



e-ISSN: 2637-0611

Available online at  
<https://myjms.mohe.gov.my/index.php/corals>

Compendium of  
Oral Science

Compendium of Oral Science 11(1) 2024, 60 – 67

# Multidisciplinary Relationship between Periodontology and Orthodontic Department: A Clinical Audit Study

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## ARTICLE INFO

### Article history:

Received 12 June 2023

Revised 16 August 2023

Accepted 21 September 2023

Online first

Published 1<sup>st</sup> March 2024

### Keywords:

Orthodontics

Periodontology

Referral pattern

### DOI:

10.24191/cos.v11i1.26039

## ABSTRACT

**Objectives:** This study aims to assess the current practice among postgraduate students in the multidisciplinary interaction between the Periodontology and Orthodontic Departments in the Faculty of Dentistry, UiTM Sungai Buloh; we conducted clinical audit research.

**Material and methods:** Data retrieval from the Integrated Dental Record Management System (iDeRMS) was used to conduct our clinical audit.

**Results:** After receiving orthodontic treatment, 25% of the referral cases, according to our study, needed non-surgical periodontal therapy. Additionally, we discovered that 16.7% of patients required surgical periodontal treatment after being sent for orthodontic care.

**Conclusion:** A multidisciplinary approach might be necessary to successfully treat periodontal disease. As periodontal therapy is a requirement for the success of orthodontic treatment, and orthodontic treatment contributes to preserving periodontal health, a reciprocal link between the two specialities is essential.

## INTRODUCTION

Periodontitis is a chronic, multifactorial inflammatory disease, mainly caused by oral biofilm dysbiosis, characterised by clinical attachment loss (CAL), the presence of gingival bleeding, periodontal pocket, and radiographic alveolar bone loss, (Papapanou et al., 2018). It represents a significant worldwide health burden due to its high prevalence and associated morbidity. The advanced form of periodontitis may lead to tooth loss, and pathological tooth migration that negatively affects aesthetics and chewing function and subsequently impairs the patient's quality of life, (Tonetti et al., 2017). Periodontal therapy aims to maintain

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the health and integrity of the periodontal attachment apparatus and provide optimum supportive periodontal care. Clinical measurement of successful periodontal therapy is defined as the control of local and systemic risk factors, minimal full-mouth bleeding on probing (<10%), no periodontal pocket of  $\geq 4$ mm with bleeding on probing and significant improvement of other clinical parameters, (Caton et al., 2018). Nonetheless, periodontal therapy alone cannot restore masticatory dysfunction, aesthetic demand, and patient comfort, mainly when the disease is associated with malocclusion.

Orthodontic treatment is required to correct pathological tooth migration, including tooth drifting, flaring and elongation. In addition, it can be considered part of periodontal therapy as correcting malocclusion, perhaps reducing plaque accumulation, and facilitating oral hygiene maintenance, (Herrera et al., 2022). Other than that, standard orthodontic procedures such as molar-up-righting can facilitate restorative and occlusal therapy and prevent teeth over-eruption and future endodontic treatment, (Zasciurinskiene et al., 2016).

As per the fact that periodontitis negatively affects dental/ facial aesthetics and orthodontic therapy may reduce these impacts, a 'grey zone' remains to exist in this inter-relationship. Whether orthodontic treatment can safely be performed in periodontally compromised patients with pathological tooth migration, what periodontal criteria are considered acceptable for orthodontic treatment, and the appropriate timing for orthodontic treatment after completion of periodontal therapy remains unclear. Orthodontic treatment in periodontitis patients remains challenging for clinicians due to its devastating effects on periodontal conditions when a low percentage of total mouth plaque score cannot be maintained. It was shown in animal studies that orthodontic bodily movement in the presence of gingival inflammation caused significant widening of periodontal ligaments, and any tooth movement into an inflamed intrabody pocket leads to an increase in the rate of periodontal tissue destruction (Wennström et al., 1993; Ericsson and Thilander, 1978). Owing to those issues, many dental practitioners are reluctant to refer patients for orthodontic treatment due to the fear that orthodontic treatment might worsen the periodontal condition. Often, orthodontists only accept patients after they achieve periodontal stability, (Willmot 2008). Therefore, we conducted a clinical audit study to evaluate the current practice among postgraduate students in the multidisciplinary relationship between the Periodontology and Orthodontic Department in the Faculty of Dentistry, UiTM Sungai Buloh.

## **MATERIAL AND METHODS**

A clinical audit was conducted by evaluating all consultation notes from patients treated by postgraduate students under the Periodontology Department (PD) and Orthodontic Department (OD), Faculty of Dentistry, University Teknologi MARA, Sungai Buloh Campus, Malaysia. After the specialists' discussion, the information included the reasons for consultation and treatment options. Inclusion criteria in this study were 1) patients treated under Periodontology and Orthodontic Department from 2016 to 2022, 2) all cases consulted in written form between both departments for an explanatory reason, and 3) a clear and detailed record of the patient's problem. The exclusion criteria in this study were 1) the patient was evaluated without writing a consultation note and 2) incomplete explanatory information in the consultation note.

Our clinical audit was conducted using Integrated Dental Record Management System (iDeRMS) data retrieval. The data were first retrieved through the 'Referral' column in iDeRMS. Only patients referred through the system from both departments were evaluated individually. Data extracted included age, gender, oral hygiene status during the consultation, a periodontal condition during referral, acceptance for orthodontic treatment, and treatments needed before and following referral.

## Statistical Analysis

The age of the patients was presented as mean and standard deviation. All the categorical data were calculated as frequencies and percentages.

## RESULTS

Within seven years, 18 patients were consulted and referred from PD to OD through iDeRMS. A higher number of male patients (66.7%;  $45.8 \pm 10.8$  years) than female patients (33.3%;  $47.0 \pm 7.3$  years) as seen in Table 1. The highest reason for consultation was for the correction of drifted/ flared/ over-erupted teeth (33.3%), whereas correction of overjet/ overbite and before implant placement were the least (11.1% each) (Table 2). Among the periodontally unstable patient consulted with the orthodontic department, 9 of them were accepted for orthodontic treatment. However, the treatment required before initiating orthodontic treatment was the extraction of hopeless and orthodontically indicated teeth, fillings, space maintainer for prosthesis, endodontic treatment, and open flap debridement. 2 of the periodontally unstable patients were deferred from orthodontic treatment due to presence of periodontal pocket. Periodontal therapy needs to be given until periodontal stability is achieved—most of the patients accepted for orthodontic treatments require supportive periodontal care concurrent with orthodontic therapy.

The total number of patients referred from OD to PD was 21, and the reasons for referral were grouped under eight categories (Table 3). In contrast with PD to OD, most patients referred from OD were younger ( $26.4 \pm 8.5$  years), and most were female (85.7%). Only two patients were referred for management of periodontitis before orthodontic treatment. 90.5% of patients were periodontally stable. The highest reason for referral was for correction of a gummy smile (19%) and extraction (19%). On the other hand, removal of gingival epulis and crown lengthening for posterior teeth were the least (4.8 % each) (Tables 3 and 4).

The Table 5 summarizes the types of treatment needed for patients before referral to the Orthodontic Department. The most common treatment was no treatment, which was required for 5 patients, representing 21.7% of the cases. Extraction was needed for 8 patients, or 34.8% of the cases. A space maintainer was required for 1 patient, which is 4.3% of the cases. Filling was necessary for 2 patients, or 8.7% of the cases. Endodontic treatment was required for 2 patients, which is also 8.7% of the cases. An implant was needed for 1 patient, or 4.3% of the cases. Surgical periodontal treatment was required for 3 patients, which is 13.0% of the cases. Finally, supportive periodontal care was needed for 1 patient, or 4.3% of the cases.

Table 6 summarizes the types of treatment needed for patients referred to the Orthodontic Department. The most common treatment is supportive periodontal care, which was required for 5 patients, representing 41.7% of the cases. Non-surgical periodontal therapy was needed for 3 patients, or 25.0% of the cases. Surgical periodontal therapy was required for 2 patients, which is 16.7% of the cases. Extraction was necessary for 1 patient, or 8.3% of the cases. Finally, crown build-up was required for 1 patient, which is also 8.3% of the cases.

Table 1: Demographic distribution of patients referred from the Periodontology Department to the Orthodontic Department

Gender	<i>n</i>	%	Age
Female	6	33.3	$47.0 \pm 7.3$
Male	12	66.7	$45.8 \pm 10.8$
Total	18	100.0	$45.0 \pm 9.7$

Table 2: Reasons for consultation from Periodontology Department to Orthodontic Department and periodontal condition during referral

Reason for consultation	Periodontal condition during consultation				Total	
	Stable		Unstable		n	%
	n	%	n	%		
Correction of drifted/ flared/ over-erupted teeth	2	11.1	4	22.2	6	33.3
Space closure	2	11.1	2	11.1	4	22.2
Crowding	1	5.6	3	16.7	4	22.2
Correction of overjet/ overbite	-	-	2	11.1	2	11.1
Prior to implant placement	2	11.1	-	-	2	11.1
Total	7	38.9	11	61.1	18	100

Table 3: Demographic distribution of patients referred from Orthodontic Department to Periodontology Department

Gender	n	%	Age
Female	18	85.7	26.0 ± 9.0
Male	3	14.3	28.7 ± 4.0
Total	21	100.0	26.4 ± 8.5

Table 4: Reasons for consultation from Orthodontic Department to Periodontology Department and periodontal condition during referral

Reason for consultation	Periodontal condition during consultation				Total	
	Stable		Unstable		n	%
	n	%	n	%		
Correction of gummy smile	4	19.0	-	-	4	19.0
Extraction	4	19.0	-	-	4	19.0
Gold chain placement/exposure	3	14.3	-	-	3	14.3
Management for periodontitis	-	-	2	9.5	2	9.5
Removal of mini dental implant	2	9.5	-	-	2	9.5
Frenectomy	2	9.5	-	-	2	9.5
Gingival recession	2	9.5	-	-	2	9.5

Gingival epulis	1	4.8	-	-	1	4.8
Crown lengthening (posterior teeth)	1	4.8	-	-	1	4.8
Total	19	90.5	2	9.5	21	100

Table 5: Treatment needed before referral to Orthodontic Department

Types of Treatment	Number of Patients	%
No treatment	5	21.7
Extraction	8	34.8
Space maintainer	1	4.3
Filling	2	8.7
Endodontic treatment	2	8.7
Implant	1	4.3
Surgical periodontal treatment	3	13.0
Supportive periodontal care	1	4.3

Table 6: Treatment needed following referral to Orthodontic Department

Types of Treatment	Number of patients	(%)
Supportive periodontal care	5	41.7
Non-surgical periodontal therapy	3	25.0
Surgical periodontal therapy	2	16.7
Extraction	1	8.3
Crown build-up	1	8.3

## DISCUSSION

Orthodontic tooth movement potentially causes further periodontal attachment loss, increased gingival inflammation, root resorption and undesired aesthetics due to loss of interdental papilla and gingival recession. Therefore, it is recommended that the orthodontic treatment be implemented only after the patients reach the endpoint of periodontal therapy, considering regenerative medicine. It is evident that orthodontic therapy causes no detrimental effect on periodontal conditions in successfully treated periodontitis patients, provided the result of the treatment is maintained throughout the therapy. Clinicians

should acknowledge that the complexity of the treatment is more significant compared to non-periodontitis patients as they require more intricate devices and appliances, which specialists can only implement with advanced training. Maintaining excellent oral hygiene at home is the most crucial part, and the patients should be informed regarding the long-course treatment costs and the requirement for frequent visits that impose higher costs (Martin et al., 2022).

Our study found that 25% of the referral cases required non-surgical periodontal therapy following the completion of orthodontic treatment. This might be due to the recurrence of periodontitis during orthodontic treatment. According to Treatment of Stage IV Periodontitis: The EFP S3 Level Clinical Practice Guideline 2022, periodontal conditions of the patient should be closely monitored, and whenever there is a recurrence of periodontitis, orthodontic treatment should be suspended, all appliances should be in passive mode, whilst periodontal therapy should be restored until the inflammation is wholly resolved, (Herrera et al., 2022).

We also found that 16.7% of the patients required surgical periodontal therapy following referral to orthodontic treatment. Nevertheless, periodontitis is not a contraindication for orthodontic treatment. Based on the current evidence, the application of orthodontic forces can be initiated during periodontal therapy as early as four weeks or delayed after six months. A randomised clinical trial conducted by Zasčiurinskienė et al. 2018 found that the group that received periodontal treatment simultaneous with orthodontic treatment showed no significant difference in the change of clinical attachment gain and pocket depth reduction compared to the control group that received orthodontic treatment after completion of cause-related periodontal therapy. The only difference was the treatment duration that increased in the control group, suggesting both treatment strategies could be applied in the routine treatment of periodontitis patients (Zasčiurinskienė et al., 2018). A study by Jepsen et al. 2021 involving 43 patients with Stage IV periodontitis that were randomised to receive early or late orthodontic treatment following regenerative therapy found no significant difference between both groups in terms of clinical attachment gain, (Jepsen et al., 2021).

Nowadays, the number of patients seeking dental aesthetic treatments keeps on increasing. We found a higher number of young patients referred from OD to PD, primarily females. This finding is comparable with the previous study. This might be due to the higher aesthetic expectation among female patients compared to males, (Kurem, Topsakal, and Ozturk; 2021). Correction of gummy smile, gingival recession, and removal of gingival epulis are aesthetic treatments provided in the periodontal clinic. This study observed that the highest number of referrals from OD to PD is for atraumatic extraction of orthodontically indicated teeth. The referral is based on the demand for research purposes conducted among postgraduate students in the periodontology department.

One of the study limitations is the lack of referral between both disciplines. This might be due to a need for more utilisation of an integrated online system, especially during the initial course of its usage. This report cannot represent the inter-relationship between both departments due to a lack of documentation. We also suggested improving consultation notes in the online system by providing a "consultation note" column. Each consultation notes need to be approved by the specialists involved to ensure a better record for future use. Frequent consultations with specialists should be encouraged to provide optimal patient care. Developing clinical practice guidelines for referral pathways between both departments could be the key to strengthening this relationship.

## CONCLUSION

A multidisciplinary approach may be required to achieve successful results in periodontal treatment. A symbiosis relationship between both disciplines is crucial as orthodontic treatment contributes to maintaining periodontal health, and periodontal therapy is the prerequisite for the success of orthodontic treatment.

## CONFLICT OF INTEREST STATEMENT

The author declares no conflicts of interest related to this study.

## DECLARATION OF FUNDING

There was no explicit grant for this research from any funding organisation in the public, private, or non-profit sectors.

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