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Furcation-involved class II subclass B molar treated by Er:YAG laser-assisted comprehensive periodontal pocket therapy (Er-LCPT) under a microscope: A case report

The progression of the furcation area exhibits horizontal and/or vertical patterns of destruction that may lead to an increased risk of tooth loss. Periodontal regenerative therapy using flap surgery is required to treat Class II subclass B (B2) furcation defects.[1] As shown in our previous article, Er:YAG laser-assisted comprehensive periodontal pocket therapy (Er-LCPT) is a very effective flapless surgery to treat severe single root periodontitis[2,3] owing to excellent inflammation suppression and photo-biomodulation (PBM) effect.[4,5] In this case report, we evaluated the effectiveness of the Er-LCPT to treat a multi-root furcation-involved Class II subclass B (B2) molar with severe periodontitis with no flap elevation.

A 52-year-old female patient presented with a 10-mm periodontal pocket depth (PPD) with bleeding on probing (BOP) (Fig. 1A and B) at the lower left first molar and felt uncomfortable and painful while biting the left side. The tooth showed a furcation-involved area that was identified as a class II subclass B (B2) defect. Although conventional periodontal regenerative open-flap surgery was required to treat the furcation-involved molar in this case, we decided to treat this furcation involvement using Er-LCPT. The furcation bone defect was treated by Er:YAG laser (Litetouch, Light Instruments, Yokneam Lllite, Israel) irradiation with a straight sapphire tip with a 400 μm diameter to remove the inflamed connective tissue on the inner gingival and bone surface in a sweeping motion at approximate 30 mJ/pulse (panel setting 40 mJ/pulse, energy density 23.9 J/cm^2/pulse) and 20 Hz in contact mode under water spray (Fig. 1C), and then thoroughly debrided by micro curette and laser under microscope (Fig. 1D). After pocket debridement, the outer epithelium was intentionally and carefully removed by the Er:YAG laser to prevent downgrowth of the outer epithelium into the periodontal pocket (Fig. 1E), and a blood clot formation procedure was performed to stabilize the blood clot using Er:YAG laser irradiation without water spray in the non-contact mode (Fig. 1F). After 6 months postoperatively, the soft tissue healing was favorable and PPD reduced to 3 mm without BOP and no furcation involvement was noted (Fig. 1G and H). One year postoperatively, the soft tissue outcome was favorable without any gingival recession after Er-LCPT treatment (Fig. 1I). A periapical radiograph obtained before treatment showed a clear radiolucency in the furcation area (Fig. 1J). At 6 months, the furcation defect showed an improving outcome (Fig. 1K). One year later, dense bone tissue was observed following Er-LCPT flapless surgery (Fig. 1L).

Conventionally, regenerative therapy is required to treat furcation-involved molars, but conventional open flap surgery is more time- and cost-consuming because of the many steps of the surgical procedure and the use of expensive biological materials. The present case report indicates that Er-LCPT is a very simple, safe, and effective therapy for

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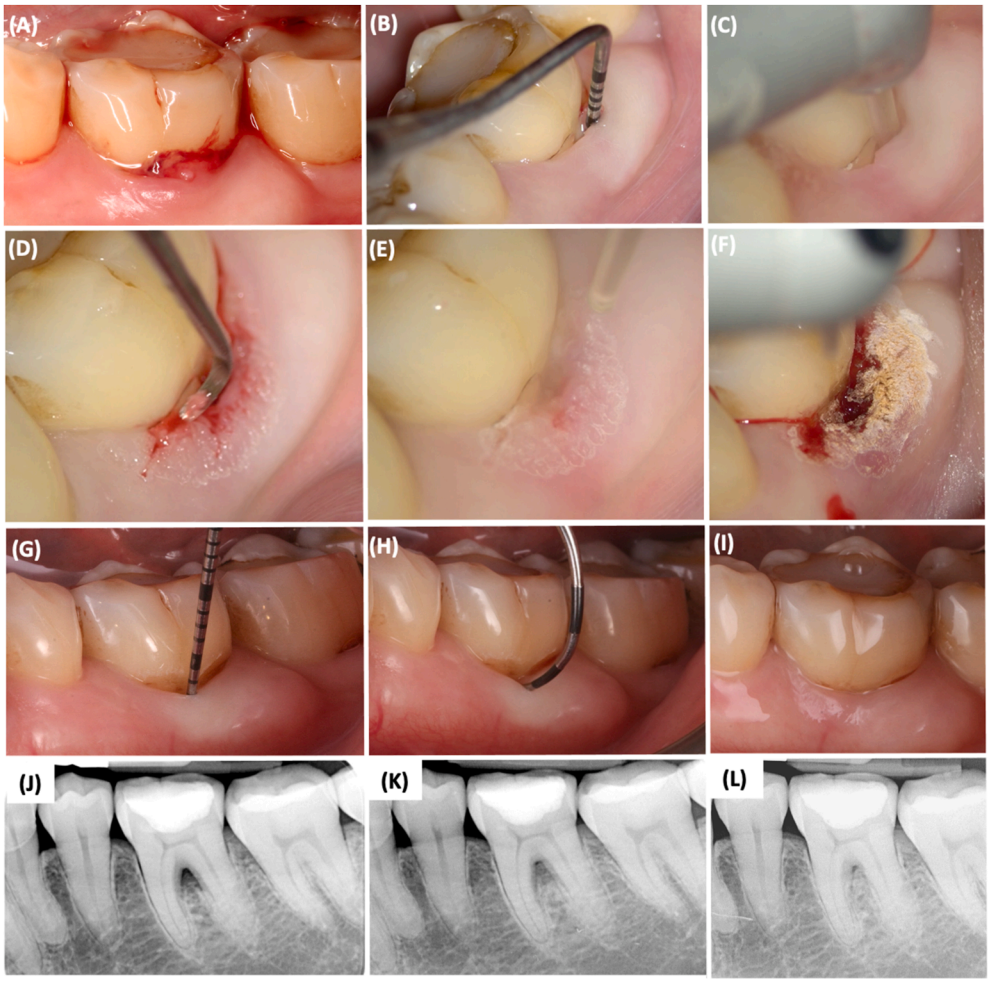

Figure 1 A Class II subclass B furcation defect was treated by Er:YAG laser-assisted comprehensive periodontal pocket therapy (Er-LCPT) under a microscope.
(A) Before Er-LCPT treatment, the lower left first molar showed severe bleeding on probing (BOP).
(B) The furcation-involved area showed a class II subclass B (B2) defect with 10 mm periodontal pocket depth (PPD).
(C, D) The furcation defect was treated by Er:YAG laser irradiation with a straight sapphire tip with a 400 μm diameter to remove the inflamed connective tissue on the inner gingival and bone surface in a sweeping motion at approximate 30 mJ/pulse (panel setting 40 mJ/pulse, energy density 23.9 J/cm^2/pulse) and 20 Hz in contact mode under water spray, and then thoroughly debrided by micro curette and laser under microscope.
(E) After pocket debridement, the outer epithelium was intentionally and carefully removed by Er:YAG laser to prevent down-growth of outer epithelium into the periodontal pocket.
(F) A blood clot-forming procedure was performed to stabilize the blood clot using Er:YAG laser irradiation without water spray under non-contact mode.
(G) Six months postoperatively, the soft tissue healing was favorable, and periodontal pocket depth (PPD) reduced to 3 mm without BOP.
(H) At 6 months, no furcation involvement was noted.
(I) At 1 year, no gingival recession was observed after Er-LCPT treatment, PPD reduced to 3 mm without BOP, and no mobility was observed before and after treatment.
(J) The periapical radiograph before treatment showed a clear radiolucency defect in the furcation area.
(K) At 6 months, the furcation defect showed an improving outcome.
(L) After 1 year, a dense bone tissue was observed following Er-LCPT flapless surgery.

treating teeth with furcation-involved periodontitis. We suggest treating furcation-involved molars with flapless surgery, such as Er-LCPT, before directly entering conventional periodontal regenerative open flap surgery.

Declaration of competing interest

The authors have no conflicts of interest relevant to this article.

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