The 1st Baltic Osseointegration Academy and Lithuanian University of Health Sciences Consensus Conference 2016. Summary and Consensus Statements: Group II - Peri-Implantitis Diagnostics and Decision Tree

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ABSTRACT

Introduction: The task of Group 2 was to review and update the existing data concerning clinical and genetic methods of diagnostics of peri-implantitis. Special interest was paid to the peri-implant crevicular fluid (PICF) overview including analysis of enzymes and biomarkers and microbial profiles from implants.
Material and Methods: The main areas of interest were as follows: effect of smoking and history of periodontitis, prosthetic treatment mistakes, excess cement, overloading, general diseases influence on peri-implantitis development. The systematic review and/or meta-analysis were registered in PROSPERO, an international prospective register of systematic reviews: http://www.crd.york.ac.uk/PROSPERO/. The literature in the corresponding areas of interest was searched and reported using the PRISMA (Preferred Reporting Item for Systematic Review and Meta-Analysis) Statement: http://www.prisma-statement.org/. The method of preparation of systematic reviews of the literature based on comprehensive search strategies was discussed and standardized. The summary of the materials and methods employed by the authors in preparing the systematic review and/or meta-analysis is presented in Preface chapter.
Results: The results and conclusions of the review process are presented in the respective papers. The group′s general commentaries, consensus statements, clinical recommendations and implications for research are presented in this article.

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RESULTS

The following reviews were prepared for publication as a result of work of Group 2:

1. Diagnostic Principles of Peri-Implantitis: a Systematic Review and Guidelines for Peri-Implantitis Diagnosis Proposal (Ramanauskaite and Juodzbalys [1])

General commentaries

Peri-implantitis has been defined as soft tissue inflammation around a functioning dental implant with concomitant loss of supporting marginal bone. Early diagnosis of the diseases is crucial for successful arrestment of the pathology. Clinical parameters, including, mobility, pain, bleeding on probing, pocket probing depth, suppuration, and radiographical evaluation of surrounding bone are the parameters suggested to be used to diagnose the disease. However, in the literature there are different thresholds suggested for these above mentioned parameters. Moreover, it was demonstrated that bone loss is prone to be higher than observed in the radiographs, and the disease might be left undiagnosed or underdiagnosed. Therefore, uniform diagnostic parameters, more sensitive diagnostic methods are in need.

Consensus statement

Diagnosis of peri-implantitis should be based on clinical and radiographical data. Patients having dental implants should be under regular follow-up, so that the disease could be diagnosed at its early stage. Regular follow-up and evaluation of bone resorption dynamics may enable to predict severity of peri-implantitis and provide implant functioning prognosis.

Clinical recommendations

Up to date, there is no single uniform definition of peri-implantitis or the parameters that should be used. However, our clinical recommendation on how to diagnose peri-implantitis are:

- Evaluate implant mobility; if it is mobile, implant has to be removed.
- Evaluate soft tissue conditions; if there is bleeding on probing and/or suppuration and probing pocket depth ≥ 4 mm around soft tissue level implants, ≥ 5 mm around bone level implants, then a radiograph should be taken.
- We suggest that periapical radiographs are enough to diagnose peri-implantitis. Bone loss around the dental implant and time of implant in function should be taken into consideration.
- Rate of bone loss can help clinician to discover how much bone loss could be expected yearly.
- Evaluate iatrogenic factors that might have caused the disease, including cement remnants, malpositioning of the implant, inadequate restoration-abutment seating, and overcontouring of the reconstruction that disturbs proper plaque control should be evaluated.

Implications for research

Prospective longitudinal studies with regular follow-up periods and with appropriate size implant-treated subjects, with clinical and radiological examinations should be performed. In the presence of peri-implantitis, the severity of the disease, i.e. the amount of bone loss, should be registered.
Factors, that might influence peri-implant mucositis progression into peri-implantitis, as well as factors that could possibly contribute to the severity and rate of progression of peri-impalntitis should be searched. Bone loss patterns, mechanisms and factors influencing it has to be elucidated. New sensitive diagnostic parameters are needed.

2. Peri-Implant Crevicular Fluid Analysis, Enzymes and Biomarkers: a Systematic Review (Dursun and Tözüm [2])

General commentaries

Close and periodical monitoring of peri-implant tissues and early recognition of any peri-implant pathology, including peri-implant soft tissue inflammation, is vital for long-term implant success. In addition to the evaluation of clinical and radiographic measures, recent research has also focused on the features of the molecular mechanisms of the inflammatory process of peri-implant tissues. This phenomena cause increased interest in analyses of biomarkers and enzymes in peri-implant crevicular fluid (PICF), an osmotically mediated transudate/inflammatory exudate around dental implants. According to the present systematic review, studies provide considerable evidence for a better understanding of the inflammatory process around dental implants.

Consensus statement

Based on this systematic review, it was concluded that inflammatory mediators, such as interleukin-1 beta (IL-1β) and tumour necrosis factor-alpha (TNF-α), in crevicular fluid collected from peri-implant pockets are the most used biomarkers to assist in the early diagnosis of peri-implantitis. Biomarkers and enzymes in PICF have been showed to have potential to distinguish between peri-implant inflammation and healthy condition. Although moderate evidence indicated in the literature, PICF ingredients such as biomarkers and enzymes may be used as additional parameters to clinical measures for interpreting and diagnosing peri-implant inflammatory conditions.

Clinical recommendations

Evidence regarding biomarkers and enzymes in PICF as possible predictors for peri-implantitis are very limited. From a clinical point of view, while PISF related measures are not a routine part of periodical assessments, this biologic fluid is considered to have a certain amount of diagnostic validity. Analysis of different PISF ingredients essentially aims to better clarify the underlying molecular mechanisms inflammatory process around dental implant sites. PICF ingredients such as biomarkers and enzymes have shown promising results however; due to inconsistent findings between different studies additional evidence is needed to develop a clinically useful chair-side kit for diagnosing and/predicting peri-implant diseases.

Implications for research

Prospective longitudinal studies with periodical PICF collection and with appropriate number of implants with peri-implantitis and healthy conditions are needed. Due to a cyclic progression of peri-implant diseases, the immune-inflammatory event biomarkers responsible for tissue breakdown may not always be active in cross-sectional studies with a single moment of fluid collection. It is suggested that first of all studies should be conducted to establish a standardized method to diagnose and classify the peri-implant diseases. Standardized investigations should be performed based on the measures of subject selection, peri-implantitis diagnosis, as well as PICF sampling method (e.g. number and severity of sampling sites, sampling time), sample handling and detection sensitivity/specificity of the used assay.

3. Microbial Profiles and Detection Techniques in Peri-Implant Diseases: a Systematic Review (Padial-Molina et al. [3])

General Commentaries

The presence of periodontopathic bacteria in the peri-implant sulcus has been proposed as a risk indicator for both peri-implant mucositis and peri-implantitis. This specific environment favours its colonization by anaerobic Gram-negative bacteria. The ecological succession of the microbes in the sulcus may lead to the development of peri-implant disease. The disease has been described as poly-microbial anaerobic infection similar to that found in chronic periodontitis. However, since peri-implant sites are different microbial ecosystems compared to periodontal sites an increasing number of studies is reporting differences in the microbial composition of peri-implant vs. periodontal sites. Although more data are now available, findings are not consistent across all studies, possibly due to the bias introduced by the microbial detection technique. New methods not species-oriented are being used to find 'unexpected' microbiota not previously described in these scenarios.

Consensus statement

Peri-implant sites are different microbial ecosystems compared to periodontal sites. Therefore, microbial composition is also different in peri-implant vs. periodontal sites.

Clinical recommendations

There is no consensus on specific microbiota on each peri-implant disease and condition. Therefore, no specific clinical recommendation can be made as to how to deal with the different scenarios. It has only been agreed that 1) peri-implantitis is the evolution of peri-implant mucositis and 2) peri-implant mucositis can be reversed by proper plaque control. However, these observations have not been properly correlated to host responses.

Implications for research

Studies using classical techniques are not consistent in their findings, possibly due to the bias introduced in the selection of specific culture media and probes. To avoid these limitations, new methods (i.e., metagenomics) have been developed that allow to find 'unexpected' microbiota as they are not species-

oriented. These new technologies, although more expensive, should be always selected in future research. Also, stratification by host characteristics as well as specific defect conditions should be included in future studies.

DISCLOSURE STATEMENTS

All group members were asked to sign a Panel Member Agreement (PMA). This agreement requires individuals to maintain the highest level of integrity and avoid all actual, perceived, and potential conflicts of interest. The authors reported no conflicts of interest related to this study.

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