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Review Article

Interdisciplinary integrated treatment challenges in dentistry: A periodontic-restorative interface

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ABSTRACT:

Comprehensive dental therapy can attain success only when there is a good team work. A well balanced coordination between the different specialties of dentistry can deliver optimum treatment to the patient. In the changing scenario of comprehensive dental treatment concept, one has to get absorbed quickly to know and implement the newer aspects of treatment and materials available to optimize the final treatment outcome. Periodontic-restorative interaction and interface occurs at many junctures with consultation and exchange of ideas required from the day of diagnosis to the final delivery and further to the supportive treatment phase. Currently multiple options are available to handle the patient in almost all given cases. This aim of this review is to collect the data regarding the periodontic-restorative interaction which helps the interdisciplinary practice of periodontics with restorative dentistry and vice versa.

Key words: Periodontic-restorative interaction, gingival zenith, gingival recession.

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Introduction

In the era of modern digital dentistry, dental clinicians need to be on their toes to deliver the most optimum treatment to fulfill the expectation of patients.[1] Integrated inter disciplinary dentistry is not a new field. Practice of such dental treatment concept was existing from the beginning of dentistry.[1,2] One to two decades ago, white esthetics was dominating the esthetic dental treatment, with attention to the patient comfort, health and function was maximum. However scenario is changed when the complications of disrespecting pink started slowly arising.[4,5] These biological failures over the mechanical failures is resulting in total failure of well delivered restoration because of diseased surrounding periodontal tissues.

Pink, periodontal tissue, support or foundation for the tooth need to be respected and its due. Failing to do so may hamper longevity of the restoration, failure and consequent biological complications. Similarly, restorative dentist need to follow “do no harm” to the healthy surrounding periodontal tissue while treating the tooth or placing the implant, to introduce iatrogenic factors and failures. This narrative review attempted to collect the data regarding the periodontic-restorative interaction which helps the interdisciplinary practice of periodontics with restorative dentistry and vice versa.

ABC of the gingival morphology: Need for establishing a stabilized gingival health-Pre prosthetic and restorative dentistry procedures

An attractive smile involves harmonious interaction of three components: the teeth, the lip position, and associated gingival architecture.[6] Gingival architecture and/or morphology[7] with its characteristics need to be

understood and blended with the teeth esthetics. A well planned interaction between periodontist and prosthodontist is essential for this 3 c's-color, contour, consistency, 2 s's- size and surface texture, and 1p-position of the gingiva is all that one need to know in gingival morphology.

Color

The factors enriches the facial esthetics or appearance are the color of hair, skin, eyes, teeth, lips and gingiva. The color of the gingiva is important component among these. There is wide variation between color of the gingiva, from pink to dark brown or purple color. Color variation is seen from gingiva of one tooth to the other, marginal to attached gingiva, unilateral variation to bilateral similarity. Color of the gingiva is influenced by gender, age, teeth, melanin content and activity, skin color, blood pressure, gingival inflammation, smoking, external factors like type of restoration and margin of restoration.[8,9]

Skin color matching with gingival color: Does it matter?-Depigmentation

In the esthetic corridor, another important aspect is the matching of gingival color with the skin color. Pigmented brown or black color of the gingiva which is not matching with the skin color, may be a dampening factor and need to undergo depigmentation, to get harmonization with the esthetic restoration. Several depigmentation methods are listed and tried successfully. Laser, cryosurgery, blade and bur methods are more popular. Laser and cryosurgery depigmentation comparative study revealed a stable color up to 18 months and considered to be less painful and acceptable to the patient for their post-surgical benefits over the blade and bur methods.[10,11]

Iatrogenic factors like impregnation of amalgam within the gingiva or extension of class II cavity or MOD deep in to the gingiva, results in bluish hue. Presence of such bluish spots need to be identified and removal/correction of the overhanging restoration need to be done to restore the gingival health and color.[12]

Smokers' gingiva can be easily identified by the gingival and lip color of the individual. Smoking is a risk factor for periodontitis. Smoking also effects the esthetic restoration. Identifying the individual with smoking by observing the color of the gingiva and smoking related periodontal changes at the initial appointment, prompts the dentist to include smoking cessation therapy in the initial appointment and precautions while initiating the non-surgical and surgical periodontal therapy.[13]

Contour of the gingiva: Gingival zenith

Gingival Zenith

A harmonious and symmetrical blending of gingival tissue in the anterior zone enhances the smile. There are many contributing factors for uneven contour of the gingival Placement of tooth in the arch, cervical bulge of the tooth and bony projections, inflammation of the gingiva, altered passive eruption, tooth alignment and contact between the teeth etc. An untreated uneven contour of the gingiva may be a detrimental factor for the esthetic restoration. Gingival contour correction to be done prior to the restorative treatment, to establish a stable gingival margin.[14,15]

Point of zenith for the central incisor and canine is of at the same level and distal to the long axis of the tooth. Lateral incisor margin is about 1 mm incisal to the central incisor and canine and point of zenith is being at the middle. If gingival zenith is manipulated very well prior to the esthetic restorations, correct tooth proportions obtained and axial inclination results in better final outcome. Whenever the crown lengthening procedure is indicated, one has to keep in mind about the gingival zenith and finish the gingival contour accordingly.[16]

Once the gingival margin/contour is stabilized, it is easy to establish the restorative margin. Bleeding free area enables a good visibility while tooth preparation for appropriate margin placement and aids in good impression procedure. A well stabilized gingival margin can be expected at least 3 to 6 months post periodontal surgery. Establishment of various group of gingival fibers will take around 72 days post periodontal flap surgery.[17] Delivering the interim restoration during this healing period and observing the reaction of the gingival margin to the newly prepared restorative margin will help in correcting the margin for the permanent restoration if required.[18]

Gingival recession: Augmentation to be done pre or post prosthodontic or restorative treatment?

Elongation of the root in esthetic zone is not acceptable to the patient and a deterrent factor for the esthetic restoration. Root coverage to be planned either by periodontal plastic surgery or means of prosthodontic treatment.[19,20] It is not necessary that gingival recession to be treated before restorative treatment, tooth morphology can be altered without altering gingival contour. An acceptable emergence profile can be obtained, without affecting the overall clinical crown length by creating impression of the dental proportion, prosthodontic camouflaging. Gum veneer is one of the alternate method to cover the root surface. Gingival color ceramics also being used to cover the exposed root surface. Though both are not ideal in terms of esthetic and can acts as a plaque trap, can be suggested

to patients who are not willing to undergo periodontal surgical procedure or may be suitable for the patient where gingival augmentation is not possible because of medically compromised condition.

Black triangle: Principle of prevention better than treatment-Concept of preservation papilla rather than reconstruction of lost papilla

Last decade has seen many articles,[21] case reports and case series dealing with the interdental papilla, with conclusion that, preserving the papilla is better, than reconstructing it. Atraumatic restoration, less pressure on papilla during following extraction immediate temporary restoration with ovate pontic designs, immediate implant placement, socket preservation and socket shied technique are strategies to follow to preserve the papilla. While restoring the tooth, avoid impinging the restoration beyond the interdental space which will push the papilla, loss of blood supply, necrosis and loss of papilla. Whenever reconstruction of papilla is necessary, non-surgical means of papilla reconstruction (space closure) to be the first choice, than the surgical therapy. Indirect or direct composite restorations, veneers as a restorative options need to be worked out.[19]

Attached gingiva-existence or non being-conflicts and controversies-relation to the restoration

The need of adequate attached gingiva or keratinized gingiva around the natural tooth, restoration and implant is though a controversy and still a debatable question.[22,23] The adequacy of attached gingiva has become hot research topic in 1980s with the series of studies on animal and human proved that, the width of attached gingiva is not of a concern in maintaining the periodontal health, if patient is able to maintain the oral hygiene.

Anterior esthetic restoration-limiting factors-labial frenum

Longitivity of anterior retention and stability of periodontium around these teeth is depending upon the type of frenal attachment. To prevent the pull of the mucosal forces near the interdental papilla, correction of frenal extension and vestibular depth alteration deepening is required.[24] Labial and buccal frenum which is close to the coronal/marginal gingiva exerts pulls the papilla pulls away from the tooth, creates a space/ black triangle, which acts as a predisposing factor for constant gingival inflammation. Similarly shallow vestibule, also acts as a factor for the collection of food and plaque, near the marginal gingiva. Without surgically correcting these extension limiting soft tissue anatomical structures, can deteriorate the periodotnal condition, which intun affect the restoration and esthetics.

Sequencing-crown lengthening-periodontally driven or restoratively driven?

There is always confusion and dilemma about what procedure to be done first? If there is minimal biologic width correction is expected and if there is not much esthetic concern, especially in the posterior region, crown preparation is done with preparation of margin to the final extension. This prepared margin with temporary crowns are used as a guide by the periodontist, to establish the SCTA, by the surgical procedure. In such cases, unnecessary exposure of root surface or furcation exposure can be avoided, with the conservative approach. However when multiple teeth requires surgical correction or many teeth are worn out which requires oral rehabilitation or teeth in the esthetic zone area, a reverse process is done. After determining the extent of crown lengthening, a diagnostic wax up is done initially. Following which bone sounding or a non-invasive three dimensional digital bone sounding using CT scan coupled with scanned model to accurately measure the thickness of gingival margin is done, followed by surgical procedure. This will allow the prosthodontist to visualize the area of crown extension properly for tooth preparation. After 3 to 6 months, once there is soft tissue maturation and attainment of proper biologic width, crown preparation is done and final restoration is delivered.[25]

Deep margin elevation: An alternative to surgical crown lengthening

Magne and Spearfical (2012) porposed an aleternative restorative technique to surgival crown lengthening. The proposed technique "deep margin elevation" utilizes placement of a modified tofflemire matrix followed by immediate dentine sealing and coroal elevation of deep margin to supragingival placement using a direct bonded composite resin base, they cocluded that theis technique is useful as a non invasive alternative to surgical crown lenghetning.[26]

Overhanging dental restoration (ODR): Physical and biological burden on the gingival tissue

Restoration of a tooth in harmonious relation to the surrounding periodontal tissue is a critical skill of a restorative dentist. To coordinate and act upon respecting the gingival tissue is the real art of dentistry. A failure of blending of restoration smoothly with the confines of the tooth, results in extension of restorative material bulging out of the contour/surface of the tooth results in overhanging dental restoration (ODR). Though short and medium overhangs were associated with the gingival inflammation, its relation to bone loss was not established.[27]

Food impaction and over/under contoured restoration

Forceful wedging of the food in the interdental area is a common problem encountered in patients attending periodontal OPD. Improperly done marginal ridges and over/under contoured restoration are the common causes for food impaction. Though there is controversy regarding the loose interproximal contact and gingival health, it is considered to be negative factor for since it can lead to poor esthetics, poor phonetics, poor oral hygiene maintenance and localized periodontitis. Vertical food impaction is related to improper marginal ridge and over/ contoured restoration. Lateral/horizontal food impaction is common after gingival recession due to post periodontal surgical procedure, loose interproximal contact and improperly contoured restoration, in the cervical region. One has to diagnose the food impaction positively, before it worsens the periodontal condition. Gnawing pain, feel like sucking the area, getting relief after bleeding or placing the tooth pick are common signs and symptoms. Additionally, one can see gingival enlargement, periodontal abscess and vertical defects in the food impaction region, correcting the proximal contacts, build up the restoration and treating the periodontal disease in time will save the tooth.[28]

Conclusion

Most of the dental patients are in need of multiple dental treatment to fulfill their facial esthetics and oral functions. A dentist has to be trained very well to identify the need and address all the problems satisfying the patient. This can happen only when, one has thorough knowledge of ones one specialty and the available treatment modality in other specialties. In the changing scenario of comprehensive dental treatment concept, one has to get absorbed quickly to know and implement the newer aspects of treatment, materials available to optimize the final treatment outcome. Periodontic-restorative interaction and interface occurs at many junctures with consultation and exchange of ideas required from the day of diagnosis to the final delivery and further to the supportive treatment phase. Currently multiple options are available to handle the patient in almost all given cases. What required is the awareness among the general dentist and other specialty dentists about the available treatment options. so that a better patient management which lead to better satisfaction.

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