



Nia Technologies Inc.

Technology for a Higher Purpose

Nia Technologies Inc. (Nia) — Nia is a Canadian not-for-profit social enterprise developing and deploying innovative technologies to help address the needs of individuals living in low and mid-income countries (LMICs). Nia's current efforts are focused on producing affordable, custom-fitting prosthetic and orthotic mobility devices using digital scanners, 3D printers and Nia's proprietary software. Located in Toronto, Nia was founded by cbm Canada in 2015 and works closely with the Critical Making Lab at the University of Toronto.




The Need — Approximately 30 million people living in resource poor countries require mobility devices, but on average, only about 1 in 10 get access to them. Several factors conspire to create this limitation:



Roseline, a 4-year-old Ugandan girl, was Nia's first-ever client to wear a custom 3D PrintAbility transtibial prosthetic.



Transtibial sockets and completed prosthetics designed and produced by 3D PrintAbility.

-  The World Health Organization (WHO) estimates there to be a shortage of about 40,000 trained orthopaedic clinicians in resource poor countries.
-  Traditional manual methods of producing prosthetics and orthotics are time-consuming, sometimes taking several days to fit a patient. Often this time can further disadvantage caregivers by keeping them away from work or from supporting other family members.
-  Orthopaedic workshops are expensive to set up and operate and mobility devices can be too expensive for families to afford.

Individuals, particularly children, living with lower-limb disabilities and unable to walk, have difficulty in fully integrating into their communities. Children with disabilities often can't play with their peers, attend school, or help with family chores. Adults with disabilities are often unemployed and cannot support their dependants. As a result, this circle of poverty and disability can cause people to lose confidence and self-esteem, and contributes to wider stigma that people with disabilities can face in resource poor countries.

3D PrintAbility — Nia's 3D PrintAbility (3DPA) is used to design and produce prosthetic and orthotic devices using digital scanners, 3D printers and Nia's proprietary software. 3D PrintAbility does not replace the trained orthopaedic clinician, it merely provides the clinician with a set of digital tools to help speed up the process of producing custom-fitting mobility devices.

3D PrintAbility mirrors the manual method of producing prosthetics and orthotics; however, efficient software and automated machines replace the labor-intensive and time-consuming aspects of traditional production methods. The clinician's understanding of human anatomy, and the engineering aspects of prosthetic/orthotic device production, continue to be an integral part of the 3D PrintAbility solution.

Clinical Studies — Nia recently completed (August 2017) clinical studies of 3D PrintAbility in three countries (Uganda, Tanzania and Cambodia) and four sites (CoRSU, CCBRT, TATCOT and CSPO). In all, approximately 140 children were fitted with 3D printed devices (70 transtibial prosthetics and 70 ankle-foot orthoses). Collaborating with its local partners and volunteer patients, Nia was able to compare 3D PrintAbility design, production and efficacy to similar devices produced using traditional manual methods. Although results of the clinical studies are still being collected and analyzed, preliminary findings are favourable to 3D printing.

Next Steps — Informed by the results of ongoing laboratory testing and extensive clinical studies, Nia is currently in the process of creating a new version of 3D PrintAbility. The entire toolchain, including scanners, printers, software and materials are being updated for Nia's third version (v3) of 3D PrintAbility. 3D PrintAbility v3 will be ready for deployment in early 2018, as part of Nia's 'Early Adopter Program'. In 2018, Nia plans to establish 6 to 8 Early Adopter sites in LMICs. Also in 2018, Nia will start making its innovations available in high income countries in order to subsidize deployment in resource poor settings.



Clinicians at CCBRT in Tanzania work with 3D PrintAbility software to design and produce a custom mobility device.




3D printed transtibial socket shown on printer bed. Designed using Nia's proprietary 3D PrintAbility software.

Funding — To date, Nia's non-profit efforts have been generously supported by cbm Canada, Grand Challenges Canada, Google Foundation, Autodesk Foundation and other donors. Going forward, Nia requires additional funding not only to support its non-profit operations and worldwide installations of 3D PrintAbility, but also to make inroads with its innovations into the 'for-profit' markets of higher-income countries.

More Info:



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