

Title

In Vitro and *in Vivo* investigation on stem cells isolated from pulp and gingival tissues from periodontally compromised teeth.

Abstract:

Background:

Dental pulp stem cells (DPSCs), originating from neural crests, can be found within the dental pulp. Recently the gingiva was also identified as containing mesenchymal stem cells (GMSCs). DPSCs and GMSCs are an attractive alternative mesenchymal stem cell (MSC) source, because their isolation simplicity compared with the more invasive methods associated with harvesting other MSC source. DPSCs are usually isolated from primary incisor and permanent third molar, while GMSCs from gingiva of periodontally healthy patients.

DPSCs and GMSCs cultured in osteogenic medium develop an osteoblastic phenotype characterized by the expression of the typical osteoblast markers such as alkaline phosphatase, osteocalcin, osteopontin, as well as mineralized matrix production. Numerous studies demonstrated the ability of this matrix to develop lamellar bone *in vivo* (animal model).

Aim:

The aim of this study is to evaluate the presence of DPSCs and GMSCs harvested from periodontally compromised teeth. A secondary aim is to demonstrate the ability of the isolated stem cells to generate mineralized matrix *in vitro* and to stimulate the formation of lamellar bone *in vivo*.

Materials and methods:

DPSCs and GMSCs collected from periodontally compromised teeth (with severe periodontitis and mobility=3) will be isolated and cultured, then will be directionally differentiated to osteogenic cell lineage. Subsequently, histology, histochemistry and immunofluorescence will be performed to study both stem cells and evaluate the differentiation to osteogenic cell lineage. The extracellular matrices containing bone nodules generated *in vitro* will be grafted in animal models to evaluate the ability to create lamellar bone tissue.

Expected Result:

To demonstrate the presence of DPSCs and GMSCs harvested from periodontally compromised teeth.

To evaluate the osteogenic potential of the isolated stem cells both *in vitro* and *in vivo*.