



3D-Printed Denture Material Showcases Strength and Esthetics

Trusana from Myerson Tooth features powerful flexural strength not seen in other materials. **by Kellie Nock**



STEVEN SADOWSKY

CLINICIAN AND PROFESSOR

Achieving a natural esthetic for 3D-printed teeth while maintaining flexural strength and wear resistance is not possible using ordinary material. That is where Trusana comes in, according to Steven Sadowsky, DDS, FACP, professor at the Arthur A. Dugoni School of Dentistry at the University of the Pacific in San Francisco, California, and dental implant expert. Trusana is a 3D printing resin that uses a photopolymer liquid to create denture teeth with fracture toughness, wear resistance, and esthetic translucency.

The Need for an Innovative Material

Created by Myerson Tooth, Trusana was formulated to fill the need left by materials that were prone to breakdown, a problem Dr Sadowsky noticed in his prosthodontic practice.

“We were seeing a lot of mechanical complications with the ‘All-on-4®’ design, especially with the provisional prosthesis that’s used to provide immediate function and stabilize the implants during the integration during the first phase of treatment,” Dr Sadowsky says. “Even after we finished the definitive restoration, there was often wholesale wear on the teeth. So that within 5 years, we needed to completely retread that prosthesis, and someone who’s paying quite a bit for this type of definitive work was obviously going to be discouraged after a fairly short time of service.”

Dr Sadowsky cites several studies. “One investigation concluded that patients were 50 times more likely to need posterior tooth replacement at 5 years or less than at 2 years of service.¹ A longitudinal study addressing prosthetic complications over 29 years found what was quite inflammatory for our work. After about 10 years, only about 10% of our prostheses were without mechanical problems.”²

Equally troubling have been the higher fracture rates of up to 60% using the all-acrylic prosthesis that is delivered at the time of implant placement.³ These mechanical problems could jeopardize the integration of the implants. This led Dr Sadowsky and his colleague and notable polymer scientist, Jeff Stansbury, PhD, to additive materials using a urethane dimethacrylate formulation with robust physical properties. After researching and patenting a highly durable denture tooth material, Dr Stansbury and Dr Sadowsky discovered Trusana for additive manufacturing.

Strength Through Data

Trusana stood out to Dr Sadowsky because of its unique composition among other 3D printing materials. “Trusana has really formidable properties,” he says. Dr Sadowsky says that Trusana’s flexural strength is where it shines. “What we see from Trusana is that the flexural strength is 50% higher than present market materials. In comparison with methyl methacrylate, which was the conventional mate-

Trusana

Trusana Premium 3D Printing Resin, a photopolymer liquid indicated for dentures, is durable and offers the enhanced esthetics that patients desire. Trusana Premium 3D Printing Resin has a lower percentage of water uptake than many resins on the market and is available in 6 shades—A1, A2, A3, B1, C1, and 51 (bleached)—for esthetic flexibility.

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rial most used in analogue processing, it is more than 100% better in terms of flexural strength.”⁴

Trusana’s flexural strength is 160 MPa when dry and 171 MPa after being stored in water for 14 days. One of the pitfalls of additive and other denture material can be water uptake. Because water uptake degenerates the physical properties of the denture tooth, it can cause breakdown and staining over time. Trusana has the added benefit of being hydrophobic, meaning its water uptake is just around 0.3% and it is impervious to the aging seen with other materials.

The denture material not only displays high strength as well as toughness with an exceptionally good elastic modulus, but its esthetics are a big draw too. Dr Sadowsky says patient feedback to Trusana has been very positive. “The patient that was first to benefit from a Trusana implant prosthesis was very complimentary, and she felt like she could smile for the first time without being sensitive to her appearance,” he says. “She also felt like she had a lot of confidence in terms of the stability of the prosthesis.” ●

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