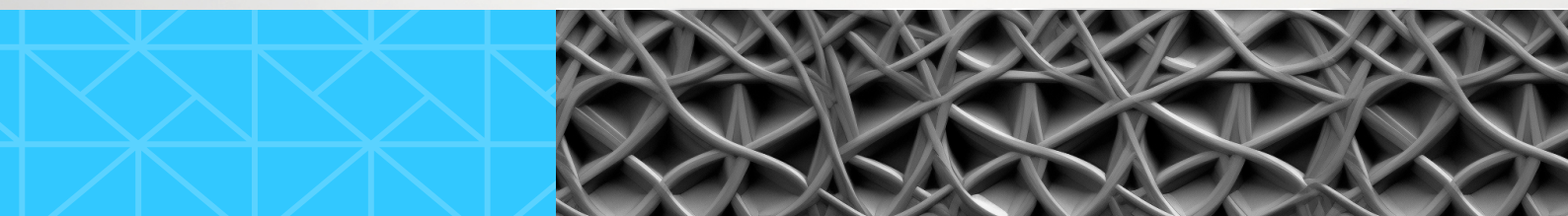


# From Life-Threatening Trauma to Life-Changing Precision:

How 3D Printing is Reshaping Craniomaxillofacial Surgery



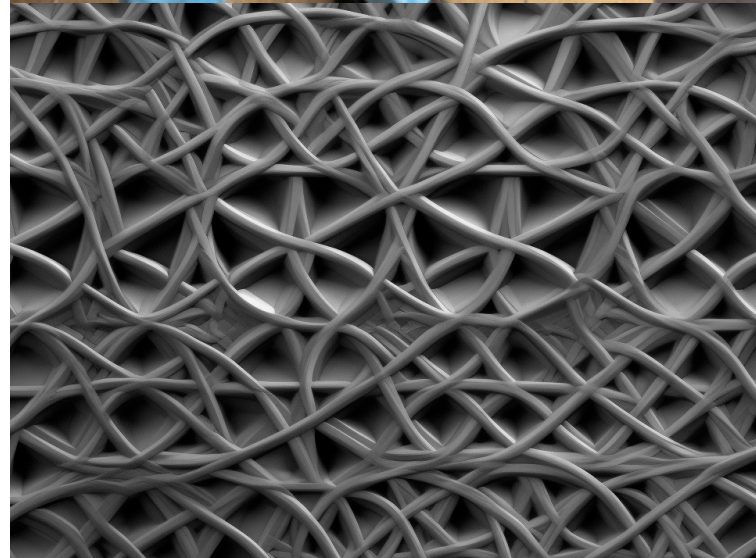


## Galilee Medical Center pioneers point-of-care 3D printing for complex Craniomaxillofacial cases

When a young man arrived at Galilee Medical Center with devastating facial injuries from a high-impact road accident, time and accuracy were critical. Traditional imaging told only part of the story: his shattered facial bones, displaced in multiple planes, required a surgical plan as complex as the trauma itself. But the surgical team had an invaluable tool at their fingertips: a patient-specific 3D model that allowed them to visualize, plan, and rehearse the reconstruction before ever making an incision.

This wasn't an isolated case. Galilee Medical Center, located in Nahariya, Israel, is the largest regional hospital in northern Israel and a Level 1 trauma center serving more than 600,000 residents.

The Department of Oral and Maxillofacial Surgery, led by Prof. Samer Srouji, specializes in highly complex procedures in trauma, temporomandibular joint (tmj) disorders, tumor resection, reconstruction, and pediatric congenital malformations.





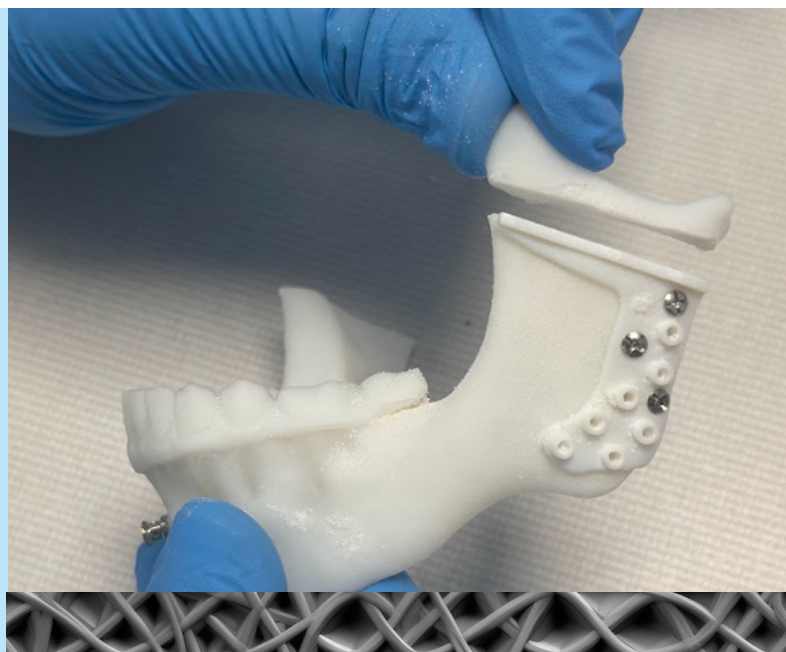
The team, which includes Prof. Srouji and Drs. Adeeb Zoabi, Shadi Daoud, and Amjad Shhadeh, established a point-of-care 3D printing lab at the hospital with the goal to transform patient care with accurate, accessible, and cost-effective surgical planning and patient-specific devices. Today, the lab uses [Stratasys PolyJet™ technology](#) to produce 3D printed anatomical models and cutting guides that have significantly improved care for some of Israel's most vulnerable patients.

## The Clinical Challenge

Galilee Medical Center handles a wide spectrum of complex surgical cases, from trauma to congenital malformations. In maxillofacial surgery, where critical structures are often just millimeters apart, precise planning is essential. But traditional 2D imaging and freehand techniques limit what can be achieved, especially in difficult reconstructions.

Outsourcing 3D printing for complex cases often means long wait times, high costs, and limited flexibility. Each model requires coordination with external vendors, with turnaround times stretching up to two weeks - an unacceptable delay in urgent trauma or oncology cases. Costs per model are also high, often exceeding hospital budgets for non-standard care.

Additionally, any small change in the surgical plan requires restarting the process from scratch, wasting time, resources, and effort. Surgeons have little control over the segmentation quality or design parameters, reducing confidence in the presurgical 3D printed model and complicating intraoperative decision-making.



“

This wasn't just a model, it was a complete simulation of the patient's anatomy. It allowed us to hold the deformity in our hands, study the fracture lines, and create a surgical plan that would have been almost impossible using imaging alone.

Prof. Samer Srouji



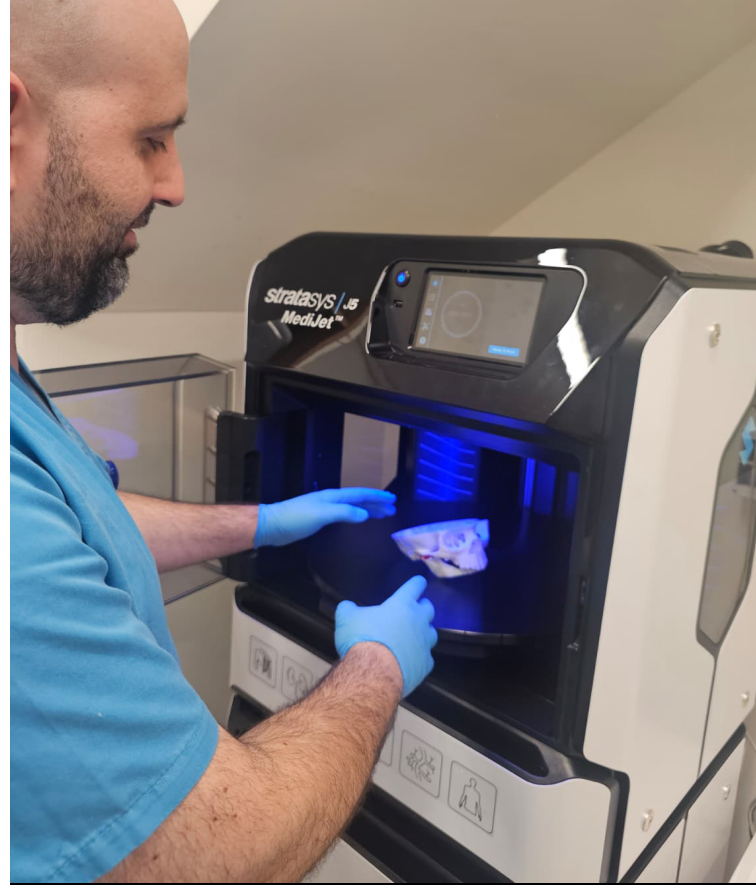
## The Solution: In-House 3D Printing with Stratasys

To gain speed, control, and precision, The Department of Oral and Maxillofacial Surgery at Galilee Medical Center integrated in-house 3D printing directly into their surgical workflow. The [Stratasys J5 Digital Anatomy™ printer](#) allows the team to rapidly transform CT and MRI scans into anatomical models, surgical guides, and patient-specific implants - all under one roof.

“Having a printer in the hospital changes everything,” says Dr. Shshadeh. “We can go from CT scan to 3D-printed guide in less than 24 hours if needed. For trauma patients, it’s a game-changer.” The J5 Digital Anatomy printer creates multi-material, multi-color, sterilizable models that simulate bone, vessels, and soft tissue with exceptional realism. This allows for more accurate surgical planning and better communication between surgeons and residents.

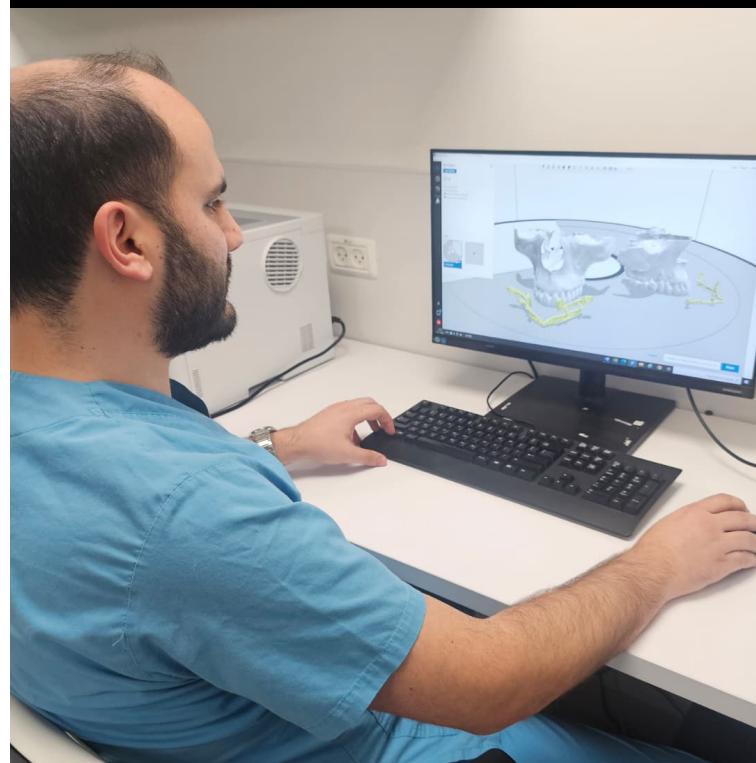
[Biocompatible MED610 material](#) is commonly used for cutting guides and surgical planning tools, while Digital Anatomy materials like [BoneMatrix](#) and [TissueMatrix](#) allow simulation of bone density and soft tissues. The J5 Digital Anatomy printer’s ability to print in multi-color and multi-materials also enables critical visualization of anatomical landmarks, including nerves, vessels, and tumors, helping surgeons reduce risk in sensitive procedures.

“If we’re planning a biopsy near a major nerve, the ability to print that nerve in a different color and see it clearly through transparent layers helps ensure we don’t miss it during surgery,” explains Dr. Daoud. “With the J5 Digital Anatomy (TM) Printer, we can visualize the anatomy more completely and safely guide our approach.”



We couldn’t afford to wait two weeks for a model when a trauma case needed to go to surgery in two days. We needed full control, from the planning to the printing to the sterilization, in our own hands.

**Dr. Zoabi**





Stratasys models have also become vital for hands-on surgical training. The team recently led a course on a new technique, printing full skulls using Digital Anatomy materials and validated presets to allow practitioners to simulate drilling and fixation.

“Surgeons reported that the bone felt real. When they drilled or inserted screws, they said it was like real surgery,” says Prof. Srouji. “That kind of realism makes a huge difference for surgical education. It’s not just a plastic model - it’s a high-fidelity training tool.” For research and ex vivo simulation, the team uses [RadioMatrix™](#), a radiopaque material that can be controlled to appear on CT scans like real bone.

## Clinical and Operational Impact

Galilee Medical Center has used its in-house 3D lab in more than 160 surgeries, including trauma, oncology, orthognathic, and reconstruction.

After more than 10 years of experience in the 3D printing, the team has found:

- Significant reductions in operating time
- Improved surgical accuracy and patient-specific outcomes
- Lower rates of revision surgeries

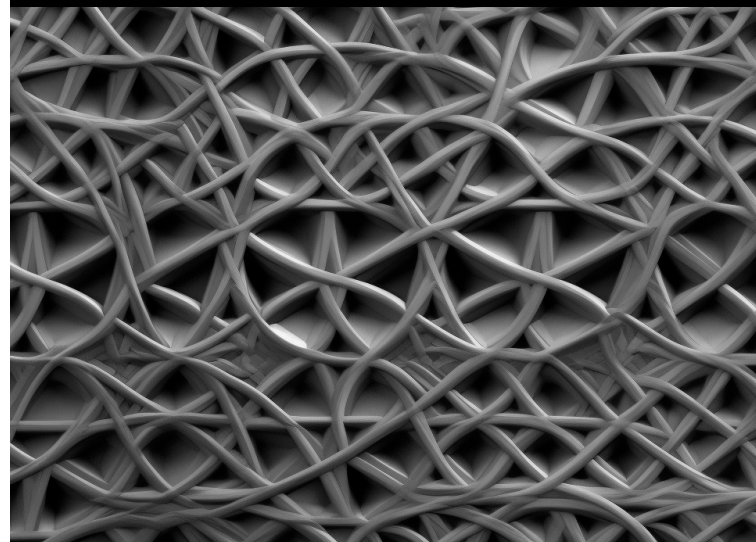
Using 3D models allows us to see the anatomy, manipulate it, and plan exactly where to cut or reconstruct,” says Dr. Shhadeh. “For cancer or trauma patients, this can be the difference between an average outcome and an exceptional one.”

The department now routinely uses 3D printing to create cutting guides for mandibulectomy, maxillectomy, and orbital reconstruction.



You can do a biopsy guide, test the procedure at your desk, and then scan the model to check its accuracy, without needing animals or cadaver bone, We’ve used it in many cases, and the feedback has been very positive.

**Prof. Samer Srouji**





# Educational Value for Patients and Medical Staff

Beyond surgical precision, the 3D lab has proven to be a valuable educational tool for residents, fellows, and patients alike. "When we bring the model into the OR, the residents understand the case better. The team is more confident. And when we show it to the patient and family, they understand the process," says Dr. Daoud.

"We had one girl with a tumor in her jaw," Dr. Daoud adds. "When she and her family saw the model of the jaw and where we were going to cut, it helped a lot to make her calm. The family understood the situation much better. That's what makes this a comprehensive solution, not just for us, but for the whole hospital."

In fact, the lab has attracted attention from other departments and health systems throughout Israel, positioning Galilee Medical Center as a national leader in point-of-care 3D printing.

As the team continues to expand the role of 3D printing in craniofacial care, they hope to further elevate surgical outcomes and establish best practices across Israel and beyond.

"3D printing has become an essential part of our workflow," Prof. Srouji says. "It saves time, improves results, and gives our patients the best possible care. We believe 3D printing will become standard in every surgical department. It's not the future anymore—it's the present. And Stratasys is helping us lead that change."



## Ready to bring point-of-care 3D printing to your hospital?

Discover how Stratasys can help you **accelerate surgical planning, improve outcomes, and empower your care teams.**



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