

## Innovations in Periodontology: A Review

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### Abstract

In an era of new technology and development periodontology has also progressed and shown lots of scope and promise. Novel developments are done for better treatment outcome for patients. Regeneration with new material such as prf is outlined. Procedures like periodontal endoscopy and new non-surgical techniques are covered and outlined.

**Keywords:** Innovations; Periodontology; Periodontitis

### Introduction

Periodontitis is a multifactorial disease. It consists of inflammation of the periodontal tissues, which is characterized by loss of support of the affected teeth, specifically periodontal ligament fibers and the bone into which they are inserted. Recently the classification has been revised and changed for better diagnosis. Innovations in periodontal therapy to improve treatment in every form for quality care for patients have evolved over the years to better improve outcome.

### Regeneration surgery material

Regeneration or repair is the expected healing outcome following periodontal therapy and has certain stringent criteria to be met in order to be successful e.g. two wall or three wall defect on mesial or distal aspect of tooth and furcation grade 2.

Previous methods of regeneration commonly used is guided tissue regeneration (xenograft membrane and bone etc.) and emdogain (amelogenin). Alloplastic material novel material can be made by mixing bio glass and  $\text{Ca}(\text{H}_2\text{PO}_4)_2$  and have cements set to form hydroxyapatite or brushite produce HAP, brushite and fluorapatite forming cements. Influence of storage media on the Calcium Phosphate Cements combined with bioactive glass, with respect to properties and phase formed and strength of development which in this study showed significance this combination can be used as regeneration [1].

Two events are dependent availability of cell types needed and presence or absence of signals necessary to recruit and stimulate the cells both on a molecular basis. The cascade of healing of any wound is initiated by clot formation, followed by proliferative stage and maturative stage.

Growth factors have shown to favor wound healing by promoting proliferation of cells (mitogenesis), migration of cells (chemotaxis), and stimulation of new blood vessel formation (angiogenesis) [2]. Platelets contain biologically active proteins that binds on to a developing fibrin mesh or the extracellular matrix. The proteins are seen to create a chemotactic gradient for recruitment of stem cells. These stems cells undergo differentiation, and hence promote healing by regeneration.

The use of autologous platelet concentrates opens a promising treatment option in the field of periodontal regeneration, especially in clinical situations demanding rapid healing [3]. The regenerative potential of platelets was initially done in 1974 by Ross., *et al.* [4] it was said that platelet-derived growth factor (PDGF) serves as growth factor on fibroblasts, smooth muscle cells, and glial cells. An autogenous living biomaterial PRF, developed in France by Choukroun., *et al.* [5] (2001), is a second-generation platelet concentrate. Being a promising line of treatment in the direction of tissue regeneration, many authors have suggested different clinical application of PRF. The concept which are “natural bone regeneration” was suggested by Simonpieri., *et al.* [6] which indicates reshaping the whole alveolar bone and the restoration of gingival volume and peri-implant bone. Chang and Zhao [7] suggested good clinical results with PRF in the treatment of periodontal infrabony defects.

### Piezosurgery

Piezosurgery is an electronic device that generates ultrasonic micro vibrations at variable frequency [8] unique for the characteristic vibrations generated in parallel and variable frequency modulation for precise cutting of bone with different degrees of density. For periodontal surgery, it has a root operating mode. The low ultrasonic frequency without over modulation is set at an ideal power level for scaling, debridement, and root planning.

The most compelling characteristics of piezoelectric bone surgery are low surgical trauma, exceptional precision, and fast healing response. As a result, piezosurgery has the ability to increase treatment effectiveness while improving postoperative recovery and healing.

### Non-surgical debridement

Non-surgical root surface debridement being the standard care which is essential could have host modulation which decrease host response and decrease cytokines and inflammation (e.g. nsaid, resolvins). Full mouth disinfection has also found a significance by decreasing pocket depths.

Laser assisted regeneration needs more studies but shows promising results in decreasing pocket depths. Photodynamic therapy with laser also needs more studies. A new innovation is a periodontal endoscope its advantages is its cheaper than surgeries. Individuals with sites that have not responded to traditional nonsurgical debridement. It can help Residual probing depths in periodontal maintenance patients who refuse surgical therapy, and/or where surgery is contraindicated for medical or esthetic reasons. Other subgingival pathologies identified with this technology include caries, open restoration margins and cervical enamel projection [8] modified minimally invasive non-surgical therapy gaining popularity for intrabony defects. The protocol is Local anesthesia by infiltration without adrenaline in the study site (not intrasulcular anesthesia) Thorough debridement of the root surface up to the bottom of the periodontal pocket under local anesthesia. Attempt to minimize the trauma to the soft tissues and especially to the papilla, using a sub papillary access for debridement (trying not to touch the most coronal part of the interdental papilla) Use of exclusively piezo-electric devices with specific thin and delicate tips. Deliberately avoid ‘smoothing’ the root surface or performing gingival curettage. Attempt to stimulate the formation of a stable blood clot, by natural filling of the intrabony defect with blood following debridement (no use of any subgingival rinses) [9].

### Discussion

More research needs to be put into host modulating agents to find more medicines with less side effects to help control periodontal disease. Piezoelectric surgery has found its way into sinus elevations and dental implants and ridge augmentation.

### Conclusion

As technology and research continues and evolves we can see more new inventions and helpful tools to treat and eradicate periodontal disease. Prevention and awareness along with regular checkups still needs to be emphasized and continued as there are still limitations to each of these innovations and more studies are needed.

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