Evaluation of dental implant therapy – peri-implantitis

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Peri-implantitis is one of the most common complications affecting patients with dental implants. The condition is characterised by an inflammation in peri-implant soft tissue and loss of supporting bone. Despite several similarities in clinical features with its counterpart at teeth, the disease progression of peri-implantitis is faster than that of periodontitis. Peri-implant mucositis is the precursor to peri-implantitis as is gingivitis to periodontitis.

Clinical and experimental studies demonstrated that peri-implant mucositis and gingivitis lesions are similar in size and cell composition (Lang et al 2011). Both lesions may progress and thereby influence supporting tissues at teeth and implants. Established peri-implantitis lesions exhibit critical histopathological differences when compared to periodontitis lesions (Berglundh et al 2011). Preclinical in vivo studies comparing the two lesions have used experimental techniques to induce periodontitis and peri-implantitis. In one such study, Carcuac et al (2013) demonstrated that disease progression differed at teeth and implants over a six-month period. Bone loss was more pronounced at implants with modified surfaces compared to teeth and implants with non-modified surfaces. Histological analysis also demonstrated that periodontitis lesions were well contained and separated from the alveolar bone by a zone of non-inflamed connective tissue, whereas the lateral and apical portions of the peri-implantitis lesion extended to the bone crest, the surface of which was lined with osteoclasts. The histopathological discrepancies between the two types of lesions may be explained by the structural differences in the supporting tissues at teeth and implants. In a comprehensive study based on human soft tissue biopsies obtained from 40 patients with severe periodontitis and 40 patients suffering from severe peri-implantitis, Carcuac et Berglundh (2014) reported further differences between periodontitis and peri-implantitis lesions. In contrast to periodontitis samples, peri-implantitis lesions were more than twice as large and contained significantly larger area proportions, numbers, and densities of macrophages, plasma cells and neutrophil granulocytes than periodontitis lesions (Figure 2). These findings indicate a more severe disease character for peri-implantitis, which may, in part, explain the higher rate of progression.

Peri-implantitis is diagnosed, as is periodontitis, in the presence of bleeding on probing and loss of supporting tissues. The discussion regarding the diagnosis of peri-implantitis usually focuses on radiographic thresholds of bone loss. In this context, recommendations for clinical research and diagnostic guidelines for everyday clinical
practice have been confused. Studies evaluating the prevalence of peri-implantitis used so-called case definitions. While there is consensus concerning the use of bleeding on probing as a clinical criterion, the use of at least seven different radiographic thresholds of bone loss has been suggested to determine peri-implantitis (Tomasi et Derks 2012).

Following a meta-analysis of data from different studies, Derks and Tomasi (2015) recently reported that about 22% of patients with dental implants suffered from peri-implantitis. Similar results have been presented in other literature reviews (Mombelli et al 2012). In a recently published nation-wide project, data from 596 patients were used to study the prevalence of peri-implantitis (Derks et al 2015). While about 45% of the patients presented with signs of peri-implantitis, 14.5% had moderate/severe forms of the disease (bleeding on probing and >2mm bone loss) at 22% of patients with dental implants. Similar results from clinical reports (Mir-Mari et alleggaard 2004, Marrone et al 2015). Data presented in a Spanish study suggested differences not only in the occurrence of peri-implantitis at different implants, but also differences regarding the time of onset (Mir-Mari et al 2012). In order to identify risk factors related to patients, clinicians, and/or implants, large and randomly selected patient cohorts are required. The nationwide project aforementioned includes such an evaluation of effectiveness (Derks et al 2015). Results of the different regression analyses revealed that several of the clinician-, patient-, and therapy-related factors were associated with moderate/severe peri-implantitis. Patients presenting with periodontitis were more likely to suffer from moderate/severe peri-implantitis. Factors related to clinicians were associated with moderate/severe peri-implantitis: patients provided with prosthetic therapy performed by general practitioners presented with a higher odds ratio (4.5). In addition, certain implant brands were associated with a higher risk for peri-implantitis: Straumann implants show the lowest rates of moderate/severe peri-implantitis when compared to Nobel Biocare, Astra Tech and the other implants represented in this observational study (including Bionet 5i, crestalTi, Xive, Friialit, Lifecore, Implamed and API). Finally, a higher odds ratio (2.5) for moderate/severe peri-implantitis was observed for implants with a reduced distance (≤4.5 mm) from the prosthesis margin to the crestal bone as measured in baseline radiographs.

References

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