Journal of Positive School Psychology http://journalppw.com
2022, Vol. 6, No. 12, 1836-1849

Decoding The Sequence Of Intervention And Subsequent Therapeutic Proposal Between Orthodontic And Periodontal Treatment In Cases Having Compromised Periodontal Health- A Systematic Review

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Abstract:

Introduction: With increasing range of age of the patients wiling for orthodontic therapy the scope of it has flourished. Increasing the number of patients with periodontal problems. Orthodontic therapy of periodontally compromised teeth can improve periodontal conditions. Thus studying the inter-relationship is impostant. **Aim:** To decode the sequence of intervention and subsequent therapeutic proposal between orthodontic and periodontal treatment in cases having compromised periodontal health. **Methodology:** The data for this narrative review was collected through literature survey conducted on search engines like PubMed, Google Scholar and Cochrane Library. The analysis covered the period till December 2021. All the studies analyzing the various periodontal defects and orthodontic treatment were screened and filtered according to the inclusion and exclusion criteria. Two researchers screened and analyzed the data from the mentioned search engines. **Results**: After screening the data from the search engines and filtering them according to inclusion and exclusion criteria, a total of 7 articles were included in this narrative review. The articles included Randomized Controlled Trials and Clinical Controlled Trials. **Conclusion:** Periodontal treatment in conjunction with orthodontic treatment can improve the overall oral health in periodontally compromised patients.

Introduction

The intent of orthodontic treatment is facial and dental aesthetics and upgrading the masticatory function. There is a continuous increase in the number of adult patients who are actively seeking orthodontic treatment which has widened the scope of orthodontics and increased the upper age limit for orthodontic intervention. It also an undeniable fact that incidence of periodontal disease increases with age. Therefore, the number of patients with periodontal problems that attend orthodontic practices is significantly greater than in the past[1].

As shown in figure 1, some adults have loss of teeth or periodontal support which can result in pathological teeth migration ending in the development of a midline diastema or generalized spacing with or without incisal proclination, rotation or tipping of bicuspids and molars with the collapse of the posterior occlusion[2].

Figure 1: Incisor Proclination, Extrusion, Spacing & other signs of periodontitis[3].

Figure 2 shows Dehiscence and formation of Midline Diastema and its correction[4].

(a)

(b)

Figure 3(a) shows gingival recession due to abnormal root torque[5].

Figure 3(b) shows correction of root torque and adequate periodontal support[5].

Orthodontics may be a mode of treatment when periodontally involved teeth are repositioned or when tooth position is altered within certain limits. Some of the bone changes induced during tooth movement may be potentially Osteogenic and alter bony deformities and contours.

When moving teeth orthodontically, the entire periodontal attachment apparatus, including the osseous structure, the PDL, and the soft tissue components (as shown in figure 3), moves with the tooth[6]. Based on the understanding of the same theory, repositioning of tipped molars orthodontically have shown improvement in the periodontium.

Complete Rehabilitation can be achieved in both esthetics and masticatory function by orthodontic therapy in adult patients if they are motivated while providing for good long term prognosis [7].

With little detrimental effects Adult orthodontics can be done on both healthy and diseased periodontia for patient's betterment. The center of resistance in periodontally compromised dentitions is more apical due to loss of alveolar bone making the teeth more prone to tipping than to moving bodily[8]. Thus, treatment is often limited to different types of tooth alignment. The use of segmental arch mechanics to provide incisor intrusion, with light forces, has been recommended to correct a deep overbite and to level arches in non-growing patients, instead of molar extrusion[9]. Thus, such a combination of orthodontic intrusion and periodontal therapy shows improved periodontal

conditions, if oral hygiene is meticulously maintained.

Periodontal disease and its sequelae often lead to unaesthetic and functional problems, either alone or with other restorative problems.

Adult orthodontic therapy has a role in providing complete cure in terms of both appearance and function with an acceptable long-term prognosis[7]. The reasons for instituting orthodontic treatment may be of greater significance, once chronic destructive periodontal disease has caused a significant pattern of loss of the periodontal supporting structure. It has been proposed that orthodontic treatment may be used to attain more favorable bone levels and contours in periodontally involved cases.

This inter-relationship between Orthodontics and Periodontics often resembles symbiosis. In many adult cases periodontal health is improved by orthodontic tooth movement, whereas orthodontic tooth movement is also often facilitated by periodontal therapy. Mutual aid by the periodontist and orthodontist can ensure excellent results with long-term stability. The outcome of an orthodontic treatment is not only a perfectly aligned row of teeth, it's a sum of many periodontal aspects viewed from a very critical and ethical point of view.

Aims and Objectives

The Aim of this Systematic Review is to decode the sequence of intervention and subsequent therapeutic proposal between orthodontic and periodontal treatment in cases having compromised periodontal health on the basis of scientific evidences from the existing literature on all the peer-reviewed orthodontic journals according to the Cochrane collaboration principles.

This systematic review is undertaken to answer the following questions:

1. The sequence of treatment between Orthodontic and Periodontal Interventions in Periodontally Compromised Conditions.
2. What Orthodontic Treatment Protocols to follow for given Periodontally Compromised State?

Methodology

Table 1

Search Strategy Score	
MeSH Term[a]	**Search Results**
Orthodontics, Periodontitis	8971
Orthodontics, Gingival Recession	614
Orthodontics, Trauma From Occlusion	396
Orthodontics, Bony Defects	258
Orthodontics, Dehiscence	219
Orthodontics, Fenestration	122

a- MeSH indicates Medical Subject Headings

The strategy for preparing this systematic review was according to the guidelines of the Cochrane Handbook for Systematic Reviews of interventions[10]. For this

systematic review, all the studies that have analyzed the sequencing of treatment and subsequent protocols for treatment for Periodontally compromised state were screened through literature survey conducted on search engines like PubMed, Google Scholar and Cochrane Library. The analysis covered the period till December 2021 using the Medical Subject Heading (MeSH) terms like "Orthodontics" which was crossed with "Periodontitis" and "Orthodontics" which was crossed with "Gingival Recession" , "Orthodontics" which was crossed with "Trauma From Occlusion", "Orthodontics" which was crossed with "Bony Defects", "Orthodontics" which was crossed with "Dehiscence" and "Orthodontic" which was crossed with "Fenestration" (Table 1).

Eligibility criteria for study selection

- **Types of Studies:**

  Randomized Clinical Trials and Controlled Clinical Trials of Periodontally Compromised individuals treated with Orthodontic Treatment.

- **Participants:**

  Patients with Compromised Periodontal Health. No restriction was set for number of participants.

- **Types of Intervention:**

  Active intervention: Orthodontic followed by Periodontal Treatment or Periodontal Treatment followed by Orthodontic Treatment.

  Control: Exclusive Periodontal Therapy or Periodontal Treatment followed by Orthodontic Treatment.

- **Outcome Measures:**

  Does Orthodontic intervention cause improvement of Periodontal Condition and if it does improve, in how much time.

Selection Criteria

- ✓ **Inclusion Criteria**
  - ✓ The following study types that reported data on the treatment effects are included: Randomized Clinical Trials (RCTs) and Controlled Clinical Trials (CCTs). Randomized Clinical Trials of Periodontally Compromised individuals treated with Orthodontic Treatment with or without periodontal therapy. Full free text. No restrictions are set for sample size. Included articles are published till December 2021 in English language. The studies which were done on adult patients have been considered.

- ✓ **Exclusion Criteria**
  - Laboratory studies, descriptive studies, epidemiologic studies, case reports, case series, reviews, and opinion articles are all excluded.

Data collection and analysis

According to the recommendations by Xianrui Yang[11] data are collected on the following items: year of publication, sample size, study design (RCT and CCT), treatment, success rate, and authors' conclusion. In addition, to document the methodological soundness of each article, a quality evaluation is done with respect to specific domains confounding bias, selection bias, bias in measurement of intervention, loss to follow-up/missing data, detection bias and reporting bias. By using domains judgment regarding risk of bias for each study is assess. Present of bias YES suggest high risk of bias and NO suggest low risk of bias.

Quality assessment of the articles in the study

The quality of each article was scored by using an adapted version of 3 methods previously used by Fudalej and

Antoszewska[12], Cozza et al[13], and Chen et al[14]. The following characteristics were evaluated: Study design, Sample size, Sample description, Error analysis, and Statistical Analysis. Each characteristic received a score according to the criteria described in Table II. The quality of each study was categorized as High (7-9 points), Medium (4-6 points), or Low (0-3 points). The data from the selected articles were divided into 2 groups according to the sequencing of treatment i.e. Orthodontic followed by Periodontic or Periodontic followed by Orthodontic.

Table - II

Methodological quality scoring protocol (maximum score: 9 points)	
Study Design	3 points: randomized clinical trial 2 points: if randomization process is not well described, or if it was a controlled prospective study 1 point: uncontrolled prospective study 0 point: retrospective study or not mentioned
Sample Size	1 point: more than or equal to 15 subjects or prior estimate of sample size 0 point: less than 15 subjects and no prior estimate of the sample size
Sample Description	2 points: description of all 3 items (age, periodontal condition, severity) 1 point: only 2 items described 0 point: only 1 item described
Error Analysis	1 point: error analysis value cited 0 point: error analysis value not cited, or error analysis not Performed
Statistical Analysis	2 points: adequate 1 point: partially adequate 0 point: no statistical tests conducted

Table - III

Authors & year of publication	**Study Design**	**Sample Size**	**Sample Description**	**Error Analysis**	**Statistical Analysis**	**Total Score**
Shigeki Ogihara & Hom-Lay Wang[15] (2010 Dec)	3	1	2	1	2	**9**

Jin Zhang, Ai-Min Zhang, Zong-Mei Zhang, Jin-Lin Jia, Xin-Xin Sui, Lu-Rui Yu, and Hai-Tao Liu[16] (2017 Aug)	3	1	2	0	2	**8**
Eglė Zasčiurinskien, Nomeda Basevičienė, Rune Lindsten, Christer Slotte, Henrik Jansson, Krister Bjerklin[17] (2018 Feb)	3	1	2	0	2	**8**
Eglė Zasčiurinskien, Henrik Lund, Rune Lindsten, Henrik Jansson[3] (2019 Nov)	3	1	2	1	2	**9**
Eglė Zasčiurinskien, Henrik Lund, Rune Lindsten, Henrik Jansson and Krister Bjerklin[18] (2019 Nov)	3	1	2	1	2	**9**
Morten Godtfredsen Laursen, Mette Rylev and Birte Melsen[19] (2020 Jan)	2	0	2	1	2	**7**
Karin Jepsen, Christina Tietmann, Eric Kutschera, Peter Wüllenweber, Andreas Jäger, Daniele Cardaropoli, Lorena Gaveglio,	3	1	2	1	2	**9**

Ignacio Sanz Sanchez, Conchita Martin, Rolf Fimmers, Søren Jepsen[20] (2021 Oct)						

Study Characteristics

Table - IV

Place /Year	Study Design	Treatment Modality		Mean Age (in years)		PPD (in mm)		CAL (in mm)	
		Test/n	Control/n	Test	Control	Test	Control	Test	Control
Tokyo, Japan[15] 2010	RCT	Ortho/EMD /DFDBA (n = 24)	EMD /DFDBA (n = 23)	50.5 ± 11.5	55.6 ± 9.4	6.75 ± 1.29	6.43 ± 0.72	7.29 ± 1.20	7.26 ± 0.96
Dongying, China[16] 2017	RCT	Combined Orthodontic Periodontic Treatment, n = 59 (38 men, 21women)	Basic Periodontic Treatment, n = 58 (30 men, 28 women)	36.5 ± 5.8	34.8 ± 6.1	3.76 ± 0.56	3.55 ± 0.64	3.59 ± 0.94	3.47 ± 0.88
Kaunas, Lithuania[17] 2018	RCT	Leveling & Alignment - Periodontic Treatment (n = 25)	Periodontic Treatment - Leveling & Alignment (n = 25)	47.31 ± 1.62	43.49 ± 2.27	4.99 ± 0.25	4.97 ± 0.17	5.28 ± 0.21	5.24 ± 0.23
Kaunas, Lithuania[3] 2019	RCT	Leveling & Alignment - Periodontic Treatment (n = 25)	Periodontic Treatment - Leveling & Alignment (n = 25)	47.31 ± 1.62	43.49 ± 2.27	4.99 ± 0.25	4.97 ± 0.17	5.28 ± 0.21	5.24 ± 0.23
Kaunas, Lithuania[18] 2019	RCT	Leveling & Alignment - Periodontic Treatment	Periodontic Treatment - Leveling	47.31 ± 1.62	43.49 ± 2.27	4.99 ± 0.25	4.97 ± 0.17	5.28 ± 0.21	5.24 ± 0.23

		(n = 25)	& Alignment (n = 25)						
Aarhus, Denmark [19] 2020	CCT	Orthodontic Root Corrections using Segmented Appliance (n = 12)		28	28	≤1	≤1	-	-
Bonn, Germany [20]	RCT	Early OT (n = 23)	Late OT (n = 20)	45.4 ± 11.9	52.0 ± 9.4	7.3 ± 1.6	7.1 ± 1.7	9.8 ± 2.5	9.2 ± 2.5

Results

The search strategy resulted in 10580 articles. After selection according to the inclusion/exclusion criteria articles qualified for the review analysis [3,15-20]. The 7 articles included six RCT [3,15-18,20] and one CCT[19]. The main reasons for exclusion are: case reports, reviews, opinion articles. Out of the seven studies reviewed, one study was conducted in Japan [15], one in China[16], three in Lithuania [3,17&18], one in Denmark[19] and one in Germany [20].

✓ **Study Design and treatment modalities**

Two articles[15&16], are RCT's where the Test Group was treated with Combination of Orthodontic and Periodontic Treatment (Ortho/EMD /DFDBA), while the Control Group was treated by Periodontic Treatment alone (EMD /DFDBA). Four articles[3,17,18,20] are RCT's where the Control Group was treated with Late Orthodontic Therapy followed by Periodontal Therapy (Periodontic Treatment - Leveling & Alignment). and the Test Group was treated with Early Orthodontic Therapy (Leveling & Alignment - Periodontic Treatment). One CCT[19] included treatment of periodontal lesion exclusively by Orthodontic Treatment.

✓ **Age of groups**

The age range of the patients in studies [3,15,17,18,20] included in 45-52 years. The study[16] had the age group of 34-36 years. The study[19] included subject aged 28years.

➢ **Periodontal Probing Depth**

The periodontal probing depth was evaluated and assessed in all the included study. In the study by **Ogihara et al[15]**, the baseline PPD was 6.67 ± 0.89 mm in Control Group and 7 ± 1.91 mm in the Test Group at Baseline. PPD at 1 year reduced to 2.58 ± 0.51 mm in control group and 2.29 ± 0.49 mm in the Test Group. PPD reduction of 4.08 ± 0.67 in the Control whereas 4.71 ± 2.14 mm in the test group was seen though the p value of the same was 0.43. In the study conducted by **Zang et al,[16]** the PPD for the Test Group was 3.76 ± 0.56 mm, after 6 months it was 2.58 ± 0.51 mm and after 18 months it was reduced to 1.72 ± 0.45 mm, whereas in the Control Group the PPD at Baseline was measured to be 3.55 ± 0.64 mm, after 6 months it was reduced to 2.79 ± 0.57 mm and after 18 months it was reduced to 1.94 ± 0.53 mm. According to the study by **Zasčiurinskienė et al[3,17,18]** the PPD in the Test Group was 4.99 ± 0.25 mm and the Control Group was 4.97 ± 0.17 mm at Baseline. PD change T0-T2 showed no significant difference between different teeth and was mean 2.72 (SD 1.25) mm. The study by **Laursen et al,[19]** showed no change in the PPD before or after the treatment and was measured to ≤1mm in all the patients. In the study by **Jepsen et al,[20]** the PPD at the Baseline was distributed equally and showed statistically significant

improved outcomes after 12 months ($p<0.0001$).

- **Clinical Attachment Loss**

According to the study by **Ogihara et al**,[15] the Clinical Attachment Loss at Baseline was measured to be 7.25 ± 1.22 mm in the Control and 7.57 ± 1.61 mm in the Test Group. After 12 months it was reduced to 3.42 ± 0.67 mm in the Control Group i.e. a gain of 3.83 ± 0.83 mm and 3.29 ± 0.76 mm in the Test Group i.e. a gain of 3.71 ± 0.76mm. The study by **Zhang et al**[16] showed Clinical Attachment Loss of 3.59 ± 0.94 mm at Baseline, after 6 months 1.93 ± 0.78 mm and after 18 months 0.45 ± 0.14 mm in the Test Group. While the Control Group showed a Clinical Attachment Loss of 3.47 ± 0.88 mm at Baseline, 2.24 ± 0.82 mm after 6 months, and 1.53 ± 0.35 mm after 18 months of treatment. According to the study conducted by **Zasčiurinskienė et al** [3,17,18] the Clinical Attachment Loss was measured to be 5.28 (5.07, 5.49) mm in the Test Group and 5.24 (5.02, 5.47) mm in the Control Group at Baseline. At T2 (T2 was considered as the end of the treatment) the Clinical Attachment Loss levels were found to be 4.85 (4.67, 5.01) mm in the Test Group and 4.81 (4.59, 5.04) mm in the Control Group. The p value for change individually in both Test and Control group was found to be < 0.0001. According to a study performed by **Laursen et al**[19]**,** the Clinical Attachment Loss levels were not accounted. According to a study by **Jepsen et al,**[20] the Clinical attachment Levels in the Test Group were measured to be 9.8 ± 2.5 mm at Baseline, 5.1 ± 1.9 mm at 6months and 4.4 ± 1.7 mm at 12 months post treatment whereas in the Control Group 9.2 ± 2.5 mm at Baseline, 5.1 ± 2.1 mm at 6 months post treatment and 4.7 ± 2.4 mm 12 months post treatment.

- ✓ **Quality Analysis**

With regard to the quality standard of the retrieved investigations, research quality is low in four studies[3,16,17,18] and moderate in 2 studies.[15,20] The selection description is adequate in all studies. Withdrawals (dropouts) are declared only in the RCT Study[20] and in this study the number of dropouts was four. All articles used proper statistical methods.[3,15,16,17,18,19,20] Five article used blinding in measurements.[3,16,17,18,20] No article declared a previous estimate of sample size.

Discussion

Orthodontic treatment aims at providing an adequate functional and aesthetic occlusion with appropriate tooth movements. These movements are stout, in relation to interactions of teeth with their supportive periodontal tissues. In current years, because of the rising number of adult patients seeking orthodontic therapy, patients with periodontal problems have risen. A look upon esthetics, like uneven gingival margins and/or functional problems resulting from any periodontal disease should be taken into consideration while planning orthodontic treatment. In addition, cases with severe periodontitis, orthodontics may perk up the potential of saving and restoring a deteriorated dentition.

In this systematic review, there were 10580 articles that were reviewed. After filtering them through the inclusion and exclusion criteria for this systematic review, there were seven that were selected in the end. It was clear from this systematic review that the parameters that are essential to be evaluated during the orthodontic diagnosis and treatment planning are Periodontal Probing Depth (PPD) and Clinical Attachment Loss (CAL).

According to a study by **Ogihara et al**[15], Forty-seven randomized patients, mean age of 53±10.7 years, were allocated into two intervention groups: ortho/EMD/DFDBA (n = 24) and EMD/DFDBA (n = 23). All patients either had a 2- or 3-wall infrabony defect of ≥6 mm deep. Primary aim was to assess change in probing depth and clinical

attachment. Along with the assessment of change in open probing attachment level gain and percentage defect resolution from baseline to 6-month re-entry surgery level from baseline to 1-year follow-up. They concluded that though both treatment modalities were effective in managing 2- or 3-wall infrabony defects, limited orthodontics provided an additional benefit to EMD/DFDBA in 2-wall defects.

According to a study by **Zang et al[16]**, 117 patients with periodontitis were randomly assigned to the basic group (receiving Basic Periodontic Treatment, n = 58) and the combined group (receiving Combined Orthodontic-Periodontic Treatment, n = 59). 52 healthy individuals free of periodontal disease were also chosen as the normal group. The following measurements were made: probing depth, tooth mobility, plaque index, clinical attachment level, and sulcus bleeding index. The study aimed to investigate the efficacy of combined orthodontic-periodontic treatment in the treatment of patients with periodontitis and its effects on the levels of inflammatory cytokines. The study showed that Combined orthodontic-periodontic treatment had good clinical efficacy in the treatment of periodontitis and could effectively decrease the levels of inflammatory cytokines

According to a study by **Zasčiurinskienė et al[17]**, Fifty periodontal patients were randomly assigned to the test or control groups according to periodontal treatment timing. All patients received supra- and sub-gingival debridement following baseline examination. Before beginning orthodontic treatment, patients in the control group got cause-related periodontal therapy, whereas patients in the test group underwent this procedure concurrently with orthodontic therapy. No difference between the test and control groups was found regarding change of clinical attachment level after periodontal-orthodontic treatment. Fewer sites with initial pocket depth of 4-6 mm healed after periodontal-orthodontic treatment in the test group in comparison with controls ($p=0.03$). Anterior teeth and teeth in male patients had a greater chance for PD improvement ≥2mm. Total periodontal-orthodontic treatment duration was significantly longer for the control group ($p<0.01$). Based on the results of this trial we conclude that orthodontic treatment, simultaneously to the periodontal treatment, could be used in the routine treatment of patients with plaque-induced periodontitis.

According to a study by **Zasčiurinskienė et al[3],** a total of 50 patients with periodontal defects were included in the study. All patients received sub-gingival debridement following baseline examination. Control group patients received final periodontal treatment before the start of OT. For the test group patients final periodontal treatment was performed simultaneous to OT. OT was performed with a straight-wire appliance. For posterior anchorage Microimplants or temporary crowns on implants were used when needed. ABL measurements were made on CBCT of 3821 tooth surfaces. The aim was to examine alveolar bone level (ABL) changes before (T1) and after (T2) orthodontic treatment (OT) in subjects with periodontal disease. ABL changes after periodontal–orthodontic treatment in patients with periodontal disease were small. ABL gain was more observed on mesial and distal surfaces and ABL loss on buccal and lingual surfaces. ABL gain was influenced by orthodontic movements of maxillary incisors.

According to a study by **Zasčiurinskienė et al[18],** included 50 patients with periodontal disease. Sub-gingival debridement by ultrasonic instrumentation supplemented with hand instruments was performed by experienced dental hygienist after baseline examination

for all patients. For the control group, final periodontal treatment was performed before orthodontic tooth movement. For the test group patients, final PT was performed after leveling and alignment phases were finished, before the active space closure with elastic chain and/or inter-arch elastic traction for sagittal correction was started. Orthodontic Treatment was performed with a straight-wire appliance. Micro-implants or implants were used for posterior anchorage. The aim of this study was to examine External Apical Root Resorption after Orthodontic Treatment in subjects with periodontal disease and to analyze how intrusion and change in inclination of the most proclined maxillary incisors influence External Apical Root Resorption. Orthoodntic Treatment in conjunction with periodontal treatment in periodontal patients resulted in External Apical Root Resorption in 81 per cent of all single-rooted teeth. Intrusion and change in inclination angle of the most Proclined maxillary central incisor influenced the extent of External Apical Root Resorption, as did longer Orthodontic Treatment.

According to a study by **Laursen et al[19],** Twelve consecutive adult patients with a mandibular incisor presenting buccal or lingual gingival recession and with the root positioned outside the alveolar bone were enrolled. The roots were moved toward the center of the alveolar process with a goal oriented segmented appliance. The following variables were measured at baseline and after orthodontic treatment: (1) recession depth, (2) recession width, and (3) recession area. In addition, pocket probing depth, keratinized tissue height, and changes in Miller's classification were registered. All patients improved in Miller's classification from Class III and IV to Class I or II. Orthodontic correction of the root toward the center of the alveolar envelope consistently reduced gingival recessions. The changes in Miller's classification indicated improved prognosis for full root coverage with mucogingival surgery.

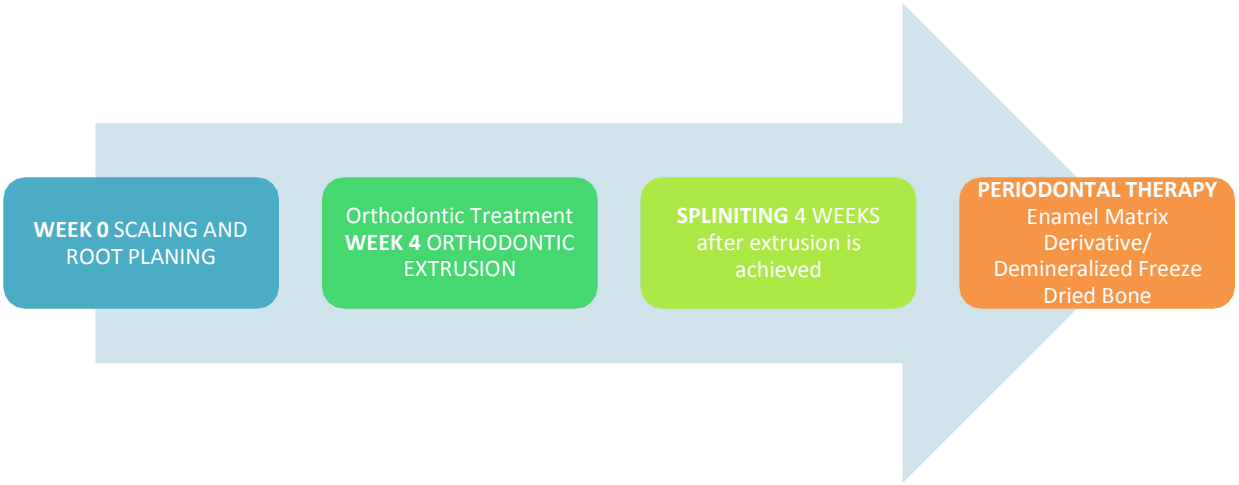
According to a study by **Jepsen et al[20],** was a multi-centered, parallel-group, randomized clinical trial 43 patients with stage IV Periodontitis. The whole sample was randomized to receive either early (n = 23) or late OT (n = 20) following regenerative surgery of IDs. In the interdisciplinary treatment of periodontitis stage IV, OT can be initiated already 4 weeks after regenerative surgery of IDs with favorable results, thus reducing the overall treatment time.

Conclusion

Harmonious cooperation of the general dentist, the periodontist and the orthodontist offers great possibilities for the treatment of combined orthodontic–periodontal problems. Undoubtedly, application of oral hygiene measures is difficult during orthodontic treatment. Orthodontic treatment along with patient’s compliance and absence of periodontal inflammation can provide satisfactory results without causing irreversible damage to periodontal tissues. Furthermore, orthodontic treatment can expand the possibilities of periodontal therapy in certain patients, contributing to better control of micro-biota, reducing the potentially hazardous forces applied to teeth and finally improving the overall prognosis. Comprehensive knowledge of the fields of periodontology and orthodontics along with close co-operation among clinicians widens the spectrum of the available treatment options in many circumstances aiming to prevent periodontal problems during orthodontic treatment.

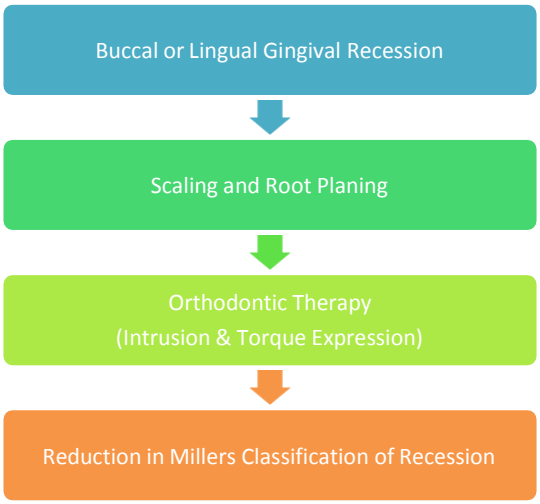
THERAPEUTIC PROPOSALS

2 or 3 Wall Bony Defect

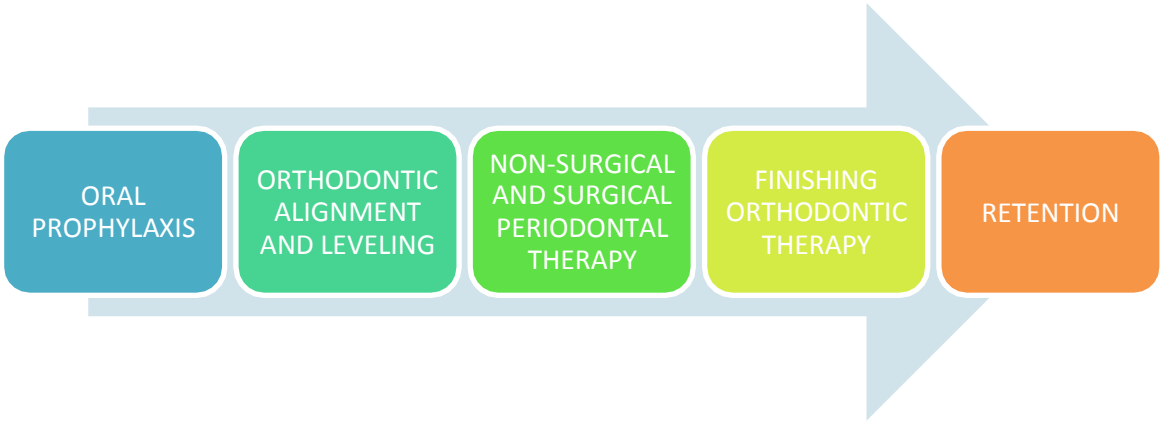


Gingival Recession (≤3-4 mm)

Labiolingual positioning of the tooth root in the centre of the alveolus



Periodontal Probing Depth ≥6 mm and BOP



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