CLINICAL CORRELATIONS BETWEEN THE CLASS V RESTORATIONS AND PROXIMAL PERIODONTAL ILLNESS- REVIEW

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Abstract

There is a strong correlation between the presence of class V defects restored or not and the inflammatory gingival reaction nearby. It has been studied extensively, considering that it may occur a vicious circle where the presence of a faulty obturation, a cavity, a recession, a certain material in obturation may irritate the gingiva and this inflammation may concur to cavity occurrence, certain plaque retention, low pH levels.

Keywords: gingivitis, class V defects, dental restorations

Periodontal tissues play an important role in proper esthetics, and comfort for the dentition. Healthy periodontium is required for all prosthetic and restorative therapies as a prerequisite for successful outcome. The interplay between periodontics and restorative dentistry is present at many fronts, including location of restorative margins, crown contours, and response of the gingival tissues to restorative preparations [1,2].

Many of the odontal restoration interfere with the health of the periodontium nearby, especially when they are located subgingival, affecting the sulcus, affecting the clinical attachment of the junctional epithelium, with its apical migration. The lost of periodontal ligament can’t be substituted by any material [3].

There are studies that focus on the position of the restoration related to the gingiva, and the presence of leakage, inflammation, overhangs, roughness of the surfaces [4].

The marginal periodontium is a location the fields of restorative dentistry and periodontics overlap. Conversely, a close attention should be paid to the response of the periodontium to the irritants arising from careless techniques, which can initiate or add to existing gingival inflammation. In turn, loss of periodontal support and subsequent tooth loss can result in the condition is not recognized and treated in its early stages [1].

Considering the type of material used some authors report increased gingival inflammation with 3-4-year-old composite resin restoration. Their observations were based on the principle that the surface deterioration with a subsequent increase in plaque accumulation occurs after in vivo wear in composite resin restorations. This observation can explain the relationship between subgingival composite resin restorations and gingival health [5]. Some antibacterial activity was found when amalgam was used, considering the presence
of copper, zinc, mercury, but also in case of ionomer cement as fluoride ions seep continuously from it and alter the adhesion of bacteria on the filling surface [6].

The presence of restorative materials on tooth surfaces is perceived to be contributing factor to periodontal disease. This observation is a result of the increased accumulation of plaque on restoration adjacent to the gingiva, which may lead to gingivitis. Plaque is believed to adhere better to restoration than to enamel [7, 8].

Plaque-induced gingivitis is gingival inflammation caused by bacterial plaque at the gingival margin. Prevalent in all ages of the dentate population, it is the most common form of periodontal disease. There are many studies regarding the relation between the class V restoration and the gingival irritation that may occur. Some studies considered the type of material and some have considered the polishing of the material. Also, it was taken in consideration the disruption degree, the relation between the gingiva margins and the extension of the filling. Other criteria were the type of lesion, if it was a carious lesion (sometimes extended on the root surfaces) or if it was a non-carious lesion [9,10].

There are discussions considering the possibility of the material used for filling, considering a higher porosity prone to assure an optimal environment for the bacteria to grow. It is important to acknowledge that the plaque forms on any surface, on natural enamel or artificial surface (fillings, crowns), only the adhesion in time may be influenced by the surface roughness and the surface free energy. Within seconds of polishing the teeth, a thin layer called the pellicle covers the tooth [11,12].

This layer is composed of salivary components such as glycoproteins, phosphoproteins, enzymes, and other bacterial byproducts that coat the tooth surface. Then, the pellicle attracts bacteria through physiochemical interactions (such as van der Waals forces, electrostatic repulsive forces, and covalent, ionic, or hydrogen bonding).

Through coaggregation and coadhesion, the motile bacteria attract other bacteria onto the tooth surface. Colonization of more bacteria ensues and forms a complex plaque biofilm [13].

Some studies compared amalgam, gold alloy, resin composite, and three ceramic materials. The investigation concluded that bacteria adhered most to amalgam then to resin composite, then to casting gold restoration, and least to the ceramics. However, when amalgam and composite were polished, bacterial adhesion dramatically decreased in all materials, except porcelain. Regardless of the polishing method, no differences of bacterial adhesion were found in comparing the three-ceramic material [14,15]. Other in vitro study similarity showed that Streptococcus mutans adhered more to glass ionomer, amalgam, composite, and resin-modified glass ionomer compared to ceramics [16]. As plaque matures, the amount of bacterial plaque adhesion depends on the smoothness of the restoration as seen by different restorative materials and as observed in clinical investigations. The formation and maturation of plaque on the surface of enamel or restorative materials will affect the adjacent soft tissue and elicit an inflammatory host response. This occurs if plaque is not removed. In summary, clinical studies investigating the effect of different
restorative materials on the gingiva do not show a detrimental consequence as long as patients demonstrate adequate to good oral hygiene. In certain cases, patients with cervical lesions that harbor plaque may benefit from having a restoration placed because these areas become more cleansable. It has long been postulated that rough surfaces and high energy surfaces tend to accumulate more plaque. This has been shown in mathematical models and in vitro and in vivo studies in which surfaces of different materials are demonstrated to be rougher than others. Clinical studies have shown that people with good or adequate oral hygiene will not develop a markedly diseased gingiva despite the surface roughness or composition of the restorative material and consequent plaque formation. Therefore, the choice of a material is not as important as providing oral hygiene instructions to the patient [7].

The combined surgical and restorative approach, which has many advantages in terms of dentin hypersensitivity reduction and aesthetics, produced significant gains in clinical attachment level and gingival recession reduction. There is a need however for having for clinical trials discovering the most predictable dental materials and surgical approaches for treatment of this conditions. Recent clinical trials and case reports show that connective tissue graft combined with cervical restorations yield successful and predictable results in the treatment of gingival recessions associated with NCCLs. The clinical outcome of these studies revealed that surgical procedures alone could not suffice to reduce dentin hypersensitivity and to provide better aesthetic results [17].

The restoration of cervical defects associated with severe recessions could lead to dissatisfying results if tooth colored materials are used because of the appearance of a disproportional elongation of the visible crown. Gingiva shaded composites can be alternative for a minimally invasive and adhesive restorative treatment, especially if they used in combined with tooth colored materials [18,19]. Deep cervical lesions have to be treated with composite restorations because their proximity to pulpal tissues could trigger pulpal inflammation. To protect the tooth from further loss of hard tissues and hypersensitivity, cervical lesions with a depth of 0.5 mm and more should be treated restoratively in order to protect the marginal periodontal tissues, reduce hypersensitivity and improve aesthetics [20]. In some cases a lesion can occur when the tooth already has a prosthetic crown. In such cases the question arises regarding a conservative treatment concept without the removal of the crown. If a cervical lesion at a crown margin is combined with a periodontal recession, the use of gingiva shaded materials may improve the aesthetics while preserving the restoration, which is also a financial advantage for the patient combined with a reduced treatment time [18].

Gingiva shaded composites are a valuable option for class V defects, representing an alternative to surgical treatment especially for seniors and anxious patients. Treatment concepts that are minimally invasive become more and more important. The age pattern of our society is changing, leading to an increased proportion of patients with periodontal diseases. 91% of the patients who are older than 41 years suffer at least from one buccal recession
Due to exposure of the root surface to oral fluids, bacterial colonization and mechanical irritation, the probability of the formation of carious lesions or non-carious defects is elevated.

Compared to enamel, the cementum, once exposed, shows a rougher surface and therefore a higher risk of plaque accumulation and the formation of root caries [22]. It is anyways recommended to roughen sclerotic dentine surfaces prior to the adhesive procedure [12]. For self-etching systems, the micro tensile bond strength to sclerotic dentine was lower than to sound dentine, independent of a previous acid etching [23]. Sometimes roughening the exposed dentin is required, sometimes just cleaning the surface with pumice is sufficient. Wedge shaped defects that were exposed to the oral cavity over a longer period of time show a hyper mineralized surface. The removal of this layer is discussed controversially in today’s literature. Due to our societies’ changing age pattern, treatment concepts that are minimally invasive become more important.

This process leads to a growing proportion of senior patients who were able to preserve an increased number of teeth due to dental prevention. As a consequence, the growing number of exposed root surfaces with caries, erosions and wedge-shaped defects requires alternative treatment concepts[18].

Periodontal health is essential for correct functioning of all restorations while the functional stimulation due to dental restorations is necessary for periodontal protection. Coronal obturations with incorrect occlusal modeling, oversized proximally or on the vestibular/oral surfaces of teeth, along with fillings, deficient interproximal contact, negatively impact the healthy periodontium and, moreover, establish an added source of irritation for the periodontium already affected by disease. The periodontium must remain healthy for restorations to last long term, to preserve the teeth [1].

This topic may be further investigated as for sure there many aspects still unknown to the subject, and this review covers only a small part of what has been studies already.

References