OMS QUARTERLY

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BRIAN SIMPSON, D.M.D. DIPLOMATE OF THE AMERICAN BOARD OF ORAL & MAXILLOFACIAL SURGERY
113 NORTH MIDDLETOWN ROAD NANUET NY 10954 (845) 623-3497 FAX (845) 623-4039 www.drbriansimpson.com

The Future of Bone Grafting- Recombinant DNA Technology

Bone grafting is performed for reconstruction or replacement of bone that has been lost due to tooth loss, trauma, pathology, ill-fitting dentures, and periodontal disease. This process is usually performed to rebuild bone for the placement of dental implants. Historically, bone grafting has involved a variety of techniques. These have included:

- **autografts**-taking bone from a distant site on the patient's own body and placing it into the defect.
- **Allografts**-taking cadaver bone and placing it into the defect.
- **xenografts**-taking bone from an animal and placing it into the defect.
- **human made materials**-ceramic material is placed into the defect.

These various techniques have been accompanied or combined with membranes of human and animal sources (collagen), hardware, and platelet rich plasma. These different techniques have several drawbacks which include:

- a second surgical site with attendant pain and increased surgical time.
- possible disease transmission (although this is not as great a concern as it has been in the past).
- inability to produce bone formation (osteoinduction).

On the positive side, these techniques are relatively inexpensive.

The latest addition to bone grafting armamentarium is the use of recombinant human bone morphogenic protein-2 (rhBMP-2). In 1965, it was discovered that demineralized bone matrix (which contains BMP) stimulates the formation of new bone tissue. In 1988 it was proven that the bone formation process caused by rhBMP-2 is similar to bone formation by natural osteoinduction. In 2007, rhBMP-2 was approved for use in sinus augmentations and localized alveolar ridge augmentations for defects associated with extraction sockets. The protein works to induce bone formation at the local defect by inducing the migration of undifferentiated mesenchymal cells into the defect and the differentiation and proliferation of the undifferentiated mesenchy-

continued on reverse

Dental Fun Fact

DID YOU KNOW THAT...

Contrary to American legend, George Washington never owned a set of wooden teeth - while he did own many sets of dentures, none were of wood construction. Washington had dental problems beginning when he was twenty two. Over the next thirty-five years, he would lose all his tee despite daily brushing, use of dentifrice and mouthwash. Toothaches followed by extraction would be a yearly occurrence for Washington. There were frequent episodes of infected and abscessed teeth, inflamed gums, and finally ill fitting dentures. One can imagine that his reputed "hair-trigger temper" might have been the result of a constant battle with pain.

From www.americanrevolution.org

News You Can Use

In a recently published case report, an Asian woman's delivery of a full-term stillbirth is attributed to intrauterine infection of *Fusobacterium nucleatum*, an anaerobic bacterium of the oral cavity that is also associated with periodontal disease. The woman had excessive gingival bleeding during pregnancy, and a late-stage respiratory infection may have weakened her immune system and increased the risk for transient bacteremia and possible hematogenous transmission of *F. nucleatum*.

Although the source of intrauterine infections is often not known, the case report provides reasonable evidence that *F. nucleatum* infection transmitted hematogenously from the mother's oral cavity to the uterus. Because the woman was otherwise healthy, without any history of gastrointestinal problems, it appears likely that pregnancy-associated gingivitis with excessive gum bleeding and her weakened immune system from the respiratory infection provided an opportunity for *F. nucleatum* to gain access to her vasculature and penetrate the placenta.

From www.ada.org

The Future of Bone Grafting

mal cells into mature osteoblasts (bone forming cells). The resulting bone functions as host bone and is of excellent quality.

A kit is available which consists of a liquid which contains the rhBMP-2 and an absorbable collagen sponge. Approximately 15 minutes prior to the procedure, the liquid is added to the collagen. After about 15 minutes, it is added to the defect. The protein works for a few weeks and the collagen is absorbed. On average, an implant can be placed in 3 to 6 months.

A minor issue is the potential for a prolonged swelling, which is thought to be from the chemotaxis– the chemical attraction and migration of undifferentiated mesenchymal cells. A major drawback is the cost and lack of insurance reimbursement. The smaller kit (0.7 mL) costs approximately $875. This is enough for a single socket grafting.

As with most new technologies, at first they are expensive and hopefully will become more affordable with time. Having said that, recombinant DNA technology is the future of bone grafting.

From: Medtronic- "Dental Bone Grafting Options," 2008.

Dr. Brian Simpson

announces the fourth meeting of the

NANUET IMPLANT STUDY GROUP

speaker: Dr. John Ruel, prosthodontist

"Treatment Options for the Edentulous Patient"

Wednesday September 22, 2010

Dinner: 6:30 Presentation: 7:00 — 9:00 pm

Pasta Cucina 253 South Little Tor Rd New City, NY

2 CE credits awarded by the Ninth District Dental Association
Cost: $30.00
Please bring your cases and documentation (photos, x-rays, models) for discussion.
To register, contact Theresa: 845-623-3497
or email her at theresag@drbriansimpson.com

Save the date! Prosthodontist Dr. Mark Samani will be the speaker for the Thursday, November 11th meeting

"You are successful because you are happy, not happy because you are successful"- unknown