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# A Long-Term Study of Oral Rehabilitation for the Treatment of Severe Advanced Periodontitis with Secondary Occlusal Traumatism Using Intentional Replantation, Fixed Prosthesis and Perioprosthetic Design of CSCTD

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## Abstract

There are many studies have documented that the efficacy of nonsurgical periodontal therapy in treating the progressive destruction of periodontal tissues [1,2]. In addition, it was also documented the most favorable modality of basic periodontal therapy is the complete removal of all microbial dental plaques on the root surfaces exposed by advanced periodontal disease [3-5]. There are many investigators documented that the ultrasonic scaling in periodontal phases I and phases IV therapies most commonly treated by the oral hygienists, followed by the active treatment by periodontists [6-9]. Our former reports also illustrated the clinically effective study of nonsurgical periodontal therapy (NSPT) by using ultrasonic scaling along with regular and periodic recall visits for professional plaque control in the short-term [1,10], mid-term [11], and in case report over ten years [12]. Results showed that remarkable improvement of the periodontal condi- tion in both moderately deep and severe advanced periodontitis (SAP) affected deep angular bony defects and secondary occlusal traumatism (SOT). The purpose of the present case report was to evaluate long-term therapeutic outcomes of periodontal bone regeneration using oral rehabilitation of intentional replantation (IR), fixed prosthesis and perio- prosthetic design of crown and sleeve-coping telescopic denture (CSCTD) for the treatment of a case of SAP affected SOT with deep periodontal angular bone loss.

Keywords: Nonsurgical periodontal therapy; Crown and sleeve-coping telescopic denture; Probing pocket depth; Subgingival scaling and Root planning; Plaque index

**Abbreviations:** NSPT: Nonsurgical periodontal therapy; SAP: Severe advanced periodontitis; IR: Intentional replantation SOT: Secondary occlusal trauma; Y: Yes; Imp: Improved; N: No; FP: Fixed prosthesis; CSCTD: Crown and sleeve-coping telescopic denture; PII: Plaque index; GI: Gingival index; PPD: Probing pocket depth; CAL: Clinical attachment level; PABL: Periapical radiographs disclosed generalized periodontal bone loss; TPP: Therapeutic provisional prosthesis;

## Case Report

A 56-year old female presented at our office seeking treatment for tooth #11 with primary complaints of recurrent gingival swelling, bleeding with pus discharge. She had visited some local dental clinics for treating above mentioned symptoms and signs, and been told that tooth #11 should be extracted, and dental implant therapy was suggested. However, she rejected those treatment plans and showed strong to keep the tooth# 11.

Oral examination showed that moderate gingival recession was generally found on the maxillary teeth from teeth #13, #12, #11, #21, #23-#25, #27, and on the mandibular teeth from #37, #46, and #47, respectively. In addition, ill fitted, poor esthetic design, anterior deep bite and bad occlusion problems were found at the maxillary and mandibular arches. Assessments of periodontal parameters of the remained teeth included gingival index (GI) [13], plaque index (PlI) [14], probing pocket depth (PPD), and clinical attachment level (CAL), were recorded at baseline and every six months until the end of the study. Periapical radiographs disclosed generalized periodontal bone loss (PABL) with deep angular bony defects and SOT were noted around both teeth #12,

#11, #23, #24, and #27 of maxillary arch, and where those at teeth # 34, #37, #45, #47, #48 of mandibular arch, respectively (Figure 1). A diagnosis of generalized SAP with SOT was established.

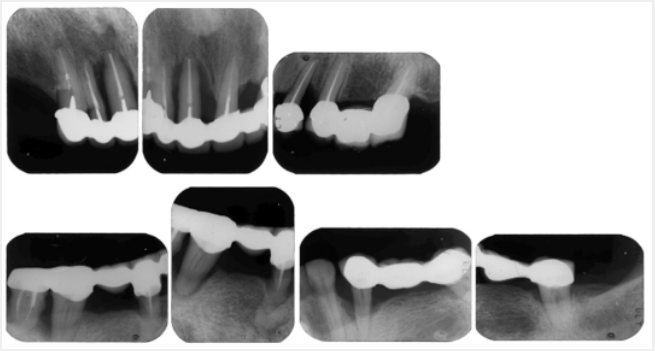

**Figure 1:** Showed the full mouth periapical radiography at baseline before removal of ill-fitted prosthesis on 2006/1/5.

Treatment plans including removal of ill-fitted and poor designed prosthesis first, and second were including basic periodontal therapies, fixed therapeutic provisional prosthesis (TPP) of full mouth, intentional replantation (IR) of tooth #11. Maxillary arch of teeth #12 to #23 was constructed as fixed prosthesis and teeth #13 and #24 were used as the inner crown abutments of perioprosthetic designs of CSCTD were proposed (Table 1). The patient was subjected to a meticulous plaque control program following subgingival scaling and root planning. Chlorhexidine gluconate (0.1%) was used for pocket irrigation at teeth with PPD≧4 mm following subgingival scaling and root planning. Subsequent recalls for pocket monitoring and reinforcement of oral hygiene were maintained every two weeks for six months. Next visit for postoperative examinations occurred every 6-8 weeks until the end of study. Table 1 described clinical parameters of case 2; including SOT, root resorption, mobility, ankylosis, and types of prosthesis design in teeth affected with periodontally hopeless prognosis before and after intentional replantation (IR).

**Table 1**: Clinical parameters including SOT, root resorption, mobility, ankylosis, and types of prosthesis design in teeth affected with periodontally hopeless prognosis before and after intentional replantation.

| Cases no. | Tooth locat. | SOT basel. after | Root Res. | Mobil. (grad.) before after | Ankyl. | Prosthesis design FP CSCTD Both |
|---|---|---|---|---|---|---|
| Case 1 | #13 | Yes Imp | No | III I | N | Y |
| Case 2 | #11 | Yes Imp | No | III I | N | Y |
| Case 3 | #14 | Yes Imp | No | III I | N | Y |
| Case 4 | #45 | Yes Imp | No | III II | N | Y |
| Case 5 | #34 | Yes Imp | No | III II | N | Y |
| Case 6 | #22 | Yes Imp | No | III II | N | Y |
| Case 7 | #22 | Yes Imp | Yes | III II | N | Y |
| Case 8 | #22 | Yes Imp | No | III II | N | Y |
| Case 9 | #21 | Yes Imp | No | III II | N | Y |
| Case 10 | #24 | Yes Imp | No | III II | N | Y |
| Case 11 | #11 | Yes Imp | No | III I | N | y |
| Case 12 | #11 | Yes Imp | No | II I | N | Y |
| Case 13 | #36 | Yes Imp | No | II I | N | Y |
| Case 14 | #35 | Yes Imp | No | III I | N | Y |
| Case 15 | #12 | Yes Imp | No | III II | N | Y |
| Case 16 | #25 | Yes Imp | No | III II | N | Y |
| Case 17 | #24 | No | No | II I | N | Y |
| Total (%) | 17 | 16/17(94); 16/16(100) | 1/17(5.9) | III/14/17(82.3);II/3/17(17.7) | 0/17(100) | 10/17(58.9);2/17(11.8); 5/17(29.4) |

SOT: secondary occlusal trauma; Y: yes; Imp: improved; N: no; FP: Fixed prosthesis; CSCTD: Crown and sleeve-coping telescopic denture; Both, FP and CSCTD; Case 17*, tooth #25 with symptoms of periapical lesion and sinus tract, but no SOT during permanent periodontal prosthesis.

Survival rate of replanted teeth with hopeless prognosis.



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Clinical evaluations on tooth #11 after IR revealed remarkable improvement in periodontal parameters and mobility in the first 18 months. The clinical mobility of tooth #11 was improved from Grade III at baseline to slight mobility only (< Grade I) after TPP application 2 years 4 months later (Figure 2). Figures 3 indicated the clinical picture after IR #11 on the labial (Figure 3a) and palatal views (Figure 3b). A permanent perioprosthetic design of CSCTD was constructed six months later. Radiographs illustrated remarkable bone fills around tooth #11 as compared to baseline (Figure 4a), 2 years 12 months (Figure 4b), and 5 years 10 months (Figure 4c), respectively. Figures 5a,b showed upper fixed prosthesis of anterior teeth #12- #23 (Figure 5a) and CSCTD with teeth #17- #27 and #37- #47 (Figure 5b) after 5 years 10 months. Figures 6 indicated upper fixed prosthesis anterior teeth #13- #24 with inner crown abutments of #13 and #24 (Figure 6a,b) on the posterior CSCTD from #37- #34 to #43 - #47 after 5 years 10 months.

**Figure 2:** Indicated the clinical picture of TPP on the labial view.

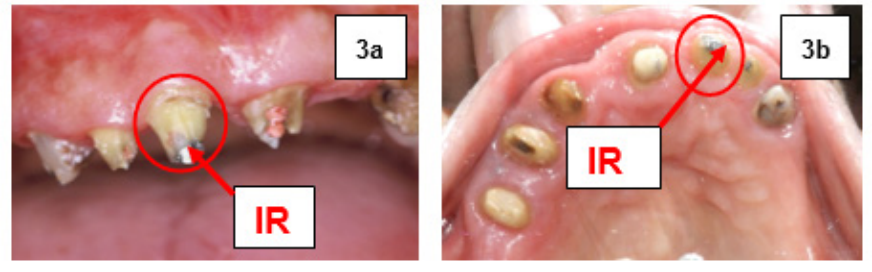


**Figure 3:** Indicated the clinical picture after IR #11 on the labial (3a) and palatal views (3b). (2008/8/19).


Figure 4: Illustrated periapical radiography after IR at baseline (Figs. 4a), 2 years 12 months (Figs. 4b), and 5 years 10 months (Figs. 4c), respectively.


**Figure 5:** Showed upper fixed prosthesis of (5a) anterior teeth #12- #23 and CSCTD with teeth #17- #27 and #37 - #47 after 5 years 10 months.



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**Figure 6:** Indicated upper fixed prosthesis (6a) anterior teeth #13- #24 with inner crown abutments of #13 and #24 on the posterior CSCTD from #37- #34 to #43 - #47 after 5 years 10 months (6b).

## Discussion

### Survival rates

The survival rates of IR are most documented relating to the evaluated observation periods and defined success criteria. The majority of the former reports were discussing the survival rates of IR focused mainly on the therapeutic options of non-periodontally involved hope- less teeth and dental disciplines, including prosthodontics, orthodontics, and endodontics, respectively. In contrast, little or limited reports dis- cuss the survival rate of IR in teeth of SAP affected with severe bone loss and SOT under conditions of periodontally hopeless prognosis. Our former study report presented that a seventeen-case series of IR got a survival rate of 88.2% based on the clinical observation of 5-12 years [15]. The present case report indicated the clinically remarkable efficacy of long-term observations of periodontal bone fills using repeated ultra- sonic scaling therapy, endodontic treatment, and prosthetic procedures after 5 years or more.

### Immobilization associated with SOT

Little or limited literature regarding successful IR for the teeth affected with periodontal hopeless prognosis, angular bony defect, and SOT, is available in the majority of former reports. In 2003, Demiralp et al. [16] indicated that teeth mobility might affect pocket formation and epithelium apical migration with the presence of inflammation as well as inhibit regeneration of periodontal tissue during and after therapy. Recently, a series successful studies associated with SAP with SOT not only documented the effectively stabilizing teeth with TPP as an immobilizing aid for hypermobile teeth, but also remarkable periodontal bone fills were noted on the teeth affected angular bony defects [15,17,18]. Furthermore, it was found to be an effective therapy for teeth affected severe periodontal bone loss with SOT using periodontal and perioprosthetic procedures.

### Clinical symptoms and signs after NSPT, TPP and IR

The clinical symptoms and signs such as gingival bleeding, inflammation showed prominent disappear after personal, professional plaque control, routine subgingival scaling and root planning, combined root surfaces deposits curettage and following pocket irrigation using chlorhexidine gluconate (0.1%), respectively.

### Periodontal and prosthetic therapies

The treatment for teeth affected SAP with primary complaints of recurrent signs, symptoms of gingival swelling, bleeding with pus dis- charge was disappeared using both professional and personal plaque controls, and non-surgical periodontal therapy after 3-6 months later. Little or limited information regarding the relationship among teeth with SAP affected periodontally hopeless prognosis, SOT after the application of IR and subsequent periodontal prosthetic designs are available. Recently, a long-term study of case series with SAP affected SOT, advanced severe angular bone loss and hypermobility of teeth was successful treated using periodontal and prosthetic therapies for 5.1-19.3 years [17,18].

Combinations of fixed prosthesis and removable denture of CSCTD are wide used in the periodontal prosthetic applications for the cases regarding teeth affected with periodontally hopeless prognosis of severe advanced periodontitis plus SOT received conservative reconstruction via periodontal prosthesis. Former studies Yalisove [19], Yalisove and Dietz [20], and Hou et al. [21] concluded the use of FP, CSCTD, or combination of both strategies provided a beneficial force distribution in cases affected with SAP and SOT, especially in shift of torque force to the tooth and minimizationof horizontal forces. Even on the abutments of CSCTD were lost, the edentulous area was easily restored prosthetically. Figure 4 showed upper fixed prosthesis of (a) anterior teeth #12- #23 and (b) CSCTD with teeth #17- #13 and #24 - #27 after 5 years 10 months. Figure 5 indicated upper fixed prosthesis (a) anterior teeth #13- #24 with inner crown abutments of #13 and #24 (b) on the posterior CSCTD from #37- #34 to #43 - #47 after 5 years 10 months.

### Periodontal bone gain on teeth with angular bony defects

Numeral conclusions of periodontal bone gain on teeth with angular bony defects were documented by several investigators, such as Andreasen [22], Andreasen & Kristerson [23], Tsukiboshi [24], Inoue et al. [25,26] and Waikakul et al. [27]. They indicated


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that osteogenic activity within the periodontal ligament might regenerate bone around donor teeth that has been replanted without enough supporting bone. Our former articles [17-18] relating with successful studies associated with SAP with SOT not only documented the effectively stabilizing teeth with TPP as an immobilizing aid for hypermobile teeth, but also remarkable periodontal bone fills were noted on the teeth affected angular bony defects. All conclusions of former studies are consisted with and confirmed by above investigators [20-25].

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