

RELATIONSHIP BETWEEN INFLAMMATORY PERI-IMPLANT DISEASE AND THE ACTIVITY OF PERIODONTAL DISEASE

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SUMMARY

Clinical application of knowledge about risk factors and indicators associated with the loss of implants or peri-implantitis requires additional studies to demonstrate the risk of peri-implant diseases. Identification of risk factors for peri-implant mucositis and peri-implantitis will provide the clinician tools for determining the prognosis of the individual and the implant and better selection of patients for placement of implants. Progress in understanding the risk of peri-implantitis at the individual level with a careful assessment of the risk level of an implant would be useful in the planning of implant treatment.

The similarity in the etiology and pathogenesis of periodontal diseases and peri-implant infections requires an assessment of periodontal status and assessing the risk of progression of periodontitis in patients with a history of periodontal disease and implants. In the literature are few and conflicting data on the relationship of periodontal status of the patient and peri-implant diseases. It is likely that the presence of periodontal pockets, showing clinical signs of an infection and activity to be associated with inflammatory peri-implant diseases.

The study is focused on the discovery of a relationship between peri-implant mucositis and periimplantitis and activity (bleeding on probing - BoP) of patient's periodontal disease. Statistically significant relationship was established between occurrence of active periodontal sites and inflammatory peri-implant diseases.

Key words: peri-implant disease, periodontal disease activity, bleeding on probing

Experimental studies have demonstrated that the microflora present in the oral cavity at the time of dental implant placement affects bacterial biofilm on the implant surface. Infected periodontal pockets showing signs of activity are presumed to play the role of a reservoir of periodontal pathogens which colonize the implant surface and thus initiate peri-implant infection [12]. There is research suggesting that a direct relationship exists between the risk of peri-implant mucositis or peri-implantitis and history of chronic and

aggressive periodontitis [7, 8, 9, 10]. It is presumed that severe chronic periodontitis with active periodontal pockets is a serious risk factor of implant failure 50 months after implant placement.

The concept of the relationship between periodontal status and implants is supported by evidence of identical flora around natural teeth and implants [6, 8] and identification of an hyperinflammatory phenotype of individuals diagnosed with periodontitis and peri-implantitis lesions [2, 11]. On the other hand contemporary prospective studies have focused on the progression of peri-implantitis and risk associated with bleeding on probing around implants. (1, 3). The results indicate that the absence of bleeding upon probing, similar to periodontal sites, has 97% negative predictive value for the loss of attachment. Data from the literature, however, reported a much lower positive predictive value of bleeding on probing at peri-implantitis as well at periodontitis. [4, 5].

PURPOSE OF THE STUDY:

To investigate a correlation between inflammatory peri-implant disease and periodontal disease activity (bleeding on probing (BoP)).

MATERIALS AND METHODS:

The study was conducted on a cohort of 136 patients aged 20 to 73 years having undergone implant treatment, with a total number of 456 implants functionally loaded since one to ten years. Bleeding on probing was recorded in all periodontal and peri-implant sites. For evaluation purposes, the parameters of periodontitis and peri-implantitis were measured using an automated computer-assisted periodontal probe Pa-on (Orangedental GmbH & Co. Germany). The accuracy of probing and detecting bleeding from the pockets using an automated periodontal probe with standardized pressure allows early and accurate evaluation of periodontal and peri-implant tissue.

Results: Of all patients studied, peri-implantitis was found in 22, the number of affected implants being 73. Peri-mucositis was diagnosed in 31 patients, with 56 affected implants. Data analysis showed that 15 peri-mucositis patients had plaque-associated gingivitis or gingivitis with reduced

periodontal tissue. Eight peri-mucositis patients were diagnosed with periodontitis. Other 8 peri-mucositis patients were periodontally healthy or healthy with reduced periodontal tissue. Peri-implantitis with concomitant gingivitis or gingivitis with reduced periodontal tissue was found in four patients. Peri-implantitis in the presence of periodontitis was

diagnosed in 11 patients. Three patients had peri-implantitis at the background of healthy periodontal tissue or healthy but reduced periodontal tissue. The results of the study have confirmed that in the presence of peri-implant disease, periodontal plaque-associated disease is also present in a high percentage of all cases.

Table 1. Comparative analysis of quantitative traits in peri-implant mucositis group and the control group at the level of patient

Indicator	Control group (n=98)		Peri-implant mucositis (n=21)		p
	Mean value (%)	SD	Mean value (%)	SD	
BoP around natural teeth	14,93	13,10	33,05	22,54	<0,001
Hygiene index	65,17	18,74	50,32	18,21	<0,001

Table 1 presents the average values for the plaque and bleeding on probing registrations in patients with implants. Of the investigated 136 individuals 98 patients show healthy peri-implant tissues and form the control group. The test group consisted of 21 patients who were diagnosed to have peri-implant mucositis according criteria adopted. In the control group were recorded 65.17% free of plaque surfaces, and in the group with peri-implant mucositis - 50.32%, with a high level of statistical significance ($p < 0,001$). The results show that in the group with peri-implant mucosa inflammation is found statistically significantly worse oral hygiene. The data are consistent with the results published in the literature to

demonstrate the relationship of the oral hygiene and gingival and mucosal inflammation.

The examination of patients for bleeding on probing (BoP) indicates 14.93% bleeding sites in the control group and 33.05% sites with bleeding on probing around natural teeth in peri-implant mucositis group. There is a high degree of statistical significance ($p < 0,001$) between the data for the control and test group. Statistically significant higher values of sites with bleeding on probing in the group with peri-implant inflammation suggest a relationship between infected/bleeding sites around natural teeth and the presence of bleeding on probing around implants (peri-implant mucositis).

Table 2. Comparative analysis of quantitative traits in peri-implantitis group and the control group at the level of patient

Indicator	Control group (n=98)		Peri-implantitis (n=17)		p
	Mean value (%)	SD	Mean value (%)	SD	
BoP around natural teeth	14,93	13,10	37,59	20,91	<0,001
Hygiene index	65,17	18,74	49,59	24,65	0,009

Table 2 shows a comparison between the levels recorded for hygiene index and the percentage of bleeding periodontal sites in the control group (98 patients) and periimplantitis group (17 patients). The data show statistically significantly worse oral hygiene (49,59% HI) in the group with periimplantitis compared to healthy implants group (65,17% HI) ($p = 0,009$). Accordingly, in the group with periimplantitis are registered statistically significantly more bleeding sites (37,59%) compared to the healthy implants group (14,93%) ($p < 0,001$). The data can be interpreted as the correlation between the percentage of periodontal bleeding sites and the presence of periimplantitis in the patients studied.

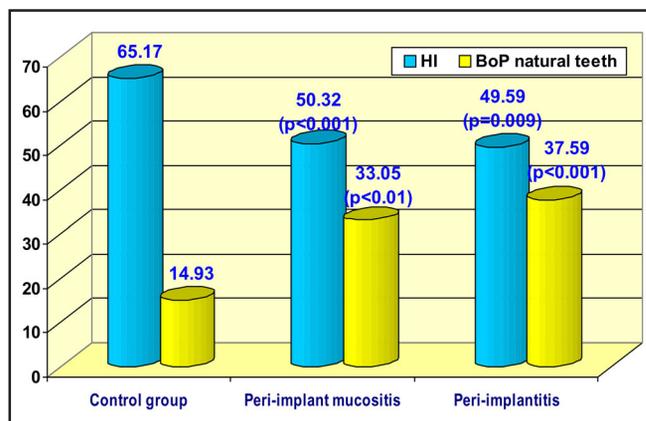


Diagram 1. Comparative analysis of HI and BoP in patients with healthy implantsq peri-implants mucositis and peri-implantitis.

Diagram 1 shows the data on oral hygiene and bleeding on probing sites in the control group, the group with peri-implant mucositis and periimplantitis. It is evident the lower hygiene index average values in patients with peri-implant disease that supports the basic concept of the pathogenesis of periimplant infections. Accordingly, in groups and peri-implantitis and peri-implant mucositis are recorded higher mean values for sites with bleeding on probing. It can be assumed that the sites with implants are at risk of infection

and inflammation with a high rate of bleeding (active?) periodontal sites.

CONCLUSION:

Within the limitation of this study, it can be concluded that in the presence of poor oral hygiene and active periodontal infection identified by bleeding on probing, there is a significant risk of peri-implant disease.

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