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study

How timing of orthodontic therapy affects outcomes of regenerative periodontal surgery

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Background

Pathological tooth migration, a side-effect of loss of periodontal attachment, is a common complication of advanced periodontal disease and a reason why patients seek orthodontic treatment. Before any orthodontic movement, control of the periodontal infection needs to be achieved followed by a corrective phase aiming to reconstruct the damage caused by the periodontal disease, including regeneration of vertical bone defects.

Reports have suggested different time intervals between regenerative procedures and orthodontic movement. For favourable periodontal outcomes, some reports advocate late orthodontic movement (six to 12 months after the regenerative procedure), while others show successful outcomes for early orthodontic movement (almost immediately or up to three months after the regenerative surgery was performed).

However, no randomised clinical controlled trials comparing these two treatment modalities are available at present.

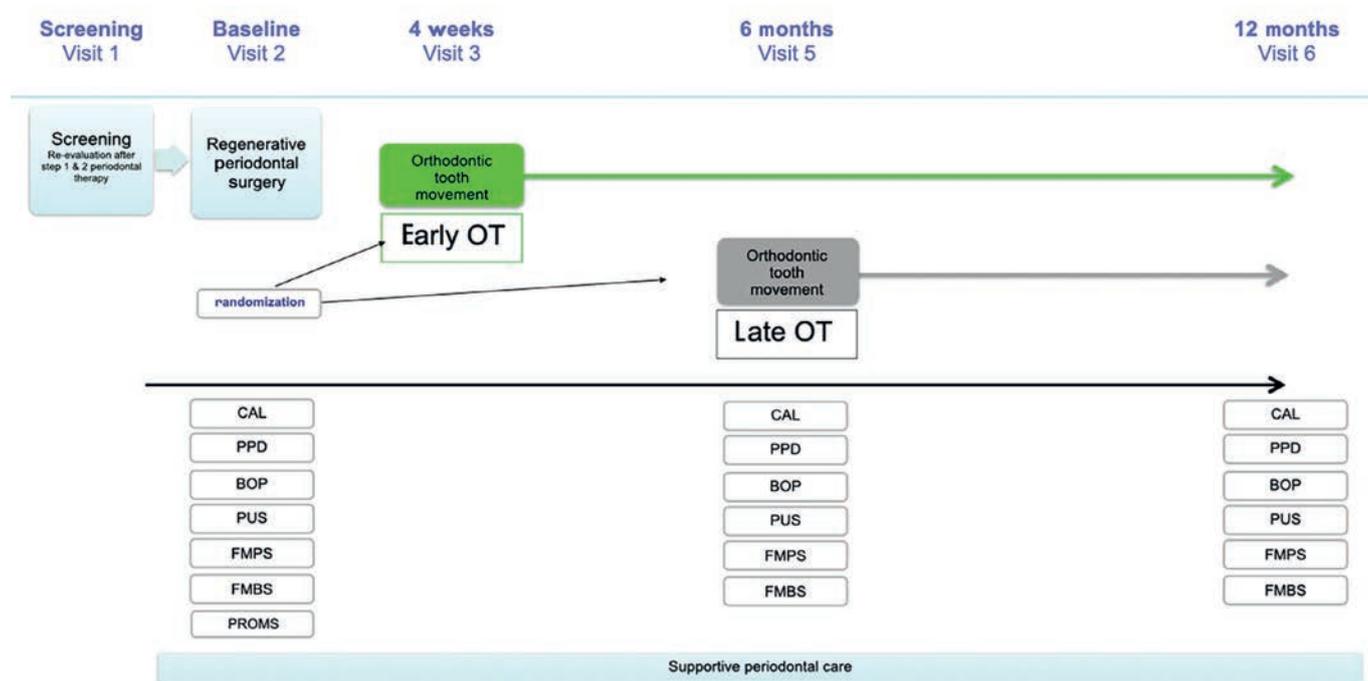
Aim

The aim of this study is to compare the early initiation of orthodontic therapy (four weeks) and late orthodontic therapy (six months) following regenerative surgery to treat infrabony defects in patients with severe periodontitis (stage IV) and to establish the clinical superiority of one treatment protocol.

Materials & methods

- A prospective, multicentre, multinational, randomised, parallel-group clinical trial.
- 12-month follow-up.
- All patients were diagnosed with stage IV periodontitis.
- The patients had to complete the anti-infective phase of therapy, with a full-mouth plaque score and a full-mouth bleeding score <25%. In addition, one infrabony defect was left untreated after the corrective phase. The included teeth were incisors, canines, or premolars with infrabony defects indicated for periodontal regeneration and presenting pathologic tooth migration that required orthodontic treatment.
- Exclusion criteria: furcation involvements of the teeth to be treated, smoking >5 cigarettes per day, uncontrolled metabolic disorders, medical contraindication for oral surgical procedures, and sensitisation to collagen-based material products.
- Regenerative therapy: All regenerative procedures were carried out by a single periodontist at each centre. Different graft materials were used depending on defect configuration.
- Before orthodontic therapy, patients were randomly allocated to two groups:
 - 1) Early treatment group (four weeks post-regeneration): 23 patients, mean age of 45.
 - 2) Late treatment group (six months post-regeneration): 20 patients, mean age of 52.
- Orthodontic movement was personalised for each individual using fixed appliances, with an emphasis on low forces and movement. Appliances were removed after achieving the goals of therapy (the planned teeth positioning).
- Supportive periodontal therapy was held on a constant basis of every two months during the whole treatment.
- The primary outcome of this RCT was clinical attachment level (CAL) gain. Secondary outcomes were probing pocket depth (PPD) reduction, bleeding on probing, pocket closure, patient-reported pain using the visual analogue score (VAS), and wound healing.

Figure: Chronological sequence of examinations, periodontal and orthodontic therapy (OT), early OT initiated 4 weeks after, and late OT initiated 6 months after regenerative periodontal surgery.



Results

- Improved CAL gain and PPD reduction were observed in both groups in target sites after 12 months. Those clinical parameters were statistically significant.
- CAL gain (12 months): Δ CAL was 0.89mm in favour of early orthodontic treatment (four weeks) in comparison to later treatment (six months). The difference was not statistically significant.
- PPD reduction (12 months): Δ PPD was 0.31 mm in favour of early orthodontic treatment (four weeks). The difference was not statistically significant.
- Percentage of pocket closure in target sites was similar in both groups: 91% (four weeks) and 85% (six months).
- Percentage of pocket closure without bleeding on probing in the target sites was 69% (four weeks) and 75% (six months).
- Patient VAS and wound healing were good in both groups and without differences between the groups.
- To overcome the effect of differences between centres, a further analysis was done. The results showed a significant Δ CAL in favour of the early treatment (four weeks) at three out of four centres.

Limitations

- Blinded examination was not possible in the first six months, because of the early application of orthodontic appliance in the early group.
- Pocket measurement in teeth with orthodontic appliances was technically challenging and might be inaccurate.
- Comparison of the defect by X-ray before and after the orthodontic treatment was not possible because of the different tooth positions at the end of the orthodontic movement.
- Follow-up was limited to 12 months after regeneration.
- Molars were not included in this study.

Conclusions & impact

- For patients with stage IV periodontitis, who present good oral hygiene and cooperation by adhering to supportive periodontal therapy every two months, good outcomes were achieved in the early group (four weeks), where teeth with intrabony defects were treated by regenerative therapy followed by orthodontic therapy for treating pathologic tooth migration.
- These results were at least as good as the results achieved after later initiation of orthodontic treatment (six months).
- The outcomes suggest that initiation of orthodontic therapy is possible as early as four weeks after regenerative treatment of an intrabony defect, and that favourable CAL gain and periodontal parameters can be achieved. This finding allows a reduction of the overall treatment time.

JCP Digest 94, published in November 2021, is a summary of 'The effect of timing of orthodontic therapy on the outcomes of regenerative periodontal surgery in patients with stage IV periodontitis: A multicenter randomized trial.' *J Clin Periodontol.* 48 (9): 1282-1292. DOI: 10.1111/jcpe.13528

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