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Editorial

Regenerative Endodontics, Trends and Tissue Engineering Related Strategies

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Recent developments in regenerative endodontic applications and tissue engineering related approaches promising and prospecting us new horizons and potentials for the regeneration of pulp and/or pulp-dentin complex in pulpal treatments. Especially in last two decades in treatment of necrotic and immature permanent teeth the regenerative techniques and strategies slowly became a part of clinical applications besides the scientific research in that field. By using the various techniques including the nanofibrous scaffolds which simulate and resemble the original extracellular matrix have been synthesized successfully to promote cell guidance. By developing the technology of fabricated scaffolds and bioactive molecules the deliverability of those mentioned molecules to the point of operation or infection have been facilitated and increased in daily routine. The bioactive scaffolds are still developing and giving prospects in the field of regenerative treatments and contributing the improvement of clinical success. Clinical trends are changing by developing the knowledge of regenerative applications in endodontics and recent advances in pulp biology. The application of biomolecules and bone morphogenic protein-7 (BMP-7), bone sialoprotein (BSP), and some other molecules are also better controlling of bacterial invasion and revolutionizing the clinical approaches in contemporary clinical endodontics. Also by the improvement of the concepts of bioactive nanofibrous scaffolds, Injectable scaffolds, stem cells and anymore as an option of the stem cell related strategies among the clinical alternatives provide new trends in endodontic therapies and directing the clinicians towards the new solutions to old problems. Regenerative endodontics using tissue engineering principles permits and facilitates the growth and development of pulp-dentin complex. Clinically revascularization techniques in regenerative endodontics seem very promising especially in apexification and apexogenesis procedures. Still neural and vascular regeneration not yet possible and this is the limitation of regenerative applications but researches and studies are also focusing towards to that horizon and also the scaffold techniques and materials becoming various. Traditional pulp regenerative procedures use blood clot as a scaffold and platelet-rich is a bioactive scaffold and if contains additional growth factors enhance the wound healing and also platelet-rich plasma (PRP) is an autologous blood source could be noted as a potentially ideal scaffold for regenerative endodontic treatment procedures and regimens. Stem cells, growth factors/morphogens, and scaffolds that can support cell growth and differentiation are three main components of tissue regeneration. In recent studies incorporated the use of PRP as a scaffold in regenerative endodontics resulted in periapical healings radiographicaly in the literature (Torabinejad & Faras "A Clinical and Histological Report of a Tooth with an Open Apex Treated with Regenerative Endodontics Using Platelet-rich Plasma" and various different studies).

Revascularization is an important treatment alternative anymore in immature necrotic teeth which is already a challenging case. Revascularization therapy, at the same time allows the root development because it is a biological based alternative application unlike apexification and artificial apical barrier techniques which allows continuation of root development Revascularization is a new concept that we can mention as treatment under the regenerative endodontic therapies. Revascularization and regenerative therapies seem practical, valuable and promising rather than traditional apexification techniques with calcium hydroxide and other apical barrier techniques. Also another new approach is using CEM cement as a new endodontic biomaterial can be considered as a strong alternative to MTA as another realistic option.

In last decades tissue engineering evolved and became an integral part of biological sciences as well as endodontics and regenerative techniques such as revascularization became trendy and applicable in endodontic routines. Endodontists are applying all these techniques more than before in daily clinical practice safely and obtaining very good results and becoming more familiar to the terminology of stem/progenitor cells, scaffolds, morphogens, stem cell therapy, vascular and neural regeneration and demanding more continuing education and lectures or seminars related those topics. Seem regenerative therapy will revolutionize the endodontic therapies by improving of the studies related morphogens as bone morphogenic proteins (BMP), stem/progenitor cells, novel and synthetic scaffolds, and effective and more efficient disinfecting materials for regenerative therapies. Still further studies are necessary and more education on the topic should be integral part of the new generation graduates and graduate programmes in collaboration with the related basic sciences.

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