ASSESSMENT OF PREVALENCE OF PATHOLOGIC MIGRATION OF ANTERIOR TEETH IN A SAMPLE OF INDIAN SUBJECTS WITH MODERATE TO SEVERE PERIODONTITIS

Dental Science	
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ABSTRACT

The dispacement of teeth from their normal position in the dental arch is referred to as Pathologic migration and is a commonly challenging clinical situation encountered by clinicians. The anterior tooth of the dentition are most commonly affected and it may manifest in the form of diastema, extrusion, rotation, facial flaring or drifting. The time consuming complex therapeutic management of this condition warrants early detection and elimination of causative factors.

Objectives- To assess the prevalence and predominant types of pathologic migration in a sample of Indian subjects and to compare the severity of periodontal destruction in migrated and non migrated contralateral teeth.

Methods- A total of 486 patients were screened for the incidence of periodontitis ,out of which 149 patients with moderate to severe periodontitis were further evaluated for presence of pathlogic migration of anterior teeth. The incidence of different types of Pathologic tooth migration (PMT) was determined and the relationship between pathologic migration and attachment loss was analysed using statistical methods.

Results- A high percentage of patients (30.65%) were suffering from moderate to severe periodontitis. The most frequent forms of PMT included facial flaring followed by diastema formation. The teeth affected by pathologic migration had significantly more attachment loss when compared to contralateral tooth without migration.

Conclusion- The destruction of attachment appartus found in periodontal disease may play a major role in the etiology of Pathologic tooth migration (PMT).

INTRODUCTION

Displacement of teeth from their normal position- commonly referred to as Pathologic migration results in severe facial disfuguration, can devastate patient's self esteem, and is a common reason for patients seeking dental treatment. The management of pathologic migration is quite challenging for clinicians whch may require an interdisciplinary approach of periodontist, orthodontist and endodontist.[1] The differnt forms of pathologic migration include- diastema formation, rotation or extrusion of tooth and drifting. Pathologic migration occurs most frequently in the anterior region but posterior teeth may also be affected. It occurs when the balance between forces that maintain teeth in their physiological position is disturbed due to periodontal disease process.[2]

Common clinical conditions that can alter tooth position include habits such as tongue thrust, bruxism, lip habits, sucking habits and playing wind instruments, posterior bite collapse, periodontal inflammation and attachment loss.[3] Early detection and treatment of pathologic migration can prevent more serious involvement which requires complex and time consuming therapeutic management.

AIMS AND OBJECTIVES

- To assess the prevalence of different forms of pathologic tooth migration of anterior teeth in a sample of Indian subjects with moderate to severe periodontitis.
- To compare severity of periodontal destruction between migrated and contra-lateral non-migrated tooth in the same subject.

MATERIAL AND METHODS

A total of 486 subjects from the out patient department of Vananchal Dental College & Hospital and dental camps in the age group of 19-72 years having moderate to severe periodontitis having atleast 10 anterior teeth were examined. Exclusion criteria included patients with less than 10 anterior teeth, established diastema since eruption and a history of periodontal surgery in last 6 months.

Diagnosis of periodontitis was done according to **NHANES III**[4]

criteria Moderate (3-4mm CAL) and severe (5 mm CAL) periodontitis was diagnosed using **AAP,1999**[5] criteria≥

The following clinical parameters were recorded for all anterior teeth -

- **Probing pocket depth (PD):**[2] Williams graduated probe was used to measure the distance from the free gingival margin to the bottom of the gingival crevice/ pocket. Probing depth measurements was done on four sites- buccal/facial, mesial, distal and lingual/palatal surfaces.
- **Clinical attachment level (CAL):**[2] The distance between the base of the pocket and the cemento-enamel junction was measured at four sites of anterior teeth with help of Williams graduated probe.
- **Mobility:** mobility was recorded as per Millers classification as Grade I (distinguishable facio lingual movement of the tooth), Grade II (crown can deviate within 1mm of its normal position) and Grade III (tooth can move more than 1mm in any direction and can be suppressed in the socket).[2]
- **Missing teeth without replacement:** Any unreplaced missing tooth in both arches in anterior or posterior region was noted.
- **Plaque:** The plaque index (Silness and Loe 1964) with 0 score standing for no plaque, score 1 for a thin film of plaque adhering to free gingival margin, score 2 for moderate accumulation visible with naked eye, and a score 3 for abundant soft matter within gingival pocket.
- **Calculus:** The presence or absence of supragingival and or subgingival calculus was recorded.
- **Gingival Index: Loe & Silnes** for assessing the severity of gingivitis on anterior teeth on distofacial , mesiofacial, facial and lingual region on a score 0 to 3, with 0 denoting normal gingiva, 1 for mild,2 for moderate and 3 denoting severe inflammation with spontaneous bleeding.
- **Frenal attachment:** Labial freni were examined to evaluate the site of attachment and the presence or absence of frenum pull:[11]
- **Trauma from occlusion:**[6,7] was diagnosed by using Fremitus test to measure the vibratory pattern of teeth in contacting positions

and lateral and protrusive movements. The teeth that were displaced were identified and noted.
- **Parafunctional habits:** [1,8,9] Bruxism, clenching and other parafunctional habits were identified through history and occlusal examination, tongue thrust evaluated through examination of swallowing pattern.
- **The types of pathologic tooth migration** viz diastema, facial flaring, extrusion, rotation or tipping was recorded.

RESULTS AND ANALYSIS

A total of 486 patients (63% male, 37% female) in age group of 19 to 72 years (mean value 42.5±9.9 years) were examined, out of which 149 (30.65%) patients (98 males & 51 females) were suffering from moderate to severe periodontitis. 136 teeth of 78 patients (44 males, 34 females; ages 19 to 69, with mean age of 48.75 years) with pathologic migration of anterior teeth were further studied to determine frequency and type of pathological migration.

34 patients with 54 pairs of migrated and non-migrated were studied to evaluate if there is any relation between pathologic migration and attachment loss. Descriptive statistics was calculated for each variable. One way analysis of variance (ANOVA) was to compare 2 categories of teeth ($\alpha < 0.5$).

Table 1: Prevalence of PTM in Moderate to severe periodontitis patients on the basis of CAL and PD

S. No	Moderate periodontitis	Severe periodontitis	Total
1	87 patients	62 patients	149 patients

Table 2: Percentage of 136 teeth in 78 Subjects Presenting With Each Type of Displacement

S No	Types of PTM	No of teeth	Prevalence (%)
•	Facial flaring	47	34.55
•	Diastema	36	26.47
•	Extrusion	7	5.14
•	Rotation	19	13.99
•	Proximal tilting	27	19.85

Table 3: Comparison of mean total clinical attachment loss in migrated and non migrated teeth

	No PTM Group	PTM Group
Mean	3.00	5.70
Standard Deviation	1.22	1.91
T Value	-8.754	
P value	0.0003 (significant)	

Table 4: Mean and standard deviation of Gingival index (Loe and Silness) in migrated and non-migrated teeth

	No PTM Group	PTM Group
Mean	2.02	2.18
Standard Deviation	0.64	0.57
T Value	-1.31122	
P value	.096308 (not significant)	

Table 5: Mean and standard deviation of plaque index in migrated and non-migrated teeth

	No PTM Group	PTM Group
Mean	1.9	1.91
Standard Deviation	0.65	0.53
T Value	-0.11295	
P value	.45514 (not significant)	

Table 6: Mean and standard deviation of calculus index in migrated and non-migrated teeth

	No PTM Group	PTM Group
Mean	1.76	1.86
Standard Deviation	0.62	0.51
T Value	-0.92222	
P value	.179254 (not significant)	

Table 7: Mean and standard deviation of mobility in migrated and non-migrated teeth

	No PTM Group	PTM Group
Mean	0.33	0.88
Standard Deviation	0.61	1
T Value	-3.47066	
P value	.000376 (significant)	

Table 8: Mean and standard deviation of periodontal pocket depth in migrated and non-migrated teeth

	No PTM Group	PTM Group
Mean	3.02	5.77
Standard Deviation	1.42	1.92
T Value	-8.46186	
P value	< . 00001 (significant)	

DISCUSSION

In our study out of 486 patients, 149 patients (30.65%) were suffering from moderate to severe periodontitis, which is similar to other observations of T Kumar TS,[10] Vandana KL,[11] Rao S[12]. A high Indian population lives in rural areas with a poor health care infrastructure. Very few community health centers have dental surgeons but lack adequate instruments. Periodontal health was found to be better in females in our study which is similar to other studies of Cherry RT[13] and Rao S[12]. It may be attributed to increased health and hygiene awareness in females rather than any genetic predisposition. Facial flaring was the most common form of PTM in our study (34.55%) followed by diastema (26.47.0%), proximal tilting (19.85%) and rotation (13.99), while extrusion was found in 5.14% cases. Similarly Towfighi et al.[1] (1997) in their study found facial flaring (90%) and diastema (88.6%) as the most common form of PTM

Many studies have been done to compare the amount of attachment loss in control and migrated teeth that support the hypothesis that loss of alveolar bone may contribute to PTM. Towfighi et al., 1997 found that in all PTM cases (e.g. diastema, extrusion and facial flaring) the attachment loss (4.79 ± 0.28mm) was significantly greater than the control teeth (3.21 ± 0.18mm)

In our study 34 patients with 54 pairs of teeth affected by migration had significantly more attachment loss than contra lateral teeth without migration. The mean attachment loss of migrated teeth (5.70 ± 1.91 mm) was significantly greater ($P < 0.05$) than control non-migrated teeth (3.00 ± 1.22 mm). The results of these studies confirm clinical impressions that periodontal disease destruction of the attachment apparatus plays a major role in the etiology of PTM.

The mean of mobility index in non migrated teeth was 0.33 ± 0.61 and in the migrated teeth was 0.88 ± 1.0 which showed significant difference (p value <0.05). Similar result was found by the Martinez et al[14] (1997) who found that teeth with 25 percent bone loss have about 34 percent chances for PTM , and with bone loss reaching 50 percent, 80% of teeth will have PTM.. Selwyn 1973[15] compared bone levels in periodontal disease patients with and without migrated incisors and found more bone loss in the migrated group compared to the non migrated group ($P < 0.001$).

Comparison of periodontal pocket depth in both groups showed the mean of non migrated teeth was 3.02 ± 1.42 and in the migrated teeth it was found to be 5.77 ± 1.92 and this difference was significant statistically (p <0.05).

Limitations of our study is that the population studied was not a random sample and the subjective nature of determining whether the control teeth had any type of displacement or not. The other limitation of the study was the method of measurement using a manual probe, the use of a constant force automated probe in the study may have increased the reliability of the measurements.

CONCLUSION

On comparing the severity of periodontal destruction, clinical attachment loss, mobility and periodontal pocket depth showed significant statistical difference between migrated and contra lateral non migrated tooth in the same subject. Within the limitation of the study, it can be concluded that attachment loss from periodontal disease has an important role in the etiology of pathologic migration.

REFERENCES

1. Towfighi PP, Brunsvold MA, Storey AT, Arnold RM, Wilimam DE, Mc Mahan CA. Pathologic migration of anterior teeth in patients with moderate to severe periodontitis. J Periodontol 1997; (68) : 967-972
2. Carranza FA and Camargo PM. Periodontal response to external forces. In Newman MG, Takei HH, Carranza FA Textbook of Clinical Periodontology 10th ed. WB Saunders Co. Philadelphia 2003 : 378.
3. Katedra I Zaklad. Pathologic migration of Maxillary incisors and their periodontal status. Dent. Med. Probl.2006; 432: 245-251
4. L. N. Boriell, B. A. Burt, G. . Taylor. Prevalence and trends in periodontitis in the USA

　　　from the NHANES III to the NHANES, 1988 to 2000, J Dent Res 2005; 84 (10) : 924-930

5.　　Lindhe, Richard Ranney etal. Consensus report. Chronic Periodontitis. Ann Periodontol 1994; 4(1) : 38

6.　　Willitrn W, Hallmon, Stephen K, Harrel. Occlusal analysis, diagnosis and management in the practice of periodontics. Periodontol 2000, 2004; (34) : 151-164.

7.　　Michael deasy. Trauma from occlusion Handout, NJDS 2007; 12

8.　　Grain DA, Stem IB, Listgarten MA. Orthodontic measures in periodontal therapy. In Textbook of Periodontics 6th ed CV Mosby Co. Torronto 1988: 1018-1019

9.　　Demetriou N, Tsami- Pandi, Parshis A. Is it possible for periodontal patients to recognise periodontal disease. Stomatolgia (Athaenaji 1991; 47 : 284-295)

10.　Kumar TS, Dagli RJ, Chandrakant D, Prabhu D, Suhas K. Periodontal status of green marble mine labourers in Kesariyaji, Rajasthan, India. Oral Health Prevent Dent 2008; 6(3) : 217-221

11.　Vandana KL, Reddy MS. Assessment of periodontal status in dental fluorosis subjects using community periodontal index of treatment needs Indian J Dent Res 2007; 18(2) : 67-71

12.　Rao S, Homagain S, Singh BP. Periodontal status & treatment needs of an adult rural community. J Pierre Fauchard Acad 1993; 7(2) : 72-78

13.　Joseph PA, Cherry RT. Periodontal treatment needs in patients attending dental college hospital, Trivandrum. J Ind Soc Perio 1996; 20(3) : 67-71

14.　Martinez-Canut P, Carrasquer A, Magan R, Lorca A. A study on factors associated with pathologic tooth migration. J Clin Periodontol 1997; 24 : 492-497

15.　Selwyn S. An assessment of patients with periodontally involved migrated incisors. J Dentistry 1973; 1: 153-157