difference between them is that LPC arises from proliferation of the dental lamina within bone, while the GCA arises from dental lamina remnants in soft tissue (Tolson *et al.*, 1996), thus the GCA presents exclusively in soft tissue and the LPC is an intra-osseous lesion. The histological appearance, location and

**Table 1.** Demographic and clinical information about GCA (adapted from Kelsey *et al.*, 2009)

Study	N	Gender M:F	Max:Mand	Age/ Mean age	Race W:B	Radiographic involvement Y:N	Bone involvement Y:N
This study	2	0:2	0:1*	67.5	2:0	0:1*	1:0*
Anonymous, 2012	1	F	Mand	38	W	N	NR
Malali <i>et al.</i> , 2012	1	M	Max	16	NR	N	Y
Ojha <i>et al.</i> , 2010	1	F	Mand	76	B	N	NR
Kelsey <i>et al.</i> , 2009	1	M	Mand	54	B	Y	Y
Santos <i>et al.</i> , 2009	1	F	Max	42	NR	N	NR
Noonan <i>et al.</i> , 2008	1	NR	Mand	NR	NR	NR	NR
Sato <i>et al.</i> , 2007	1	M	Mand	78	NR	N	Y
Anonymous, 2006	1	F	Max	56	B	NR	NR
Damm and Fantasia, 2006	1	M	Max	44	NR	NR	NR
Cunha <i>et al.</i> , 2005	1	F	Mand	69	NR	Y	Y
Hegde and Reddy, 2004	1	M	Mand	18	NR	N	NR
McGuff <i>et al.</i> , 2003	1	M	Mand	45	NR	N	NR
Giunta, 2002	22 <sup>+</sup>	6:15	2:16*	52	0:1*	0:22	NR
Cairo <i>et al.</i> , 2002	3	0:3	0:3	46	3:0	0:3	0:3
Bell <i>et al.</i> , 1997	8	1:7	1:7	51	6:2	NR	NR
Tolson <i>et al.</i> , 1996	1	M	Mand	50	B	Y	Y
Fardal and Johannessen, 1994	1	F	Mand	41	W	NR	NR
Haring, 1994	1	F	Mand	47	NR	NR	NR
Nxumalo and Shear, 1992	14	7:7	6:8	NR	NR	NR	NR
Dent <i>et al.</i> , 1990	2 <sup>+</sup>	M	0:2	64	NR	2:0	0:2
Shade <i>et al.</i> , 1986	2 <sup>+</sup>	M	0:2	47	B	0:2	1:1
Wescott <i>et al.</i> , 1984	2	M	0:2	46	B	NR	1:1
Gregg and O'Brien, 1982	2	1:1	1:1	52	NR	1:1	0:2
Brannon and Brasher, 1981	1	M	Max	40	B	N	Y
Wyscocki <i>et al.</i> , 1980	10	5:4*	1:7*	51	NR	NR	NR
Buchner and Hansen, 1979	33	14:19	9:24	48	NR	2:31	10:23
Mesa, 1975	2	0:2	1:1	45	1:1	1:1	NR
Moskow and Weinstein, 1975	3 <sup>+</sup>	2:0	0:3	NR	NR	0:3	3:0
Melhado <i>et al.</i> , 1973	3	NR	NR	NR	NR	NR	NR
Young <i>et al.</i> , 1973	1	M	Mand	68	NR	N	N
Moskow <i>et al.</i> , 1970	2	NR	NR	NR	NR	1:1	NR
Reeve and Levy, 1968	4	1:3	0:4	61	4:0	4:0	4:0
Henning, 1968	1	F	Mand	53	NR	N	N
Amar, 1966	1	F	Mand	19	W	N	Y
Zerden, 1966	2 <sup>+</sup>	M	0:2	52	B	1:1	Y
Alexander and Griffith, 1966	2	2:0	0:2	45	1:1	1:1	1:1
Mabile, 1965	1	F	Mand	49	B	Y	Y
Grand and Marwah, 1964	1	NR	Max	62	B	Y	Y
Sherman, 1963	1	F	Mand	58	B	Y	Y
Bruce, 1962	2	0:2	0:2	52	2:0	0:2	0:2
Holder and Kunkel, 1958	1	M	Mand	40	NR	Y	Y
Kennedy, 1957	1	M	Max	30	W	NR	1:0
Bhaskar and Laskin, 1955	3	0:3	0:3	47	0:3	2:0	1:2
Ritchey and Orban, 1953	8 <sup>++</sup>	3:2	2:5*	34	2:0*	NR	NR
Ramfjord, 1953	1	F	NR	60	NR	NR	NR
Cahn, 1936	1	NR	NR	NR	NR	NR	NR
Total	157	57:82	30:112	49.10	25:19	22:80	35:39

\*Clinicopathological information was not complete for all cases. <sup>+</sup>Two cysts in the same patient. <sup>++</sup>Three cysts in the same patient. M:F, male:female; Max:Mand, maxilla:mandible; W:B, white:black; Y:N, yes:no; NR, not reported.

clinical behavior of both lesions are very similar. In some cases there is both radiographic and gingival involvement and the differential diagnosis is hampered because it is hard to establish if it is a GCA causing bone resorption or an LPC eroding the cortical bone (Tolson *et al.*, 1996; Kelsey *et al.*, 2009). Radiographic analysis is important to distinguish both lesions: in the present literature review 25 cases of GCA presented with a radiographic image that could suggest an LPC. In cases in which GCA is causing cortical resorption, it is possible to see only a diffuse radiolucency, whereas LPC appears as a well-defined round or ovoid radiolucency, often with a sclerotic radiopaque margin, (Tolson *et al.*, 1996; Shear and Speight, 2007). It is important to state that 78.43% of the cases reviewed herein revealed no abnormalities in radiographic examination, supporting that the absence of radiographic image can indicate a GCA, although when an image is present, GCA must not be excluded from the differential diagnosis and a deeper analysis has to be performed.

Another situation that can contribute to the differentiation of GCA from LPC is the surgical aspect. Gingival cysts of adults usually present against the labial bone, whereas an LPC is situated within the bone (Giunta, 2002; Shear and Speight, 2007). Although the present literature review indicated that 47.29% of cases presented with bone involvement, root exposure related to GCA, as founded in Case 2, is a particularly rare finding (Kelsey *et al.*, 2009). The lesion can involve the alveolar bone surface and a “saucer-like” defect might be produced in the lingual or buccal plate (Malali *et al.*, 2012). When necessary, different approaches might be used to achieve resolution of the lesion-associated osseous defect, such as bone allograft, collagen membrane (Kelsey *et al.*, 2009) and hydroxyapatite bone substitute (Malali *et al.*, 2012). In Case 2 the defect provoked by the lesion was small and the use of these therapies was judged unnecessary during the surgical procedure.

Histologically GCA usually presents with a narrow epithelium, closely resembling reduced enamel epithelium with 1-3 layers of flat to cuboidal cells with darkly staining nuclei. Focal thickenings of epithelium may occur as plaques of glycogen-rich clear cells. The junction between the epithelium and the underlying connective tissue is tenuous and easily peels off, leading to an epithelial discontinuity. Generally, the lesion is unicystic and the connective tissue is free of inflammation (Tolson *et al.*, 1996, Shear and Speight, 2007). The histopathological aspect of GCA is exactly the same as that of an LPC; for that reason it is of great importance to provide clinical and radiographic information in the biopsy file to allow the pathologist to make a correct diagnosis. Surgical excision is usually the curative treatment and no recurrence has been reported in the literature. Still, it is important to maintain clinical and radiographic follow-up of the patient (Tolson *et al.*, 1996; Kelsey *et al.*, 2009).

## Conclusion

Despite being a rare lesion, knowledge about GCA allows dental practitioners to establish a correct differential diagnosis for focal gingival swelling. This study emphasizes the low frequency of occurrence of GCA and the importance of gathering clinical, radiographic and histopathological information to make a correct diagnosis between GCA and LPC, as well as other gingival lesions.

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