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Editorial

The Role of Dental Pulp Stem Cells in Oral and Maxillofacial Surgery

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Although the tissues in the oral region show some regeneration in response to various diseases, caries and trauma, the damage of these tissues is often irreversible. Therefore, recent research focuses on the regeneration of damaged tissue by techniques such as tissue engineering, stem cell culture, and developmental biology. Dental pulp-derived stem cells (DPSCs) are particularly eye-catching in regenerative medicine studies because they do not cause problems, especially ethically, embryonic and mesenchymal stem cells [1]. Manipulations of DPSC are supported by sophisticated technology. In recent studies, the search for new sources that are less invasive as possible and which are rich in stem cells continues. Oral cavity is a convenient source with permanent and primary teeth which are easy to access for the surgeon and reduce patient morbidity [2].

Mesenchymal stem cells (MSCs) are the main components of tissue engineering due to their clonogenicity and differentiation abilities. One of the main problems identified in this treatment approach is that only a small percentage of MSCs remain alive after transplantation [3]. DPSCs are stem cell sources that provide some advantages over other MSCs as they are adult stem cells without ethical problems associated with the use of embryonic cells. The ethical problems associated with the cell source are also avoided because DPSCs can be isolated from the pulp of the immediately removed third molars, which are normally discarded tissue [4]. In addition, these cells have low immunogenicity and clonogenic (e.g. self-renewable), highly proliferative properties and tissue renewability. DPSCs are known to differentiate into several cell types including osteoblasts. Because dental pulp originates from neural crest cells, DPSCs are more suitable for mineralized tissue regeneration than bone marrow MSCs, indicating that it is a more reliable source for regeneration in the oral and maxillofacial region originating from neural crest. Today, DPSCs are used in the treatment of many diseases requiring regeneration. Immunomodulation, differentiation and migration capabilities make DPSCs more privileged for clinical use. Reconstruction of tissue losses due to infection, trauma, tumors and congenital diseases is a major problem in maxillofacial surgery and many techniques are used for this. Large amounts of autogenous tissue transplantation is not always possible in order to restore function and aesthetics and there is a risk of morbidity in the donor area. DPSCs have the potential to find many applications in the maxillofacial region in the future. More preclinical and clinical trials are necessary to establish reliable evidence.

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