



Food and Drug Administration  
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August 4, 2016

Datum Dental Ltd.  
% Ms. Janice Hogan  
Partner  
Hogan Lovells US LLP  
1835 Market Street, 29th Floor  
Philadelphia, Pennsylvania 19103

Re: K153549  
Trade/Device Name: OSSIX<sup>®</sup> VOLUMAX  
Regulation Number: 21 CFR 872.3930  
Regulation Name: Bone Grafting Material  
Regulatory Class: II  
Product Code: NPL  
Dated: July 5, 2016  
Received: July 5, 2016

Dear Ms. Hogan:

We have reviewed your Section 510(k) premarket notification of intent to market the device referenced above and have determined the device is substantially equivalent (for the indications for use stated in the enclosure) to legally marketed predicate devices marketed in interstate commerce prior to May 28, 1976, the enactment date of the Medical Device Amendments, or to devices that have been reclassified in accordance with the provisions of the Federal Food, Drug, and Cosmetic Act (Act) that do not require approval of a premarket approval application (PMA). You may, therefore, market the device, subject to the general controls provisions of the Act. The general controls provisions of the Act include requirements for annual registration, listing of devices, good manufacturing practice, labeling, and prohibitions against misbranding and adulteration. Please note: CDRH does not evaluate information related to contract liability warranties. We remind you, however, that device labeling must be truthful and not misleading.

If your device is classified (see above) into either class II (Special Controls) or class III (PMA), it may be subject to additional controls. Existing major regulations affecting your device can be found in the Code of Federal Regulations, Title 21, Parts 800 to 898. In addition, FDA may publish further announcements concerning your device in the Federal Register.

Please be advised that FDA's issuance of a substantial equivalence determination does not mean that FDA has made a determination that your device complies with other requirements of the Act or any Federal statutes and regulations administered by other Federal agencies. You must comply with all the Act's requirements, including, but not limited to: registration and listing (21 CFR Part 807); labeling (21 CFR Part 801); medical device reporting (reporting of medical device-related adverse events) (21 CFR 803); good manufacturing practice requirements as set forth in the quality systems (QS) regulation (21 CFR Part 820); and if applicable, the electronic product radiation control provisions (Sections 531-542 of the Act); 21 CFR 1000-1050.

If you desire specific advice for your device on our labeling regulation (21 CFR Part 801), please contact the Division of Industry and Consumer Education at its toll-free number (800) 638-2041 or (301) 796-7100 or at its Internet address <http://www.fda.gov/MedicalDevices/ResourcesforYou/Industry/default.htm>. Also, please note the regulation entitled, "Misbranding by reference to premarket notification" (21 CFR Part 807.97). For questions regarding the reporting of adverse events under the MDR regulation (21 CFR Part 803), please go to <http://www.fda.gov/MedicalDevices/Safety/ReportaProblem/default.htm> for the CDRH's Office of Surveillance and Biometrics/Division of Postmarket Surveillance.

You may obtain other general information on your responsibilities under the Act from the Division of Industry and Consumer Education at its toll-free number (800) 638-2041 or (301) 796-7100 or at its Internet address <http://www.fda.gov/MedicalDevices/ResourcesforYou/Industry/default.htm>.

Sincerely yours,

 Tina Kiang  
-S

Tina Kiang, Ph.D.  
Acting Director  
Division of Anesthesiology,  
General Hospital, Respiratory,  
Infection Control, and Dental Devices  
Office of Device Evaluation  
Center for Devices and Radiological Health

Enclosure

**Indications for Use**

510(k) Number (if known)

K153549

Device Name

OSSIX® VOLUMAX

Indications for Use (Describe)

OSSIX® VOLUMAX is a resorbable collagen membrane intended for use during the process of guided bone regeneration (GBR) and guided tissue regeneration (GTR) as a biodegradable barrier for:

- Ridge augmentation for later implant insertions.
- Simultaneous ridge augmentation and implant insertions.
- Ridge augmentation around implants inserted in delayed extraction sites.
- Ridge augmentation around implants inserted in immediate extraction sites.
- Alveolar ridge preservation consequent to tooth (teeth) extraction(s).
- Over the window in lateral window sinus elevation procedure.
- In implants with vertical bone loss due to infection, only in cases where satisfactory debridement and implant surface disinfection can be achieved.
- In intra bony defects around teeth.
- For treatment of recession defects, together with coronally positioned flap.
- In furcation defects in multi rooted teeth.
- Localized gingival augmentation.

Type of Use (Select one or both, as applicable)

Prescription Use (Part 21 CFR 801 Subpart D)

Over-The-Counter Use (21 CFR 801 Subpart C)

**CONTINUE ON A SEPARATE PAGE IF NEEDED.**

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## 510(k) Summary

### I. 510(k) Applicant

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Contact person: Arie Goldlust, CEO, VP R&D

Date prepared: July 28, 2016

### II. Device

Trade name: OSSIX<sup>®</sup> VOLUMAX  
Common name: Resorbable Collagen Membrane  
Classification name: Bone grafting material (21 CFR 872.3930)  
Regulatory class: II  
Product code: NPL (Barrier, Animal Source, Intraoral)

### III. Predicate Device

Primary predicate: OSSIX<sup>®</sup> PLUS (K053260)

Reference device: Mucograft<sup>®</sup> (K073711, K102531, K140518)

### IV. Device Description

OSSIX<sup>®</sup> VOLUMAX is a biodegradable and biocompatible collagen membrane intended for use during the process of guided tissue and bone regeneration. The collagen is derived from veterinary certified pigs and is purified and cross-linked using ribose.

OSSIX<sup>®</sup> VOLUMAX is packed in a double blister and an outer cardboard box and is sterilized by ethylene oxide.

Due to its porous and fibered microstructure, the membrane readily absorbs fluids, adheres to the surrounding tissues and provides a barrier that guides bone and tissue regeneration.

Available in sizes: 10x12.5 mm, 15x25 mm, 25x30 mm and 10x40 mm.

Intended for use by dental surgeons.

## **V. Indications for Use**

OSSIX<sup>®</sup> VOLUMAX is a resorbable collagen membrane intended for use during the process of guided bone regeneration (GBR) and guided tissue regeneration (GTR) as a biodegradable barrier for:

- Ridge augmentation for later implant insertions.
- Simultaneous ridge augmentation and implant insertions.
- Ridge augmentation around implants inserted in delayed extraction sites.
- Ridge augmentation around implants inserted in immediate extraction sites.
- Alveolar ridge preservation consequent to tooth (teeth) extraction(s).
- Over the window in lateral window sinus elevation procedure.
- In implants with vertical bone loss due to infection, only in cases where satisfactory debridement and implant surface disinfection can be achieved.
- In intra bony defects around teeth.
- For treatment of recession defects, together with coronally positioned flap.
- In furcation defects in multi rooted teeth.
- Localized gingival augmentation.

## **VI. Comparison of Technological Characteristics with the Predicate Device**

OSSIX<sup>®</sup> VOLUMAX has the same intended use and the technological characteristics as the predicate device, OSSIX<sup>®</sup> PLUS. The principal difference between the two products is the thickness and content of collagen. Otherwise, both products are identical in their chemical composition (porcine type I collagen cross-linked by D-ribose), their structure (porous membrane made of lattice network of collagen fibers) and manufacturing technology. The technological differences do not affect the substantial equivalence as demonstrated by bench and animal testing.

With this submission, the company is including the localized gingival augmentation indications for use to the previously cleared indications. The addition of the localized gingival augmentation indication does not result in any change in the therapeutic effect, mode of action or instructions for use as compared with the predicate device (OSSIX<sup>®</sup> PLUS) as this indication is similar to the already cleared following indication for OSSIX<sup>®</sup> PLUS: "For treatment of recession defects, together with coronally positioned flap". This added indication is one of the indications of MUCOGRAFT<sup>®</sup>, the reference device, which has a similar thickness as OSSIX<sup>®</sup> VOLUMAX.

Thus, the subject device is substantially equivalent to the predicate device as summarized in the below table.

Parameter	<b>OSSIX<sup>®</sup> VOLUMAX</b> K153549 <b>Subject of this submission</b>	<b>OSSIX<sup>®</sup> PLUS</b> K053260 <b>Predicate device</b>
<b>Intended use/ Indications for use</b>	OSSIX <sup>®</sup> PLUS is a resorbable collagen membrane intended for use during the process of guided bone regeneration (GBR) and guided tissue regeneration (GTR) as a biodegradable barrier for: <ul style="list-style-type: none"> <li>• Ridge augmentation for later implant insertions.</li> <li>• Simultaneous ridge augmentation and implant insertions.</li> <li>• Ridge augmentation around implants inserted in delayed extraction sites.</li> <li>• Ridge augmentation around implants inserted in immediate extraction sites.</li> <li>• Alveolar ridge preservation consequent to tooth (teeth) extraction(s).</li> <li>• Over the window in lateral window sinus elevation procedure.</li> <li>• In implants with vertical bone loss due to infection, only in cases where satisfactory debridement and implant surface disinfection can be achieved.</li> <li>• In intra bony defects around teeth.</li> <li>• For treatment of recession defects, together with coronally positioned flap.</li> <li>• In furcation defects in multi rooted teeth.</li> <li>• Localized gingival augmentation.</li> </ul>	OSSIX <sup>®</sup> PLUS biodegradable collagen membrane is intended for use during the process of guided bone regeneration (GBR) and guided tissue regeneration (GTR) as a biodegradable barrier for: <ul style="list-style-type: none"> <li>• Ridge augmentation for later implant insertions.</li> <li>• Simultaneous ridge augmentation and implant insertions.</li> <li>• Ridge augmentation around implants inserted in delayed extraction sites.</li> <li>• Ridge augmentation around implants inserted in immediate extraction sites.</li> <li>• Alveolar ridge preservation consequent to tooth (teeth) extraction(s).</li> <li>• Over the window in lateral window sinus elevation procedure.</li> <li>• In implants with vertical bone loss due to infection, only in cases where satisfactory debridement and implant surface disinfection can be achieved.</li> <li>• In intra bony defects around teeth.</li> <li>• For treatment of recession defects, together with coronally positioned flap.</li> <li>• In furcation defects in multi rooted teeth.</li> </ul>
<b>Contra- indications</b>	OSSIX <sup>®</sup> VOLUMAX must not be used in: <ol style="list-style-type: none"> <li>1. Patients with known collagen hypersensitivity.</li> <li>2. Patients with sensitivity to porcine-derived materials.</li> <li>3. Patients suffering from autoimmune disease and connective tissue disease, such as: systemic lupus erythematosus, dermatomyositis etc.</li> </ol>	OSSIX <sup>®</sup> PLUS must not be used in: <ol style="list-style-type: none"> <li>1. Patients with known collagen hypersensitivity.</li> <li>2. Patients suffering from autoimmune disease and connective tissue disease, such as: systemic lupus erythematosus, dermatomyositis etc.</li> </ol>
<b>Composition of materials</b>	Cross-linked porcine type I collagen	Cross-linked porcine type I collagen
<b>Mode of Action/ Properties</b>	<ul style="list-style-type: none"> <li>• Biocompatible</li> <li>• Non-pyrogenic</li> </ul>	<ul style="list-style-type: none"> <li>• Biocompatible</li> <li>• Non-pyrogenic</li> </ul>

<b>Parameter</b>	<b>OSSIX® VOLUMAX K153549 Subject of this submission</b>	<b>OSSIX® PLUS K053260 Predicate device</b>
	<ul style="list-style-type: none"> <li>• Non-antigenic</li> <li>• Porous and fibered microstructure</li> <li>• Readily absorbs body fluid</li> <li>• Adheres well to the surrounding and underlying tissues</li> <li>• Is not disrupted by the closure of the surgical site</li> <li>• Slowly resorbed and replaced by new tissue</li> </ul>	<ul style="list-style-type: none"> <li>• Non-antigenic</li> <li>• Porous and fibered microstructure</li> <li>• Readily absorbs body fluid</li> <li>• Adheres well to the surrounding and underlying tissues</li> <li>• Is not disrupted by the closure of the surgical site</li> <li>• Slowly resorbed and replaced by new tissue</li> </ul>
<b>Device Design</b>	Resorbable dental membrane made of porous lattice network of collagen	Resorbable dental membrane made of porous lattice network of collagen
<b>Thickness (dry)</b>	Approx. 1-2 mm	Approx. 0.2 mm
<b>Porosity</b>	Approx. 90%	Approx. 80%
<b>Size (mm)</b>	10 x 12.5 mm 15 x 25 mm 25 x 30 mm 10 x 40 mm	25 x 30 mm 30 x 40 mm
<b>Packaging configuration</b>	Packed in a double blister pack	Packed in a double blister pack
<b>Sterilization</b>	Sterilized in double blisters by ethylene oxide	Sterilized in double blisters by ethylene oxide
<b>Principle of operation</b>	Surgically implanted over a bony or periodontal defect	Surgically implanted over a bony or periodontal defect
<b>Reusability</b>	Single use only	Single use only

## VII. Summary of Data to Support Substantial Equivalence

The determination of substantial equivalence was based on an assessment of non-clinical performance data obtained from *in vitro* characterization studies, an *in vivo* animal study, biocompatibility testing and clinical history of the predicate device.

Non-clinical testing was performed in accordance with the following FDA recognized consensus standards:

- ISO 10993-1:2009/AC:2010 Biological evaluation of medical devices- Part 1 - Evaluation and testing within a risk management process
- ISO 10993-7:2008 /AC:2009 Biological evaluation of medical devices- Part 7: Ethylene oxide sterilization residues
- ISO 10993-11:2006 Biological evaluation of medical devices-Part 11-Tests for systemic toxicity

The control of animal materials is performed following

- ISO 22442-2:2007 - Medical devices utilizing animal tissues and their derivatives – Part 2: Controls on sourcing, collection and handling

The ethylene oxide sterilization process is performed according to

- ISO 11135:2014 - Sterilization of health-care products -- Ethylene oxide -- Requirements for the development, validation and routine control of a sterilization process for medical devices

The sterilization process was validated to assure a minimum sterility assurance level of  $10^{-6}$ . The OSSIX<sup>®</sup> VOLUMAX membrane is specified to have minimal residual levels of EtO and ethylene chlorohydrin (ECH) remaining on the product after sterilization, as measured using validated aqueous simulated use extraction methods, that shall not exceed an average daily dose specified in ISO 10993-7:2008.

*In vitro* product characterization testing was performed to demonstrate substantial equivalence of the subject device to its predicate device in biochemical, physicochemical, mechanical properties, as summarized in the table below. As expected from the increase in the thickness and collagen content, OSSIX<sup>®</sup> VOLUMAX exhibits a higher resistance to suture pulling.

Test	Test Method
Heavy metals	USP < 233 > Inductively coupled plasma optical emission spectrometry (ICP-OES)--full screen of heavy metals
Endotoxins (LAL)	USP < 85 >
Collagenase resistance	Internal test method: enzymatic degradation
Trypsin resistance	Internal test method: enzymatic degradation
Weight	Weighing on analytical scales
Suture pull test	Internal test method
3D structure (SEM)	Scanning electron microscope analysis
Tensile strength (Maximum Load)	Internal test method; tensile machine
Denaturing temperature	Differential scanning calorimetry (DSC)
Carbohydrates content	Colorimetric test: sulfuric/phenol method
Ethanol content	Gas chromatography
Porosity	Mercury intrusion porosimetry analysis
Thickness	Digital micrometer
Organic extractables impurities	Gas chromatography–mass spectrometry (GC-MS)
Thermo gravimetric analysis (TGA)	Thermo gravimetric analyzer
Amino acid analysis	Amino acid analyzer
pH	pH-meter

The biocompatibility, viral inactivation, stability and packaging validation data obtained for the predicate device was used to demonstrate the biocompatibility, viral safety and shelf-life of the subject device.

The following biocompatibility tests leveraged from previous submission were utilized to support the biocompatibility of the subject device: cytotoxicity, sensitization, intracutaneous reactivity, systemic toxicity, subchronic toxicity, chronic toxicity, genotoxicity, 2- and 12-week implantation tests.

In addition, the pyrogenicity of OSSIX<sup>®</sup> VOLUMAX was tested *in vivo* using the Rabbit Pyrogen Test as per USP <151>, and the test article was judged as nonpyrogenic.

An *in vivo* animal study was conducted in an L-shape buccal beagle mandibular defect model system in Beagle dogs to evaluate the *in vivo* performance, degradation and safety of OSSIX<sup>®</sup> VOLUMAX dental membrane as compared to OSSIX<sup>®</sup> PLUS. The study was conducted on 19 animals followed up to 6 months. The subject device performed in a manner substantially equivalent to the cleared predicate device.

## **VIII. Conclusion**

The subject and predicate devices have the same intended use with similar indications for use and substantially similar technological characteristics and principles of operation. In addition, the non-clinical data provided within the 510(k) submission, as summarized above, demonstrate that OSSIX<sup>®</sup> VOLUMAX is substantially equivalent to the predicate device.