



CASE STUDY
MEDICAL

Scaling Complex Dental Training with 3D Digital Anatomy[®] Simulation

How Fusetec Uses the Stratasys
Digital Anatomy[®] 3D Printer to
Standardize and Scale Complex
Dental Training





The Challenge

Limitations of traditional surgical training methods

- Inconsistent anatomy and inability to reproduce specific pathologies
- Difficulty providing repeatable hands-on surgical practice
- Limited access, high costs, and logistical complexity of cadavers

The Solution

High-fidelity 3D printed anatomical simulation

- Multi-material 3D printed anatomical models with realistic tactile feedback
- Realistic mechanical and visual behavior during procedures
- Customizable Digital Anatomy materials engineered for procedural realism

The Impact

Controlled, repeatable surgical simulation

- Repeatable training across different anatomies and pathologies
- Scalable, on-demand simulation to drive clinical innovation
- Improved surgical preparedness and device testing





The Challenge:

Limited Access to Hands-On Training in Complex Dental Procedures

In dental surgery, clinicians often encounter complex procedures for the first time in real patient scenarios, where variability, limited hands-on preparation, and procedural complexity can impact both confidence and consistency of outcomes.

Fusetec, an Australia-based advanced manufacturing and medical training design company specializing in anatomically accurate surgical training models, was founded to address this gap in surgical education. Fusetec's founder and CEO, Mark Roe, says the company set out to bridge the gap in surgical training after identifying a need in healthcare to constantly advance surgical training.

When Fusetec expanded into dentistry, the challenge became even more apparent: Hands-on training opportunities were limited and inconsistent for dental trainees, leaving clinicians underprepared for complex procedures.

"Dental education often focuses on foundational procedures, leaving fewer opportunities to train on advanced and high-risk cases," says Roe. "Many clinicians still learn by observing procedures before performing them, which can result in uneven skill development. In some regions, inconsistent or improvised training methods persist, reinforcing the need for a more standardized and accessible approach."

The Solution:

Structured Training for Complex Dental Procedures

To address these challenges, Fusetec developed anatomically accurate dental simulation models that allow clinicians to practice complex procedures before performing them on patients.

Fusetec's models are designed to support training across some of the most demanding procedures in dentistry. A key example is zygomatic implant training, which is commonly used in cases involving severe trauma or bone loss. These procedures require advanced surgical skill and are performed by a limited number of specialists worldwide.

Beyond individual procedures, Fusetec structures training as a progressive learning pathway. Clinicians advance through increasingly complex procedural scenarios, building technical skill and clinical confidence in a controlled, repeatable environment.



We can create a variety of models along a learning curve. We start with a simple model and get more and more complex as their skills develop."

Mark Roe

Because every trainee works on the same simulation model, training becomes standardized, measurable, and comparable across cohorts, helping institutions establish clear competency benchmarks and more predictable learning outcomes.



Mark Roe
Founder and CEO
of Fusetec



While traditional methods such as cadavers have long been used, they do not offer the consistency, repeatability, or scalability required for modern training. Access is limited, anatomy varies from specimen to specimen, and opportunities for repeated practice are constrained."



The Application:

Digital Anatomy® 3D Printing for Dental Simulation

To create these lifelike dental simulation models, Fusetec partnered with Stratasys to leverage Digital Anatomy® 3D printing solutions, combining advanced PolyJet™ technology, Digital Anatomy® Creator software, and specialized multi-material capabilities to produce highly realistic anatomical models for medical training applications.

“The devil is in the details when you create surgical models,” Roe explains, emphasizing the importance of replicating internal structures like trabecular bone rather than relying on traditional solid plastics.

This approach enables Fusetec to produce highly detailed, multi-material dental simulation models that replicate both the structure and biomechanical behavior of human anatomy. Models can be customized to represent specific clinical scenarios, with bone density, internal trabecular structures, gingival texture, and soft tissue response all simulated within a single model.

Multi-material printing, available on systems such as the J5™ and J850™ Digital Anatomy printers, allows each model to reproduce the look, feel, and performance of bone, teeth, and soft tissue within a single build.

By leveraging materials such as BoneMatrix®, TissueMatrix®, and GelMatrix®, the simulation models provide realistic feedback during drilling, cutting, suturing, and implant placement. RadioMatrix™ also supports imaging workflows, [enabling validation under X-ray and CT](#).

Dental anatomical presets in GrabCAD™ Digital Anatomy software and the Digital Anatomy Creator add-on provide pre-configured combinations of materials and structures that mimic real dental anatomy. These presets give users a reliable starting point for model design, ensuring consistency across builds while reducing development time and enabling scalable production of identical, high-quality models.



The Results:

Standardized Training and Improved Clinical Confidence

The integration of Digital Anatomy 3D dental models has empowered Fusetec to deliver more structured and consistent training programs. Clinicians now practice on identical anatomy, supporting standardized training, reducing variability across cohorts, and enabling objective assessment of skills.

Institutions can scale these programs efficiently by producing models on demand, supporting training across universities, workshops, and global education initiatives without the ethical, hygienic, logistical, storage, or regulatory constraints of traditional methods.

For Roe, the value is clear: “A consistent and repeatable learning outcome.”

Clinicians gain hands-on experience before treating patients, improving confidence and reducing uncertainty in complex procedures.

The Impact:

Scalable Dental Training with Consistent, Measurable Outcomes

Fusetec's collaboration with Stratasys reflects a broader shift in healthcare training toward simulation-based education. Training programs can now be designed with defined learning pathways, enabling more predictable skill development and consistent clinical readiness.

By making high-fidelity simulation accessible and scalable, dental anatomical models are helping institutions expand training capacity while maintaining quality and consistency.

For Roe, the goal is simple: "It's up to us to give clinicians better tools. We can help them build the skills to complement their knowledge."

As dental procedures become more advanced, the need for realistic, accessible training solutions will continue to grow. With Digital Anatomy technology, Fusetec is helping define a new standard in dental education built on precision, repeatability, and confidence.

Learn more

Discover how Stratasys Digital Anatomy® solutions can transform your dental training programs. Contact a Stratasys expert today to bring anatomical realism into your workflow.



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