Pulled teeth stored for stem cells

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Naidelys Montoya didn't wait for her son's baby teeth to fall out. She took the boy to an oral surgeon to have two of the loose ones extracted.

"He was a bit scared," said Montoya, of Hialeah, Fla. "He's not that brave."

The dentist shipped the teeth in a temperature-controlled steel container to a lab in Massachusetts, where their stem cells will be spun out, frozen to more than 100 degrees below zero and stored - in case her son, Raul Estrada, 6, might need them for a future illness.

"I believe in this," Montoya said. "I did as a precaution against things that could happen."

Montoya and her son have joined a major new medical movement.

In South Florida and around the world, dentists are extracting baby teeth, wisdom teeth and even healthy adult teeth, and researchers are spinning out stem cells that they believe can be used to regrow lost teeth, someday even to repair damaged bones, hearts, pancreases, muscles and brains.

It could put the Tooth Fairy out of business.

"These are teeth we've been discarding as dental waste," said Dr. Jeffrey Blum, the Miami Beach oral surgeon who pulled Raul's teeth. "We might as well get some use out of them."

"I can't help but feel excitement for their potential use in regenerating different tissues in the human body," said Dr. Jeremy Mao, director of the Regenerative Medicine Laboratory at Columbia University. Mao also is chief science advisor to StemSave, a New York City company that freezes the stem cells and stores them for later use.

There are concerns. It's expensive, costing $590 upfront plus $100 a year to store the stem cells from up to four teeth for up to 20 years. It's speculative, with the first FDA-approved practical use of such stem cells years away.

"Every treatment using dental stem cells is still in the clinical testing phase, and won't be ready for general use for at least five years," said Art Greco, StemSave's CEO.

Montoya understands: "Things are evolving so quickly, who knows what they will be able to do in 15 or 20 years?"

Other researchers welcome the new source of stem cells.

"Perhaps it does make sense to save" dental stem cells, said Dr. Joshua Hare, director of the Interdisciplinary Stem Cell Institute at the University of Miami Medical School, who is not involved with dental stem cells. "Within human adults and children there are lots of reservoirs of stem cells. We get them from bone marrow; others use umbilical cord blood. It seems teeth are also a good source."

The National Institutes of Health concluded in 2003 that teeth are a rich source of stem cells. Every child has about 20 baby teeth that fall out between ages 6 and 12. Adolescents have wisdom teeth that often are removed between ages 14 and 25 because they crowd the jaw or grow in crookedly.

Blum and other oral surgeons must extract baby teeth before they fall out naturally, so they still have a blood supply to keep them healthy. He puts them in a temperature-controlled steel container and overnights them to the StemSave facility.

Stem cells are the body's repair system, Hare said. Stem cells beneath the skin are constantly spinning off new skin cells to replace skin that is sloughed off or damaged in daily life. The same is true for hearts, livers, pancreases - except that as the body weakens from age, injury or disease, those stem cells start to lose the ability to keep up and need help. Today, stem cells from bone marrow, blood and now perhaps teeth can be reprogrammed to help those ailing organs.

Also, by using these stem cells, researchers avoid involving human embryonic stem cells, which are controversial because their creation involves destroying human embryos.

The first practical use of dental stem cells probably will be to repair human teeth and jawbones, researchers say. At Boston University's School of Dental Medicine, researchers have used stem cells from baby and wisdom teeth to generate dental pulp, the soft interior of a tooth, and dentin, its hard white casing.

Now they are inserting the material into a broken human tooth and implanting it into a mouse to access a blood supply. When the technology reaches humans, the pulp material would be injected into a spongy "scaffold" where a tooth has been removed and prompted to grow into a human tooth. It's at least five years away.

Across the world, the use of stem cells to heal the human body is exploding. At the University of Miami's med school, Hare is doing human trials using stem cells from bone marrow to inject around hearts damaged by heart attacks, hoping to regenerate damaged heart tissue.

For years, stem cells from umbilical cord blood have saved the lives of patients with leukemia, lymphoma, multiple myeloma, aplastic anemia, sickle cell and other diseases.

Umbilical cord blood is being donated both to private labs for use only by the donor's family, and also to public donation centers.

In Broward County, Memorial Health Care System, Memorial Hospital West in Pembroke Pines, Memorial Regional in Hollywood and Memorial Hospital in Miramar have opened or are opening public cord-blood donation centers.

Women giving birth may donate their umbilical cords without charge. The blood is flown to a lab at Duke University in North Carolina, where the stem cells are spun off and stored at subfreezing temperatures. The cells become part of a National Cord Blood bank where they are available to any patient in the world if an adequate cell match can be determined.

Cord blood stem cells collected for private use have been more speculative because of the rarity of diseases it can treat. A 2009 study published in the peer-reviewed journal *Obstetrics and Gynecology* said cord blood stem cells in private banks have been used in less than half of 1 percent of cases over the past 10 years. But stem cells in public cord blood cell banks are in short supply, especially for Hispanics and African Americans.

So far, only private banks are storing dental stem cells, although Mao says a public bank would be valuable and appropriate.

The American Dental Association, while cautiously optimistic about the potential of dental stem cells, urges parents considering banking their children's dental stem cells to consider both the cost and the rarity of use

before joining private donation programs.

"That's the question people have to ask themselves," Blum said. "Am I saving this for no reason? Is it worth what I'm paying? Essentially it's an insurance policy."