



SHINING 3D Joins The Team To Improving Lives In Sierra Leone



SHINING 3D[®]

Scanner

EinScan Pro 2X Plus



Overview

The EinScan Pro 2X Plus offers an enhanced Handheld HD Scan Mode and enlarged scan range, meeting demands for a wide range of applications. It is a professional 3D digitizing solution for versatile application in an easy way.

SHINING 3D supports 3D Sierra Leone with Multifunctional Handheld 3D Scanner EinScan Pro 2X Plus to create customized leg prostheses for patients in the West African country. We are looking at how this project came to life and how SHINING 3D became a sponsor to change the lives of many by means of modern technology.



The Project of 3D Sierra Leone is built on 3 main pillars:
Care, Research and Sustainability

Let's find out how these values are put into practice!

Care

Many amputations occur in Sierra Leone due to complex wounds caused by traffic accidents, serious infections and the delayed patient presentation to the hospital. Besides, many amputees lost their limbs due to acts of violence during the Civil War (1991-2002). In Sierra Leone, the vast majority of people still do not have access to prostheses due to a lack of knowledge, availability of materials, trained staff and high costs.



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As a result, people often feel incomplete, which can lead to jealousy, insecurity, and depression. It is expected that having a prosthesis will enable them to blend in with the rest of the society and give them confidence. Access to 3D printing, even in its most basic form, can provide a useful and essential tool for manufacturing locally relevant medical aids, such as braces, splints and prostheses at reasonable cost.

Research

In collaboration with the Technical Medicine course at the University of Twente and under the guidance of the 3D lab at the Radboud University Medical Centre, a 3D lab has been set up in the Masanga Hospital in Sierra Leone. The 3D lab is run by Dutch Technical Medicine students, who collaborate with local physio therapists and prosthetic specialists. Dutch specialists are involved for any advice if necessary. By exchanging knowledge in the field of culture, medicine and technology, a partnership is created in which both the Dutch interns and the local population learn from each other.

In the future Sierra Leonean students should be also involved in the project, so that in addition to providing care, it will also become a training place for the local population.

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Sustainability

For a project like this to run on its own, it must be made sustainable. This means that the prostheses must be affordable for the local population and the project can be carried out by the local population itself. To achieve this, the process of making the prostheses must be made as standardized and simple as possible. In addition, it is important to continue monitoring patients in the future to collect data and prove the sustainability.



Method

The process of designing and manufacturing customized prostheses for the patients in Sierra Leone is in perfect alignment with SHINING 3D's philosophy of 3D Digitizing – Intelligent Design – 3D Printing.

Making a 3D printed prosthesis can be done very fast. It takes around 20 minutes to scan the patient's stump, this is including preparation of the scanner and clinical inspection of the stump. Then a design of the socket can be made using Meshmixer in 30 minutes. Subsequently, printing the socket takes between 16 and 20 hours. After this, the different prosthetic parts can be adjusted. The feet are locally made of wood. After a number of physiotherapy sessions, an aesthetic cover is made, so that the prosthesis looks like a real leg. Finally, the prosthesis is painted with XTC-3D in a brown color.



Throy is one of the physical therapists at Masanga Hospital. He learned how to use the EinScan Pro 2X Plus scanner in a short time.





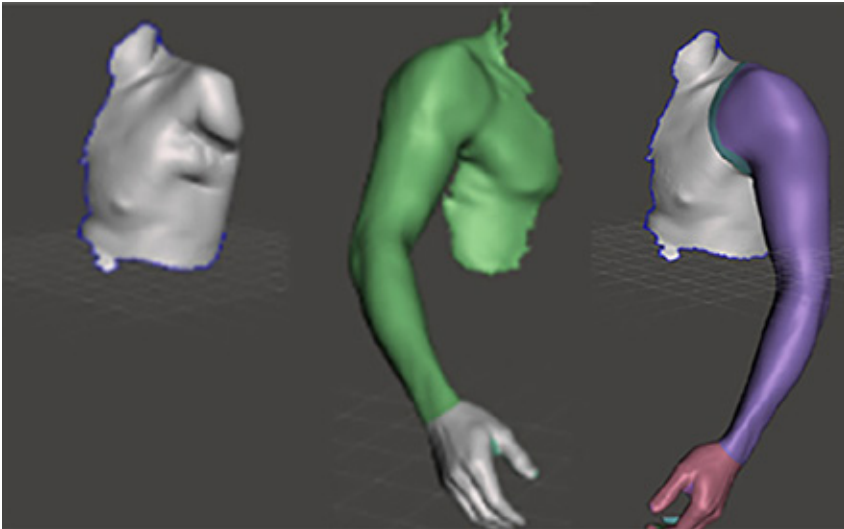
In the physical therapy sessions patients are trained to use their new prosthesis.

Sierra Leone locally crafted wooden prosthesis parts.



Case Examples

On April 1, 2020, the American Journal of Tropical Medicine and Hygiene (Vol. 102, No. 4, pages 905-909) published the research results of the project. After the approval and authorization of the parties and their families, four cases of the “3D Sierra Leone” project have also been recorded.



Case 1: Full-Arm Prosthesis

In this case, the EinScan Pro 2X Plus Scanner provided great help to the team. By scanning the left and right arms of the patient, the staff not only obtained the 3D data of the left arm shoulder joint, but also the designer was enabled to quickly “connect” the intact right arm data to the left arm through the “mirror” function.

The 3D printed prosthesis is mainly used for aesthetic purposes, especially in public life the prosthesis serves as a real confidence booster.



Case 2: Arm Prosthesis



Case 3: Arm Splints Supporting the Healing of Burned Contractures

This child's contractures have been burned. The burns were around a joint. If the burn starts to heal, the skin will contract causing the joint's inability to further move. Doctors have performed a skin transplant. Skin from the abdomen has been placed in the elbow to provide more freedom of movement. After the operation it is very important that a splint is applied against the contracture, otherwise the wound will contract again. This operation combined with the splint ensures that the child will be able to use and extend the arm again.

The scar suppression splint shown above is customized by 3D scanning the patient's body and 3D printed to match the treatment area achieving the effect of inhibition and orientation of scar growth by external pressure.



Case 4: Orthotic Brace

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This boy has kyphoscoliosis, an abnormal lateral curvature of the spine. Currently there are no medical devices or solutions for people with this condition in Sierra Leone. With the help of 3D Scanning and 3D Printing it was possible to provide a custom-made brace. In the near future this patient will be followed up in order to provide further medical assistance in his healing and growth process.



About 3D Sierra Leone

The Masanga Medical Research Unit, the platform to promote medical research in Sierra Leone, was started in 2018. Due to a lack of resources and education only little is known on the epidemiology and the best treatment methods for diseases in Sierra Leone. The MMRU aims to bring Sierra Leonean healthcare professionals together with a large network of international partners to perform medical research together. It hopes to improve access of Sierra Leonean researchers to academic degrees, and, at the same time, to improve patient care at Masanga Hospital and beyond.

We are proud to see how the team of 3D Sierra Leone has incorporated our 3D Scanner to their workflow. And we look forward to see more lives in Sierra Leone improved through more shining ideas.

About SHINING 3D

SHINING 3D, founded in 2004, is pioneering independent research and the development of 3D digitizing and 3D printing technologies. SHINING 3D provides professional solutions covering “3D Digitizing – Intelligent Design – 3D Printing” for various industries including industrial manufacturing, healthcare & life sciences, product customization, and STEM education. SHINING 3D is well-positioned in the market and has the capacity to handle large sales volume, offer powerful 3D technologies, and provide strong support service. SHINING 3D’s mission is to enable flexible production of high performance, complex structural products, and make 3D imaging and manufacturing technologies accessible to all; from large multi-national corporations worldwide to at home hobbyist. As the leader among Chinese 3D printing companies, SHINING 3D has currently extended a strong international influence with customers in more than 70 different countries in Asia Pacific, Europe, North America, South America, Africa and the Middle East.

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