Peripheral giant cell granuloma (PGCG) associated to dental implants is a very infrequent peri-implant soft-tissue complication, with only 11 cases recorded in the literature to date. The present study describes a 54-year-old woman presenting a swelling of the alveolar margin in the fourth quadrant in relation to a fixed prosthesis cemented over implants. Treatment consisted of complete resection of the lesion with implantoplasty of the exposed implant threads. The diagnosis of PGCG was confirmed by histological study, and no relapse has been recorded after 12 months of follow-up.

**Key Words:** peripheral giant cell granuloma, dental implants, complications

**INTRODUCTION**

Peripheral giant cell granuloma (PGCG) is a reactive exophytic lesion classified as a benign tumor of the oral mucosa. Peripheral giant cell granuloma originates from the periosteum or periodontal ligament. The etiology is unclear, although a locally acting irritative factor or chronic traumatic mechanism might be involved. The lesion may appear at any age, with a maximum incidence between the fifth and sixth decades of life, and it exhibits a slight female predominance.

The clinical appearance is similar to that of pyogenic granuloma, that is, a fleshy, soft, sessile or pediculate mass with a color ranging from dark red to purple, located on the attached gums or on the mucosa of the alveolar margin. Peripheral giant cell granuloma tends to bleed and can erode the underlying alveolar bone. It is most often observed in the posterior regions of the mandible.

The appearance of PGCG associated to dental implants is rare, with only 11 cases reported in the literature to date. Both the appearance and diagnosis of the lesion are the same as in patients without implants.

**CLINICAL CASE**

A 54-year-old woman presented with a swelling of the alveolar margin in the fourth quadrant in relation to a fixed prosthesis cemented over implants.

Five years before, the patient underwent upper fixed rehabilitation with 8 dental implants (Centerpulse, Centerpulse Dental Inc), followed 2 years later by postextraction implant surgery in the lower arch for rehabilitation with a cemented fixed prosthesis over 7 Defcon Avantblast TSA surface implants (Impladent, Sentmenat, Barcelona, Spain).

Intraoral exploration revealed an elastic, exophytic, and nonulcerated lesion measuring about 2 cm in diameter. The lesion was of hard consistency, with a smooth and shiny surface and a reddish-blue color, located between 2 implants in the right lower region at the level of the second premolar and first molar (Figure 1a and b). There was no bleeding in response to probing, although a pouch depth of about 3 mm was recorded around both of the mentioned implants. The implants were osteointegrated, with no mobility or symptoms.
Radiologically, slight bone reabsorption was noted in the zone of the 2 implants, measuring 3 and 1.9 mm mesial and distal, respectively. The measurement was made using the Cliniview version 5.1 program (Instrumentarium Imaging, Tuusula, Finland; Figure 2a and b).

The cemented prosthesis was removed, thus fully exposing the lesion, and healing caps were placed. The lesion was removed, exposing the underlying alveolar bone, which was subjected to careful curettage (Figure 3a). Implantoplasty of the exposed implant threads was carried out using a 30-μm diamond drill fitted to a handpiece operating at 15,000 rpm (Figure 3b).

The healing caps were kept in place on both implants during the healing period, preparing a provisional resin prosthesis retained over the remaining 5 implants and leaving the operated zone exposed. The sutures were removed 7 days later, adequate healing of the zone was confirmed, and the definitive prosthesis was placed (Figure 3c).

The histological study of the lesion revealed abundant multinucleated giant cells together with histiocytic cells, blood capillaries, and hemorrhagic foci (Figure 4a and b). The histological diagnosis was PGCG.

After 12 months of follow-up, no evidence of relapse has been observed (Figure 5a and b).

**DISCUSSION**

Peripheral giant cell granuloma associated to dental implants is a very infrequent peri-implant soft-tissue complication, with only 11 cases recorded in the literature to date (Table). Because of the few cases documented to date, the etiology and incidence of these lesions associated to dental implants are not fully clear.

In the same way as in patients without implants, PGCG appears to be more common in females, a situation attributed by some authors to the action of...
of certain hormones such as estrogens or progesterone, which could be implicated in the development of PGCG.\textsuperscript{15,16}

Regarding location, in both our case and in the cases reported in the literature, PGCG appears to show a predilection for the posterior regions of the maxillas, fundamentally the mandible.

In the same way as in the rest of the patients, the origin of this benign tumor in patients with dental implants is associated with chronic local irritation acting upon attached gingival tissue. In this sense, the local irritating factors involved may include the accumulation of plaque or tartar or the presence of foreign bodies such as possible traces of dental cement.\textsuperscript{8,11}

Some authors have examined the possible impact of PGCG on alveolar bone. Thus, Flaitz\textsuperscript{2} described reabsorption of the bone underlying the lesion as corresponding to areas of cortical flattening in edentulous areas and interdental bone loss in dentate patients. Such loss is apparently also seen in patients with dental implants, and 10 of the 11 published cases of PGCG associated to dental implants described bone loss around the implants. In contrast, Ozden et al\textsuperscript{13} and Cloutier et al\textsuperscript{10} considered that such bone loss could be the cause rather than the result of PGCG. These investigators suggested that bone loss causes exposure of the rough portion of the implant neck, which in turn would exert a chronic irritative effect on the attached gums. Hernández et al\textsuperscript{12} have also speculated whether bone loss is the cause or the consequence of granuloma. These authors moreover believe that the increased prevalence of these lesions in the posterior regions may be due to the greater bone loss occurring in the latter areas due to the greater implant overload caused by the occlusal forces.\textsuperscript{19}

The treatment of PGCG consists of the complete removal of the lesion from its base, with adequate

\textbf{FIGURE 3.} Intraoral view. (a, b) The intraoral image shows the removal of the lesion and polishing the implant threads. (c) Adequate healing of the zone was confirmed 7 days after the lesion was removed.
curettage of the underlying alveolar bone, and leaving safety margins with the aim of avoiding possible relapses. Any irritative factors that might be causing or favoring the appearance of PGCG should also be eliminated, and it may even prove necessary to remove any implants exerting a traumatic effect or preventing adequate access to the lesion and its complete removal. Hernández et al also advocate polishing the implant surface with an abrasive paste. However, in our case, we polished the exposed implant threads with drills and rotary instrumentation.

According to Gándara et al, relapse appears in 10% of all cases, while Eversole and Rovin and Mighell et al report relapse rates of 5%–11%.

Relapse appears to be more frequent when PGCG is associated with dental implants, having been reported in 5 of the 11 cases published to date (45.5%). Hernández et al attributed the relapse found in 2 of their 3 cases to inadequate resection of the lesion.

In 5 of the 11 published cases, some or all of the implants implicated in PGCG were lost, with the main cause being peri-implant bone loss. This loss of peri-implant bone support may precede surgery for removal of the granuloma or may occur during lesion excision and curettage. In 2 of the cases published to date, continuous lesion relapse and the bone loss caused by the repeated

Figures 4 and 5. Figure 4. (a) Low magnification (×2.5) showing ulceration of the mucosa of the fibrohistiocytic stroma and numerous giant cells. (b) Medium magnification (×10) revealed abundant multinucleated giant cells together with histiocytic cells, blood capillaries, and hemorrhagic foci. Figure 5. (a) Clinical photograph taken 1 year after the removal of the lesion. Satisfactory soft-tissue healing took place, and the lesion did not recur. (b) Follow-up radiograph demonstrating a stable bone level.
operations needed to eliminate the lesion led to implant loss.

In our case, there has been no lesion relapse after 12 months of follow-up, thanks to correct removal of the granuloma and implantoplasty of the exposed implant threads, which could have exerted a chronic irritative effect on the gums.

**ABBREVIATION**

PGCG: PERIPHERAL GIANT CELL GRANULOMA

**REFERENCES**


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<th>Study (Year)</th>
<th>Sex (Age, y)</th>
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