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Contents

Scientific Editorial

Dental Stem Cells – A Review:

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Stem cells can divide multiply and differentiate into diverse specialized cell types and can self-renew to produce more stem cells.There are two broad types of stem cells: embryonic stem cells, which are isolated from the inner cell mass of blastocysts, and adult stem cells, which are found in various tissues. In adults these stem cells and progenitor cells act as a repair system for the body, replenishing adult tissues.

Tooth development results from sequential and reciprocal interactions between the oral epithelium and the underlying neural crest-derived mesenchyme. Mesenchymal stem cells can be isolated from different sources. Differnent mesenchymal progenitors have been assessed for tooth engineering purposes.

Stem cells from human exfoliated deciduous teeth (SHED).;Adult dental pulp stem cells (DPSC).;Periodontal ligament stem cells (PDLSC).;Bone marrow derived mesenchymal stem cells (BMSC);Stem cells from the apical part of the papilla (SCAP).Dental Pulp Stem Cells, or (DPSCs) are multipotent stem cells that have the potential to differentiate into a variety of cell types discovered in 2003 by Dr. Songtao Shi. Kerkis reported discovery of Immature Dental Pulp Stem Cells (IDPSC), a pluripotent sub-population of DPSC using dental pulp organ culture in 2006.By addition of tissue-specific cytokines the Immature Dental Pulp Stem Cells (IDPSC) differentiated into Mesenchymal, Endodermal and ectodermal lineage of cells.

Since teeth are formed from two different tissues, building a tooth logically requires the association/cooperation of odontogenic mesenchymal and epithelial cells. The recombination of dissociated dental epithelial and mesenchymal tissues leads to tooth formation both in vitroand in vivo (Amar et al., 1989; Yoshiba et al., 1998).l

Making entire teeth with enamel and dentin structures in vivo is a reality and not a utopia.Stem cell storage by means of oral tissues is the new front in business for the dentists to explore .his article proposes to save teeth by multidisciplinary approach. In many cases the dentists consider replacing teeth, which otherwise could be saved. Grade III Furcation involved tooth may well be preserved partially by hemisection and as two separate teeth by bisection/bicuspidization.

Diode Laser Frenectomy – A case report

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ABSTRACT:

Frena are triangle-shaped folds of tissue found in the maxillary and mandibular alveolar mucosa. Their high attachment may cause problems such as- diastema, poor retention of denture, gingival recession, inflammation and speech problems. This type of aberrant frenum can be treated by frenectomy which is simple excision of the tissue. Along with conventional methods, diode laser can also be used to perform frenectomy. The following manuscript presents a case report of 11year old boy with high labial frenum which was excised with diode laser of 940nm wavelength.

Key-words: Frenectomy, diode laser, Ezlase, diastema,

INTRODUCTION

The word frenum is derived from the Latin word “fraenum”. Frena are triangle-shaped folds found in the maxillary and mandibular alveolar mucosa consists of mucosal folds in the labial, buccal, and the lingual surface of the alveolar ridge. They act as flexible checkreins limiting the movement of the lips, cheeks and sometimes the tongue1. Their high attachment may cause orthodontic problem e.g. - diastema, prosthodontic problems e.g. - poor retention of denture, periodontic problems e.g.- gingival recession and inflammation and speech problem e.g.- tongue tied in lingual frenum2. This kind of aberrant frenum can be treated by frenectomy (complete removal of the frenum, including its attachment to the underlying bone) or frenotomy (incision and relocation of the frenal attachment) procedures. Although age old surgical frenectomy procedures like Dieffenbach V-plasty, Schuchardt Z-plasty are widely used, recently lasers are proven to be an excellent tool in this field. Frenectomy using Diode laser is convenient both for patient and dentist. The diode laser is a solid-state semiconductor laser (wavelength 810-980nm) that typically uses a combination of Gallium (Ga), Arsenide (Ar), and other elements such as Aluminum (Al) and Indium (In) to change electrical energy into light energy. The laser is emitted in continuous wave and gated-pulsed modes, and is usually operated in a

contact method using a flexible fiber optic delivery system3. Its poor absorption in water, but high absorption in hemoglobin and other pigments causes thick coagulation of treated surface with very less penetration into deeper tissue.

Materials and Methods

1. Laser Unit- In this case Ezlase (Biolase®) diode laser was used. The parameters are as follows:

- Wavelength: 940nm
- Output Power: 3.5 W
- Operational Mode: Continous Wave
- Tip: 300 µm
- Contact Mode
- Delivery system: Fiber optic with surgical initiated tip.

2. Topical spray anesthesia (Lidocaine with Epinephrine 1:80000).

CASE REPORT

An 11year old boy presented with wide spacing between the upper front two teeth. He was referred to me by an orthodontist. On examination he was seen to have very highly attached labial frenum and diastema in between 11,21 (Fig. 1). The patient was in mixed dention phase and otherwise healthy with no systemic disease. Medical and Dental histories were taken. Diode laser guided frenectomy was planned. Verbal and written consents were given to the patient and he accepted the treatment

Fig.1- Pre-operative photograph

Fig. 2: Immediate post-operative photograph

Method:

Topical spray anesthesia (Lidocaine with Epinephrine 1:80000) was applied in the frenum region. Protective glass was used both by dentist and patient. The lip was retracted and held with finger to make the frenum stretched. Now, the laser was used in continuous mode at 3.5W output power to cut the frenum. Laser was first used at the middle part of the frenum in a horizontal way to cut through the epithelium and fibrous tissue of frenum. When deeper layer was reached, laser was used along the muscle fibers for a short time. Hydrogen Peroxide or wet cotton pellet was used to remove tissue tags. A rhomboid shaped wound was produced after the laser cut. Care was taken not to cut excessively into the soft tissue as it may hamper healing. A sufficient cut was determined by freeness of the lip.

Fig. 3: 1 Week post-operative photograph

Result:

The frenectomy procedure was done successfully with diode laser. There was no sign of bleeding and patient did not feel any pain during the procedure. No suture was given. Gentamycin ointment was applied on the wound to prevent any further secondary infection. Patient was asked to use antiseptic mouthwash for the next few days (CHX 0.2%) and called on next week for a follow up.

Post operative follow up:

1 week after the surgery (Fig. 3), patient reported with no post-operative pain and discomfort. A minor swelling was reported lasting for first 2-3days. Overall wound healing was satisfactory.

DISCUSSION

Photo thermal interaction with the tissue is the basis of surgical laser2. In this process radiant light is absorbed by the tissue and transformed to heat energy changing tissue structure4. The amount of light absorbed depends on a number of factors such as wavelength of laser radiation, output power at the laser tip, optical properties and composition of the target tissue5. Here, Diode laser of 940nm wavelength is highly absorbed in pigmented tissue of oral mucosa and the absorbed energy in turn cuts the soft tissue of frenum and at the same time coagulates the minor vessels like

electrocautery. Suturing was also not needed. In conventional method (scalpel), bleeding obscure the operative field and increases the fear of surgery especially in children and patients with bleeding disorders. Also the treatment with inflicting pain sometimes causes problem for both the patient and the clinician. While using diode laser, there was no postoperative pain and the patient did not require analgesic or antibiotic coverage. The entire procedure was completed within 5min which is high time saving for the dentist. Overall patient compliance is very good with laser aided frenectomy.

CONCLUSION

Although frenectomy is a simple surgical procedure, it can be made even simpler by using diode laser. The use of laser makes the procedure faster with better healing. Sutures, medicaments, post-operative complications can be easily avoided with laser and so making it the future scalpel for surgeon.

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Pictorial

Bulk filling posterior direct resin restorations

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ABSTRACT:

Bulk filling posterior resin restorations can compromise the resulting restoration. A case will be presented demonstrating a unique sonically activated resin allowing bulk filling with minimal shrinkage and high depth of cure.

Key-words: bulk fill, direct composite, posterior filling.

INTRODUCTION:

Direct resin posterior restorations have been a challenge to practitioners with a trade off between time involved in the procedure and compromising the mechanical properties of the resulting restoration. SonicFill will be discussed utilizing a special composite resin formulation that is optimized to be sonically activated to improve flow and better adaption to the preparation while lowering polymerization shrinkage and increasing depth of cure so that true bulk filling can be accomplished.

Figure 1: Defective (fractured) amalgam in the lower right 1st premolar to be replaced with a direct resin restoration

Figure 2: Defective amalgam has been removed with recurrent decay with carbide burs in a highspeed followed by a SmartBur (SS White) in a slow speed to ensure removal of demineralized dentin.

Figure 3: Triodent sectional matrix and V wedge have been placed interproximally.

Figure 4: Lateral view showing Triodent sectional matrix and V wedge placement.

Figure 5: Triodent V3 retainer ring placed against the sectional matrix and straddling the V wedge, adapting the matrix to the tooths contours.

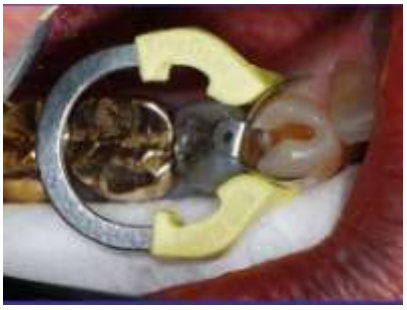

Figure 6: Triodent V3 retainer ring adapting the sectional matrix to the tooths contours an providing a tight contact.

Figure 7: SonicFill handpiece (Kerr Sybron) attached to a highspeed handpiece line with composite compule attached ready to fill the preparation.

Figure 8: The tooth was acid etched with 37% phosphoric acid gel for 30 seconds then rinsed and dried. Bond1 (Pentron) total-etch adhesive was applied then light cured for 20 seconds. SonicFill was used to bulk fill the preparation then adapted using an acorn burnisher developing primary anatomy prior to light-curing for 40 seconds on the occlusal, then buccal and then lingual surfaces.

Figure 9: The retainer ring, wedge and matrix have been removed and additional light-curing performed. Preliminary anatomy can be seen in the restoration.

Figure 10: Lateral view showing the

adaption of the composite to the contour of the tooth prior to any finishing of the restoration.

Figure 11: Restoration following occlusal adjustment, contouring and polishing.

Figure 12: Lateral view demonstrating natural contours of the SonicFill direct resin restoration achieved using the Triodent matrix, wedge and V3 retainer ring.

DISCUSSION:

Bulk filling direct resin restorations in the posterior present several challenges, some related to technique and others to the materials commonly used. Composites traditionally used undergo polymerization shrinkage which being a percentage of volume increases with bulk filling. Additionally, composites typically only cure in 2-3mm thicknesses which can when bulk filling lead to incomplete polymerization of the resin during curing. Kerr has optimized the chemistry of the SonicFill direct resin to overcome these two inherent problems in posterior direct resin restorations namely, volumetric shrinkage from polymerization and depth of cure. With polymerization shrinkage below 1.6% and a depth of cure of 5mm, this direct resin is well suited for bulk filling. The unique resin requires sonic vibrations to allow flow of the material and adaptation to the cavity preparation walls. Upon activation through the special handpeice, the resin becomes flowable and extrudes from the tip of the activated compule. The resin does not return to its preactivated state for 1-2 minutes allowing the practitioner to shape and carve the anatomy. Following shaping into the cavity preparation, the material is cured with a conventional LED or Halogen curing light. Finishing and adjustments are accomplished in a similar manner to other traditional composites.

CONCLUSION:

Bulk filling of direct posterior resin preparations can be accomplished with the SonicFill handpiece and resin yielding well adapted, wear resistant low shrinkage restorations.