Giant cell peripheral granuloma: post-surgical recurrence.  
Literature review and clinical case report

Granuloma periférico de células gigantes: recidiva postquirúrgica.  
Revisión de la literatura y reporte de un caso clínico

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INTRODUCTION

Giant cell peripheral granuloma (GCPG) is the most frequent lesion of this histological profile found in the jaws.1 It is an infrequent lesion. It is considered a reactive, extra-osseous, exophytic and non-neoplastic lesion, originating from the periostium or periodontal ligament. It mainly appears in marginal gums and alveolar mucosa of totally or partially dentate patients. It is also known as giant cell epulis, osteoclastoma, repair cell granuloma or giant cell hyperplasia. It is important...
to differentiate it from giant cell central granuloma (GCCG), which is an intra-osseous, destructive, aggressive lesion found in the anterior section of the jaws, and is also composed of mono-nucleated giant cells.2 Nevertheless, greater prevalence of GCPG over GCCP has been observed (3:1).3

Drs. Lipa and Dan4 mentioned several possible etiologies for GCPG. Nevertheless, the etiology of GCPG still remains uncertain. Among the possible GCPG causes, the following can be mentioned among many others: dental extraction procedures, periodontal surgery, presence of local irritant agents, (dental biofilm and dental calculus), overflowing restorations, indiscriminate use of toothpicks, chronic infection, foodstuff impaction and fractured teeth.3-13 Wolfson & al,14 reported in 1989 a GCPG case in a patient initiating orthodontic treatment. Other authors15-17 reported this alteration in patients with hormonal unbalance associated to hyperparathyroidism.

No ethnic predilection associated to the lesion has so far been described. GCPG can have its onset in patients of all ages, nevertheless it has been mainly found in groups of patients between the third and seventh decade of life. Females exhibited a slightly higher percentage than males (2:1).1,15,18-22 The reason for this predilection was probably related to the influence of female sex hormones at the onset or during the development of the granuloma. Nevertheless, research results have not achieved to establish a link between both entities, and have yielded inconclusive and confusing results.23,24 Clinically, the lesion is described as a dome-shaped tumefaction, with a firm, sessile base, of dark-red, bluish-red and / or purplish red hue (areas particularly susceptible to epithelial ulceration).25 It exhibits a smooth and shiny surface, measures from 0.5 to 2.0 cm in diameter, is of soft or gelatinous consistency, exhibits slow growth around one or more teeth. In some instances, dental mobility or even dental displacement are elicited. GCPG is a painless lesion, which causes symptoms only in cases of ulceration or super-infection. Hemorrhage after meals or dental brushing is a frequent finding. Greater predilection for the mandibular area has been observed, specifically in the pre-molar and molar region.26 Dr Sapp2 mentioned the fact that an inter-dental papilla might be involved in the lesion, even though this fact is not considered a pathognomonic sign. According to Dr Flaitz,26 there could be radiographic signs of bone involvement, such as alveolar bone superficial resorption and slight broadening of the periodontal ligament space at the apical level of affected teeth. In edentulous areas, it has been observed that cortical bone presents a concave resorption zone underneath the lesion (flattening).15 Radiographic records are important, since, although GCPG is a lesion pertaining to soft tissues, a radiographic image can indicate whether the lesion is a peripheral expression of a central lesion, (GCCG) or whether there is erosion in the underlying cortical bone. The aforementioned is relevant when speaking about differential diagnosis and therapeutic proposals.15 GCPG treatment consists on the surgical extirpation of the lesion, with curettage of the bony base, and elimination of irritant factors in order to prevent recurrence. This procedure can be undertaken with CO2 laser or an electrocautery. Nevertheless, some authors recommend the use of a cold scalpel, since this allows surgical curettage of lesions with bone involvement.1

**CLINICAL CASE PRESENTATION**

Fourteen year old female patient. Medical history did not reveal systemic alterations, blood chemistry was non-contributory. The patient attended the clinic seeking removal of a gingival epulis located at the premolar area of quadrant number IV. Clinical examination revealed a sessile-based, shiny, purplish-red, nodular lesion measuring ± 1.5 centimeters. The lesion was present in the marginal gingival tissue, from the vestibular side of

**Figure 1.** Sessile-based exophytic reddish nodular lesions with smooth surface, present in the marginal gingival tissue from 4-4 to the 4-6 medial portion.
tooth 44 up to the mesial portion of tooth 46 (*Figure 1*) without compromising the alveolar mucosa located in that area. The lesion was interfering with the chewing process, as well as with the patient’s aesthetics. Multiple carious lesions were equally found as well as no history of previous orthodontic devices. Radiographic examination of compromised teeth revealed absence of bone involvement, root resorption or increase of periodontal ligament space (*Figure 2*). Next to the gingival lesion, it was observed that tooth 46 presented grade 4 mesio-occlusal caries, with painful symptoms and irreversible pulpitis diagnosis. Epulis treatment consisted of lesion extirpation; the procedure was achieved with electrocautery, having previously infiltrated the area with 2% lidocaine with 1:80,000 epinephrine (*Figure 3*). The procedure was completed uneventfully, harvested tissue was sent to be histo-pathologically analyzed (*Figure 4*). This latter analysis revealed ulceration of the gingival mucosa, proliferation of giant cells with hemosiderin pigmentation in macrophages as well as fibrous stroma. All the aforementioned characteristics were consistent with diagnosis of giant cell peripheral granuloma (*Figure 5*). Twenty one days after the surgical procedure, tooth 46 was extracted according to the patient’s instructions. The patient reached this decision due to financial reasons. Four months after the surgical removal of the soft tissue lesion, the patient attended the clinic exhibiting gum enlargement, with similar characteristics to the initial lesion. This suggested recurrence of the lesion. The patient is presently under regular control (*Figure 6*).

*Figure 2.* Radiographic image showing uncompromised underlying bone.

*Figure 3.* Gingival epulis removal with an electrical scalpel.

*Figures 4 and 5.* Histological and macroscopic aspect of the lesion. Giant cell proliferation with pigmentation of hemosiderine in macrophages and fibrous stroma (HE x 250) can be observed.
DISCUSSION

Scientific literature widely associates GCPG to chronic inflammatory processes which affect a specific area within the oral cavity. Dr Rosember et al.\textsuperscript{25} presented the study of 220 patients who had been diagnosed with hyperparathyroidism; in this sample, 4.5\% of patients (n = 10) presented GCPG. Dr Falashini\textsuperscript{27} mentioned the case of a 25-year-old man with poor oral hygiene. The patient was remitted to the clinic for extraction of tooth 15. One week after the procedure, the patient exhibited an exophytic lesion in the treated area. Histological examination revealed diagnosis of GCPG. The dental-medical history of the patient described in our case, did not present clear evidence of the chronic inflammatory process which triggered the primary apparition of the lesion. Likewise, no history was found of any type of endocrine alteration which might have supported the outstart of the lesion. Ozcan-Cengiz\textsuperscript{28} reported the first case of GCPG at the head of the articular condyle. He described it as a painful, pre-auricular mass with a two years evolution. This finding was relevant since it eliminated the exclusive association of GCPG with the oral cavity as well as with the lack of symptoms associated with this lesion, as it was, during decades, previously described in scientific literature.\textsuperscript{15} From the clinical perspective, the average size of a GCPG lesion is about two centimeters. Lesions of greater size are generally associated to deficient levels of oral hygiene as well as presence of xerostomy. The potential size of untreated GCPG lesions is as yet unknown, since these lesions are removed before reaching their maximum growth level.\textsuperscript{4}

Drs. Robbins & Cotran\textsuperscript{29} defined this type of granuloma as a focus of chronic inflammation consisting of microscopic aggregation of macrophages which transform into epithelial-like cells, surrounded by a rim of mononuclear leucocytes, mainly lymphocytes, as well as occasionally plasmatic cells. It is also mentioned that epithelioid cells fuse to form giant cells in the granuloma periphery or center. Dr. Liu et al.\textsuperscript{30} based on immune-histochemical and enzyme-histochemical tests, described that GCPG multinucleated giant cells possessed cellular characteristics which were compatible with osteoclasts, cells responsible for bone resorption and remodeling of the human skeletal system. In this respect, this osteoclastic cellular pattern could justify the presence of bone resorption observed in edentulous ridges associated with GCPG (erosion of alveolar bone) as was described by some authors.\textsuperscript{15,25} Nevertheless, Dr Arzole\textsuperscript{35} presented the hypothesis that GCPG possessed low bone destruction capacity, since they presented fewer and smaller-sized giant cells when compared to GCCG.

**Table I.** Chronological review of GCPG recurrence after surgical removal as reported in scientific literature.

<table>
<thead>
<tr>
<th>Reference</th>
<th>Year</th>
<th>Recurrence /total</th>
<th>Recurrence (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Giansanti &amp; Waldron\textsuperscript{32}</td>
<td>1969</td>
<td>36/720</td>
<td>5.0</td>
</tr>
<tr>
<td>Katsikeris et al.\textsuperscript{22}</td>
<td>1988</td>
<td>22/224</td>
<td>9.8</td>
</tr>
<tr>
<td>Bhaskar et al.\textsuperscript{33}</td>
<td>1971</td>
<td>6/50</td>
<td>12.0</td>
</tr>
<tr>
<td>Eversole &amp; Rovin\textsuperscript{12}</td>
<td>1972</td>
<td>12/63</td>
<td>19.0</td>
</tr>
<tr>
<td>Andersen et al.\textsuperscript{34}</td>
<td>1973</td>
<td>24/34</td>
<td>70.6</td>
</tr>
<tr>
<td>Mighell et al.\textsuperscript{25}</td>
<td>1994</td>
<td>14/63</td>
<td>22.2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>114/1154</td>
<td>9.9</td>
</tr>
</tbody>
</table>
GCPG treatment, besides surgical extirpation, consists on the suppression of etiological factors. Dr Angie mentioned the fact that no differences were found when comparing extirpation with cold scalpel or CO₂ laser. The use of the latter offers advantages like less trans-operative bleeding, wound sterilization, avoidance of the need for sutures, and lesser post-operative discomfort for the patient. Nevertheless, use of electric scalpel as well as cutting laser is limited in lesions that affect adjacent bone; treatment of these lesions requires meticulous surgical curettage.

Even though different authors (Table I) have reported variable figures with respect to recurrence, evidence on recurrence causes is limited and inconclusive.

Based on consulted scientific literature, anamnesis and conducted treatment, we can offer five probable causes for GCPG lesion recurrence:

1. Premature extraction of lesion-compromised tooth. Three weeks after primary lesion extirpation, tooth 46 was extracted. This coincides with Falaschini’s theory, which clearly associates dental extraction as triggering factor for lesion recurrence.

2. Lack of intra-operative periodontal therapy. In spite of the relative suitable oral hygiene exhibited by the patient, no trans-operative periodontal therapy was conducted (scaling and root planning). This could have triggered a «sequestration» of bacterial plaque remnants which could have remained underneath the lesion during healing process, causing thus a chronic infectious focus which paved the way for a recurrence.

3. Insufficient surgical technique. In the present case, electrical scalpel was used as the method to remove epulis. The working area of this instrument is only limited to the supra-periosteal level, and does not reach the bone. The lesion recurrence was probably due to lack of surgical curettage on bone walls.

4. Hormonal alterations. In the present case it would not represent a valid diagnostic option, since the patient in her medical history, referred total absence of endocrine disorders

5. Idiopathic causes.

REFERENCES


35. Arzola-Rober JF. Comparación citométrica e inmunohistoquímica de los granulomas a células gigantes centrales y periféricos [Tesis Doctoral]. Santiago, Chile: Universidad de Chile; 2005.

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