

## INTENTIONAL REPLANTATION WITH TOOTH ROTATION AS INDICATION FOR TREATMENT OF CROWN-ROOT FRACTURES

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### ABSTRACT

The present article describes a clinical case of crown-root fracture, with invasion of the biological width, in an esthetic area, where is no possible to carry out the conventional treatment. This clinical study demonstrates the biologic width recovery, invaded by crown-root fracture through intentional replantation with rotation technique. The procedure consists of: extraction, rotation and replantation of the remaining dental with sufficient supra alveolar root structure to regain junctional epithelium adaptation and collagen fibers attachment. Clinical and radiographic success, after two years, was based on mobility test, probing on depth, clinical attachment level, absence of root resorption (inflammatory or by substitution) and alveolar bone integrity.

**Keywords:** replantation, crown-root fracture, biological width.

### RESUMO

O presente artigo relata um caso de fratura corono-radicular, com invasão da unidade dento gengival, além de perfuração não região cervical da face vestibular, em uma área estética, cujas opções de tratamentos convencionais inviabilizariam a reabilitação estética e funcional do remanescente dental. O relato clínico demonstra a recuperação do espaço biológico, pela técnica do Reimplante Intencional Rotacional. O procedimento consiste na extração, rotação e reimplante do remanescente dental com recuperação da estrutura radicular supra-alveolar suficiente para a adaptação do epitélio juncional e inserção de fibras colágenas. O sucesso clínico e radiográfico, após 2 (dois) anos, foi embasado nos seguintes parâmetros: teste de mobilidade, profundidade de sondagem, nível de inserção, ausências de reabsorções radicular (inflamatória e ou substitutiva) e integridade da cortical alveolar.

**Palavras-chave:** reimplante, fraturas corono-radulares, espaço biológico.

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## INTRODUCTION

The crown-root fractures are common trauma usually due a horizontal force. The occurrence of these fractures might to compromise the aesthetics, function, occlusion and periodontal health through invasion of biological width.

The biological widths are distances covering from gingival margin to crestal bone, involving biological gingival sulcus, junctional epithelium and conjunctive attachment (structures of the protection periodontum). Those zones represent the biological seal, i.e., the protective barrier against the penetration of microorganisms and their products (toxins, enzymes and by products) in underlying conjunctive tissue and support tissues (supporting periodontum) (Reeves, 1991). The invasion of biological width is a factor that induces to establishment of the inflammatory process, by interfering in seal, causing an imbalance NA bacterium-host relationship and attachment loss with apical migration of junctional epithelium.

For establishing the invaded biological widths there are therapeutic procedures such as the osteotomy and osteoplastic with apical placement of flap, the fast mediate tooth pulling or the immediate pulling (Magini et al., 1997).

The re-section technique carries out the removal of supporting periodontum from traumatized tooth and from surrounding teeth, for obtaining bone architecture parallel to cementum-enamel junction, with subsequent flap apical placement. However, for aesthetic reasons, the procedure is contraindicated for teeth located in anterior region, specially in patients showing smile line with high exposure of gingival margin.

The fast mediate tooth pulling provides space for the junctional epithelium and conjunctive attachment, by axial movement of tooth with mobile or fixed orthodontic devices. That technique demands higher time of treatment, in function of traction and retention periods, and compliance of the patient in order to obtain the expected results (Magini, 1997). The rotational intentional replantation or mediate tooth replantation consists in to carry out, surgically, tooth extraction and its placement in a more coronal position, allowing that the remainder gains more structure, thus, allowing a better restorative re-establishment, recovering biological width with no damage of clinical crown/root ratio on force transfer mechanism.

The intentional replantation also is an option of treatment in cases of root perforations in sites of difficult endodontic or surgical access (Bramante & Berbet, 2000).

According to Bender & Rossman (1993), the procedure should be contraindicated in teeth showing periodontal disease with pronounced mobility or showing gingival inflammation.

According to Fariniuk et al. (2003), the success of the intentional

replantation treatment is directly related to correct selection of cases, based on clinical e radiographic evaluations.

## OBJECTIVE

This work aims to report a clinical case in which the technique of Intentional Rotational Replantation was used, making the tooth was occupied a different position inside alveolus, allowing thus that the end of fracture was supra-gingival.

## CASE REPORT

The patient J. F. S. S., in March 2005, when he was 9 years-old fractured the tooth number 21 after fell during sports practice (Fig. 1). Next day, seeking for dental service at Health Unit in her neighborhood, he had the palatal fragment removed. Following step the endodontic treatment was performed. After 1 year the accident, the patient was referred to Dental Brazilian Association at state of Espírito Santo (ABO-ES) for evaluation of possible orthodontic traction. On evaluation was observed fracture with invasion of biological width through the palate as well cervical perforation through buccal.



**Figure 1** – Tooth 21 with fracture with invasion of biological width.

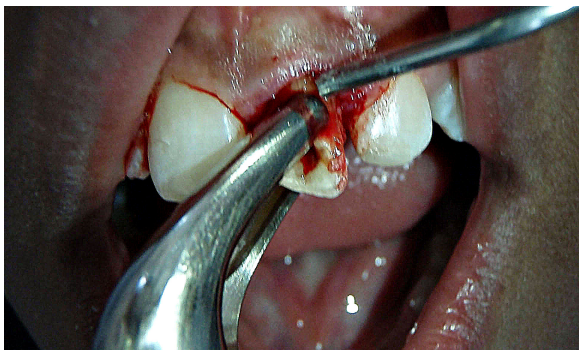
The extent of fracture and the location of the perforation led us to select the Intentional Replantation technique with rotation of 180°.

The adolescent's mother was informed about the risks and benefits from procedure and she assigned an informed consent authorizing the procedure.

Initially, it had been placed reversed bevel intra-sulcus incision, with preservation of papillae. The tooth removal was performed by gentle rotation motions in order to avoid pressing periodontal ligament against the wall of socket by buccal-palatal dislocation. The tooth remainder was immediately replanted with rotation of 180°, followed by single interproximal sutures (Fig. 2, 3 and 4).



**Figure 2** – Tooth removal.



**Figure 3** – Replantation.



**Figure 4** – Interproximal sutures.

The retention of dental element was made from steel wire and composite resin, which remained for 15 days. The semi-rigid retention is the more indicated because it allows small motions, which on healing may to avoid or minimize small ankylosis areas (Fig. 5).



**Figure 5** – Semi-rigid contention.

The protocol used includes antibiotic therapy for 7 days, and the choice medication was amoxicillin 500 mg. The sutures were removed after 1 week.

After 6 months from the replantation procedure, the aesthetic restorative treatment was accomplished with composite resin (Figures 6 and 7).



**Figure 6** – After 6 months.



**Figure 7** – After 6 months.

## RESULTS

Clinical and radiographic follow ups were carried out with the following evaluated parameters: mobility test, probing on depth, clinical attachment level, root resorption and bone loss absence, and integrity of the alveolus cortical. Again, after 2 years the restorative

treatment, a new evaluation was accomplished in which the clinical and radiographic success of advocated technique was proven.

## DISCUSSION

The Intentional Rotational Replantation was first performed by Lesgsjö et al. (1978), and may be indicated in cases of crown-root fractures, cervical caries, root resorptions or perforations.

Usually the risks of root resorption, inflammatory or by substitution, are associated with the Dental Replantation procedures. It is important point out that the presence of an intact and feasible periodontal ligament on root surface is a key factor to secure the healing of the periodontal ligament with no root resorption. Taking care about the control of extra-alveolar time, the absence of contamination and the tooth extraction technique with minor trauma to periodontal ligament, these risks are remote. According to Consolaro (2002) the root resorptions may be classified into: surface resorption, substitution or inflammatory resorption, which can be active, interrupted or healed. The surface resorption results from small lesions of more inner layer of the periodontal ligament and, likely, also from cementum, which causes a surface osteoclasts attack on root. The healing takes place from adjacent periodontal ligament, by which, the initial resorption cavity is almost completely healed with the cementum. The substitution resorption is caused by necrosis or removal of the periodontal ligament. The main histologic features of that resorption are lacunae of resorption healed with bone. That substitution resorption may be appeared of two ways: permanent, that reabsorbs gradually the whole root, or transitory, in which the ankylosis once established, disappears latter. Radiographically that type of resorption can be noted within 3 to 4 weeks after replantation. The inflammatory resorption is histologically characterized by resorption lacunae, with multinucleated cells in granulation tissue that can to compromise cementum and dentin. The inflammatory resorption may to progress quickly, and thus to lead tooth loss within months. The first radiographic evidence may be observed 3 weeks after the replantation. Clinically the tooth presents extrusion and mobility. The etiology of the inflammatory resorption is related basically to some factors: trauma of the periodontal ligament on luxation movement, cementum resorption with exposure of contaminated dentin tubules, age, and diffusion of toxics products from death and contaminated pulp.

In association with care cited above, the treatment with antibiotic reduce the likelihood of root resorption because eliminates the variable related to contamination. It is important also the adequate instructions to patient as for the plaque control, since the protective periodontum on healing is more susceptible to periodontal disease. The gingival attachment appears complete after one week the replantation when the sutures are removed. The healing of periodontal ligament begins after

one week, and with two weeks, two third of periodontal fibers already is formed, allowing the stabilization of the tooth in alveolus. Hence the semi-rigid retention usually is removed after two weeks.

The selection of case, based on clinical and radiographic evaluations, must be judicious to analyze the possibility of tooth extraction to be performed with no greater risks of root fracture and extensive damage to periodontal ligament. Therefore, the Intentional Replantation is contraindicated for teeth with divergent roots or lacerations (Andreassen, 1993).

In virtue of invasion of the biological width, the osteotomy and osteoplastic with flap apical replacement were contraindicated for need great removal of supporting periodontum in fractured tooth and adjacent teeth, implying an aesthetic damage. On the other hand, the responsible for the patient had rejected orthodontic traction because of high costs and time.

The Intentional Replantation with rotation of 180° was the choice therapy, once that on buccal surface there was considerable amount of tooth structure located supragingival, which allowed after rotation sufficient space for accommodation of the biological widths.

With respect to prognosis, Kahnberg (1985) observed patients treated with Intentional Replantation with root rotation for 5 years period, as for two aspects: healing of the periodontal ligament and teeth survival. For the ligament, there was a complete re-establishment in 75% of the cases, being that the remainder showed small areas with self-boundary, surface resorption, and spontaneous healing sites. For the teeth survival, after 5 years all of teeth which undergone that type of procedure were present in oral cavity, aesthetically and functionally rehabilitated, demonstrating that the long-term prognosis is excellent.

## CONCLUSION

For treatment of crown-root fractures, should to have knowledge about the more safe alternatives, which present a better prognosis, in order to maintain the damaged structures at health condition, aesthetically and functionally.

The Intentional Rotational Replantation for treatment of that type of fracture may be employed successfully and safely by dental practitioner since correctly indicated and performed.

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