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STEM CELL TREATMENT TO REPLACE DREADED ROOT CANALS



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Could root canal procedures go by the wayside in the not-too-distant future?

What do dentistry and stem cell research have in common?

The answer to the above question sheds light on the importance of stem cells in routine treatment procedures which would otherwise involve painful invasive process and discomfort to the patient. Researchers have been working hard to discover the abilities of stem cells which have very high regeneration capabilities in treating different ailments. Dentistry has been playing a pivotal role in this new age research. Over the past decade, we have seen advances in the predictability of endodontic clinical procedures, better outcomes for surgical and reparative procedures, better management of pain both during clinical treatment and associated with various dental diseases, improved understanding and treatment of traumatic dental injuries, enhanced treatment options related to better understanding of pulp revascularization and endodontic regeneration, and improved diagnostic and treatment modalities.



Despite recent advances in the fields of regenerative and reparative dental medicine and stem cells, the million dollar question of “whether or not the days of dreaded root canal could finally be numbered” remains to be answered. The short answer to this question NOW is YES!

A root canal procedure involves cleaning out the infected and dead tissue in the root canal of the tooth, disinfecting the area, and adding an impermeable seal to try to prevent further infection. An estimated 15.1 million root canals are performed in the U.S. annually, according to a 2005-06 survey by the American Dental Association. Elimination of root canals would be a huge paradigm shift in dentistry. One of the major concerns associated with root canal is that, although the pain and infection could be minimized, a sterile environment inside the dentinal tubules cannot be created. The fact that the seal that is carefully placed at the apex of the tooth does not always prevent new infection from occurring is also a cause for concern. This compromised condition could subsequently spread to surrounding tissue without detection and eventually develop unexplained or mysterious illnesses in other areas of the body.

What an exciting time to be in Regenerative dentistry!

Current research shows that advances made by scientists in treating tooth decay may allow dentists to restore tooth tissue and avoid the dreaded root canal procedure. Several recent studies have demonstrated in animals that procedures involving tooth stem cells appear to regrow the critical, living tooth tissue known as pulp.

We here at Transcell believe that sooner than later there comes a day when dentists will be moving away from traditional root canal treatments and reduce or eliminate the need for extracting teeth due to extensive dental decay by switching to stem cell based treatment modalities.



What is Root canal?

My research says that...Inside the tooth, under the white enamel and a hard layer called the dentin, is a soft tissue called the pulp. The pulp contains blood vessels, nerves and connective tissue, and helps to grow the root of our tooth during development. In a fully developed tooth, the tooth can survive without the pulp because the tooth continues to be nourished by the tissues surrounding it. Sometimes, a tooth's pulp becomes inflamed or infected. These inflammations or infections can be caused by: faulty crowns, a crack or chip in the tooth, deep decay, etc. When an ordinary filling fails to fix the problem, a dentist will recommend Root Canal. This procedure involves removing the tooth pulp, nerves and all, to prevent further tooth decay. The new now hollowed-out tooth chamber is then filled with a permanent object known as "gutta-percha" to keep the tooth free from further decay. This is a nerve wrecking procedure that Me thinks.....Nothing can strike fear into a grown man's heart quite like being told he's in need of a root canal, but a new stem cell dental implant may one day make this painful operation a thing of the past. So, tooth and the intense research on stem cells is beyond the story of tooth fairy as Scientists have been close in developing a new and effective way to treat tooth decay that fully restores the tooth integrity rather than being filled, capped or extracted.



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The end of root canals? Revolutionary 'stem cell fillings' trigger teeth to repair themselves

A radical stem cell treatment could change the way dentists deal with the dreaded root canal treatment. The novel stem cell based treatment would involve a new type of tooth filling that can aid teeth to regenerate and repair themselves. This essentially translates to shorter treatment and recovery times for millions of patients with dental ailments and those who have to undergo dental surgery. By using synthetic, light curable biomaterials, researchers at the University of Nottingham and the Wyss Institute at Harvard University were able to demonstrate the effect of native dental stem cells found inside teeth on repair and regeneration of dentin pulp. The inherent beauty of this novel stem cell technique is that it eliminates the use of toxic dental fillings which could also pose a problem of incompatibility within the tooth pulp.

The synthetic biomaterials could be used to replace existing dental fillings and also eliminate the need for a root canal procedure (Fig 1) By placing the synthetic biomaterials in direct contact with the pulp tissue, stimulation of the native stem cell population could be achieved, which in turn would help in regeneration of pulp tissue and the dentin surrounding it.

Scientists at Transcell Biologics, Hyderabad, India have developed a novel biocomplex of tooth pulp derived mesenchymal stem cells and an inert biomaterial like titanium (Fig 2) that could act both as vehicle to apply stem cells to the affected zone as well as a device by itself to address the infected zone in the periodontal area. The product efficacy is being evaluated in clinics in India.

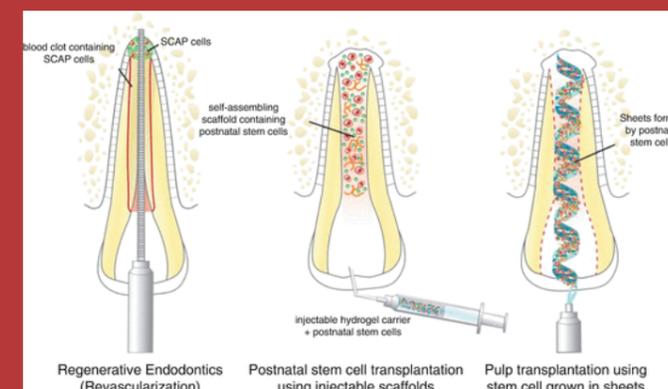


Fig 1

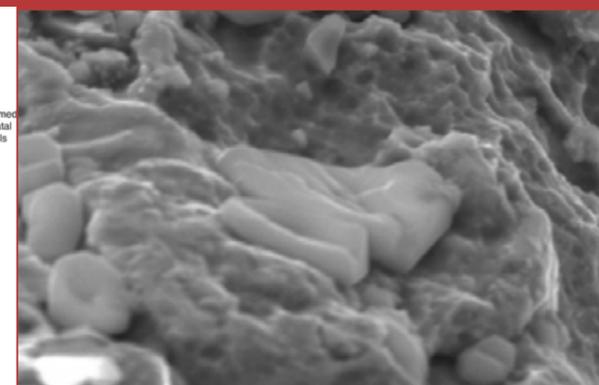


Fig 2



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