The Journal of Dental Panacea 2024;6(3):115–121

Content available at: https://www.ipinnovative.com/open-access-journals

The Journal of Dental Panacea

Journal homepage: https://www.jdentalpanacea.org/

Review Article

Iatrogenic factors in periodontal diseases

Harish Saluja[1]*, Shivani Sachdeva[1]

[1]*Dept. of Oral and Maxillofacial Surgery, Rural Dental College, Pravara Institute of Medical Sciences, Loni, Maharahtra, India*

ARTICLE INFO

Article history:
Received 15-06-2024
Accepted 19-07-2024
Available online 29-08-2024

Keywords:
Iatrogenic factors
Periodontal disease
Inflammation

ABSTRACT

Gingival inflammation is mostly caused by bacterial plaque, in addition to other risk factors. Among these risk factors are radiation therapy, calculus, malocclusion, subpar restorations, issues from orthodontic therapy, self-inflicted injuries, and use of tobacco. Prosthetics and inadequate dental restorations are the main causes of periodontal disease and gingival inflammation. Iatrogenic variables are poor dental procedures that exacerbate periodontal tissue degradation. The connection between periodontal health and dental restorations has been well studied for a number of years. Studies have focused on a variety of aspects of the connection between periodontal disease and restorative therapy. These comprise the position of the restoration with respect to the gingival margin, the presence of overhangs, the existence of marginal leaks, the surface roughness, and the kind of restorative material utilized. This review article addresses iatrogenic causes and their effects on the periodontium.

1. Introduction

The state of the surrounding soft and hard tissues affects how well the natural dentition functions. An extensive diagnosis, a well-thought-out treatment plan, and appropriate treatment methods can assist the dentist preserve the health of the sick oral tissues. On the other hand, if the dentist's careless or careless dental work results in ongoing tissue damage, they may be held legally responsible. The state of the surrounding hard and soft tissues determines how well the natural dentition functions. Therapeutic dental procedures have the potential to worsen pre-existing oral health conditions. Because incompetent or negligent dental therapy exacerbates periodontal disease, the dentist may be held accountable for the disease's continuation. "Iatrogenic damage" is the term for this type of harm brought on by the dentist, and the Iatrogenesis is a very common, often preventable, hazard of treatment and is related with considerably increased patient mortality and cost.

Since the time of Hippocrates people have accepted the possible damaging effects of a healer's actions.

A tradition of conservatism in medical practice has understandably grown up in the centuries since Hippocrates admonished his disciples, "Primum non nocere" (first, do no harm). Man also has long been aware of the hazards of the doctor-patient relationship, as well as the benefits. Napoleon, when advised to consult his physician, allegedly declaimed, "I do not want two diseases - one nature-made, one doctor-made", and marched off instead to Russia.[1]

2. Review of Literature

2.1. Iatrogenic factors

The broad phrase "harm, hurt, damage, or impairment that results from the activities of a doctor" can be used to characterize iatrogenic injury.[2] Iatrogenic harm can come from a therapist's intentional or unintended actions, as well as from their acts of commission or omission.[3]

* *Corresponding author*.
E-mail address: harry_saluja@yahoo.co.in (H. Saluja).

https://doi.org/10.18231/j.jdp.2024.024

Iatrogenic dental treatments have the potential to harm the periodontium, the tooth, or both. Any trauma that has resulted from a dentist's procedures, activities, or treatments is referred to as "iatrogenic trauma."

It is typically used to describe treatment-related problems such as infections. During dental and periodontal treatments, the mouth cavity is in contact with a variety of instruments, substances (such as drugs, endodontic materials, and retraction agents), and tangible items (such as partial dentures and orthodontic appliances). Traumatic gingival lesions may result from the incorrect application or use of these instruments.[4] There could be an iatrogenic cause for periodontal disease. Dental procedures include crowns, endodontic therapy, removable and fixed prostheses, orthodontic therapy, and oral and maxillofacial surgery may cause harm to periodontal structures if they are not carried out appropriately. In the long term, improper tooth preparation could be harmful to your dental health. For example, insufficient axial reduction often results in an overly contoured restoration, which complicates plaque control. Gum disease could result from this.[5] The periodontal tissues provide the framework necessary for the teeth to function, look, and feel comfortable. A healthy periodontium is a necessity for the success of all prosthetic and restorative therapy. The position of the restorative margins, the shapes of the crown, and the gingival tissues' reaction to the restorative preparations are just a few examples of the numerous ways that periodontics and restorative dentistry are related and interact. Black A first identified the link between iatrogenic causes and periodontal disease in 1912.[6]

For many years, there has been a thorough investigation into the relationship between periodontal health and dental restorations. Research has focused on a number of characteristics of the relationship between periodontal disease and restorative therapy, including the restoration's location in relation to the gingival edge, the presence of overhangs, the existence of marginal leakage, surface roughness, and the type of restorative material used.[7] Gingival inflammation and periodontal damage are exacerbated by substandard dental restorations or prostheses. "Iatrogenic factors" are substandard dental practices that further the degradation of periodontal tissue. Features of detachable partial dentures and dental restorations that are crucial for preserving periodontal health.

2.1.1. That includes

1. Location of gingival margin for the restoration.
2. The space between the margin of the restoration and the unprepared tooth.
3. The contour of the restoration.
4. The occlusion.
5. Material used in the restoration.
6. Restorative procedure itself.
7. The design of the removable partial denture.

These characteristics are relate to the etiology of periodontal diseases

3. Discussion

3.1. Overhanging restoration

Dental restoration with overhanging or open margin create plaque-rententive area that can increase gingival inflammation, bone loss, and attachment loss (Gilmore N. et al. 1971, Highfield et al. 1978, Ainamo et al. 1980).[8] In genral more attachment loss is associated with large overhangs than small one (Jeffcoat MK, Howell TH 1980).[9]

Overhangs that extend apically to apposition close to the marginal bone are more likely to induce bone loss, attachment loss than overhangs that do not extends as far apically. Overhanging restorations acts to extend the sphere of influence of plaque apically.

Its contribution to the development of periodontal disease:

1. Rearranging the gingival sulcus's ecological balance so that gram-negative anaerobic species—which are mostly linked with disease—proliferate more readily there than gram-positive facultative species, which are linked to health.
2. Removing access to get rid of accumulated plaque. According to several research, the proximal restoration's overhanging edge occurs anywhere from 16.5% to 75% of the time. There is a documented highly significant statistical correlation between a smaller bone height and a marginal defect.

4. Effect of Removal of Overhanging Metallic Margin of Restoration

Overhang removal improves gingival conditions and helps prevent attachment loss. The study by Newman et al. in 1980 was concluded that the presence of a subgingival overhanging defective margin may be the only important clinically significant feature of an amalgam restoration related to the pathogenesis of chronic inflammatory periodontal disease. They also demonstrated that correction of defective restoration should be effective during initial phase of periodontal therapy.

Highfield and Powell (1978) suggested that regular plaque removal result in disappearance of gingival inflammation and increased alveolar bone support and is more effective when overhanging margins are removed.[10]

Prasad RV et al. (2015) suggested that contouring of defective subgingival restoration, followed by effective scaling and oral hygiene instruction produced approximately 1mm of gingival shrinkage sufficient to produce clinical gingival health.[11]

Overhangs may removed during surgery or by replacement of the defective restoration when surgery is indicated, the best final restoration may be achieved after complication of surgery. When the restorative dentist has the best access and visibility. Overhangs may be removed with curettes, sonic or ultrasonic scalers, chisels, diamond or finishing burs or other appropriate instrumentation.

4.1. Location of margin

The location of the gingival margin for a restoration is directly related to the health status of adjacent periodontal tissue.

Intracrevicular margin – All the restorative margin located apical to Gingival margin should be with in the confine ness of gingival sulcus, are termed " Intracravicular margins (Nevins et al. 1984).

The term intracravicular implies knowledge of biological width, determination of the attachment location, then placement of the restoration margin at least 1mm coronal to the attachment.

Biologic width -The dimension of the space that the healthy gingival tissue occupies above the alveolar bone is called the "Biologic width". (Gargiulo AW, et al. 1961).This comprises of 1.07 mm of connective tissue attachment and 0.97 mm of junctional epithelium. The biologic width should not be violated in any restorative procedure. [12]

The subgingival margin - It suggests that the restoration margin was merely positioned apically to the gingival margin, presumably in violation of biologic width, without any consideration for the attachment location or an attempt to retain the margin within the gingival sulcus. Since the periodontal attachment is more coronally placed interproximally than on the lingual and facial sides, the tooth preparation should follow the attachment's general contour, which is to run around the tooth's circumference in a line parallel to the CEJ. Large levels of plaque, more severe gingivitis, deeper pockets, and even high-quality restorations are linked to subgingival margins. Plaque accumulation, gingival irritation, and gingival fluid flow rate will all increase if inserted subgingivally.

Margin at the level of gingival crest – Less severe inflammation is caused by it. The research demonstrates that margins situated supragingivally or at the level of the gingival margin, for example, are the best indicators of compatibility with periodontium. The optimal gingival esthetic and periodontal health can be achieved by using the intercravicular margin and paying special attention to the notion of biologic width in the maxillary anterior. However, supragingival margin use is precluded due to aesthetic considerations. According to Silness (1980), one of the main causes of plaque accumulation and the ensuing gingival inflammation is roughness in the subgingival area. Both the prepared and unprepared tooth surfaces make up the subgingival zone. [13]

Sources of marginal roughness include the following:

1. Grooves and scratches in the surface of carefully polished acrylic resin, porcelain, or gold restorations.
2. Seperation of the restoration margin and luting material from the cervical finish line, therapy exposing the rough surface of the prepared tooth.
3. Dissolution and disintegration of the luting material between the preparation and the restoration, leaving a space.
4. Inadequate marginal fit of the restoration
5. Subgingival margins typically have a gap of 20nto 40μm between the margin of the restoration and the unprepared tooth. (Setz et al. 1994).

Colonization of this gap by bacterial plaque undoubtedly contributes to the detrimental effect of margins placed in a subgingival environment.

5. Morphologic Characteristics of Restoration and Periodontal Health

Overcontoured restorations tend to accumulate plaque and possibly prevent the self-cleaning mechanisms of the adjacent cheeks, lips and tongue (Yuodelis RA, Weaver JD, 1973).Failure to establish adequate interproximal embrasures lead to papillary inflammation. The contours of the occlusal surfaces as established by the marginal ridges and the related developmental grooves, normally serve to deflect food away from the interproximal spaces. The integrity and location of the proximal contacts along with occlusal morphology typically prevent food impaction. The interproximal plunger cusp effect may be observed when the missing teeth are not replaced and the contact relationships between adjacent teeth are altered. [14–17]

5.1. Crown contour

Overcontouring elicits effects similar to those of overhanging margin of restoratios and that be detrimental to the periodontal tissue.Although controlled research data on this aspect of reconstructive dentistry are scarce, it is generally agreed that gingival irritation often results from unsatisfactory crown contour (Moris et al. 1973).

Overcontouring may occur in several dimension:

1. Interdental areas
2. Buccolingual aspects, and
3. Furcation aspects

Interdental areas

Quite often interproximal contact areas of reconstruction qare grossaly overcontored. This will not only impinge on the tissues of interdental area, which represent a delicate network of blood vessels within a fine connective tissue of a col area, but also jeopardizes the possibility of effectively cleaning this area using special aids for oral hygiene

The approximal surface of natural teeth present with a flat or even concave outline. (RC.Wheeler 1962) Nevertheless, this anatomic feature is continuously being neglected in reconstructive dentistry. Quite often the interproximal contour of filling and restorations are made too wide and hence close the interproximal space. The plaque control is more difficult, and a hyperplastic gingivitis will completely close the col region. This again will enlarge the buccal and lingual papillae and hence favour the accumulation of plaque. Establishment of proper, open embrasure and flat or convex interproximal surface is critical to gingival and papillary health. (RC. Wheeler 1963).

On the other hand, interproximal space that are widely open do not provide a hazard to the gingival tissue. special aids including interdental brushes, wide balsa toothpick, and thick floss have been designed to effectively remove bacterial plaque in these areas. It is therefore preferable to undercontour rather than overcontour an artificial crown. [18]

5.2. Buccolingual aspects

The primary cause of overcontouring in the buccolingual dimension is that prepared teeth do not have enough tooth substance removed from the labial aspect to allow for the proper implantation of artificial crown material. (Porcelain and metal frame). This overcontouring interferes with the dentogingival junction's "sealing" function by preventing the gingival tissues from closely adapting to the tooth. Increased plaque buildup can cause persistent gingival irritation, which can result in attachment loss and diminished alveolar support. Generally speaking, periodontal health is better compatible with flat buccal and lingual crown contours that mimic the root surface contour than with those that replicate or amplify the cervical bulge.(C.M. Beckers 1982). This bulge tend to accumulate plaque and promote gingival inflammation. [19]

In maxillary anterior where facial contour cannot be flatten for esthetic reason the flat contour is preserved with in the sulcus, whereas normal contours and embrasure are established coronal to the gingival margin. This is referred to as establishing a zero –degree emergence angle.

5.3. Furcation aspects

Teeth with beginning furcation involvements and open furcations deserve special attention during tooth preparation. To provide sufficient space for the dental materials of an artificial crown, the contours of the furcations have to be accentuated. If not enough space is provided, overcontouring of the furcation region is inevitable, providing conditions that will favor the accumulation of plaque in this most critical areas.

5.4. Pontic design

When lost teeth replaced with fixed prosthetic reconstruction, new hard surface susceptible to plaque formation are introduce in the oral cavity. Inflammatory tissue reactions of the mucosa covering the alveolar ridge have repeatedly been reported in close association with bridge pontic.

From the periodontal standpoint, pontics should be esthethic and cleansable. (Stein 1974). As with full coverage restoration, the contour and embrasures should be properly designed. In addition, a pontic should have a ridge– facing. Surface that is convex and easily cleaned. In general three types of pontics fulfill these requirements:

1. Ovate
2. Modified ridge- lap and
3. Sanitary

The ridge- lap pontic which straddles the ridge much like a saddle, has a concave ridge-facing surface that can not be cleaned and should not be used.

The tapering ovate pontic may make slight touch with the posterior ridge. For cosmetic purposes, the ridge-facing portion of the maxillary artery is marginally implanted in the gingival tissue. The pontic gives the impression that a tooth is emerging from the gingival sulcus as it emerges from the gingival tissue. Both anterior and posterior sites can benefit from the cosmetic application of the modified ridge-lap pontic. As long as there is enough opening beneath the sanitary pontic to facilitate cleaning, the pontic's lack of ridge contact has no effect on the soft tissue. Its ridge-facing surface is not utilized in esthetic areas since it is distant from the edentulous ridge.

5.5. Clinical implications

Since, pontic design per se is not preventing dental plaque accumulation and subsequent inflammation, priority has to be given to the feasibility of mechanical plaque removal. Only the removal of bacterial plaque and the establishment of an anatomic relationship to allow proper hygiene will result in maintenance of periodontal health in close proximity to bridge pontics.

5.6. Restorative materials

Restorative materials often do not harm periodontal tissue intrinsically. Gingival tissue is compatible with the majority of materials, including amalgum, composite, glass ionomer, gold, and porcelain. The type of plaque that develops at restoration margins is comparable to that found on neighboring unrestored tooth surfaces. Plaque developed on silicate differs in composition from plaque formed on other types of restorative materials. In 1994, Newman et al. All restorative materials can be effectively cleaned if they are polished and made accessible to oral hygiene techniques,

even though the surface textures of the materials vary in their ability to hold plaque. (Sorensen et al. 1991).[20]

Allergy to a restorative material can create periodontal problem. Rapid bone loss has been associated with nickel allergy.(Lamster et al. 1987) Allergy to alloys with high nickel content should be considered in diffential diagnosis of unusual bone loss associated with new restoration.

6. Design of Removable Partial Denture

Plaque accumulation is encouraged by partial dentures, especially if they cover the gingival regions. The abutment tooth is also harmed by poorly designed clasps because they consistently apply high forces, which lead to occlusal trauma. If a posterior partial denture is not sufficiently supported on occlusal rests, the clasp's arms may press against the abutment tooth's marginal tissue when the denture settles. The removable partial denture should be supported by teeth wherever possible, not by soft tissue. Insufficiently supported teeth need to be soldered into place using crowns to splint them to the adjacent teeth. In cases where teeth serving as strategic abutments are absent or in a compromised state, tissue support is frequently required in addition to tooth support.

In such cases, unless constructed carefully, the partial denture may exert a cantilevering effect on the abutment teeth thus resulting in occlusal trauma.

Restorative Dental Procedure and Gingival HealthDental restorations have been demonstrated to cause periodontal changes in both clinical and experimental settings. These changes can range from slight gingival alterations to pocket formation with bone loss and increased tooth movement.

6.1. Application of rubber dam

When it comes to safeguarding the surrounding gingival tissues, a rubber dam is quite helpful. Make sure the rubber dam clamp is securely lodged on the tooth's hard tissues when you place it. It is not appropriate to press the clamp subgingivally in order to go against the biologic width. It should not be stored for an extended period of time since ischemia will result in tissue sloughing and recession. In order to stop apical migration, a movable clamp needs to be stabilized with compound. In order to prepare a tooth's subgingival margins or to take an imprint, the gingival cord should not be forced into the sulcus. This can mechanically harm the periodontium and leave behind impacted debris that could trigger a foreign body reaction.

6.2. Crown preparation

Before preparing a tooth, periodontal tissues should be in a healthy state. When inflammation is present, precise tooth preparation is not possible. To lower the likelihood of postoperative iatrogenic recession, extreme caution should be used to avoid laceration of soft tissues throughout the preparatory process.[19,20] A restoration should end above the gingival margin or at the same level as the gingiva, according to some study. Among the more important factors are the gingival contour of the restoration, surface quality, material type, and fit accuracy. Subgingival extension of restorations creates a hostile environment for the gingival tissues even when done correctly. Moreover, because tooth preparation necessitates the use of manipulative methods, it is not feasible to place a restoration's cervical edge two to three millimeters deep without violation of the biologic width could result from this. It is challenging to make an impression, carve, verify adaption, and seal following cementation when there are subgingival margins.

For subgingival restoration and cervical caries, a subgingival finish line might be necessary to generate sufficient resistance and retention. Pins and grooves can boost retention, but the claimed increased retention will not outweigh the risk of periodontal issues. Intracrevicular margins can be placed using the following three rules: 1. Place the edge 0.5 mm below the gingiva crest if the sulcus depth is less than 1.5 mm. 2. Position the margin half the sulcus depth below the gingiva crest if the sulcus depth is greater than 1.5 mm. 3. If the sulcus is more than 2 mm, particularly on the facial aspect, consider if a gingivectomy could be done to extend the teeth and make the sulcus 1.5 mm. Next, apply Rule 1 again.

7. Impression, Retraction and Electrosurgery

Recession and biologic width damage might result from the careless use of gingival retraction procedures during impression-taking. It's important to avoid using too much digital force when taking impressions to prevent the attachment's biologic width from being removed. It is necessary to exercise caution while utilizing an excessive amount of cord or a cord with an excessive diameter in the crevicular space for extended periods of time. Retraction of thin, delicate, free gingival tissue requires caution, particularly in cases where the gingiva that is connected is insufficient. Research has indicated that, despite cautious application, attachment loss may occur, particularly in the anterior area, should the electrosurgical loop's end tip inadvertently come into touch with the tooth apical to the epithelial attachment.

7.1. Temporary restorations

Temporary restorations will aid in healing after tooth preparation. Careless use of disks, burs and stones may destroy connective tissue fibres. If this is followed by inadequate temporary coverage with unadapted, unpolished and imperfect margins, marginal inflammation and apical migration of the junctional epithelium ensues. Thus, marginal fit, contour and surface finish of the temporary restoration are critical in maintaining health and position of

gingiva during placement of the temporary restoration.

7.2. Cavity preparation and placing the matrix

When preparing cavities, caution must be used to avoid damaging the gingival tissues, particularly in regions where the amount of attached gingiva is minimal. For Class II restorations, interdental wedges and a firm matrix that is well-contoured must be positioned. Food impaction and plaque retention are caused by improperly shaped interdental contacts and gingival overhangs, which can lead to recurrent caries or periodontal collapse. A prudent separation should not be wider than the periodontal ligament because it can result in a similar kind of harm. Should the prepared cavity's edges need to be positioned inside the fissure, this process needs to be done carefully to prevent disrupting the biologic width.

This structure is the most vulnerable of all the supporting structures to periodontal disease and procedural trauma can initiate its apical migration and result in periodontitis or recession.

7.3. Placement, finishing and cementation

Sealing a restoration at the tooth preparation minimizes the cement line, which promotes the buildup of plaque. The tissue alterations near the restoration have been attributed to the subgingival junctional zone, which is made up of the prepared tooth, the luting material, and the crown and restoration margin. Subgingival plaque development and retention are facilitated by subgingival roughness. Stripes and scratches on flawlessly polished acrylic resin, porcelain, and the exposed surface of the luting substance are a few causes of roughness. Curettage should be used to smooth out the cervical portion of the preparation in order to lessen the potential effects of subgingival roughness. After the luting mixture has solidified, any surplus should be scraped out using wood points and dental floss rather than steel probes, since metals can scratch the surface further.

8. Periodontal Complication Associated with Orthodontics Therapy

Orthodontic therapy may affect the periodontium by favoring plaque retention, by directly injuring the gingiva as a result of overextended band and creating excessive unfavorable forces both on the tooth and supporting structures.

8.1. Plaque retention and composition

In addition to their propensity to hold onto food particles and bacterial plaque, orthodontic appliances have the ability to alter the gingival ecology and cause gingivitis. Following the insertion of the orthodontic band, the proportion of facultative microorganisms in the gingival sulcus decreased and the numbers of Prevotella melaninogenica, Provetella intermedia, and Actinomyces odontolyticus increased. More recently, 85% of children utilizing orthodontic appliances had at least one Actinobacillus actinomycetemcomitans site, compared to only 15% of the control patients. Selective grinding must be used to control the traumatic occlusion that teeth experience as a result of molar uprighting, extrusions, and buccolingual movement. Many patients experience root resorption, which is brought on by the application of excessive forces—that is, jiggling forces—during tooth movement.

9. Implants

The field of prosthodontics has been significantly impacted by osteoeintegration. These days, implants take the place of tooth roots and aid in supporting and holding in place overlaying prosthetics. Around implants, gingival tissues adhere firmly in a band. Soft tissue hyperplasia may result from the peri-plant tissues' reaction. As the connection screw is tightened, it is crucial to make sure that no soft tissue is caught between the implant and the crown.

10. Occlusal Trauma and Periodontium

Because it is so vital to dentistry, occlusion is significant. Understanding occlusion is crucial for restorative dentists who aim for a high degree of predictability in their final product. The increasing use of dental implants and nonmetallic esthetic restorations has raised concerns about force management. During centric closure, every tooth should come into contact with the restorations at the same time. Creating occlusion at a stable vertical dimension is crucial. Occlusal stresses on the teeth may be disrupted or altered by restorations that produce acute damage, discomfort, sensitivity, or decreased tooth movement. High-profile fillings, prosthesis that place excessive strain on abutment teeth, orthodontic migration of teeth onto functionally adjacent teeth, and disturbed proximal contact connections can all contribute to or worsen periodontal disease.

Migration and occlusion mutilation are other consequences of reduced periodontal support. The degree, direction, duration, and frequency of occlusal forces affect the extent of mutilation. Periodontium-related exodontic procedures According to a plethora of clinical research, third molar extraction frequently causes vertical abnormalities to form distal to the second molars. This iatrogenic impact is independent of the flap design and seems to be more common in patients over the age of 25 who have had their third molars pulled. (Mary Y., 1986).[21]

11. Conclusion

In order to create a healthy environment, any dental procedure must first identify and treat any pre-existing

pathologic conditions, with the exception of treating acute carious lesions that affect or jeopardize the pulp's health. The primary requirement before beginning any additional dental therapy is to restore the periodontium to health. This involves treating morphologic and pathologic gingival abnormalities, eliminating gingival irritants, fixing functional and occlusal interferences, and straightening out bony deformities in the supporting periodontium. The dentist's experience, familiarity, and current knowledge are the main factors in preventing potential iatrogenic traumas.

Although "To err is human," careful practice is very important for the principle "Primum non nocere" ("First do no harm").

12. Source of Funding

None.

13. Conflict of Interest

None.

References

1. Wolf JA, Hanson H, Moir MJ, Friedman L, Savage GT. Organization development in healthcare: conversations on research and strategies. Concluding remarks. *Adv Health Care Manag*. 2011;10:389–92.
2. AAP. Glossary of Periodontal Terms. 4th ed. Chicago: American Academy of Periodontology; 2001. Available from: https://members.perio.org/libraries/glossary?ssopc=.
3. Vandersall DC. problems and dangers of adult tooth movement in general dentistry. Schlossberg A, editor. Philadelphia: Saunders; 1975.
4. Rawal SY, Claman LJ, Kalmar JR, Tatakis DN. Traumatic lesions of the gingiva: a case series. *J Periodontol*. 2004;75(5):762–9.
5. Sorensen JA. A rationale for comparison of plaque-retaining properties of crown systems. *J Prosthet Dent*. 1989;62(3):264–9.
6. Black A. Preventive treatment of periodontal diseases. *Northwestern Dental J*. 1912;10:60–73.
7. Waerhaug J. Effect of rough surfaces upon gingival tissue. *J Dent Res*. 1956;35(2):323–5.
8. Gilmore N, Sheiham A. Overhanging dental restorations and periodontal disease. *J Periodontol*. 1971;42(1):8–12.
9. Jeffcoat MK, Howell TH. Alveolar bone destruction due to overhanging amalgam in periodontal disease. *J Periodontol*. 1980;51(10):599–602.
10. Highfield JE, Powell RN. Effects of removal of posterior over hanged margins of restorations upon the periodontal tissues. *J Clin Periodontol*. 1998;5(3):169–81.
11. Prasad RV, Chincholi S, Deepika V, Sirajuddin S, Biswas S, Prabhu SS, et al. Iatrogenic Factors Affecting the Periodontium: An Overview. *Open Dent J*. 2015;9:208–9. doi:10.2174/1874210601509010208.
12. Gargiulo AW, Wentz FM, Orban B. Dimensions and Relations of the Dentogingival Junction in Humans. *J Periodontol*. 1961;32(3):261–7.
13. Sirajuddin S, Narasappa KM, Gundapaneni V, Chungkham S, Walikar AS. Iatrogenic Damage to Periodontium by Restorative Treatment Procedures: An Overview. *Open Dent J*. 2015;9:217–22. doi:10.2174/1874210601509010217.
14. Shenoy A, Shenoy N, Babannavar R. Periodontal considerations determining the design and location of margins in restorative dentistry. *J Interdiscip Dent*. 2012;2(1):3–10.
15. Safiaghdam H, Oveissi V, Bahramsoltani R, Farzaei MH, Rahimi R. Medicinal plants for gingivitis: a review of clinical trials. *Iran J Basic Med Sci*. 2018;21(10):978–91.
16. Dietrich T, Kaye EK, Nunn ME, Van Dyke T, Garcia RI. Gingivitis susceptibility and its relation to periodontitis in men. *J Dent Res*. 2006;85(12):1134–7.
17. Ajmera N, Chatterjee A, Goyal V. Aloe vera: It's effect on gingivitis. *J Indian Soc Periodontol*. 2013;17(4):435–8.
18. Ciurea AC, Şurlin P, Stratul Ş, Soancă A, Roman A, Moldovan M, et al. Evaluation of the biocompatibility of resin composite-based dental materials with gingival mesenchymal stromal cells. *Microsc Res Tech*. 2019;82(12):1768–78.
19. Becker CM, Kaldahl WB. Current theories of crown contour, margin placement, and pontic design. *J ProsthetDent*. 1981;45(3):268–77.
20. Sorensen JA, Kang SK, Avera SP. Porcelain-composite interface microleakage with various porcelain surface treatments. *Dent Mater*. 1991;7(2):118–23.
21. Marmary Y, Kutiner G. A radiographic survey of periapical jawbone lesions. *Oral Surg, Oral Med, Oral Pathol*. 1986;61(4):405–8.

Author biography

Harish Saluja, Professor

Shivani Sachdeva, Professor

Cite this article: Saluja H, Sachdeva S. Iatrogenic factors in periodontal diseases. *J Dent Panacea* 2024;6(3):115-121.