

EVALUATION OF THE PERIODONTAL STATUS OF DIABETES MELLITUS PATIENTS WITH NORMAL OCCLUSION AND MALOCCLUSION- AN ORIGINAL RESEARCH.

- 1. Dr. Shameem Karpe,**
Registrar Orthodontics, Security Force Hospital, Makkah, KSA. shameemkarpe@yahoo.com
 - 2. Dr. Abhinay Muthyala, B.D.S, MS,**
3975 N cramer street, Milwaukee, Wisconsin, USA.abhimuthyala19@gmail.com
 - 3. Dr. A Rashmi Pillai, MDS,**
Oral and Maxillofacial Surgeon, Rashmis Dentofacial Multispeciality Centre, Kavanad, Kollam, Kerala. drarashmipillai@gmail.com
 - 4. Dr. Abhishek Gautam, M.D.S,**
Periodontics, Dental officer, Primary Health Center, Tekari, Gaya, Bihar. dr.abhi90@gmail.com
 - 5. Dr. Praveen Kumar Varma,**
Professor, Dept of Orthodontics, Vishnu Dental College, Vishnupur, Bhimavaram, Andhra pradesh. dpkvarma@yahoo.com
 - 6. Dr. Abhimanyu Singh,**
P.G student, Department of Pediatric and Preventive Dentistry, Saraswati Dental College, Lucknow. abhimanyusingh.2405@gmail.com
- Corresponding Author:** Dr. Abhishek Gautam,
M.D.S, Periodontics, Dental officer, Primary Health Center, Tekari, Gaya, Bihar. dr.abhi90@gmail.com

ABSTRACT

Introduction: Malocclusion may be a lead cause of the aggravating the periodontitis especially in the diabetic. Hence in the present study we aim to conduct an evaluation of the periodontal status of diabetes mellitus patients with normal occlusion and malocclusion at an institutional level.

Material and methods: We conducted an institutional observational study. We divided equally two groups of the cases and the control each with n=100. All the subjects were diabetics with normal and malocclusions. The angle's malocclusion, the Resell's periodontal index, were noted among the subjects. The data noted and was analyzed and the significance of < 0.05 was considered significant.

Results: we observed that prevalence rate of severe destructive periodontal diseases (SDPD) in malocclusion group was 81.72% than in normal occlusion group with less prevalence rate of 55.21%.

Conclusion: Periodontal disorders were significant in the uncontrolled diabetes mellitus in malocclusion group was more than in normal occlusion group, with maximum periodontium destruction observed during first between 1-5 years of detection of diabetes.

Key words: Malocclusion, Diabetics, Orthodontic Treatment.

INTRODUCTION

Cross-sectional and longitudinal studies showed that the risk of periodontitis is approximately 3–4 times higher in people with diabetes than in non-diabetic subjects.¹ There are 90% people affected by the periodontitis of the world.²⁻⁵ The chronic inflammatory condition of periodontitis is prompted by pathogenic bio-films or dental plaque, which amasses on the tooth surface.⁶⁻⁸ Diabetes has an important effect on enhancing osteoclastogenesis and on increasing osteoblast apoptosis as well the inflammatory response is characterised by dysregulated secretion of host-derived mediators of inflammation and tissue breakdown. The literature are well documented with orthodontic treatment in diabetic patients poses more problems than in healthy non-diabetic patients because of more periodontal breakdown (due to low bone density, due to poor differentiation of fibroblast into collagens in both term of quantity and quality and other inflammatory cascades causing destruction of periodontal tissues etc.⁹⁻¹¹ The role of occlusion (trauma from occlusion) and the periodontal problems are also documented,¹¹⁻¹⁴ Most of the recent reviews and studies indicate that plaque- induced periodontal diseases was not aggravated by occlusal trauma. The malocclusion deteriorates the periodontal condition and hence the treatment outcome in diabetic patients. Orthodontic treatment should be evaded in patients with poorly

controlled Insulin-dependent DM (type-1) as these patients are particularly susceptible to periodontal breakdown. The role of malocclusion in diabetes patients could be logically clarified and recognized fact for causation of periodontitis due to more plaque depositions and poor oral hygiene maintenance. But the role of normal occlusion in diabetic mellitus patients with causation of periodontitis is less experimented and documented. Hence in the present study we aim to conduct an evaluation of the periodontal status of diabetes mellitus patients with normal occlusion and malocclusion at an institutional level.

MATERIALS AND METHODS

After the ethical clearance from the institutional committee we conducted a case control institutional observational study. We considered 200 subjects equally divided as case and control groups. All the patients were diabetics. The controlled group diabetes patients was called so when their blood reports were normal range as follows, the random blood sugar level (80-160mg/dl), fasting blood sugar level (70-110mg/dl) and HbAc1 range between 5.6%-6.0%. We included patients with no other medical condition, willing for the study. We excluded >50 aged patients, unwilling for the study, any other medical conditions than diabetes were excluded from study. The controls were with no malocclusion and the case group was with any of the malocclusion.

The malocclusion as classified as per modified Angle’s classification of malocclusion:

- Normal occlusion
- Class I malocclusion (crowding, spacing etc)
- Class II malocclusion: Class 11 div.1 and class 11 div.2
- Class III malocclusion
- Class1 bimaxillary protrusion

The periodontal conditions of a patient was noted by the Russell’s periodontal index (PI) and there is a pocket. The Statistical analysis was done using the appropriate tools keeping the p<0.05 as significant.

RESULTS

The Distribution of periodontal finding in patients with diabetes in malocclusion and in normal occlusion patients is presented in table 1. Majority in the case group showed class I malocclusion. In both the groups type-1 DM shows severe destructive periodontal diseases in normal occlusion as well in malocclusion groups. Most of the patients in both group of type -2 DM shows (126 out of 186) with SDPD. But in normal occlusion group 48 patients out 90 shows SDPD which comes around 53.33% in comparison to malocclusion group 79 patients out 96 shows SDPD which comes around 82.30%.

Table 2 indicates that in type-1 DM group 09 patients out of 11 patients and in type -11 DM group 96 patients out Of 148 were noticed with severe destructive periodontal diseases (SDPD) during first 1-5 yrs. of detection of diabetes.

Table 1: Distribution of periodontal finding in patients with diabetes in malocclusion and in normal occlusion patients.

| Types of Diabetes | Types of malocclusion | Periodontal Finding | | | | | Total |
|-------------------|------------------------|---------------------|-------------------|---|---|------------------|------------|
| | | Normal gingivitis | Simple gingivitis | Beginning destructive periodontal disease | Established destructive periodontal disease | Terminal disease | |
| 1.00 | Normal occlusion | | 1 | 3 | 2 | 0 | 6 |
| | Class I crowding | | 1 | 2 | 0 | 0 | 3 |
| | Class I spacing | | 0 | 1 | 0 | 0 | 1 |
| | Class 1 | | 0 | 0 | 3 | 0 | 3 |
| | Bimaxillary Protrusion | | | | | | |
| 2.00 | Class II Div. 1 | | 0 | 0 | 0 | 1 | 1 |
| | Total | | 2 | 6 | 5 | 1 | 14 |
| | Normal occlusion | 0 | 42 | 34 | 14 | 0 | 90 |
| | Class I crowding | 1 | 8 | 28 | 5 | 2 | 44 |
| | Class I spacing | 0 | 3 | 6 | 4 | 0 | 13 |
| | Class 1 | 0 | 5 | 6 | 7 | 0 | 18 |
| | Bimaxillary Protrusion | | | | | | |
| Total | Class II Div. 1 | 0 | 0 | 10 | 8 | 0 | 18 |
| | Class II Div. II | 0 | 1 | 1 | 0 | 0 | 2 |
| | Class III | 0 | 0 | 1 | 0 | 0 | 1 |
| | Total | 1 | 59 | 86 | 38 | 2 | 186 |

Table 2: Periodontal findings in relationships with duration of diabetes

| Types of Diabetes | | | Periodontal Finding | | | | |
|-------------------|----------|-------------|---------------------|-------------------|---|---|------------------|
| | | | Normal gingivitis | Simple gingivitis | Beginning destructive periodontal disease | Established destructive periodontal disease | Terminal disease |
| 1.00 | Diabetes | 0.1-5 Yrs. | | 2 | 5 | 3 | 1 |
| | Duration | 5.1-10 Yrs. | | 0 | 1 | 2 | 0 |
| | Group | | | 2 | 6 | 5 | 1 |
| 2.00 | Total | | | 2 | 6 | 5 | 1 |
| | Diabetes | 0.1-5 Yrs. | 1 | 51 | 71 | 24 | 1 |
| | Duration | 5.1-10 Yrs. | 0 | 5 | 12 | 10 | 0 |
| | Group | >=10.1 Yrs. | 0 | 3 | 3 | 4 | 1 |
| | | | 1 | 59 | 86 | 38 | 2 |

DISCUSSIONS

There is plethora a of study available in literature explaining the effects of DM on periodontium, effect of diabetes and orthodontic treatment, effect of trauma from occlusion and periodontium, effect of oral hygiene maintenance and glycemic control 0.40%, DM and oral complications etc. are well explained. In this study results shows that type -1 DM severely damages the periodontium in both normal as well as in malocclusion group.^{1,9,15}

In term of malocclusion types class1 crowding followed by class11 div.1 and followed by bimaxillary protrusion have more predilections for periodontal damage in both types of DM groups than in class1 spacing, Class11 div.2 and Class111 and normal occlusion group.

So, orthodontic intervention for malocclusion should be started to deaccelerate plaque deposition hence improve the glycemic control as well to achieve normal range of blood sugar. The normal occlusion provides less periodontal diseases due to the self- cleansing environment in the oral cavity. But maintaining the blood sugar level is more important and hence forth it is advisable for more stringent oral hygiene maintenance along with immediate consultation with periodontitis and orthodontist for maintaining good oral hygiene and normal alignment of teeth.⁹⁻¹⁵ When orthodontic treatment is started in plaque free oral cavity there is only 0.03mm of mm of gingival recession and 0.13mm of alveolar bone loss when compared with no treatment.^{11,12}

The HbA1c test provides an estimate of the average glucose level over the 30 to 90 days preceding the test. It does not account for short-term fluctuations in plasma glucose levels. In a patient with diagnosed diabetes, the haemoglobin A1c test (HbA1c) is used to monitor the patient's overall glycemic control. It is not recommended for diagnosis because there is not a gold standard assay for the HbA1c and because many countries do not have ready access to the test.^{7,11}

In type-1DM group maximum cases with periodontal damages are seen between 23-41 yrs. of age and during 0.1-5.0 yrs. of age of onset of DM, whereas in type- 2 DM group most of the periodontal disease cases are seen in above 41 yrs. of age and between 0.1-5.0 yrs. of detection of DM. so therefore it is also advisable that in both types-DM early detection of diabetes should be done. If any patients complain of periodontal problems should be taken as suspect of DM case and timely investigation should be prescribed.³¹ This two- way relationship points to a need to promote oral health in DM patients, and to implement a joint management protocol between endocrinologist and dentist/orthodontists that aims to create adequate conditions for early diagnosis and the effective treatment of both disease.^{5,13,21,29} Many studies have been published describing the bidirectional inter-relationship exhibited by diabetes and periodontal disease and has an impact on improvement of glycemic control evidenced by a decrease in demand for insulin and decreased also.

It is also observed in this study that patients with normal occlusion group with diabetes shows less severity of periodontal disease stage transition (as per Russell's index scoring) than in malocclusion group. So, it is recommended to prevent and effectively treat diabetes-associated oral and systemic disorders. These findings are in concordance with the finding of many studied. It will be easy to explain them about practices of keeping good oral hygiene and correction of maligned and crooked teeth. We suggest Follow-up to evaluate the effects of DM on periodontium of the teeth especially in patients with normal occlusion having clinically no plaque deposition to observe the effect of diabetes mellitus on periodontal disease.

CONCLUSIONS

We can conclude that diabetes mellitus on periodontal diseases was more prevalence in malocclusion group of

patients than in normal occlusion group of patients. It was also observed that in malocclusion group patients with Class1 crowding, Class11 div.1 & Class1 bimaxillary protrusion have more periodontal diseases than in Class1 spacing, Class 11 div. 2 and Class III malocclusions.

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