3D SYSTEMS®

VSP®

Virtual Surgical Planning, integrating precision healthcare with 3D technologies for better surgical outcomes
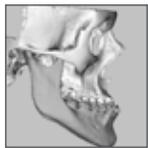
Precision Healthcare Solutions

VSP Orthognathics

Healthcare providers are transitioning from traditional model block surgery to a more accurate and anatomically based personalized surgical method.
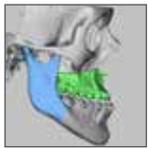
VSP Orthognathics accurately integrates bony anatomy from CT/CBCT data with occlusal data from high resolution scans to fabricate splints guides, and other tools via 3D printing.

Patient presents with Class III malocclusion. Surgical planning to include a mandibular setback and LeFort I advancement.

High resolution scans of the occlusal surfaces are integrated with the CT/CBCT data.

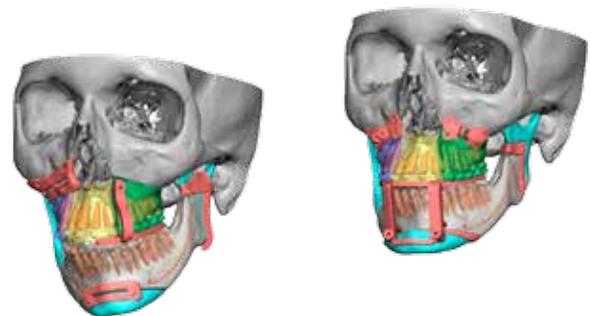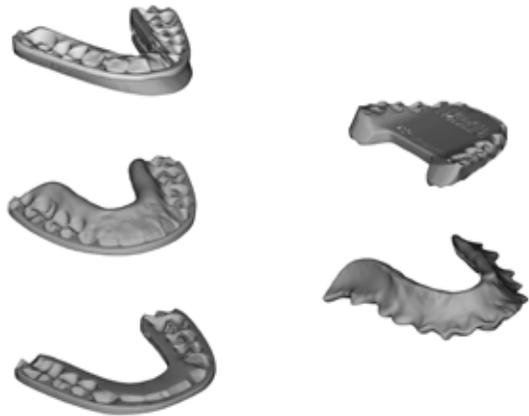Accurate osteotomy simulation tailored to clinical requirements.

Real time 3D bony movement and cephalometric analysis.

Post-operative surgical result shows balanced facial proportions.

SPLINT AND GUIDE DESIGN

Customized to your patient, a range of splints and guides are available to accurately cut and position anatomy.

Virtual Surgical Planning

With nearly 10 years of experience in Virtual Surgical Planning (VSP), 3D Systems' un-matched expertise provides surgeons with improved accuracy and surgical outcomes that results in reduced time in the operating room benefiting both patients and surgeons.

An essential tool for pre-surgical planning and patient-specific models, guides and templates; VSP is a 510(k) cleared service that provides surgeons with clear 3D visualization of a patient's anatomy to develop a surgical plan prior to entering the operating room.

Following the online planning session between our biomedical engineers and the surgeon; patient-specific surgical guides, models and instruments are designed and 3D printed for use within the sterile field. Surgeons around the world are seeing the benefits of the 3D visualization that VSP provides.

COMMON APPLICATIONS

- Orthognathic surgical planning with 3D printed intermediate and final splints (VSP Orthognathics).

- Mandibular or maxillary reconstruction with free flaps and full jaw reconstruction (VSP Reconstruction).

- Trauma reduction surgery with repositioning guides and / or augmented DICOM data for navigation assistance (VSP Trauma).

- Distraction osteogenesis planning includes vector positioning and distractor placement (VSP Distraction).
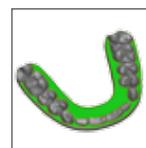
VSP PROCESS

Medical imaging data is prepared for the webmeeting.

Surgical planning webmeeting takes place between the surgeon and 3D Systems engineers.

Patient-specific disposable instruments (splints, guides) are designed.

Instrument design is reviewed on a detailed case report and approved by surgeon.

3D printed models, guides and templates for the case are manufactured and shipped.

Models, guides and templates are used in surgery.

Pre-operative planning and patient-specific models, guides and templates to ensure a better surgical outcome.

VSP Reconstruction

VSP Reconstruction provides an enhanced view that reveals the complexities of a case before entering the operating room.

Example VSP Reconstruction deliverables include:

- Reconstructed model of the anatomy showing the proposed post-operative outcome with graft in place.
- Patient specific resection guide(s) for the maxilla and/or mandible, to allow accurate transfer of the digital plan.
- Graft osteotomy guide for the donor site that contains precise osteotomies to create closing wedges, if needed.
- Metal instrument(s) that fit into the resection or osteotomy guides to provide for more accurate osteotomies and eliminate debris.

Patient-specific
hardware options

Fibula osteotomy guide

Mandible resection guide

Jaw in a Day model with
dental prosthesis

Jaw in a Day®

The Jaw in a Day procedure utilizes state-of the-art digital CAD/CAM technology to create a personalized surgical plan and design patient specific instruments for a single-stage dental rehabilitation. Placement of a provisional dental prosthesis eliminates the need for multiple surgeries, and enables patients to emerge after a single surgery with a full jaw reconstruction including dental rehabilitation.

This process shortens procedure time, streamlines treatment, reduces operating costs and allows patients the convenience of a single surgery.
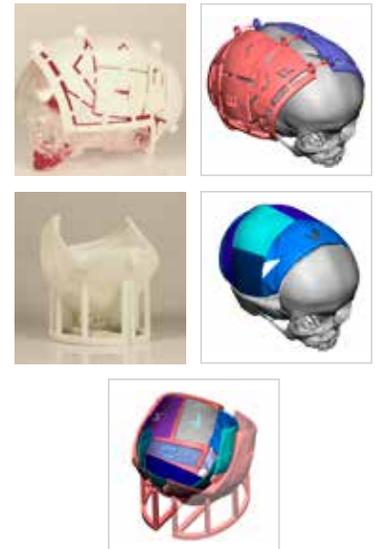
VSP Cranial

3D Systems' VSP Cranial product applies proven and FDA-cleared virtual surgical planning techniques to craniofacial cases, especially procedures related to craniosynostosis and cases that require cranial vault distraction.

Building on the success of the renowned VSP service, VSP Cranial delivers improved surgical outcomes to surgeons by supplying the digital tools, 3D printed surgical guides and access to the expertise surgeons need to apply precision to craniofacial surgery.
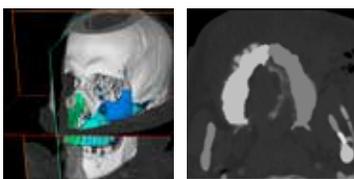
Features:

- Online web meetings between 3D Systems Healthcare experts and the surgeon for planning of complex osteotomies

- Accurate pre-surgical visualization of cuts and movements

- Real-time comparison to select age-matched normative anatomical contour

- Personalized marking and positioning guides for realization of digital plan

- Provision of images, measurements, precision 3D printed models, marking and positioning guides
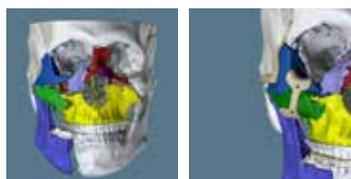

VSP Trauma

Surgeons benefit from the improved visualization and 3D understanding provided by VSP Trauma.
These time sensitive, complex cases utilize a combination of models, guides, templates and digital images to support the virtual plan. Example VSP Trauma deliverables include:

- Digitally reduced, perfected or mirrored anatomical models for a more simplified approach to reduction.

- Custom osteotomy and positioning guides.
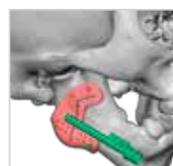
- Occlusal-based positioning splints.

Augmented DICOM

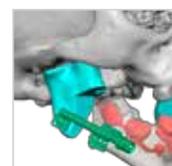

Digital fracture reduction with optional guides

VSP Distraction

The 3D anatomy visualization provided in a VSP distraction session reveals underlying tooth roots and nerves to optimize device position. This customized plan is used to:

- Determine the placement of osteotomies.

- Identify a distraction vector plan.

- Create templates to guide device placement.

- Facilitate pre-operative hardware setup.

Patient-specific design

Surgical movement simulation

Tactile clinical transfer tools

Getting Started

Contact us to learn more about Virtual Surgical Planning at vsp@3dsystems.com or +1 720 643 1001. An interactive orientation is available to experience planning a case.

Peer Reviewed Journal Articles

Would you like to learn more about how VSP has impacted clinical care? A large group of peer reviewed journal articles substantiate the uses of VSP products.

Visit www.3dsystems.com/vsp/journal-references for a complete bibliography.

3D Printing Technology

3D Systems offers a broad range of 3D printer technologies and materials. Virtual Surgical Planning uses Stereolithography (SLA) for the versatility, accuracy and ISO 10993 tested biocompatible materials. VSP materials allow for sterilization for use in the operating room and <30 day intra-oral splints.

Healthcare Solutions

3D Systems is a pioneer for healthcare solutions that improve outcomes which benefit both patients and surgeons. Our global team works with customers to help navigate technologies and provide support for surgical planning, training, device design, personalized medical technologies and 3D printing. We are dedicated to helping medical professionals train for, plan and practice complex medical procedures to achieve better patient outcomes.

www.3dsystems.com/healthcare

3D Systems Corporation

5381 South Alkire Circle
Littleton, CO 80127 USA
Tel +1-720-643-1001
denver.healthcare@3dsystems.com

Grauwmeer 14, Leuven
Belgium
Tel +32-1694-6400
info.leuven@3dsystems.com

3 Golan Street (Golan Building)
Airport City, 7019900 Israel
Tel +972-3-911-4444
healthcare@3dsystems.com