



Denise Vicentin, who lost her right eye and part of her jaw to cancer, looks in the mirror for the first time after getting a digitally-engineered prosthesis, in Sao Paulo, Brazil, on Dec 3, 2019.



Vicentin embraces Salazar-Gamarra after receiving the digitally-engineered prosthesis. — AFP



Vicentin poses after receiving the digitally-engineered prosthesis.

# Low-cost prosthesis gives Brazil cancer survivor a new face

Denise Vicentin looks in the mirror and bursts into tears. After losing her right eye and part of her jaw to cancer, the Brazilian woman is getting a new face thanks to a digitally-engineered prosthesis. "Today I can say how much better I will feel being out in the streets. I have no words," Vicentin, 53, tells AFP at a clinic in Sao Paulo after being fitted with a prosthesis for a missing chunk of her face. Researchers at Paulista University are employing smartphones and 3D printing to create digital facial impressions used to make silicone prostheses.

The pioneering method has slashed costs and halved production times. "In the past, it took much longer work, hours of sculpting by hand, and the process was very invasive, with material on the patient's face to get an imprint of their appearance," says Rodrigo Salazar, the lead researcher. "Today with cell phone pictures, we cre-

ate a three-dimensional model."

Vicentin is one of more than 50 patients treated by Salazar and his colleagues since 2015. The team specializes in maxillofacial prosthetics, a branch of dentistry focused on treating people disfigured by birth defects, disease or trauma. Their technique was published in 2016 in the peer-reviewed Journal of Otolaryngology - Head & Neck Surgery.

### Enduring the stares

AFP has followed Vicentin's journey for more than a year and a half, documenting the various stages of her physical and psychological recovery. Her ordeal began 30 years ago when she developed a facial tumor. It was removed twice, but it returned in a malignant form two decades later. Gradually, she lost parts of the right side of her face - along with her marriage and her dignity.

"When I was on the metro or train, I tried not to pay attention to the stares," Vicentin recalls. "At places like the bowling alley, I felt them looking, and the person would even leave when they saw me."

Vicentin has difficulty eating and her speech slurs because of the loss of her jaw. Her daughter, Jessica, acts as her interpreter. As 3D printing developed in recent years, Luciano Dib - one of Salazar's supervisors and a co-researcher - got the idea to use the technique for prosthesis models. "I saw people at the mall do 3D printing, so I thought, 'Why can't we use that for prostheses?'" he says.

### Budget tech

Vicentin's transformation began in 2018. Dib implanted titanium rods in her eye socket to hold the prosthesis. Over the next year, she underwent multiple surgeries to build up her facial tissue. Using a smartphone, Salazar took 15 pictures of her face from different angles, which were used to make a three-dimensional digital model. Using that model, a graphic designer created a mirror image of the healthy half of Vicentin's face.

Technicians then 3D-printed a prototype prosthesis which they used to make the final one from silicone, resin and synthetic fibers. To make the prosthesis as real-looking as possible, Salazar and his colleagues carefully matched its coloring to Vicentin's skin and blue-green eye. The process for making the final prosthesis took 12 hours - half the time of conventional methods.

But it was spread out over a year because of Vicentin's surgeries. She received the completed prosthesis in early December. The small egg-sized piece fit perfectly, with magnets clipping it to the titanium implants. Conventional techniques for making prosthesis models involve equipment costing up to \$500,000, he says. Their method requires a computer and a smartphone. "The method demonstrates that you don't need big investments to use advanced technology," Salazar says.



A doctor tests an eye implant on Vicentin on Nov 1, 2019.



A doctor works on the construction of the eye implant.



Doctor Rodrigo Salazar-Gamarra works on a digitally-engineered prosthesis for Vicentin.

### 'So happy'

Next year, Dib and Salazar plan to open a treatment center for facial prosthetic rehabilitation built by Paulista University and a non-profit organization which they founded, called Plus Identity. They have a waiting list of potential patients. Eventually, Dib hopes 3D printing can be used to make the actual silicone prostheses. "In a very short time, we will be able to assist the patient on the spot with a printed prosthesis," Dib says. For Vicentin, the journey is not yet over. She needs further treatment to restore her jaw and top lip. But for now, she is overjoyed. "It was a long time looking at a face which was missing a piece, so I am so happy," she tells AFP after spending her first night at home with the prosthesis. "I only took it off to clean it - I even slept with it." — AFP

## China farmers reap rich harvest through video-sharing apps

Do you want a piece?" beekeeper Ma Gongzuo says, looking into the camera of a friend's smartphone before biting into the dripping comb of amber-colored honey. The clip goes out to his 737,000 followers on Douyin, the Chinese version of popular video sharing app TikTok that has 400 million users in the country and has turned Ma into something of a celebrity. Creating videos has become a popular sales tactic for Chinese farmers: The clips show increasingly discerning consumers the origins of the product and provide a window into rural life that captures audience imagination.

For some it has helped them find a way out of poverty, which the ruling Communist party hopes to eradicate by 2020. "Everyone said I was good for nothing when they saw I'd come back," the 31 year-old says of his return to his village after a failed attempt at running an online clothing business. "They tell us that we can only get out of poverty if we study and get a job in a city," he adds. Today, Ma drives an expensive car and has already earned enough to buy property and help his parents and fellow villagers with their homes and businesses.

### 'I show my life'

In 2015, Ma took on the family honey producing business in the verdant hills of Zhejiang province, and thanks to e-commerce apps, managed to turn a yearly revenue of 1 million yuan (\$142,000). But the sales began to stagnate. So in Nov 2018, with help from



This picture taken on Nov 13, 2019 shows Chinese farmer Ma Gongzuo collecting honey at his apiary in Songyang county in China's Zhejiang province. — AFP photos

his friends in the village, he began posting videos about his life on the farm. They showed him opening up a hive surrounded by a swarm of bees, swimming bare-chested in a river, and chopping wood.

"I never advertise my products. I show my daily life, the landscapes of the countryside. That's what interests people," Ma says. "Of course people suspect that I'm selling honey. But they decide to get in touch with me to say they want to buy some." Like most transactions in China, where hard cash is less and less popular, the orders are paid through apps like WeChat or AliPay. Ma says he now sells between 2 and 3 million yuan (\$285,000-\$428,000) worth of honey each year, as well as dried sweet potato and brown sugar.

"When I was young we were poor," he recalls, adding: "At school I used to admire other kids who had pocket money, because I never had any." Now he drives a 4x4 BMW that cost around 760,000 yuan (\$108,000) and has also invested in building a B&B. "Using Douyin, that was the turning point," he says. "Today I can buy my family what they need. I help the other villagers to sell their products too. All of the local economy benefits," he explains.

### 'It's progress'

In China, some 847 million access the

Internet via their smartphone, so online apps have played a vital role in Ma's success. "It's progress," his father Ma Jianchun says happily. "We old people are overwhelmed. With the money, we've been able to renovate our house." China is home to the world's largest market for live video broadcasting, according to US audit firm Deloitte. Getting in on the trend, Douyin's parent company ByteDance says it has organized training for 26,000 farmers on how to master the art of making videos.



Ma at his house in Songyang county.



Ma's assistant uses a mobile phone to take a video as Ma tastes honey at his apiary.

There are other similar platforms including Kuaishou and Yizhibo. Taobao, the most popular e-commerce app in the country and owned by tech giant Alibaba, launched a project in 2019 showing farmers how to become livestreaming hosts in a bid to help them earn more. The number of people living under the poverty line in rural China has reduced dramatically - from 700 million in 1978 to 16.6 million in 2018, according to government figures.

But the depopulation of the countryside

continues, as many Chinese head to cities in search of better-paid jobs. "We want to be an example, to show young people that it is entirely possible to set up a business and earn money in rural areas," explains university-educated Ma Gongzuo. "We hope that more will return, so that life and the economy can resume in the villages." With his newfound fame, Ma says he has already received many proposals. And not just from those interested in his honey. — AFP



Ma checks his tea garden.