



## Radiation effects on bone healing and reconstruction: interpretation of the literature

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### Objective

Reconstructing irradiated mandibles with biomaterials is still a challenge but little investigated. We collected data that could help us understand studies in the field of regeneration with biomaterials and irradiated bone.

### Study design

Systematic review of the literature.

### Results

Delay and duration of radiation delivery and total equivalent dose are the most variable parameters in the various studies, resulting in confusion when interpreting the literature. Most reproducible experiments show that radiation reduces osteogenic cell numbers, alters cytokine capacity, and delays and damages bone remodeling. Interindividual variations and how such changes become irreversible lesions are still uncertain. In the case of regeneration using biomaterials, most studies have addressed the question of reconstruction in previously irradiated bone. The results show that osseointegration is often possible, although the failure rate is higher. The sooner the implantation takes place after the end of the radiation, the higher the likelihood of failure. Few studies have focused on primary reconstruction followed by early irradiation, and most of the currently available engineering models would be altered by radiation. Good outcomes have been obtained with bone morphogenetic protein and with total bone marrow transplantation.

### Conclusion

This review points out the difficulties in achieving reproducible experiments and interpreting literature in this underinvestigated field.

Résumé en anglais

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