

# Dental-specific solution for 3D model printing

Consistency and accuracy – an example of how Prof Shen Yung-Kang embraces technology advancements by deploying Renfert's Simplex 3D filament printer to streamline model production.



Integrating modern technology into everyday dental practice enables dental clinicians to provide more precise and, perhaps, more economical, treatment options to their patients. In the planning stage of treatment, for example, the process can be simulated and optimised in the virtual world made possible by today's advances in digital dentistry.

The preparation required prior to treatment can be broken into several aspects and, depending on the treatment plan, might involve digital model production. To better support the practitioners in fabricating dental models, Renfert developed Simplex, a dental-specific all-in-one 3D filament printer system.

A user of Simplex is Prof Shen Yung-Kang, a professor at the School of Dental Technology at Taipei Medical University (TMU) and a member of the TMU Research Centre of Biomedical Devices, who has deployed the system for the production of oral guide plates and 4D printing applications. Highlighting speed as one of the features he favoured about Simplex, Prof Shen elaborated on other aspects a 3D printer should be equipped with, one of which is printing orientation as it impacts the quality, accuracy and surface finish of the final product.

"It is crucial to have reproducible and reliable results in using a 3D printer to ensure consistent product quality every time. For clinics, 3D printers can help technicians deepen their knowledge about this industry," he shared.

Renfert's Simplex consists of a modified filament printer, slicer software with parameters that are already stored, and resource-saving filaments. Designed with a plug-and-play concept, Simplex offers a spectrum of orthodontic model fabrication and pre-installed pre-sets for various models. Once the print bed has been loaded virtually, the optimised slicer software will select the appropriate parameters for the user to carry out 3D filament printing of diagnostic, working or aligner models.

Particularly, Simplex is designed with four filaments with their high layer and print bed adhesion, as well as constant dimensional accuracy with improved mechanical and physical printing properties. The four filaments are the Simplex study model, a white bio-filament with a high level of detail reproduction suitable for producing planning and diagnostic models; Simplex working model, a viridian green bio-filament for accurate fitting working models; Simplex aligner model, a white special filament that is temperature-resistant and dimensionally

stable up to 230°C; and Simplex multi-use model, a special white filament with a high hard gypsum content for a natural surface effect.

Featuring a dimensional accuracy of  $\geq 50\mu\text{m}$ , Simplex boost a low-noise production process of 47-48dB and is packed with the Filament Monitoring System function that allows the user to receive a precise, reproducible result. It also features intuitive touchscreen navigation and a closed building chamber with a lockable door and removable cover with a fan integrated, making the unit a "convenient and safe companion" for daily model production. **DA**

