

The role of mesenchymal stem cells in bone repair and regeneration

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Despite the undisputed modern development of synthetic biomaterials that range from bioactive unresorbable to resorbable materials, clinically applied osteoconduction bone substitutes still have limitations in the treatment of bone defects. These are the result of the physical and chemical properties of the utilized materials and the biological interactions associated with both local and general reactions of the organism. Mesenchymal stem cells constitute a promising treatment alternative in orthopedics. Preclinical studies regarding the use of MSCs have shown good therapeutic results. However, it is still necessary to advance further in this area and enable the treatment of patients with critically large bone defects. The aim of this review is to describe the role of MSCs in bone repair and regeneration, describe the techniques used in the clinical application of MSCs and to outline future research endeavours in this area.

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