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Advances in 3-D Printing Launch a Promising Future for Birth Defects Treatments

Teratology Society Journal Issue Reviews New 3-D Printing Technologies to Treat Heart, Craniofacial Birth Defects

RESTON, VIRGINIA—From reconstruction of craniofacial syndrome effects, whose social stigmas were recently depicted in the movie “Wonder,” to a better understanding of congenital heart defects, 3-D printing is providing exciting approaches to more successful birth defects treatments, according to editors of the latest special issue of [Birth Defects Research](#) (DOI: 10.1002/bdr2.1367).

The special issue just published by the Teratology Society with John Wiley & Sons, focuses on the exciting and rapid strides made in 3-D printing technology. “Birth defects are often extremely complex and challenging to treat and differ from one individual to another,” explained Michiko Watanabe, PhD, co-editor of the special *Birth Defects Research* issue and professor of pediatrics at Case Western Reserve University School of Medicine. “The reviews chosen for this issue illustrate how 3-D printing strategies may help to improve treatment for a growing child with birth defects to avoid multiple surgeries over time, and why they are being considered for use in many clinics as an essential tool for individualized education and medical therapy. Models provided by 3-D printing allow for practicing complex surgical or other interventions that could greatly improve outcomes. “

The utility of 3D printing for diagnosis and surgical planning of complex cardiac defects in children has been described in the review, “3-D printing and virtual surgery for congenital heart procedural planning,” (Moore, R. A., [DOI: 10.1002/bdr2.1370](#)). “It is now possible to use 3D printed heart models for advanced planning of surgical and catheterization based procedures, and virtual surgeries can potentially improve surgical outcomes,” said Deepa Prasad, MD, a pediatric cardiologist (advanced cardiac imager) at the Banner Cardon Children’s Medical Center, clinical assistant professor at the University of Arizona and guest editor of the special journal issue. The technical process for creating 3D heart models has been outlined in detail in the review, “3D printing and modeling of congenital heart defects: A technical review,” (Townsend, K., Pietila, T., [DOI: 10.1002/bdr2.1342](#)).

Additional subtopics covered in the issue include the expertise of doctors treating craniomaxillofacial congenital anomalies using 3-D printed cartilage and bone for reconstructive surgery of the head and face ([DOI: 10.1002/bdr2.1345](#)), and “Future of 3D printing: How 3D bioprinting technology can revolutionize healthcare ([DOI: 10.1002/bdr2.1351](#)),” authored by Steven Morris, the CEO of BIOLIFE4D,

who is working to combine stem cell and 3-D technologies in the hopes of eventually engineering human hearts capable of growing with a child.

“The potential for printing living tissues that will grow with the child is not science fiction, but close to reality now,” said Dr. Prasad. Additionally, 3D printing methods for eliminating bacterial growth on implants used in some birth defect treatments is also on the horizon as described in Dr. Anna CS Samia and colleagues’ review ([DOI: 10.1002/bdr2.1352](https://doi.org/10.1002/bdr2.1352)). “More than ever, these treatments for birth defects are close to reality.”

About the Teratology Society

[The Teratology Society](http://www.teratology.org) is an international and multidisciplinary group of scientists including researchers, clinicians, epidemiologists, and public health professionals from academia, government and industry who study birth defects, reproduction, and disorders of developmental origin. The Teratology Society is made up of nearly 700 members worldwide specializing in a variety of disciplines, including developmental biology and toxicology, reproduction and endocrinology, epidemiology, cell and molecular biology, nutritional biochemistry, and genetics as well as the clinical disciplines of prenatal medicine, pediatrics, obstetrics, neonatology, medical genetics, and teratogen risk counseling. Scientists interested in membership in the Teratology Society are encouraged to visit www.teratology.org.

The society’s official journal, *Birth Defects Research*, is published by [John Wiley & Sons](http://www.wiley.com) in partnership with the Teratology Society.

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