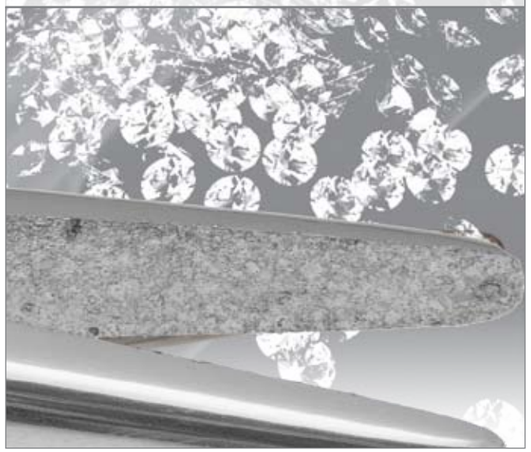
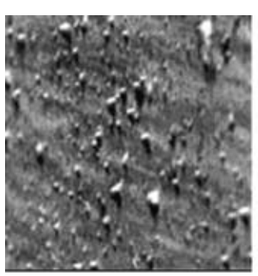
Diamond Coating

Surgical Science Systems is proud to announce our new **Diamond Coating** instrument line. Using a breakthrough in **electrofusion** bonding technology, this "Tungsten-Carbide Texturing" technique creates a rough, non slip surface that will **not crack, chip, peel or scrape off.** This results in less wear, while at the same time maintaining high hardness and corrosion resistance. All of this occurs without affecting the temper or toughness of the base material. The result is that appropriate use of the **Diamond Coating** can increase tool life by up to **1000%!**



Recommended Instruments for Diamond Coating

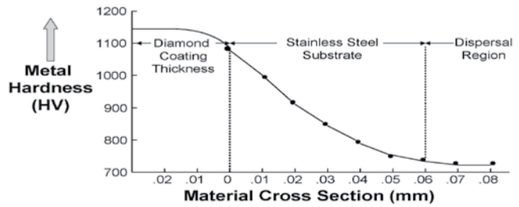
This coating is recommended for the following:
Needle Holders,
Extraction and Heamostatic Forceps,
Scissors,Rongeurs,Tweezers,
Root Elevators (Luxators),
Probes, Carvers and Pliers.



(1000x)

The **Diamond Coating** on Needle Holders has less surface roughness than typical Tungsten Carbide Inserts. This decreases scratching of suture needle surfaces, resulting in less ragged suture holes in the tissue. This same principle applies to all the instruments with **Diamond Coating**, resulting in:

Decreased tissue trauma while maintaining greater clamp security.



"Air spark exhaust" disperses an intimate surface coating (0.05-0.20), creating a very strong bond that will not peel off*.
* Data on file

Workholding (Vise) Performance Test Results

Clamping Torque lbs/in	Force Needed * without Coating	Force Needed with Coating
100	340	640
150	490	1000
200	790	1680
300	1070	2040
600	1800	3250

"Force Needed" = force in lbs. required to move a part clamped in jaw vice.

Diamond Coating is one of a number of technological advances that Surgical Science has incorporated in its' instrument line, in an effort to provide the most innovative and highest quality products.

In the next issue we will describe how our instruments attain their anti-corrosive surface.

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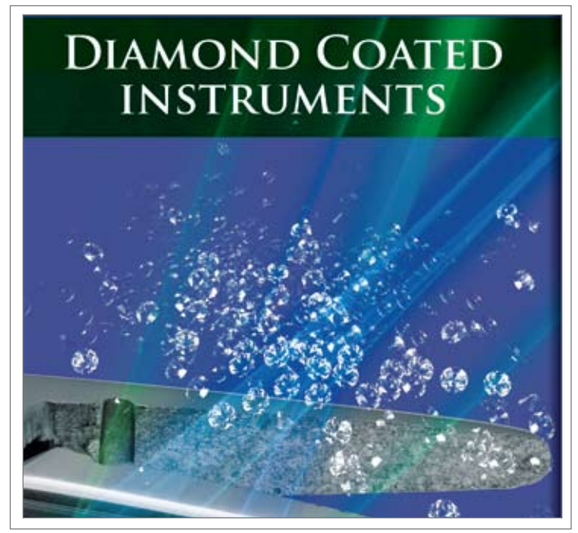
Surgical Science Systems Report

Vol. 2 • No.1 • October 2008

FEATURES



Advances in Surgical Science

Surgical Science Systems is proud to present its' 2008 issue of "Advances in Surgical Science". From the outset Surgical Science Systems has been committed to the triad of:

1. Innovative products,
2. High level of professional service and, last but not least,
3. Continuing education.

It is our firm belief that the more educated the client is in the use of our products, the more likely it will be that we can build a stronger bond for future interaction of the company and the user. We are always on the lookout for new, exciting and innovative products for the surgical specialists, and are proud that so many of you have shown an interest in sharing your clinical experiences.

In each of our quarterly issues we will try to give you highlights of the Surgical Science Systems product line, as well as exciting articles from the surgical literature.

In this issue we are beginning the 1st of a series of articles on NuOss, the Surgical Science Systems Xenograft bone material that many of you are already using. This series will take you from an analysis of the physical and chemical properties of NuOss- in this issue- through to the long-term animal experiments in the next issue. We will finish with a number of multi-center human clinical studies of NuOss in various oral regions, from sockets to sinus augmentations.

With these articles we hope to show you why NuOss has gained the reputation as a reliable natural bone grafting material. Enjoy the read!

NuOss®1, a Bone Grafting Material for Oral Surgery:

Introduction

Bone generally can be divided into cortical and cancellous regions. Cortical bone has a higher density than the cancellous bone, due primarily to the difference in the pores distributed in the bone structure. Cancellous bone has a more porous structure, with large pores distributed throughout the bone.

The organic component of bone represents 40% of bone content, primarily type I collagen (99%), with minor components of acidic glycoproteins, phosphoproteins, bone morphogeneic proteins (BMPs) and other non-collagenous moieties (1%).

The inorganic component is comprised of calcium-based minerals of apatite structure, mainly carbonate apatite, containing small amounts of magnesium, sodium, potassium, chloride, etc.

It has been demonstrated that the organic part of bone can be removed without significantly altering the native structure of the bone mineral (1). A method has been developed that can create this anorganic bone, while maintaining the structure of the mineral similar to that in native bone: Called **NuOss®**(cancellous and cortical - ACE Surgical Supply Co., Brockton, MA),it is isolated and purified from bovine bone.

Methods:

Calcium phosphate index (Ca/P ratio): Calcium was determined by atomic absorption spectrophotometry, and phosphate by using acidic molybdate/acetone as reagent. The color developed was read using a spectrophotometer.
Pore size determination: Scanning electron micrographs were taken at various magnifications. Pore size was defined as the longest distance across a single pore.
Inner surface area: Using a nitrogen porosimetry method, the area was expressed as square meter per gram of mineral, m2/g.
Purity: Determined by analyzing total nitrogen and hydroxyproline content. Total nitrogen content provides information relating to the potential residual proteins remaining, while hydroxyproline content measures the residual collagen.
Volume fill capacity: The space available for conducting cellular ingrowth and new bone deposition, expressed in unit of cm3/g.
In vitro dissolution: In vitro rate of mineral dissolution has been correlated with in vivo stability of the mineral (2). In general, the larger the crystal dimensions of the mineral and the larger the size of the mineral particle, the slower the rate of resorption in vivo.

EDUCATION SERIES

Results:

The overall results are summarized in Table 1.
The volume fill capacity is the same for both **NuOss®** and human apatite, indicating that the space available for new bone deposition should also be similar. Finally, **NuOss®** has a highly pure mineral content, evidenced by the minimal presence of residual organic materials.

Table 1

Characteristics	NuOss®	Human Cancellous Bone
Ca/P Index	1.58 ± 0.16	1.67 ± 0.17
Inner Surface Area (m^2/g)	59	50 -100
Volume Fill (cm^3/g)	1.70 ± 0.01	1.60 ± 1.80
Pore sizes (Macro/Micro)	See below	
Purity- Protein Content (%)	<0.06	0.05 – 0.065
- Collagen Content (%)	<0.05	<0.05

Case Study:

In a human crest preservation case, **NuOss®**, and a resorbable occlusive membrane (**RCM6** [1]), were placed into a post- extraction alveolar socket of a 40 year old female.

Figure 1: Low Magnification of a 5 Month Socket with **NuOss®**
Core consists of new vital bone with **NuOss®** and fibrous Connective Tissue
(Apical direction ⟶)

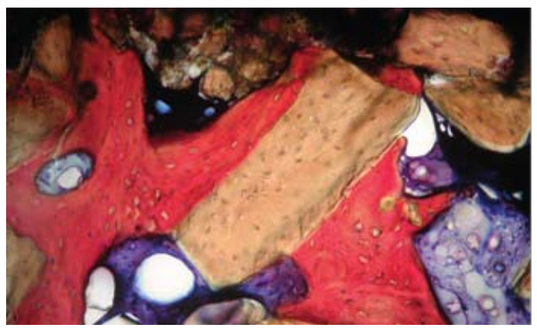


Figure 2: High magnification showing human vital bone (red),with osteocytes, in intimate contact and "bridging" the **NuOss®** particles (light brown), in the 5 month core.

The Histomorphometry shows this specimen consisting of new vital bone (22%), marrow and fibrous tissue (32%) and residual xenograft (46%). This is within the range normally seen with non-autogenous graft materials at 5-6 months. It highlights the fact that in a clinical setting one needs to wait at least 5-6 months to get reliable bone regeneration for functional implant integration.

Discussion and Conclusion:

This report summarizes the characterization studies of **NuOss®**, a natural bone mineral, for applications in the oral cavity. **NuOss®** has physical and chemical characteristics very similar to Human Cancellous Bone. Based on the results presented in this paper, **NuOss®** should perform effectively as a grafting material in oral surgical applications.

1 **NuOss®** - registered trade mark of ACE Surgical Supply Co.,Inc.

References:

1. G. S. Johnson, M. R. Mucalo, M. A. Lorier, J Mater Sci Mater Med 11, 427-41 (July, 2000).
2. C. P. Klein, A. A. Driessen, K. de Groot, Biomaterials 5,157-60(May,1984).