Reviewer's report

Title: Definition, etiology, prevention and treatment of peri-implantitis - a review

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Reviewer: Andreas Kolk

Reviewer's report:

The submitted review describes an update on the aspects of aetiopathogenesis, prevention and concepts of therapy of peri-implant infections. This is a comprehensive overview of an important topic in dentistry considering all relevant features from definition aspects, etiology, risk factors as well as antinfectious non-surgical and surgical therapy. Aspects such as the protective issue of keratinized tissue, iatrogenic impacts, the length and surface of implants, factors of host response and pathogenic microbiota are discussed with the appropriate criticism. Treatment aspects of non-surgical therapy were divided into manual treatment, drug therapy, laser assisted treatment and photo-dynamic therapy. For surgical therapy, the differential indications of resective and regenerative therapy as well as their advantages and limitations have been emphasized.

The extent of the manuscript (word count) could have been reduced. However, due to the complexity of this topic this issue seems acceptable. In generally, this manuscript falls into the scope of Head And Face and it can be recommend for publication. However, there are a number of minor issues addressed below point for point that should be revised before the manuscript can be finally accepted.

Page 1 (Abstract):
“… forms of peri-implantitis can obviously be treated effectively…”

Page 3 (Definition and pathogenesis):
“However, it is not possible to conclude progression and prognosis criteria from these classifications.”

Page 4 (Risk factors and prevention):
“fold as reported by Wallowy et al [6].”

“In a recent meta-analysis smoking increased the annual rate of bone loss by 0.16 mm/year and represented the main systemic risk factor [34]. The extent of osseointegration as well as the oral hygiene around dental implants was found to be reduced among smokers [35].”

“In particular, attention should be paid…”

“The impact of keratinized gingiva around dental implants has been controversially discussed…”
Peri-implant probing is recommended to be carried out carefully with a minimal probing force. However, the so-called platform switch (abutment is located horizontally between implant and crown) can complicate probing and, thus..

Implant loss can be differentiated on the basis of the following...

… implantation site in which peri-implant inflammation will be detectable as brightening zones indicating increased bone resorption [6].

The treatment of peri-implant infections comprises conservative (non-surgical) and surgical...

Page 6:

4.2. Therapy of Peri-implantitis

Figure 2: Conservative Therapy – Example of the use of a carbone curette

Page 7:

Figure 3: Conservative Therapy – Detoxification using an air polishing device with glycinc powder

The extent of re-osseointegration of titanium implants after air polishing …

Application of chlorhexidine resulted in the reduction of pocket depths, a higher implant adhesion and general weakening of inflammation measured by the level of the inflammatory markers...

Page 8:

Please only use the abbreviation “CIST” instead of “CIST/AKUT” on this page and on the following pages

The indication for the appropriate treatment strategy has been demonstrated in patient studies leading to the development of the “cumulative interceptive supportive therapy (CIST)” concept [93, 94, 95].

Page 9:

A further commonly accepted concept by Zitzmann et al. is referred to systematic periodontitis therapy. During the initial phase oral hygienic conditions have to be improved

The basic principles include the elimination the periimplant osseous defect using ostectomy and osteoplasty as well as bacterial decontamination (Figure 4 and 5).

Two years after open reduction of inflamated peri-implant soft tissue and osseous surgery 48% of the patients...

Adjuvant implant surface decontamination with antimicrobial substances…
“Resective surgical therapy for peri-implantitis is a recommendable…”

Page 10:

“In general, GBR alone and bone fill alone have been shown to be more effective than debridement alone regarding to bone regeneration and re-osseointegration. The results of studies using a combination of membranes and bone graft materials were superior to those using membranes or bone grafts alone and tend to give the best results, However, there is …”

“…protocols and measurements [99-101] and not in all studies there was a benefit for these…”

“… but 6 months after surgery both treatments resulted in clinically relevant reductions in probing depths and gains of clinical attachment level [110]. Roos-Jansäker et al. came to similar results using a coralline xenograft [19]. In another study bovine-derived xenogenic material was compared with autogenous bone as filling material for infracrestal defects. The xenograft provided radiologically…”

"In a recent prospective case series a combined resective and regenerative approach including a bovine bone mineral and a collagen membrane infracrestally and implantoplasty supracrestally showed a significant peri-implant probing depth reduction and an increased radiographic defect fill after 12 months of follow-up [113]. In another study of Schwarz et al. defect cleaning with either Er:YAG laser or plastic curettes / cotton pellets with saline was combined with regenerative surgical procedures (xenogenic bone substitute and collagen membrane). Thereby, the clinical outcome did not differ according to the chosen method of surface debridement. [114].”

Page 11:

“There is a tendency that xenograft materials in combination with resorbable membranes might have advantages in terms of re-osseointegration. Nevertheless, because of the lack…”

Page 12:

“Therefore, prevention is the most important instrument based on appropriate treatment planning, an atraumatic approach for implant insertion and continuous check-up intervals with professional teeth and implant cleaning. Above all, attention should be paid to risk factors such as smoking and active or previous periodontitis. In non-surgical therapy, combinations of mechanical cleaning with curettes and air polishing systems are recommendable.”

“Surgical therapy with resective and augmentative procedures completes the treatment options. Resective surgery can be used in order to eliminate peri-implant defects, to re-establish hygienic abilities and to reduce or even stop peri-implantitis progression. Regenerative approaches, e.g. with xenograft materials in combination with a resorbable membranes, are promising. The
results of bone replacement materials and autologous bone grafts might be considered as nearly equivalent although long-term studies are still missing and only few studies with autologous bone material exist.”

“A graded systematic treatment planning according to the CIST protocol can be recommended.”

**Level of interest:** An article of importance in its field

**Quality of written English:** Needs some language corrections before being published

**Statistical review:** No, the manuscript does not need to be seen by a statistician.

**Declaration of competing interests:**

None of the above