Primary teeth stem cells may help repair adult teeth

Children's cells regenerate pulp in their injured secondary teeth

Stem cell research has been central to many developments in medicine. In a new study, scientists have investigated whether stem cells from primary teeth can help in the regrowth of damaged adult teeth. The promising results of the study highlight the potential of the approach, which could one day be applied in a wide range of dental procedures or even in treating certain systemic diseases.

The research was led by Dr. Songtao Shi, chair and professor of the Department of Anatomy and Cell Biology at the University of Pennsylvania, and Drs. Yan Jin, Kun Xuan and Bei Li from the Fourth Military Medical University in Xi'an, China. "This treatment gives patients sensation back in their teeth. If you give them a warm or cold stimulation, they can feel it; they have living teeth again," explained Shi. "So far we have follow-up data for two, two and a half, even three years and have shown it’s a safe and effective therapy," he continued.

Over the past 10 years, Shi and his colleagues have learned more about human deciduous pulp stem cells (hDPSC) and how they could be safely employed to regrow pulp. The study involved 40 children with mixed dentition who had each injured one of their permanent incisors. Thirty of the children were assigned to hDPSC treatment, which involves extracting tissue from a healthy primary tooth and then reproducing the stem cells from the pulp in a laboratory culture. From there, cells were implanted into the injured tooth. The remaining 10 patients received controlled apexification treatment.

The researchers found that patients who received hDPSC treatment had more signs than the control group of healthy root development and thicker dentin, as well as an increase in blood flow. Additionally, the researchers were able to directly examine the tissue of a treated tooth when one of the patients reinjured it and it had to be extracted. They found that the implanted stem cells regenerated different components of the dental pulp, including the cells that produce dentin, connective tissue and blood vessels.

Despite the successful results, the researchers acknowledge that these are just the first steps. While using a patient’s own stem cells reduces the possibility of immune rejection, it’s not possible in adult patients who have lost all of their primary teeth. Shi and his colleagues are beginning to test the use of allogeneic stem cells to regenerate dental tissue in adults. They are also hoping to secure Food and Drug Administration approval to conduct clinical trials using hDPSCs in the U.S.

"We’re really eager to see what we can do in the dental field, and then building on that to open up channels for systemic disease therapy," said Shi.

The study, titled "Deciduous autologous tooth stem cells regenerate dental pulp after implantation into injured teeth," was published in Science Translational Medicine on Aug. 22.
Register now for PDC

Online registration is open for the 2019 Pacific Dental Conference, which is held annually at the Vancouver Convention Centre in Vancouver, British Columbia.

Always running from Thursday through Saturday, the meeting in 2019 will be from March 7–9. It features a comprehensive agenda of more than 200 open sessions and hands-on courses presented by some of dentistry’s top clinicians and thought leaders. The program enables attendees to earn up to 20 C.E. credits.

The exhibit floor typically sells out months in advance, and this year is no exception. More than 300 dental companies and organizations will be available to help attendees try out the industry’s latest technological innovations and ever-improving products. And attendees will be able to take advantage of the many show specials. The exhibit hall will be open on Thursday and Friday, March 7–8.

On Saturday, March 9, in addition to the meeting’s final day of educational sessions, the Dental Technicians Association of British Columbia will hold its annual conference in conjunction with the annual PDC Lab Expo. The Dental Technical Association conference features a keynote address and concurrent sessions. The PDC Lab Expo, Western Canada’s largest dental technology tradeshow, brings together dental technicians and dentists to exchange information and forge new business relationships with some of the industry’s top companies displaying their latest tools, technology, techniques and other advancements. All registered PDC attendees also have access to the PDC Lab Expo. Dentists and their team are invited to join the more than 3,000 dental technicians and denturists to explore the new options and technologies together.

The ability to network with the more than 14,000 dental professionals that attend the PDC isn’t limited to the courses and exhibit hall. Many dental-school class years hold annual reunions at the meeting and there are a number of socializing opportunities, including PDC After Hours and De La Vigne — French Wines Explored.

PDC After Hours takes place Friday evening from 6–7:30 p.m. on Thursday in the Vancouver Convention Centre West Ballroom foyer. The wine tasting will feature a selection from the northern region France’s Loire Valley through Burgundy, down to Rhone Valley and west to Bordeaux. The cost is $40 (plus GST).

You can register now for www.pdconf.com for one of the largest dental conferences in North America.

(AAACD heading to San Diego)

Besides the location change to sunny San Diego, the American Academy of Cosmetic Dentistry Professional Education Committee has designed the educational program at the 2019 annual AACD meeting to optimize C.E. opportunities while enabling greater access to the meeting’s many other offerings.

Featuring more than 50 speakers, 25 lectures and 30 workshops, the 35th Annual American Academy of Cosmetic Dentistry Scientific Session will be from April 24–27 at the San Diego Convention Center.

Thursday’s AACD headliningeduca-
tor Stephen Chu, DMD, CDT, and Friday’s Rapid-Fire Educators — “No Prep to Prep” session — will run from 9 a.m.-2 p.m. with breaks so attendees can spend more time shopping in the exhibit hall, exploring San Diego or catching up with friends and colleagues.

The education committee also is consolidating the accreditation case type lectures into an accreditation super session, which will run Thursday from 9 a.m.-1:50 p.m. Attendees will be able to work through the five case types with AACD’s top Accredited and Accredited Fellow Members and then use the after-noon as best fits their needs.

Member Pearl presenters are moving out of the exhibit hall and into the AACD Virtual Campus, to give attendees more time with educational opportunities in sessions or with exhibitors.

Attendees may want to arrive on Tues-
day to not miss any of these additions to Wednesday’s educational program:

• Practice transition courses will be offered Wednesday afternoon for any attendee looking to buy or sell a practice or even expand a current practice.

• A dental team course titled “Generational Diversity: Adaptation Strategies” by Lisa Philp will be offered Wednesday afternoon.

• A special course for Accredited and Accredited Fellow members (each also able to include a guest) titled “The Biological Emulation Approach: A Histo-anatomic Based Technique for Direct Restorations,” by Javier Tapia Guadix, DDS, will be held Thursday, so attendees can have Friday evening for their own activities. Breakfast Saturday morning will be in the exhibit hall to give attendees an opportunity to place orders and finalize purchases before moving on to the highly anticipated program by Pascal Magne, DMD, PhD.

Magne will present “Crescendo of Techniques for Anterior Bonded Restorations,” an intense lecture program for all practitioners wishing to update their skills in anterior bonded restorations using direct composite resins and indirect porcelain veneers.

To register for AACD 2019, visit www.aacdconference.com/tuition.

(Source: AACD)
Sulzer Mixpac expands

In an interview with Dental Tribune International, Samuel Fitzi, Sulzer Mixpac product manager for dental products, shares insights on the acquisition of Transcodent, the new T-Mixer Colibri and continued efforts to protect users from low-quality copycat tips.

Sulzer Mixpac has a large product portfolio of mixing and dispensing systems, providing Mixpac products for the OEM and the new Transcodent brand products for the trade business. How can U.S. clients now receive Transcodent products?

SF: Transcodent is the leading supplier of dental one-component application systems, unit-dose technology for dental products with the highest barrier properties and premium-quality dental needles. This merger of Sulzer Mixpac and Transcodent establishes an excellent position for further growth and the expansion of the product portfolio in the future. With this thought in mind, we decided — in the course of the name change — to take this opportunity to modernize the existing Transcodent logo, integrating it into the world of Sulzer and realigning it with the Mixpac product portfolio. In the future all OEM and industry products will appear as “Transcodent — A Sulzer Brand.” All trade products will appear as “Transcodent — A Sulzer Brand.” All operations have moved to Sulzer Mixpac USA in Salem, N.H. All order processing, logistics, accounting and complaint management will be handled from Salem. For assistance, you can contact SFUS.AME_Dental_Customer_Service@sulzer.com or sales manager Lisa Lowry at (603) 681-2741 or lisa.lowry@sulzer.com.

In your product portfolio you have Helix and T-Mixer mixing tips. The T-Mixer product family is continuously growing. recently adding the T-Mixer Colibri plus. What are the differences of both mixing technologies? What are the benefits for the dentists?

SF: Thanks to its advanced technology and the compact, shorter design, the T-Mixer offers material savings up to 40 percent compared with Helix mixing tips. This enables easier, more precise and safer handling and application of the material. The shearing and stretching forces produced inside a T-Mixer result in a more homogenous distribution of individual molecules in comparison to conventional mixing tips, ensuring improved material reactivity. The T-Mixer has received multiple awards from the magazines Dental Advisor and Clinicians Report.

Sulzer has been combating copies of protected mixing tips for a long time — for the benefit of patients and dentists. How can users be sure that they have the original Sulzer product in his hands?

SF: Sulzer is committed to protecting its products. Genuine MIXPAC™ tips can be identified by the MIXPAC name stamped on the retaining ring and the “Candy Color” quality seal. We recommend that everyone continue to take great care to ensure that you actually do receive the original mixing tips from Sulzer Mixpac. With its system approach, Sulzer Mixpac guarantees high performance and top application results when using the whole Mixpac system — dispenser, cartridge and mixers from Sulzer Mixpac.
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JOI: Bone augmentation procedure successful for challenging cases

Dental implants have become a reliable, long-term treatment option for restoring proper speech, function and aesthetics of the oral cavity and facial features. However, despite the effectiveness of conventional augmentation procedures, complex cases, such as tumor resections or extreme atrophy, result in considerable patient pain and other comorbidities from slow or incomplete healing. To address this challenge, different bone substitution materials are currently being investigated.

Researchers from the Medical Center of the Goethe University Frankfurt (Germany) recently published a case study in the Journal of Oral Implantology that evaluates the use of a novel augmentation alternative in a former DECEMBER 2018 — Vol. 13, No. 11 www.dental-tribune.com

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AAP installs new officers, president

The American Academy of Periodontology installed Richard T. Kao, DDS, PhD, as its president during its 104th annual meeting in Vancouver, British Columbia, held Oct. 27-30. Other newly appointed officers are President-Elect Bryan J. Frantz, DMD, MS, of Scranton, Pa; Vice President James G. Wilson, DMD, of Tampa, Fla; as well as Secretary and Treasurer Christopher Richardson, DMD, MS, of Richmond, Va.

In addition to maintaining a private practice in Cupertino, Calif., Kao is a clinical professor in the department of orofacial sciences at the University of California San Francisco and an adjunct clinical professor of periodontology at the University of the Pacific. Kao obtained his doctor of dental surgery degree, certificate in periodontology and PhD from the University of California.

About other installed officers:
- Bryan J. Frantz, DMD, MS, president-elect: Certified by the American Board of Periodontology, Frantz is in full-time private practice in Scranton, Pa.
- James G. Wilson, DMD, vice president: A two-term AAP trustee, Wilson is also a past president of the Florida Association of Periodontists, and he currently serves as the president of the Florida Academy of Dental Practice Administration.
- Christopher Richardson, DMD, MS, secretary/treasurer: Currently in private practice in Richmond, Va., Richardson is also a clinical professor at the Virginia Commonwealth University School of Dentistry.
- Steven R. Daniel, DDS, immediate past president: Daniel has been a practicing periodontist for more than 35 years. He completed his doctor of dental surgery degree and certificate in periodontics at the University of Tennessee School of Dentistry. He also earned his board certification and became a diplomate of the American Board of Periodontology in 2005.

These executives will serve a one-year term ending with the installation of a new team of officers at the AAP 105th Annual Meeting in Chicago, to be held Nov 2-5, 2019.

* See JOI, page B2

By AAP Staff

Fig. 1. Autologous fibrin matrix platelet rich fibrin after centrifugation and subsequent compression. Figs. 2, 3. Radiographic (Fig. 2) and clinical (Fig. 3) baseline situations after tumor therapy and before reconstruction. Fig. 4. Three-dimensional design of the titanium mesh according to the ideal anatomy of the mandible and the position of the foramen mentale. Figs. 5, 6. Augmentation process with the titanium mesh, a combination of the xenogenic Bio-Oss, advanced platelet rich fibrin and injectable platelet rich fibrin. Photos/Provided by JOI.

By JOI Staff

Fig. 1

Fig. 2

Fig. 3

Fig. 4

Fig. 5

Fig. 6
head and neck cancer patient. By using a combination of a xenogenic bone substitute (BO) and platelet-rich fibrin (PRF), they were able to successfully perform an implantation in a severely compromised mandible.

A 61-year-old female with cancer in her mandible was treated by a tumor resection in her jaw as well as neck dissection on both sides, resulting in disfigurement to the lower jaw. After enduring a painful cancer treatment, the patient did not desire another surgery to harvest bone for dental implants and opted instead for using the BO and PRF alternative. The patient’s blood was drawn, centrifuged and combined with the BO to fill an anatomy-specific three-dimensional titanium mesh. The titanium “cage” was designed and made from a CT scan generated model of the patient’s mandible. The mesh was placed at the involved surgical site, and then covered with collagen matrix (that had previously been shown to aid in tissue regeneration) plus a final layer of PRF clots were used to cover the matrix.

No complications were observed during the 16-month, full implantation procedure in which six implants were successfully integrated into the mandible. From bone biopsies taken during the implantation procedure, researchers were able to histologically confirm that the combination of BO and PRF created a successful augmentation and is a strong alternative to direct bone harvesting from the patient. The histology also revealed an increased blood flow of the connective tissue, which aided tissue regeneration and new bone formation during augmentation healing phase.

In this case study, researchers introduce an extremely promising new method of dental reconstruction in treating a severely compromised mandible in a patient recovering from head and neck cancer. More research is necessary to examine the longer-term effects of this procedure on bone regeneration.


About Journal of Oral Implantology

The Journal of Oral Implantology is the official publication of the American Academy of Implant Dentistry and of the American Academy of Implant Prosthodontics. It is dedicated to providing information to general dentists, oral surgeons, prosthodontists, periodontists, scientists, clinicians, laboratory owners and technicians, manufacturers and educators. The JOI distinguishes itself as the first and oldest journal in the world devoted exclusively to implant dentistry. For more information about the journal or society, visit www.joionline.org

Fig. 7: Post-operative X-ray image after reconstruction of the mandibular defect.
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