Update in dental implant periapical surgery

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ABSTRACT

Implant periapical lesions are infectious-inflammatory alterations surrounding an implant apex, and can be caused by a number of situations – including contamination at instrumentation, overheating of bone, and the prior existence of bone pathology. The diagnosis is based on the clinical manifestations and radiological findings, where a radiotransparency can be seen at periapical level. The lesions are classified according to their evolutive stage as either acute (non-suppurated and suppurated) or chronic (or periapical abscess). The management of implant periapical lesions comprises periapical surgery with curettage and irrigation in the acute phase, or implant extraction when the bone surface is affected and/or primary fixation is lost (chronic phase).

Key words: *Implant periapical lesion, implant periapical pathology, apical periimplantitis.*

RESUMEN

La lesión periapical implantaria es una patología infecciosa-inflamatoria localizada alrededor del ápice del implante. Puede ser provocada por diversas causas, entre ellas: la contaminación en el momento de la instrumentación, el sobrecalentamiento óseo y la presencia de una patología preexistente en el hueso. Su diagnóstico es sintomático y radiográfico, y puede observarse una imagen radiolúcida alrededor del periápice. Clasificamos las lesiones según el momento evolutivo en lesión aguda (no supurada y supurada) y crónica o absceso periapical. El tratamiento de esta patología es la cirugía periapical con legrado e irrigación en la fase aguda; y la extracción del implante cuando se involucre la superficie ósea y/o se pierda la fijación primaria (fase crónica).

Palabras clave: *Lesión periapical implantaria, patología periapical del implante, periimplantitis apical.*

INTRODUCTION

In 1993, Sussman and Moss (1) introduced the concept of implant periapical pathology as corresponding to an infectious-inflammatory process of the tissues surrounding the implant apex.

The increasing popularity of implants has led to a considerable increase in the incidence of implant periapical lesions, though the series published to date are short. A Medline search is made of the literature corresponding to the last 10 years to define the frequency, etiology, diagnosis, prognosis and treatment of this pathology.

PATHOGENESIS

Implant periapical lesions are attributable to a variety of factors. According to the different authors reviewed, they may be produced by the overheating of bone during drilling (2-7), contamination of the implant surface during instrumentation (3,8), pre-existing bone disease (9), the presence of residual root fragments, and implant placement in proximity to an infected maxillary sinus (4).

Ayangco and Sheridan (9) published three cases of implant periapical lesion in patients with a history of endodontic treatment and failed apicoectomy prior to implant placement. According to these authors, despite curettage, socket cleansing and the prolonged waiting time, bacteria remain in the bone – with the consequent development of an implant periapical lesion.

On the other hand, Brisman et al. (10) reported four implant failures attributable to clinically and radiologically asymptomatic adjacent teeth subjected to endodontic treatment. Sussman (5) classified the lesions as follows: implant to tooth (type I) when produced during preparation of the implant bed, and tooth to implant (type II) when produced secondary to an apical lesion affecting the teeth adjacent to the implant.

CLINICAL MANIFESTATIONS AND DIAGNOSIS

Acute dental periapical pathology causes pain – the latter increasing in intensity in response to percussion applied to the affected tooth, as a consequence of the type of innervation of the periodontal ligament. In contrast, acute implant periapical pathology manifests as spontaneous pain that does not increase in response to percussion, since the bone-implant interface is direct in this case. In the chronic phase, the dental periapical abscess may evolve to form a fistula through bone and soft tissue; however, in the case of a dental implant there is no pressure to generate a fistular trajectory – since the purulent material emerges through the still not fully consolidated interface between implant and bone (Figure 1).

Reiser and Nevins and Oh et al. (6,11) classify implant periapical lesions as inactive (not infected) and infected.

Table 1. Differences between tooth and implant in the presence of periapical pathology.

	TOOTH	IMPLANT
ACUTE APICAL PERIODONTITIS OR PERIIMPLANTITIS (non-suppurated and suppurated)	Acute, continuous, spontaneous, moderate to severe and localized pain	Acute, continuous, moderate to severe and localized pain
	↑ with percussion	No ↑ pain with percussion
		Tympanic percussion
	Periapical mucosa may be painful and inflamed	Periapical mucosa may be painful and inflamed
	Rx: No alterations or widening of periodontal ligament in early phases (non-suppurated), or apical radiotransparency in advanced phases (suppurated)	Rx: No alteration in early phases (non-suppurated) or apical radiotransparency in advanced phases (suppurated)
PERIAPICAL ABSCESS	Dull or scarce symptoms, except in exacerbation phases	Dull or scarce symptoms, except in exacerbation phases
		Dull percussion
	Fistulization (↓ symptoms)	Suppuration around implant and gingival reddening
	Possible mobility	Mobility
	Rx: Apical radiotransparency	Rx: Implant periapical radiotransparency with marginal bone destruction

Rx (X-ray); ↑ (increases); ↓ (Decreases)

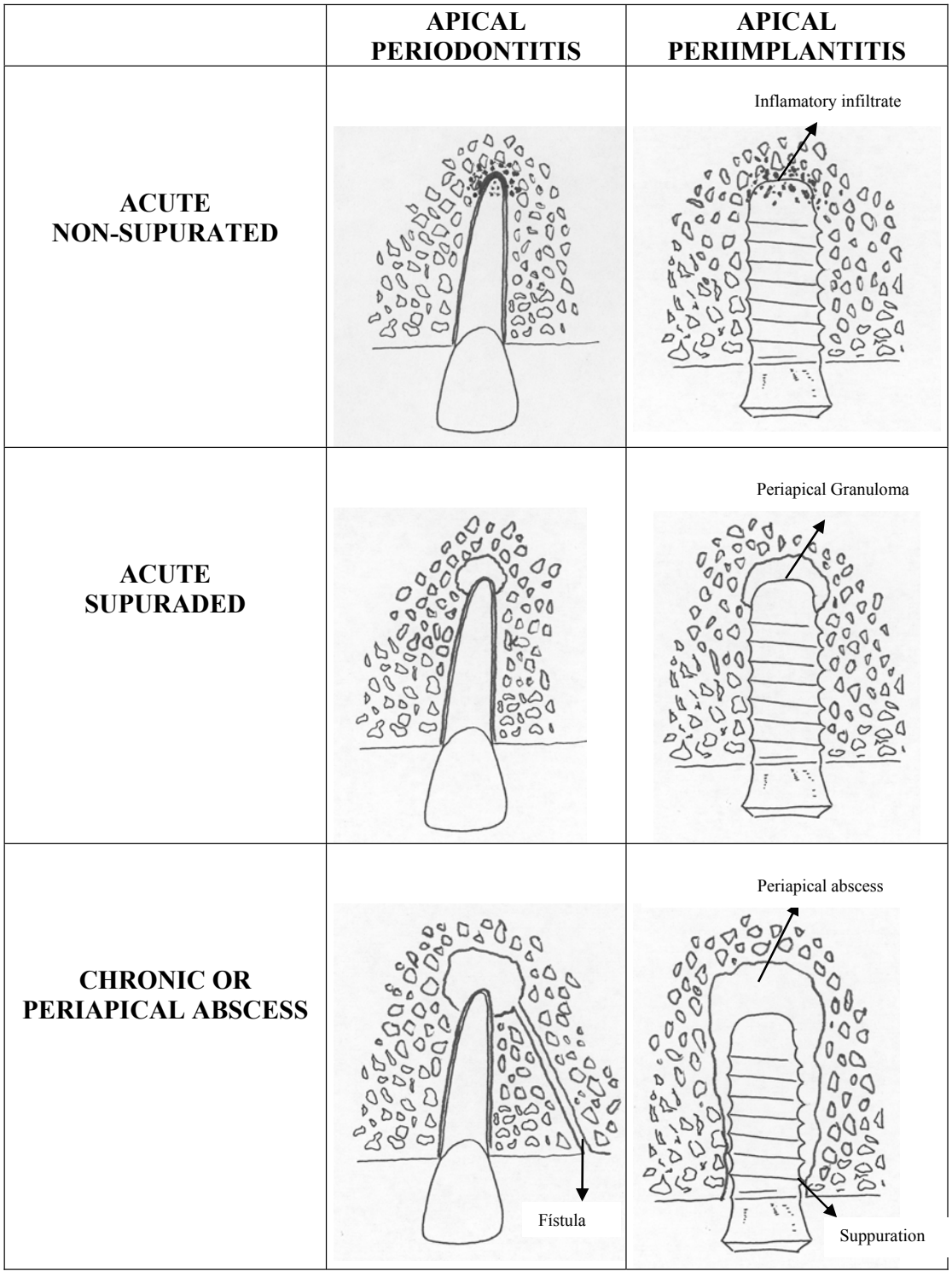

Fig. 1. Schematic representation of periapical pathology.

Inactive lesions result from vertical overinstrumentation of the bed – leaving an apical radiotransparency that can be mistaken for the infected presentation. These are not true lesions and therefore do not require treatment – only due control. According to these authors, infected lesions are lesions located in the apex of the implant.

According to the reviewed literature, the clinical manifestations of implant periapical lesions (Table 1) can be summarized as follows: constant and intense pain (even persistent and refractory to analgesic treatment)(4), inflammation (12), dull percussion (12), no mobility (12), the presence of a fistula (2,3,9,12), and an apical radiotransparency (2-4,9,12,13). Bretz et al. (13) published a case of maxillary sinusitis associated to the apical area. However, none of the these authors classified such lesions according to their evolution – a fact that complicates treatment.

The literature makes no distinction of these lesions according to their evolutive stage. As in the case of dental pathology, we may distinguish an acute phase (suppurated and non-suppurated acute periapical periimplantitis) and a chronic phase (periapical abscess or chronic periapical periimplantitis)(Table 1 and Figure 1).

Based on the criterion of the course of these lesions, their diagnosis is established by the clinical and radiological findings. Clinically, acute periapical lesions (suppurated and non-suppurated) are characterized by acute pain in the affected implant zone, the absence of pain in response to percussion (dull percussion), and gingival inflammation in the area adjacent to the periapex. In chronic lesions or periapical abscesses, the symptomatology is dull or scarce – except in the exacerbation phase – implant mobility is observed, and suppuration and gingival reddening are present. Radiologically, no alterations are noted in the case of non-suppurated lesions, while the suppurated phase is characterized by a periapical radiotransparency. Lastly, periapical abscesses present implant periapical radiotransparency with destruction of marginal bone.

PROGNOSIS

The prognosis is favorable in those cases where immediate treatment is provided (i.e., in the acute phase)(6), since such prompt action avoids the need for implant extraction, the waiting period is shortened, and the costs and patient discomfort are reduced.

TREATMENT

The literature proposes different management approaches for implant periapical pathology, such as implant extraction and periapical surgery with or without resection of the implant apex. According to Reiser and Nevins and Oh et al. (6,11), the infected presentations require surgical intervention, with elimination of the infected tissue via apical resection of the implant or extraction of the latter – depending on the extent of the lesion or the degree of implant mobility. Sussman (5) is of the opinion that the implant should be extracted immediately to prevent osteomyelitis, since retaining the implant may lead to irreversible bone loss. Scarano et al. (4) and Piatelli et al. (2,3) also prefer to extract the implant, resulting in pain cessation.

Other authors (9,12,13) in turn report that curettage of the lesion with irrigation leads to resolution of the process. Bretz et al. (13) successfully treated a case of implant periapical lesion with periapical surgery, curettage and chlorhexidine irrigation – placing demineralized bone and covering the field with a reabsorbable collagen membrane. Ayangco and Sheridan (9) carried out periapical surgery and irrigation of the implant – applying tetracycline to the zone for one minute to ensure local disinfection. As an alternative to treatment, these authors comment the possibility of sectioning the implant apex in those cases in which total removal of the granular tissue is not assured, and when working within the maxillary sinus or nasal cavity.

CONCLUSION

Implant periapical pathology is classified according to the evolutive stage as acute (non-suppurated and suppurated) and chronic or periapical abscess. We propose implant periapical surgery in the case of non-suppurated and suppurated lesions, while implant extraction is reserved for those situations in which the entire bone surface in contact with the implant is affected, or primary implant fixation is lost.

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