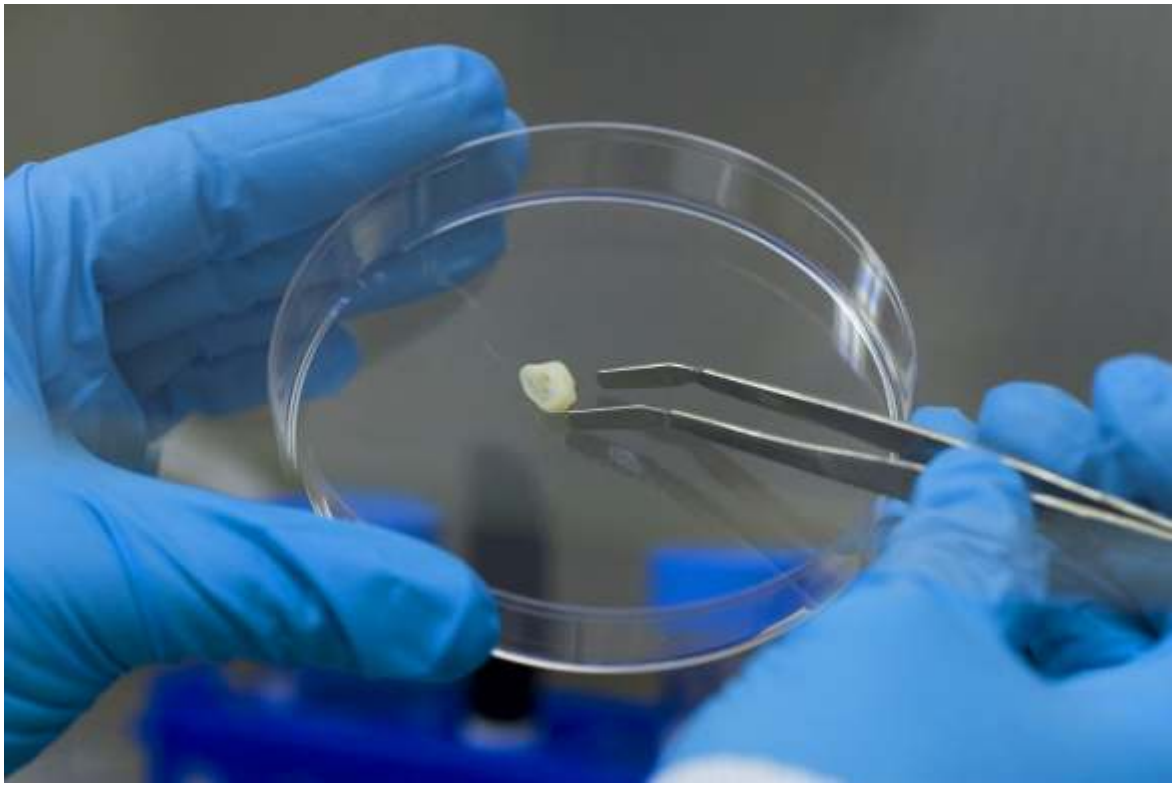

# STEM CELLS FOR PERIODONTAL DISEASES

Periodontal disease also known as gum disease is a progressive disease affecting the supporting and surrounding tissues of the teeth and also the usually strong jawbone. If untreated at the right time, periodontal disease can result in loose, unstable teeth or tooth loss. Periodontal disease is in fact the leading cause of tooth loss in adults in the developed and developing world and hence this cannot be neglected.

Soft pulp inside the tooth can become inflamed and infected due to deep decay or repeated dental procedures on a tooth or large fillings or a crack or chip in the tooth. Root Canal Treatment is needed when an injury or a large cavity damages the tooth root associated with local infection. In order to reach the root of the tooth, an opening is made through the crown of the tooth to the pulp chamber. Initially, cleansing of the canals is necessary to remove debris followed by filling to suppress infection.

Periodontal disease sets in when the bacteria in the plaque start to attack the soft gingival tissues surrounding the teeth, rapidly breeding to cause infection. As the infection deepens, it starts to burrow deeper into the tissues causing inflammation between the teeth and the gums. Typically, the body responds to, by destroying the infected tissues and that is why the gums appear to draw back. The resultant gaps between the teeth if not addressed, lead to unstable teeth and finally to tooth loss.

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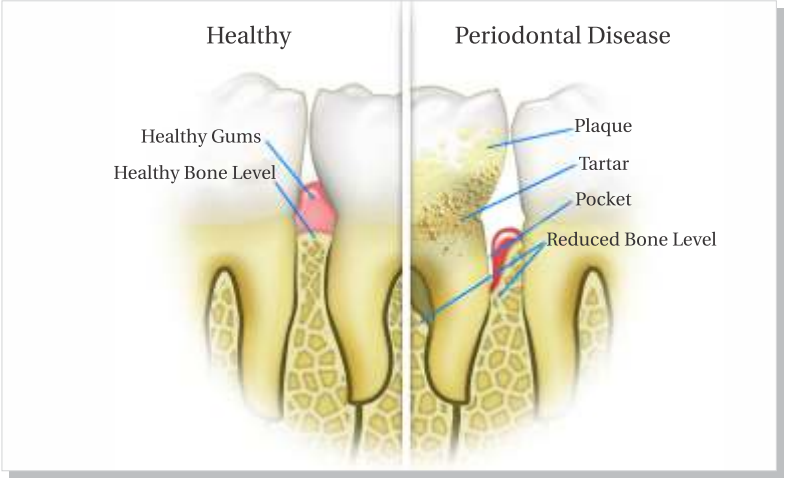


Generally, the dentist performs deep scaling procedures to cleanse the pockets in the periodontium. A combination of antibiotics and medicated mouthwashes are used to kill the bacteria and promote good healing of the pockets.

Chronic, Aggressive and Necrotizing Periodontal Diseases are harder to treat and to save with a regular antimicrobial treatment plan.

Recent advancements in Research and Development in Regenerative Dentistry have strongly advocated Stem Cell Treatment not just for regeneration but also as anti-inflammation agents. The only difference is with their stark biological and clinical properties that are advantageous with dual function at the site of infusion.

Although there are four different types of Stem Cell Treatment, depending on the source of their harvest, human mesenchymal stem cells (hMSCs) sourced from stroma / mesenchyme are studied and evaluated in terms of mechanisms related to the antimicrobial function.

The studies in this regard reported that the hMSCs directly slow down the growth activity of the bacteria resulting in lower bacteria burden in the milieu. The slow growth and fewer bacteria is the first piece of antimicrobial effectiveness, thought to induce a window of opportunity for the antibiotics as well as the host's immune system to resolve the infection and restore the health of the microenvironment.

*Pseudomonas aeruginosa*, *Staphylococcus aureus* and *Streptococcus pneumoniae* are some of the pathogenic bacteria causing sepsis with the release of pro-inflammatory stimulators contributing to the tissue damage. The second piece of the important antimicrobial effectiveness of the hMSCs is their ability to secrete antimicrobial peptides including the peptide LL-37. LL-37 that is shown to mediate its effects by softening the bacterial cell walls and allowing increased sensitivity to host and antibacterial agents.

Among the adult sources of hMSCs, milk tooth is a recent clinical discovery which has been identified as the best source to harvest. Tooth pulp derived hMSCs can be stored from 5-11 year old kids. The loose tooth (milk tooth) that would eventually fall off is to be collected sterile and the Stem Cell Banks provide the service of harvesting, culturing hMSCs from the extracted loose tooth once the family enrolls for the Service. The harvested hMSCs are cryopreserved immediately in Liquid Nitrogen Tanks.

The cryopreservation helps in storing Stem Cells Naive retaining their therapeutic properties to be retrieved for any application anytime later. The advantages of banking tooth stem cells now are manifold while every kid aged between 5-11 years would be eligible with 32 times of opportunity to donate.