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***Stem Cell Research:
What are the implications for dentistry?***

Dear Martha:

As you well know, stem cell research is all over the news these days. There is much controversy surrounding the use of stem cells for medical research that may -- or may not -- lead to breakthroughs in the treatment of various illnesses.

Swirling in this cloud of controversy are certain important facts about stem cells as they apply to ***dentistry***. The purpose of this letter is to give you a brief overview of the latest findings and the implications for improving oral health and treating certain conditions of the human mouth and face.

To understand the future of stem cell biology in the practice of dentistry, it is important to define what is known of the features of stem cells. In the interest of space, here's a synopsis: (1) a stem cell "self-renews", (2) a stem cell forms multiple cell types, (3) a single stem cell completely re-forms a particular tissue when it is transplanted within the body.

The idea that stem cells remain in adults is relatively new. This is based on the fact that several tissues in the body do indeed undergo rapid renewal, such as blood, skin and the gastrointestinal tract. Scientists infer from this that very young tissues must therefore contain stem cells to initiate such replacement.

Thus, scientists theorize that virtually every tissue in the body contains some type of stem cell. From there it is possible to consider the idea of medical -- and specifically ***dental*** -- cell-based strategies for tissue repair. The current focus on self-renewing stem cells provides the opportunity to understand the process of tissue turnover.

This leads us to the cutting edge of stem cell research as it applies to dentistry.

So called "tissue engineering" refers to the number of ways tissue lost due to trauma or disease might be restored. The focus of stem cell research as it applies to dentistry is on ***facial*** reconstruction. Of the estimated 1.6 million bone grafts performed annually to regenerate bone lost to trauma or disease, about 96,000 relate to the face and mouth.

Where do things stand at present? In a nutshell, researchers using animal models have developed a number of applications for repairing defects that would never heal and the development of bone rudiments with blood vessels. These procedures have direct impact on our ability to restore bone defects in the facial region.

The alveolar ridge, or jaw bone, forms the borders of the upper and lower jaws and contains the sockets of the teeth. The restoration of alveolar ridge height is a major concern to dental professionals as we seek to prevent the loss of teeth due to bone destruction resulting from periodontal disease, and for the effectiveness of dental implants.

Where is all of this exciting dental science leading?

As I've stated, restoring bone is a **major** objective in the current research efforts. Why? Because it is essential for promoting the functionality of dental implants.

Scientists have now identified potential stem cells in unerupted tooth buds, or dental pulp. These cells provide the prospect of restoring dental tissue such as dentin, cementum, and periodontal ligament. Today, a dental implant relies on the ability of bone to interface with metal (usually titanium). Tomorrow, dental scientists imagine the development of an enamel-like bio-material fabricated in the shape of a patient's tooth that needs to be replaced. And beyond this, it just may be possible to one day recreate a tooth bud in the laboratory -- then transfer it into the patient's jaw to develop, grow, and erupt on its own.

Yes, it is a fascinating time to be in dentistry. The promise of tomorrow for myriad improvements in dental treatment is most exciting. As always, if you would like to know more about this subject, please contact our office at **212-838-8230**. And, be sure to keep up your program of regular professional dental checkups.

In health,

Jason S. Kasarsky, D.D.S.
and staff

P.S. Our web site is regularly updated with useful information on this and other oral care topics. As always, please consider "bookmarking" our site and visiting often by clicking to www.jkdds.com.