



RESEARCH ARTICLE

MANAGEMENT OF STAGE III PERIODONTITIS: AN INTERDISCIPLINARY APPROACH

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Abstract

Periodontitis is a chronic inflammatory disease with varied symptoms that may be bleeding gums, malodour, tooth mobility or irritation and inflammation of the gingiva. Signs of severe periodontitis include tooth loss, masticatory dysfunction, negative effects on aesthetics and function. Depending upon the severity of the symptoms the treatment varies from case to case. This case report describes the management of a Stage III periodontitis in a 23 years old female patient, who was concerned by the impact of pathological migration on aesthetics. Treatment planning was done with focus on management of the pathology keeping in mind the concerns presented by the patient. The primary treatment was focused on management of periodontitis by removal of local factors and antimicrobial therapy to prevent further destruction of periodontal tissues. The prosthetic phase was planned to address the aesthetic concerns of the patient. Hence, an interdisciplinary approach was used to restore function and aesthetics.

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Introduction:-

Periodontitis is a major concern due to its high prevalence, as well as because it may lead to tooth loss and disability, negatively affecting chewing, function and aesthetics and impairs the quality of life. Periodontitis is a chronic multifactorial disease characterized by an inflammation of the periodontal tissue mediated by the host, which is associated with dysbiotic plaque biofilms, resulting in the progressive destruction of the tooth supporting apparatus and loss of periodontal attachment.¹ Periodontitis may show different forms of presentation enough to require being classified into different types. The particular manifestation of periodontitis that shows rapid progression and is often attributed to altered microbiology of the disease and a altered host response has been given different names over time.^{2,3} This form of periodontitis which was earlier classified as juvenile periodontitis by Chaput et al in 1967⁴. Later the term aggressive periodontitis was introduced and the 1999 American Association of Periodontology (AAP) workshop recognized that periodontitis had several distinct clinical presentations, different age of onset and rates of progression and classified periodontitis into chronic, aggressive, necrotizing and as a manifestation of systemic diseases.⁵ However, the diagnostic criterion to classify periodontitis as aggressive periodontitis was extensive and was not always feasible at chairside. Also due to diagnostic specifications, some cases that showed a rapid rate of disease progression were not diagnosed as aggressive periodontitis.⁶

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The 2017 workshop developed a new classification which included a recategorization of various forms of periodontitis, the development of a novel staging and grading system for periodontitis. Staging is largely dependent upon the severity of disease as well as the complexity of disease management while grading provides supplemental information about the biological features of the disease, including the historybased analysis of the rate of disease progression, assessment of the possible progression. Grading also takes into consideration the effect of risk factors that maybe present such as smoking and diabetes.⁶

In this particular form of periodontitis (formerly aggressive periodontitis) usually greater destruction of the periodontium occurs and signs such as tooth mobility, pathological migration maybe seen. However, the severity of the disease does not usually correlate with amount deposits. It shows periodic stages of active destruction where the patient reports symptoms of periodontitis followed by periods of quiescence where disease activity is minimal and the patient may not observe any symptoms. Due to these periods of quiescence (disease inactivity), the disease may go undetected. The treatment strategies often involve a combination of antimicrobial and surgical periodontal therapy in addition to conventional periodontal therapy.⁷ In severe cases of tooth loss, rehabilitation maybe required.

The goals of the treatment are to limit the spread of the disease and prevent further loss of periodontal tissue as well as correct the functional and aesthetic disabilities caused by the disease process.⁸

The present case describes a case of Generalized periodontitis Stage III/Grade C in a young female patient and the management using a combination of the treatment modalities to treat the disease and restore the aesthetics.

Case Report

Establishing a diagnosis

A 23 year old female patient reported to the outpatient section of the Department of Periodontology with the chief complaint of bleeding gums since two years and a gradual increase in spacing in the upper and lower front tooth region since past 1 year. The patient expressed her concern over the unaesthetic appearance that was gradually increasing with the proclination of the upper and lower front teeth. The patient did not suffer from any other medical condition and was not under any medication. The intra-oral examination revealed generalized mild calculus deposits, bleeding on probing, generalized periodontal pockets. Probing depth ≥ 6 mm were recorded and clinical attachment loss ≥ 5 mm in more than 30% of the sites. Pathological tooth migration was present in 11, 12, 21, 22 and mobility was present in mandibular and maxillary anterior tooth region. (Image 1-3) According to Miller's classification, Grade I mobility was seen in 16, 26, 33, 36, 43 and 46, Grade II mobility 11, 12, 21, 22, 32, 41, 42, Grade III mobility in 31.



Image 1:- Facial pre-operative view showing calculus deposits, gingival inflammation, gingival recession and pathologic migration of anterior teeth.



Image 2:- Rightbuccal view (pre-operative).



Image 3:- Leftbuccal view (pre-operative).

An orthopantomogram was advised which upon evaluation revealed generalized horizontal bone loss extending to the middle third of the root or beyond. An arc shaped pattern of bone loss was associated with incisors and 1st maxillary and mandibular molars with furcation involvement irt 16, 26, 36, 46. (Image4) According to Glickman (1953) furcation involvement was classified to be Grade II irt 16, 36 and 46 and Grade III irt 26. Vertical defects were present irt mesial aspect of 36, 46. (Image 4)



Image 4:- Orthopantomogram showing generalized alveolar bone loss.

Based on the severity and complexity of periodontitis Stage III was assigned.

Direct evidence for grading of disease progression was not possible as patient did not have any previous radiographic records. %bone loss /age and the case phenotype were considered for indirect evidence of progression of the disease. The percentage of bone loss/age was > 1.0 and the destruction did not commensurate with the biofilm deposits. Specific clinical patterns were suggestive of periods of rapid progression followed by periods of remission. Grade C indicating rapid progression of the disease was assigned.

The case was diagnosed as Stage III Grade C periodontitis.

Treatment Plan

Due to the peculiar nature of the disease progression and the pathogenesis of the disease in large parts being attributed to altered microbial flora and altered host response the treatment strategy was focused on limiting the bacteria, removal of diseased tissue followed by functional and aesthetic rehabilitation.

The treatment plan typically extends over four phases. In the present case, since no treatment was required in the emergency phase the non-surgical phase (Phase I) was directly initiated to establish infection control. Full mouth disinfection was performed which included full mouth debridement completed in two appointments over 24 hours, the tongue was brushed with 1% chlorhexidine gel for 1 minute, the mouth was rinsed with 0.2% chlorhexidine solution for 2 minutes and periodontal pockets were irrigated with 1% chlorhexidine solution.⁹ An antimicrobial regimen was administered which consisted of Amoxycillin 500 mg TDS and Metronidazole 400 mg TDS for 8 days. After 8 days of medication, doxycycline was administered with a loading dose of 100 mg BD on the first day followed by a maintenance dose of 100 mg OD for 20 days.¹⁰

The patient was re-evaluated after 21 days (maintenance phase) and the surgical phase (Phase II) was planned to include open flap debridement to access the underlying tissues for removal of the granulation tissue as well correction of the bony defects. Regenerative procedures were planned for the vertical defects present in 16, 26, 36, 46.

On surgical exposure a horizontal furcation defect of 3mm was observed in tooth 16 and hydroxyapatite bone graft along with collagen membrane was used for regenerative procedure. For 26, on exposure early Class III furcation involvement was visible with 3mm horizontal and 4 mm vertical dimension of the defect. Guided tissue regeneration was attempted using collagen membrane to prevent tissue invasion into the defect space. In the third quadrant small osseous craters of depth 2 mm were found on the mesial aspect of 36 which was treated by hydroxyapatite bone graft and collagen membrane. In the fourth quadrant a saucer shaped defect was seen surrounding the mesial and the buccal aspect of the mesial root of the first molar extending upto the furcation and was also treated with bone graft and membrane placement. (Image 5-8). Suturing was done with 3-0 silk to achieve adequate approximation of the flaps. The patient was recalled after 7 days for suture removal, following which patient was recalled for follow up visits at an interval of 1 month.



Image 5:- A saucer shaped defect is seen surrounding the mesial and the buccal aspect of the mesial root of the first molar extending upto the furcation.



Image 6:- Hydroxyapatite bone graft placed in the defect.



Image 7:- Collagen membrane placed over the bone graft to achieve compartmentalization of the defect.



Image 8:- Suturing done to ensure adequate approximation of the flap.

Post operative probing depth and clinical attachment level (CAL) were recorded 2 months after the surgery showing a generalized pocket probing depth of 3 – 5 mm indicated improved periodontal health.⁶



Image 9:- Facial post-operative view.



Image 10:- Right buccal post-operative view.



Image 10:- Left buccal post-operative view.

To address the aesthetic concerns of the patient in the anterior region of the mouth resulting due to pathological migration of the anterior teeth, prosthetic phase (Phase III) was planned. Full coverage crowns (bridge) were planned from 13 – 23 and 33- 43. The bridge also provided the additional advantage of acting as a permanent splint for the mobile teeth in the anterior region.⁶(Image 11)



Image 11:- Facial view after the completion of prosthetic phase.

The patient was kept on monthly follow ups for the first 6 months after which the patient was recalled every 2 months. The patient displayed satisfactory oral hygiene on follow-up visits and reported improved function. She was also completely satisfied with the aesthetic improvement and expressed a higher level of confidence.

Discussion:-

The case described presents a form of periodontitis where the destruction of periodontal structures is far greater than what the hard tissue deposits indicate. Also the destruction is extensive when compared to the young age of the patient. This form of periodontitis earlier described as aggressive periodontitis is considered to be caused in large part due to the presence of specific microbiota in the periodontal pockets, deficient/ altered host response. According to the latest 2017 World Workshop Classification of Periodontal Disease and Conditions this case was classified as Generalized Periodontitis Stage III/ Grade C based on the severity and complexity of the disease as well as rate of disease progression.⁶

The treatment modalities used to treat this disease includes non-surgical periodontal therapy, surgical periodontal therapy and rehabilitation of the lost tissues. The prognosis of patients with extensive bone loss and tissue destruction is dependent on the degree of destruction that has taken place at the time of diagnosis as well as the ability to control future progression of the disease.¹¹ Patient education is of utmost importance. The goal of the periodontal treatment is to establish infection control, arrest the disease progression, correct the anatomic defects as well as replace any missing teeth.

The primary causative microbe *Aggregatibacter actinomycetemcomitans* is known to remain in the tissues after therapy to reinfect the pocket hence, antimicrobial therapy is advised in such cases. Full mouth disinfection was done as described by Quirynen et al (1995)⁹, followed by an antimicrobial regimen. Different types of regimens have been described to be successful in the management of cases of aggressive periodontitis which includes antimicrobials such as tetracycline, doxycycline, metronidazole, amoxycillin, ciprofloxacin, azithromycin. Genco et al (1981)¹² treated localized aggressive periodontitis with scaling and root planing and tetracycline. They reported an arrest in bone loss and an increase in bone levels for about one-third of the vertical defects.

Other non-surgical aspects of the treatment include local drug delivery for the treatment of shallow/residual pockets by tetracycline fibers, chlorhexidine chip, minocycline microspheres. Host modulation therapy may also be performed using sub-antimicrobial dose doxycycline.¹³

The surgical phase of the treatment is performed to correct the anomalies of the alveolar bone. Both resective and regenerative approaches have been used depending upon the defects present. Studies show that attempts at regeneration using bone graft and membranes for vertical defects in aggressive periodontitis cases have been

successful.^{14,15} In the present case also regenerative therapy was attempted for vertical defects and furcation defects where containment of bone graft was possible.

One of the symptoms of periodontitis is pathological migration which over a long period of time causes sufficient aesthetic changes especially in the anterior region leading to proclination and extrusion of the incisors.¹⁶ Also as the bone support is lost the mobility of the tooth increases rendering the prognosis of the tooth questionable or hopeless. Such cases can be temporarily treated with splining to provide comfort to the patient and last through the surgical phase but ultimately rehabilitation is needed. This can be achieved by replacing the tooth by dental implants, but for the more aggressive type of periodontitis chances of loss of attachment around the implants leading to peri-implantitis or failure are higher than a periodontally healthy individual.¹⁷ Replacement through other means such as removable/ fixed partial denture is slightly more reliable. FPD can be given only when the abutment teeth have sufficient bone support for the edentulous span that needs rehabilitation. Rehabilitation by FPD using the teeth that show slight mobility along with the abutment teeth can provide additional support to the prosthesis as well as act as a permanent splint to the mobile teeth.

Studies have reported the use of interdisciplinary approaches in the treatment of periodontitis via orthodontic and prosthetic procedures to address the aesthetic deficits that may have been caused by the disease.¹⁸ This is especially true for cases where dental implants may not be feasible option for the patient either due to lack of available bone for implants or poor patient compliance or financial constraint. In this case the prosthetic phase of the treatment was planned keeping in mind these factors, and full coverage crowns (bridge) were given to improve the aesthetics and function in the anterior region.

Conclusion:-

An interdisciplinary approach that involves fixed prosthesis for correction of aesthetic deficits in Stage III periodontitis is a viable treatment option after adequate infection control has been achieved. The prosthesis acts a splint for the mobile teeth and the teeth provide additional abutment teeth thus, making up for the compromised support for the prosthesis as a result of bone loss due to periodontitis. It is vital that periodontal infection is treated before initiating the prosthetic phase.

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