

Stem cell therapy could offer new hope for defects and injuries to head, mouth

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In the first human study of its kind, researchers found that using stem cells to re-grow craniofacial tissues—mainly bone—proved quicker, more effective and less invasive than traditional bone regeneration treatments.

Researchers from the University of Michigan School of Dentistry and the Michigan Center for Oral Health Research partnered with Ann Arbor-based Aastrom Biosciences Inc. in the clinical trial, which involved 24 patients who required jawbone reconstruction after tooth removal.

Patients either received experimental [tissue repair cells](#) or traditional guided [bone regeneration](#) therapy. The tissue [repair cells](#), called ixmyelocel-T, are under development at Aastrom, which is a U-M spinout company.

"In patients with jawbone deficiencies who also have missing teeth, it is very difficult to replace the missing teeth so that they look and function naturally," said Darnell Kaigler, principal investigator and assistant professor at the U-M School of Dentistry. "This technology and approach could potentially be used to restore areas of bone loss so that missing teeth can be replaced with dental implants."

William Giannobile, director of the Michigan Center for Oral Health Research and chair of the U-M Department of Periodontics and Oral Medicine, is co-principal investigator on the project.

The treatment is best suited for large defects such as those resulting from trauma, diseases or birth defects, Kaigler said. These defects are very complex because they involve several different tissue types—bone, skin, gum tissue—and are very challenging to treat.

The main advantage to the stem cell therapy is that it uses the patient's own cells to regenerate tissues, rather than introducing man-made, foreign materials, Kaigler said.

The results were promising. At six and 12 weeks following the experimental cell therapy treatment, patients in the study received dental implants. Patients who received [tissue repair](#) cells had greater bone density and quicker bone repair than those who received traditional guided bone regeneration therapy.

In addition, the experimental group needed less secondary bone grafting when getting their implants.

The cells used for the therapy were originally extracted from bone marrow taken from the patient's hip. The [bone](#) marrow was processed using Aastrom's proprietary system, which allows many different cells to grow, including [stem cells](#). These stem cells were then placed in different areas of the mouth and jaw.

Stem cell therapies are still probably 5-10 years away from being used regularly to treat oral and facial injuries and defects, Kaigler said. The next step is to perform more clinical trials that involve larger craniofacial defects in a larger number of patients.

More information: The study, "Stem cell therapy for craniofacial bone repair: A randomized, controlled clinical trial," appears this month in the journal *Cell Transplantation*.

Provided by University of Michigan

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