

Technology

# In Togo, hi-tech orthopedic care goes through crucial test

‘We can make him an orthotic using a 3D printer’

**LOME:** In a consulting room in Togo's capital, Lome, Geraldo Emmanuel-handicapped since birth six years ago-waits patiently on a bed while a digital scan is taken of his right leg. Thanks to new 3D technology, he may be able to walk normally within a few months. “The child walks on his toes so I’m scanning his leg so we can make him an orthotic using a 3D printer,” said Enyonam Ekpoh, from Togo’s national orthopedic device and physiotherapy centre (CNAO).

A few hours later, Adjovi Koudahe, 46, has tests to receive a 3D brace for her right leg, which has been paralyzed since a car accident in 2012. “I’ve stopped doing anything because I’m in pain. I can’t walk properly anymore,” said the former trader, who limps heavily, aided by a crutch. “Despite all the treatment I’ve had, my leg won’t respond and drags along the ground. But with the brace they want to make here, I’ve got high hopes.”

Three-dimensional printing is a fast-track way to make individually-tailored prosthetics and orthopedic supports that compensate for a lack of a limb, deformity or paralysis. The technology, initiated by a charity called Handicap International, allows the bespoke devices to be produced faster and reach a larger number of patients. But if it is familiar to orthopedic clinics in rich countries, it has yet to be introduced to poorer countries where needs are greater and the social safety net much smaller.

Only five to 15 percent of people in low income countries who need a prosthetic limb or orthopedic brace get one, according to the non-profit organization based in France. Handicap International-recently renamed Humanity & Inclusion-is pushing ahead with research and clinical trials to see how the



**LOME:** Togolese technician Fabrice Agbelehounko Djodji checks the work of a 3d printer used to produce prosthetic supports at the African Organization for the Development of Centers for Disabled People (OADCPH).



**LOME:** Emmanuel Geraldo, 5, is helped by a technician with his new 3D printed prosthetic support on June 19, 2018 at the CNAO (Togo's national orthopaedic and physiotherapy centre). — AFP photos

technology can be used in poor settings. In 2016, it carried out clinical trials of three types of lower limb prosthetics in Madagascar, Syria and Togo, the results of which were highly encouraging.

A more ambitious project called “3D Impact” has been running in Togo, Mali and Niger since November last year, where 100 patients are getting made-to-measure 3D devices for free. The project is backed by 700,000 euros (\$816,000) of funding from the Belgian Development Agency. Fifty of the 100 patients will be in Togo, where many handicaps affecting mobility are linked to

strokes or infectious diseases such as polio, said Impact 3D manager Simon Miriél.

**Saving time**

3D printing is revolutionary for doctors working in conflict zones or even just hard-to-reach areas: the scanner is the size of about two mobile phones and very easy to transport. One has been tested at a regional orthopedic centre in Dapaong, some 620 kilometers by road north of the capital. Normally, patients far from hospitals would have had to travel to have casts taken.

“It saves us a lot of time,” said Miriél. “As

needed, scans can be sent directly by telephone to the specialist in charge of making the digital orthotic on a 3D printer.” In all, four 3D scanners are being used in the three countries. The project’s two printers are located in a laboratory in Avepozo, some 15 km from Lome, and work non-stop to produce all the orthopedic devices.

Togo is a good choice, said Miriél. “It is one of the few countries in West Africa which has a good structure for orthopedic care.” Specialists from across the region are trained at the national school of medical auxiliaries (ENAM), which is a partner in the project. The

test phase is expected to finish before the end of the year, and will be followed by a long evaluation about the successes and problems, costs and benefits. But, if all goes well, the cost of 3D orthopedic devices will fall dramatically, the charity hopes.

The devices that were tested in 2016 were printed overseas and cost between 1,500 and 2,000 euros each (from \$1,745 to \$2,330) — a huge sum in West Africa, where the average wage often does not exceed \$100 a month. But once the devices are made in-country, they will become “a lot more accessible”, said Miriél. — AFP

## Dell accelerates toward 2020 legacy of good goals

**ROUND ROCK, Texas:** Dell Inc released its annual 2020 Legacy of Good update yesterday, continuing the company’s long-term commitment to society, team members and the environment. The report summarizes efforts during fiscal year 2018 (Feb 4, 2017 - Feb 2, 2018). The report and corresponding activities are rooted in Dell’s acknowledgement of its responsibility to realize a sustainable and prosperous future.

Dell’s purpose as a company is to drive human progress through technology. One of the ways the company brings that to life is through its Legacy of Good commitment — to put Dell technology and expertise to work where they can do the most good for people and the planet. For Dell that means investing in innovation that reduces environmental impact, supports a transparent supply chain, ensures an inclusive future workforce and advances underserved communities.

“The Legacy of Good program reflects what’s possible when people and technology come together with purpose,” said Christine Fraser, Chief Responsibility Officer, Dell. “Our customers, partners and teams care about this work now more than ever, and we will continue to seek innovative ways to deploy our resources, design out waste, celebrate inclusion and address the greatest need.”

**Sustainable design and innovation**

Dell believes transitioning to a circular economy is critical to enable human progress in the future. The company’s deep supply chain expertise, design strategy and global electronics recycling infrastructure puts the company in a unique position to advance a circular model. Dell has pioneered sustainable design innovation in a multitude of areas, including:

- **Closed-loop recycling:** In the reported period, Dell brought closed-loop plastics recycling to its enterprise portfolio in Europe, recycling more than 35,000 lbs. of plastic from e-waste into new enterprise products. Cumulatively, Dell has used 73 million pounds of recycled material in new products since 2013, keeping the company on track to meet 2020 goal of 100 million pounds.
- **Gold reclamation:** At the same time, Dell closed the loop on gold, up cycling used gold from e-waste into new



motherboards in the Dell Latitude 5285 2-in-1 and into a jewelry line. The Circular Collection, in partnership with Bayou with Love, founded by Nikki Reed.

- **Global e-waste tracking:** This year, Dell is piloting the use of global tracking technology to monitor the responsible recycling of used electronics. In addition to piloting its own electronic tracking program, Dell has partnered with Basel Action Network to deploy trackers across Dell’s consumer take back programs. Results will be reported in approximately 12 months following the pilot period.

- **Intercepting ocean-bound plastics:** Dell’s XPS 13 2-in-1 laptop ships in packaging made with recovered ocean-bound plastics. The packaging, which received a Best of Innovation Award at CES, will begin shipping on the broader XPS line and commercial product portfolio later this year. To scale the work, Dell in partnership with the Lonely Whale created NextWave, a consortium of companies dedicated to scaling use cases for ocean-bound plastic materials in manufacturing while creating economic and social benefits for stakeholders. NextWave hopes to divert 3 million pounds of plastics over five years, the equivalent of keeping 66 million water bottles from washing out to sea.

**Enabling the workforce**

The only way to ensure that the innovation we put in place today carries through to tomorrow, is by engaging everyone we can in today’s workforce and ensuring the next generation is equipped with the skills to thrive in an increasingly tech-centric world:

- Dell donated a \$650,000 grant to benefit more than 400,000 youth and 3,000 educators in 422 locations in Ethiopia. The entire project, through a partnership with the Ethiopian Ministry for Education and Camara Education, will deliver more than 30,000 PCs to more than 1,000 schools, benefitting 1.2 million students between 2016 and



2019. The \$12 million innovation project will also include more than 16 million hours of information and communication technologies education training to more than 3,000 teachers and school leaders.

- The company continues to build a flexible work environment that serves a diverse set of work styles. More than 58% of Dell team members used Dell’s remote work opportunity at least one day per week.
- More than 1 million people have gained access to technology and technology skills through Dell strategic giving programs this year. The company has helped a total of 11.2 million people since 2013.
- Since 2014, \$50 million has been committed to science, technology, engineering and math (STEM) initiatives focused on underserved youth.

**Investing in a transparent and diverse supply chain**

Dell is committed to maintaining an innovative, diverse, ethical and transparent supply chain that ensures good working conditions and a sustainable approach for their suppliers around the world. Highlights include:

- A new virtual reality experience that allows users to look around an actual supplier factory, see the living conditions for workers at the factory and observe an engagement session featuring customers and workers. The 360-degree videos are available on Dell’s supply chain site.
  - More than \$3 billion invested annually with women- and minority-owned suppliers and small businesses in the past six years.
  - More than 200,000 workers in the company’s supply chain are monitored through the company’s weekly working hours monitoring program.
- To learn more about Dell’s commitments, including in-depth case studies and greater details on the company’s goals, please visit [www.legacyofgood.dell.com](http://www.legacyofgood.dell.com).

## The ‘plink, plink’ of dripping water finally decoded

**PARIS:** In the middle of the night it becomes a form of psychological torture, the insidious “plink...” (wait-for-it) “plink...” (wait-for-it) “plink...” of drops falling, one-by-one, into water. Scientists said Friday that they had finally cracked the “dripping tap” enigma and know exactly how the sound is generated. In 1908, Arthur Mason Worthington published a treatise, “A Study of Splashes”, featuring the first known photograph in a scientific journal of a drop as it punctures a body of water’s still surface.

The image clearly shows the formation of a cavity-like a thimble turned upside down-on the water’s surface upon impact, followed by a narrow column of water rising as the cavity recoils. But if the fluid mechanics of drops-in-liquid have been understood for a century, the signature noise they make remained harder to grasp.

Around 1920, a team of researchers in England decided that resonance inside the tiny water cavity was the likely mechanism behind the sound. A decade later, another group discovered that a minimum height was required to generate a “plink.” Finally, in 1955, scientists noticed the formation of a tiny bubble of air briefly trapped beneath the cavity as it took shape, speculating that when it burst sound waves rose to the surface and escaped into the air. Over the following decades, dozens of published experiments with increasingly precise instruments backed up this idea.

**No bubble, no ‘plink’**

“Until now, everyone thought these sound waves just passed through the water surface and that’s how we heard the sound, much like if you hear someone speaking through a wall,” said Samuel Phillips, an undergraduate student at the University of Cambridge and lead author of a study in Scientific Reports. The idea to probe further came to Phillips’ professor, Anurag Agarwal, while he was visiting a friend who had a small leak in the roof of his house. “I was being kept awake by the sound of water falling in a bucket,” he recalled.

“The next day I discussed it with my friend and another visiting academic and we were all surprised that no one had actually answered the question of what causes the sound.” To find out, the researchers set up an experiment making full use of cutting-edge video and audio recording technology. Using ultra-slow-motion video, a microphone and a hydrophone, they were able to perceive details that had previously gone unnoticed.

The trapped air bubble, it turned out, began to vibrate as the cavity deepened. “Sound waves emitted by the vibrating air bubble don’t simply pass through the water surface into the air, as previously thought,” Phillips explained. “Rather, the oscillating bubble causes the water surface itself to vibrate at the bottom of the cavity, acting like a piston to drive sound waves into the air.”

Not only did the researchers crack the enigma, they also found a way to neutralize the “plink” for those leaky-roof rainy days. Adding a little dish-soap will do the trick, they said. “It changes the surface tension of the water, and so prevents the bubble from being trapped under the water,” Phillips said. “No bubble means no sound, hence no ‘plink!’” — AFP

## Electric scooter-sharing moves into the fast lane

**WASHINGTON:** How fast is the electric scooter-sharing craze growing? Fast enough to be declared a nuisance and kicked off the streets of San Francisco and a handful of others cities to allow local officials to mull regulations. And fast enough to draw big investments to allow nimble startups to reach billion-dollar valuations.

In the US capital Washington, the electric two-wheelers have become a fixture on city bike paths, zipping along at speeds up to 25 kilometers (15 miles) per hour, sometimes veering onto sidewalks despite warnings to the contrary. The scooters are “dockless,” meaning they can be rented and left at any location, unlocked with a smartphone app which also indicates the location of the vehicles, in a model similar to new-style bike-sharing startups.

Most systems charge \$1 to unlock the scooter and 15 cents per minute, so a 10-minute trip would cost \$2.50. “The economics work very well” for both the consumer and the companies, said Sanjay Dastoor, founder and chief executive of Skip Scooters, one of four startups authorized by Washington to deploy up to 400 dockless scooters.

Dastoor offered no specific figures but said riders get inexpensive transportation for short-term trips and companies are able to recoup the costs of the scooter quickly. Just this year, dockless scooter programs have been launched in a dozen US cities and college campuses. On Friday, California-based Limebike was set to launch

scooters in Paris as part of a global expansion plan.

Some say these gadgets, a tech-infused version of the child’s kick-scooter, could become an elegant solution to “last mile” transportation to fill gaps in public transit and discourage automobile use. “I’ve been working on last-mile transportation for the last seven years and have been looking for the magic of the right vehicle and I think this is the moment,” Dastoor said.

**Scooter ‘unicorns’**

Investors have taken notice and begun pouring in cash to scooter start-ups at an unprecedented rate. According to the research firm Lagniappe Labs, Bird Scooter is aiming for a \$2 billion valuation in its latest funding round and Lime was seeking a \$1 billion worth. Even for Silicon Valley, the pace of funding is at a staggering speed, giving birth to scooter “unicorns,” the term used for venture-funded startups hitting valuations of \$1 billion.

“Investors are pouring record levels of capital into bike and scooter technology,” said a report from the research firm CB Insights. “People are increasingly turning to these emerging methods of transportation to cut costs and travel shorter-distance trips.” Car-sharing giants Uber and Lyft are reportedly interested in scooters as well. Scooter-mania has been made possible by improvements in battery technology they still need to be recharged daily-and low-cost GPS chips which connect

with smartphones. Some reports suggest a healthy profit margin for scooters which cost less than \$500 and can pay for themselves in a few weeks with rental fees. Silicon Valley-based Lime planned its scooter launch Friday in Paris after working with local officials on the deployment of the “trotinettes électriques” which have a similar pricing structure to those in the US. “What we’re proposing is a smart mobility solution that’s been missing here in Paris,” said Arthur-Louis Jacquier, Lime manager for France. —AFP



**WASHINGTON, DC:** A “scan and ride” shared bicycle is seen waiting for a rider on a street of downtown Washington, DC. — AFP