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## A brief discussion on the Research Prospect of the Application of DPSCs in Stomatology

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### ABSTRACT

The study of dental pulp stem cells(DPSCs) has been a research hotspot in the treatment of oral regeneration, because of its advantages such as convenient acquisition and preservation, safety, low immunogenicity, etc. In the future, we hope to apply it to the repair and regeneration of dental pulp, periodontium and Maxillofacial bone tissue. However, at present, our research in this area is still insufficient, and the data obtained is extremely limited. We still need to carry out in-depth research in the following aspects, such as clinical donor selection, experimental models, experimental materials and methods, evaluation criteria and so on.

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In oral clinical practice, the application of some biomaterials or autologous blood derivatives for vital pulp preservation has achieved great success. However, there is still a lot of research space in the use of dental pulp stem cells(DPSCs) for dental pulp regeneration therapy<sup>[1,2]</sup>. In recent years, tissue engineering technology based on autologous stem cells has developed rapidly, because of its convenient acquisition, low immunogenicity, safety, greater neural differentiation potential and no ethical dispute, has become a research hotspot in the world. In the future, we hope to apply it not only in dental pulp regeneration, but also in periodontal and maxillofacial tissue regeneration. But at present, our research methods and strategies in this area are still flawed, mainly in the following aspects:

**Firstly**, in the research direction, the relevant basic research is still insufficient. The molecular mechanism of DPSCs proliferation and differentiation into various tissues in vivo is not clear, and the strategy to determine the signal pathway is incomplete.

**Secondly**, in terms of experimental materials, how to select clinical donors is still a topic worthy of discussion. We need to pay attention to whether there is an upper age limit for the selection of donors, whether there are differences in the characteristics of DPSCs at different ages<sup>[1]</sup>.

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**Thirdly**, in terms of experimental methods, the passage times of DPSCs and their aging degree may be the initial step to explore. We need to clarify their aging mechanism in order to select the most appropriate passage times for research<sup>[1]</sup>. Then we need to pay attention to the differences among the research models (vivo, vitro and vitro 3D model). We should also implement comprehensive evaluation on the characteristics of DPSCs in histology, immunology and molecular biology.

**Last but not the least**, in terms of evaluation criteria, the qualitative histological and molecular biological criteria for the differentiation of DPSCs into other tissues need to be improved, such as the re-establishment of dental pulp nerves.

In summary, we believe that with the further development of material science, molecular biology, tissue engineering and the further understanding of the biological properties of DPSCs, the clinical application of DPSCs will be promoted. And it is expected highly to become a mature clinical technology in the future.

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