Digital Anatomy Printer Software

The power to create the most realistic anatomical models.

Buyer's Guide

stratasys

Introduction

The Digital Anatomy Printer brings medical models to life with incredible realism that accurately represents both the appearance and response of human tissue. These models provide unmatched clinical versatility, repeatability and accuracy for healthcare professionals and medical device companies.

Functional Models

Ultra-realistic, lifelike pathology models based on research conducted with top academic medical centers across the globe. With three unique digital materials and an extensive library of anatomical presents, you can create a range biomechanical models that not only look the part but also respond like the real thing.

Visual Models

Full-color anatomical models. Choose colors. Define transparencies. Determine textures and finishes. Create an end product that's as close to the real thing as possible.

Diagnostic Workflow

End-to-end FDA-cleared printing workflow validated for use with Materialise Mimics and Simpleware ScanIP Medical segmentation software to create accurate anatomical models for diagnostic use.

Radio-opaque

Create visual models that are also radio-realistic providing visibility of anatomical structures under X-Ray and CT.

Unlock the unique material combinations that create realism you can see and feel.

The Digital Anatomy™ 3D printer software gives you the power to quickly create the most lifelike pathology models available. More than 100 presets have been developed and validated to demonstrate similar feel and biomechanical performance as human anatomy.

Each anatomy preset in the software license is configured using unique material combinations that vary in softness, flexibility, and density to mimic native tissue behavior

BoneMatrix

Complex material-depositing patterns mimic porous bone structures, fibrotic tissues, and ligaments.

GelMatrix

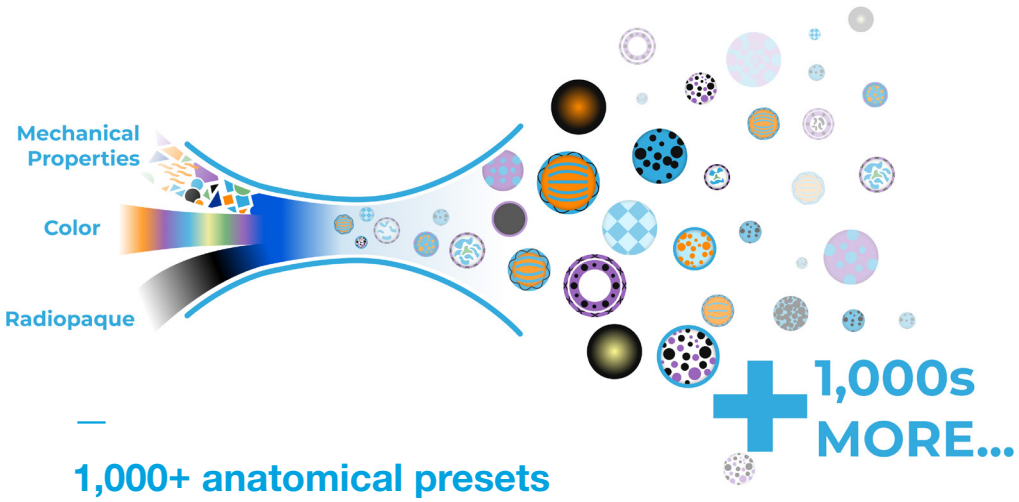
Unique GelMatrix material and GelSupport™ depositing patterns allow you to print small, complex vascular structures and easily remove internal support material.

TissueMatrix

Sophisticated material configurations make models that feel and behave like native organ tissue when force is applied.

RadioMatrix

Radiopaque 3D print material gives you the power to create medical models that exhibit realistic features under X-Ray and CT



1,000+ anatomical presets

Unlock the power to mimic native tissue and bone structures.

The software license offers more than 100 preset anatomy options and advanced design tools that allow you to print accurate, lifelike models in a few clicks.

Blood Vessels[1]

Create large and very small complex blood vessels that behave like native vessels when force is applied such as device insertion.

Structural Heart[2]

Create models that match tissue deformation characteristics and behave like native tissue when force is applied such as suturing and device insertion.

Musculoskeletal[3]

Create models that match bone density characteristics and behave like native bone when force is applied such as discectomy, drilling, reaming or sawing.

General Anatomy[4]

Produce functional models to mimic organs such as the stomach, colon, kidney, and liver. Replicate encapsulated and non-encapsulated tumors. Simulate tumor resection and experience realistic haptic feedback to instruments.

Radiographic

Print anatomies that vary in radio-density exhibiting radio-realistic features under X-Ray and CT.

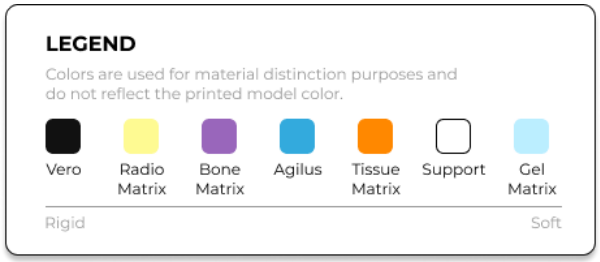
Structural Heart

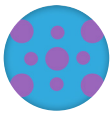
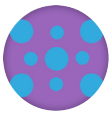
Experience the physiological response of native cardiac tissue.

See the accurate biomechanical behavior associated with gender, age, ethnicity, and other physiological and pathological characteristics.

Feel realistic feedback while suturing, cutting, inserting, and deploying devices.

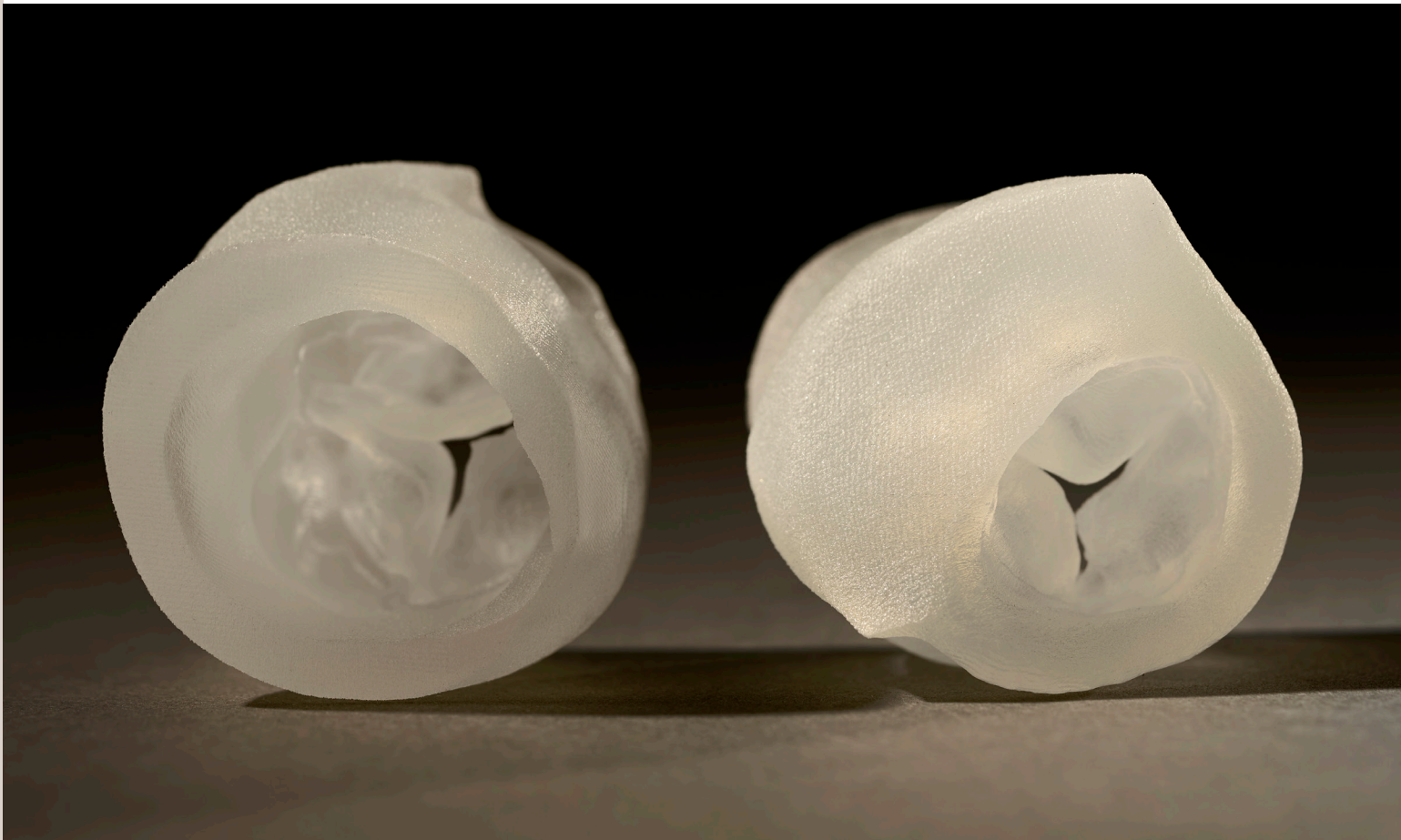
Legend	
	Material deposit patterns and fiber structures for the targeted anatomy.
• Least soft ••• Most soft	Relative material softness ranging from least soft to most soft.
Fiber structure and coating	Varying thickness of fiber structures and coatings.
Agilus™ Vero™ BoneMatrix™ GelMatrix™ TissueMatrix™ RadioMatrix™	Combinations of print materials that are deposited to create the model.



Digital Anatomy printer software license features					
	Models properly mimic tissue deformation characteristics and behave like native tissue when force is applied such as suturing and device insertion.				
Myocardium					
	•••	•••	••	••	••
	Highly contractile	Moderately stiff	Stiffened	Very stiff	Extremely stiff
	Coatings and fiber structures range from thin to thick				
	Complex combinations of Agilus and TissueMatrix				
Valve annulus					
	Soft healthy		Moderately stiff		Stiffened diseased
	Non-coated				
	Complex combinations of Agilus and BoneMatrix				
Solid tumor					
	Soft non-encapsulated	Soft encapsulated	Uniformly soft	Uniformly stiff	
	Coated or non-coated				
	Complex combinations of Vero, support material, and Agilus				

Structural Heart

	Digital Anatomy printer software license features		
Valve chordae			
	•••	••	•
	Highly extensible	Extensible	Stiffened
	Coatings and fiber structures range from thin to thick		
	Complex combinations of Agilus and TissueMatrix		
Vessel wall			
	Compliant	Slightly compliant	Low compliant
	Non-coated		
	Complex combinations of Agilus and Vero		

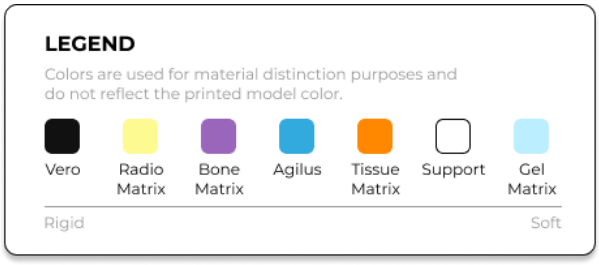


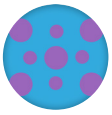
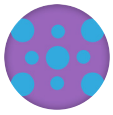
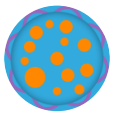
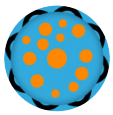
Blood Vessels

Experience the arterial elasticity caused by changes in blood pressure and disease.

See how the artery will move as internal and external forces are applied with blood vessel material that mimics vessel degeneration.

Feel realistic vessel responses while inserting and deploying devices.



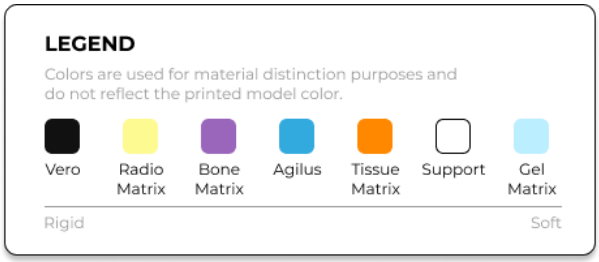
Digital Anatomy printer software license features						
	Models properly mimic pulsatile characteristics and behave like native vessels when force is applied such as device insertion.					
Vessel wall						
	Compliant	Moderately compliant	Slightly compliant	Low compliant	Semi rigid	Rigid
	Non-coated					
	Complex combinations of Agilus and Vero					
Valve annulus						
	Soft	Moderately stiff	Stiffened			
	Non-coated					
	Combinations of Agilus and BoneMatrix					
Solid tumor						
	Soft non-encapsulated	Soft encapsulated	Uniformly soft	Uniformly stiff		
	Coated or non-coated					
	Complex combinations of Vero, support material, and Agilus					
Large vessels						
	Supports large vessels					
	Non-coated					
	Complex combination of Agilus and GelMatrix					
Suturable blood vessel						
	Medium Strength Vessel			High Strength Vessel		
	Coated material mixtures					
	Complex combinations of TissueMatrix™, BoneMatrix™, Vero and Agilus					

Musculoskeletal

Experience the density properties of human bone.

See accurate bone articulation with variations in cancellous and cortical density.

Feel realistic feedback while tapping, reaming, sawing, inserting screws and attaching plates.



Advanced design tools take model creation to the next level.

Screw Insertion Strain Relief

- ✓ Create a perimeter on an orthopedic model that allows for screw insertion without cracking the model
- ✓ Control the location, size and shape of the strain relief site.

Long Bone Manipulation

- ✓ Autogenerate the distal and proximal regions of the bone and match intricate internal structures to the appropriate region– replicating cortical, cancellous and the medullary canal.

	Digital Anatomy printer software license features	
	Models properly mimic bone density characteristics and behave like native bone when force is applied such as discectomy, drilling, reaming, or sawing.	
Vertebra		
	Dense	Porous
	Uniform coating	
	Complex combinations of Vero, BoneMatrix, Agilus, and support material	
Intervertebral discs		
	Normal	Degenerated
	Uniform coating	
	Complex combinations of Agilus, TissueMatrix, and support material	

Musculoskeletal

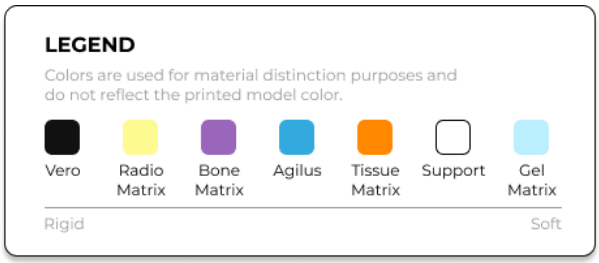
	Digital Anatomy printer software license features		
Nerves			
	•••	•••	••
	Soft	Moderately stiff	Stiff
	Coatings and fiber structures range from thin to thick		
	Complex combinations of Agilus and TissueMatrix		
Facet joints			
	•••	•••	••
	Soft	Moderately stiff	Stiff
	Coatings and fiber structures ranging from thin to thick		
	Complex combinations of Agilus and TissueMatrix		
General bone			
	Porous	Slightly dense	Dense
	Uniform coating		
	Complex combinations of Vero, BoneMatrix, and Support		
Skull			
	Dense		
	Uniform coating		
	Complex combinations of Vero, BoneMatrix, and support material		
Long bone			
	Miniature medullary canal	Medium medullary canal	Typical medullary canal
	Uniform coating		
	Complex combinations of Vero, BoneMatrix, Agilus, and Support		
Ribs			
	Moderately stiff	Very stiff	
	Uniform coating		
	Complex combinations of BoneMatrix, Vero, and support material		

General Anatomy

Experience the response of native organ tissue.

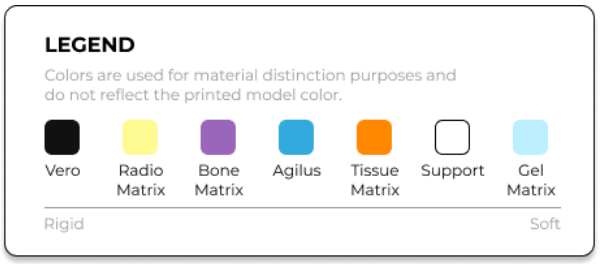
See the accurate biomechanical behavior associated with organ structures and disease states.

Feel realistic feedback while suturing, cutting, inserting, and deploying devices.



Digital Anatomy printer software license features							
	Models behave like native tissue when force is applied such as suturing, cutting, and device insertion.						
Solid internal organs							
	•••	•••	••	••	••	•••	•••
	Highly contractile Fiber contraction 1	Moderately stiff Fiber contraction 2	Stiffened Fiber contraction 3	Very stiff Fiber contraction 4	Extremely stiff Fiber contraction 5	Directional force affects behavior Fiber contraction 6	 Fiber contraction 7
	Coatings and fiber structures range from thin to thick						
	Complex combinations of Agilus and TissueMatrix						
Hollow internal organs							
	Compliant	Moderately compliant	Slightly compliant	Low compliant	Semi rigid	Rigid	Highly rigid
	Non-coated						
	Combinations of Agilus and Vero						
Solid tumor							
	Soft non-encapsulated	Soft encapsulated	Uniformly soft	Uniformly stiff			
	Coated or non-coated						
	Complex combinations of Vero, support material, and Agilus						
Liver							
	Highly Contractile	Thicker coated Highly Contractile	Moderately Stiff	Thicker Coated Moderately Stiff			
	Varying coating layers						
	Complex combinations of TissueMatrix™, GelMatrix™ and Agilus						

Radiology



Digital Anatomy printer software license features

Models with unprecedented visibility of anatomical structures, medical devices and implants under medical imaging—for unmatched surgical navigation, training, and testing.

Solid internal organs

100% Radio	Radio Vero 1	Radio Vero 2	Radio Vero 3	Vero 100%	Tissue 1	Tissue 2	Tissue 3

Non-coated Mixtures

Varying combinations of RadioMatrix™ Vero and TissueMatrix Vero that correlates to Hounsfield values from high (left) to low (right)

Experience the most consistent, **accurate** representation of your targeted pathology.[1-3]

Cardiac [1]

A study comparing the biomechanical properties of porcine tissue to 3D printed myocardium found that Digital Anatomy printed models **mimic real tissue better** than any other material.

Vascular [2]

A study comparing 3D printed aortic, carotid, and coronary artery models to native vessel behavior found that the Digital Anatomy Printer creates the **most accurate arterial models** available.

Orthopedic [3]

Biomechanical testing confirmed the driving torque and pullout force of screw fixation in 3D printed bone models has **similar haptic response** to human bone.

General Anatomy – Liver [4]

A study comparing Porcine liver tissue and 3D printed models found that while they exhibit similar biomechanical values, the printed models showed higher consistency between measurements.

References:
[1] Severseike, Leah et al., “PolyJet 3D Printing of Tissue-Mimicking Materials: How Well Can 3D Printed Synthetic Myocardium Replicate Mechanical Properties of Organic Myocardium?,” bioRxiv, 2019, doi.org/10.1101/825794.
[2] Dahan, Gal, “Synthetic Bones vs. Human Bones for Screws Testing: A Literature Survey,” In progress, 2020.
[3] Sparks, Adam et al., “Digital Anatomy Printing (DAP): A Direct Characterization of DAP Materials for Use as Compliant 3D-Printer Arteries using Intravascular Ultrasound (IVUS),” The Jacobs Institute, Submitted for publication, 2020.
[4] Lee, Vania et al., “PolyJet 3D Printing of Tissue Mimicking Materials: An Investigation of Characteristic Properties of 3D Printed Synthetic Tissue”, BioRxiv, 2020, doi.org/10.1101/2020.12.23.424075.

Digital Anatomy Creator

Unlimited 3D possibilities with the Digital Anatomy Creator.

The Digital Anatomy Creator module provides advanced capabilities to the Digital Anatomy printer software. This user-friendly graphic interface allows users to take full advantage of the different materials on the Digital Anatomy Printer. Operators can create a custom preset with their desired mechanical properties and colors to receive a final model with specific mechanical properties and visualization.

- Create beyond existing anatomical presets
- Calibrate digital materials to meet your exact specifications.
- Open the door to new research

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