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DIGITAL SURGERY AND EDUCATION

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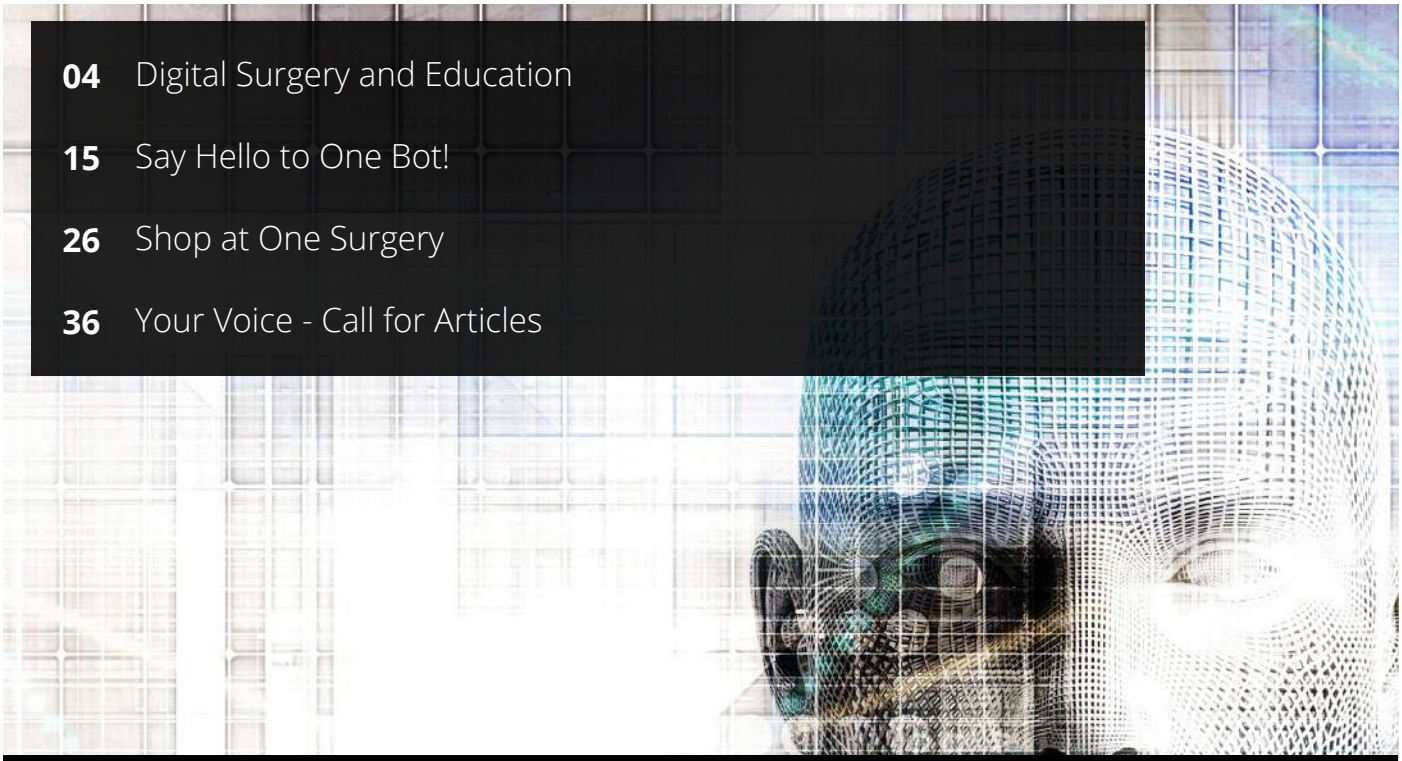

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DIGITAL SURGERY & EDUCATION

August 2022

Dearest readers,

Digital health has transformed the way medicine is practiced. Robots controlled by skilled surgeons are able to perform miraculous surgeries that before seemed impossible. Yet, in many parts of the world, this seems painfully out of reach. At the border of Ghana and Togo, an anaethetist works without a machine, providing life-sustaining oxygen during surgeries using a hand-operated bag. This is his ground truth, and what he has learned first-hand is that saving lives must be done through all means necessary—with or without technology.

This edition of Voices of One.Surgery highlights the gap that the global surgery movement aims to reduce. Human-computer interaction allows surgeons to work better and faster, empowering them to save more lives, but is it accessible to all? In some countries, there are “robots gathering dust”, while in others, surgeons are using old instruments, working tirelessly, sometimes without even running water and electricity. Perhaps digital education can help to bridge this gap. Cryptocurrency has funded the world’s first conference for Innovation in Global Surgery, and digital therapeutics open new avenues to help people learn new ways of managing their own health.

Technology can truly transform the way global health is practiced. Surgeons from all around our earth are able to meet each other digitally, sharing knowledge, techniques, diagnostic information, and advice. Those who are working in developing countries have so much to teach surgeons everywhere: they know how to perform complex surgeries with the simplest of equipment, in the most challenging of conditions, and to do it well, to save lives.

We can all learn from each other. This is a call to all of us to join hands, to help lift each other up, as we can only rise when we rise together. Together, let’s rise.

Elizabeth Lacey

lizzie@one.surgery

SOUTH AFRICA'S FIRST FEMALE ROBOTIC SURGEON

Dr. Farzana Cassim
Robotic Surgeon, Urologist, Urogynecologist
Tygerberg Hospital, Cape Town, South Africa

One.Surgery had the opportunity to interview Dr. Farzana Cassim about her work as Africa's first female robotic surgeon:

Q: What is robotic-assisted laparoscopic surgery?

Robotic-assisted laparoscopic surgery is an extension of laparoscopy that adds a lot in terms of what we can see and what we can do. There are different types of surgery: there's open surgery, which is historically and still to this day a very important part of surgery, and still necessary for some patients, and the next step is what we would call "minimally invasive surgery". The world is moving towards trying to do less harm to patients. With every surgery, we are aiming to fix a problem, but there can be complication—every surgery is associated with risk. In efforts to try and minimize risk, minimally invasive surgery came about. This started off with laparoscopy, or "keyhole surgery", where we use a camera, and our instruments are essentially straight sticks that have little instruments on the end, and laparoscopy revolutionized surgery to a large extent, and is still an important part of what we can offer patients. Robotic-assisted surgery has taken it a step further.

With laparoscopy, the magnification is about 4x what you can see with the naked eye, so it helps with the surgeon's vision, the instruments are small, and one can get into tiny spaces, but it utilizes straight instruments so there are limitations to getting around corners. Robotic surgery is similar in that we still use a camera and its still the same small little cuts on the abdomen, or wherever we're operating, and the magnification is 10x, plus it's a 3D view, which is phenomenal. When we're working it feels like we are inside the patient's abdomen, or in the body, and working around in there, which is amazing. The instruments are much finer and they have many more joints, and the range of motion is much greater.

Its *Intuitive*—and that's actually what the company that created it is called. Laparoscopy is counter-intuitive—if I move my hand to the left, the instrument on the inside of the body moves to the right, whereas with the robot, its intuitive, its an extension of our hands and fingers, so if I move to the left, it moves to the left. The learning curve is much less, much quicker, and it gives you the magnification, the vision, and with the finer instruments and the increased range of motion, we can get into smaller spaces and we can do more, quicker, with less trauma to the surrounding tissue.

Our procedures are generally quicker, the blood loss is less, the anesthetic time is shorter, the hospital time is shorter, thus the overall trauma to the patient is less. There are cases that previously a patient would stay in hospital for 5-7 days, would stay in ICU, etc, but with robotic surgery the patient now can go home the next day. It's quite phenomenal for patients, from that perspective.

"I HAVE LEARNED TO NEVER THINK ANYTHING IS IMPOSSIBLE. WE CAN LITERALLY DO ANYTHING WE PUT OUR MINDS TO."

Q: Are there limitations to robotic surgery, in the African context?

The cost of the robot is significantly more than open surgery or laparoscopy, so that's where the limitation comes in. The robot that we have is top of the range, and it cost 41 million ZAR (2.5 million USD) just for the robot, and then the cost per surgery is approximately 40,000 ZAR (2,474 USD), depending on what we do and what instruments we use. The company—Intuitive—has worked with us to make it a bit more cost effective in the state sector. Another issue is the cost of the instruments: with laparoscopy, instruments can be used many many many times, whereas with the robot, in general, the instruments have a lifespan of about 10 uses.

What the company has done for the state [public] sector is to increase the lifespan of the instruments where they can, so we can use them a bit longer, which is great and brings the cost down, but its still very expensive to run, so its not something that we can offer every single patient. We use the robot with patients where the cases are more complex, we are working in deeper darker holes—so we select our patients who would be good candidates, and would actually benefit from it, as opposed to using it as a blanket option for anyone.

Q: What would be steps for lower and middle countries to be able to access this technology?

If they do want to make it work, they can make it work, there's a way. There's always a way. Sometimes you have to think laterally and a bit out of the box, because the cost is a rate-limiting factor. What the Western Province government has done is a phenomenal move forward, not just for South Africa, but for Africa in general. There are two da Vinci Xi robots in the state [public] hospital sector in Cape Town at the two major trauma facilities, Groote Schuur and Tygerberg Hospitals. The first robotic surgery in the state sector in South Africa was performed in Cape Town in February 2022 at Tygerberg Hospital.

I'm a surgeon: I want to see my patients, I want to help them, and move on. However, with this new technology, I've been involved in a lot of management meetings regarding the robotics program, and one of the things I've found quite interesting from a surgeon's perspective is that we are decreasing the cost for the hospital because we are getting patients out quicker, we aren't using the ICU as much, and we can make sure we can help more patients, which in my mind as a surgeon is a good thing.

Many in the admin side say look, bed occupancy doesn't actually make a difference because in a state hospital we are always full, there is always someone to fill the bed, so from a cost management perspective it doesn't make a difference, however from a humanitarian perspective, we are helping more patients, so we are getting patients off of those waiting lists and getting them to be functional, working members of the community at a faster rate. It has an awesome effect for the whole country really: the economic benefits go a lot further than just for the hospital. For other African countries, there has to be a way.

Also there can be partnerships with some "developed countries" where around every corner there's a robot, and there are robots gathering dust. Perhaps there could be donations of robots, and the receiving hospital covers the cost of the instruments. It might be that you get an older generation robot, but so be it.

I think there has to be buy-in from the companies as well. It costs about 220,000 ZAR (13,700 USD) to train a surgeon in robotic surgery, so what they did in the state [public] sector is the company payed half, and the hospital paid half. The companies should be willing to take those strides, and we are very grateful, after a lot of negotiation, that they stepped up. They also realized its important, and it will benefit them in the long run. At the end of the day we are training future surgeons who will end up in private or other state [public] facilities.

I think Africa is so full of riches and natural resources that are unfortunately often not used appropriately, and if even just a tiny smidgeon of that was channeled correctly, we could really make huge differences in not just robotics but healthcare in general.

Q: What inspired you to learn robotic- assisted surgery?

One has to learn something new every single day, otherwise it's a day wasted. We always want to help our patients do better and be better, and when the robotic talks came about, there are 6 of us at Tygerberg hospital that have been trained, until now, and I think there will possibly be two more trained from general surgery soon. I'm the only qualified urogynecologist at the hospital (I'm a urologist, and I'm a sub-specialist in urogynecology) and as such I'm the only person who'd ever done the urogynecology procedures robotically.

I've been very blessed that I have had the opportunity to have been trained robotically. At the time it all happened, its very exciting and fun, but I didn't think I'd ever see it in a state hospital in my lifetime—it was a pipe dream. So when the opportunity came, I grabbed it with both hands.

I've also had a lot of support from my family. The training is quite rigorous and intense. We have to put in a lot of hours in the simulator, do online trainings, in person trainings, then go overseas for the last bit of training. My husband and my 5 year old daughter were unbelievably phenomenal and supportive.

When I went in to do my first case, my child was like "rock it mommy, you're a superstar!" and she did also say, "don't fail at the robot!" And I got home and my in-laws had taken her to the shops and they had chosen cake, and held a mini-celebration at home. They just spoiled me rotten.

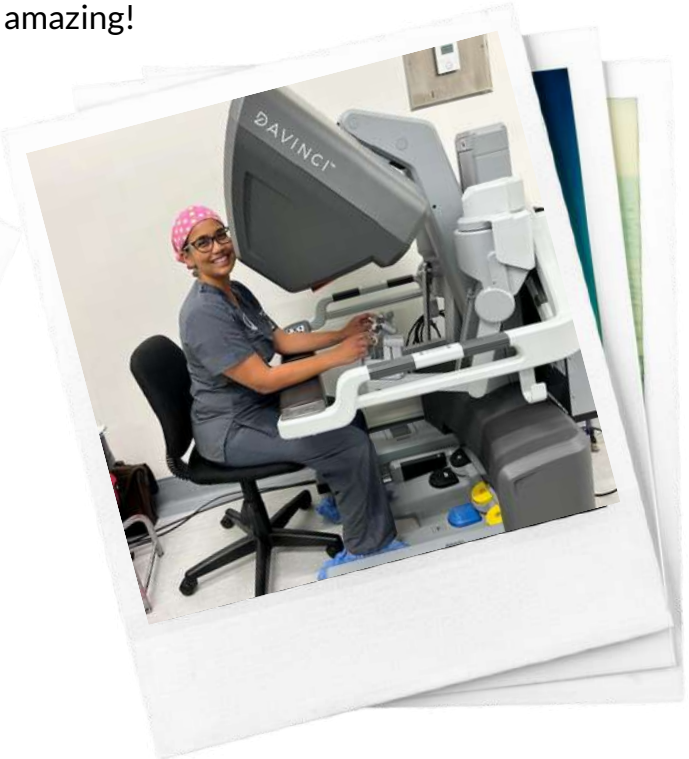
I want my daughter to know she can do whatever she likes. The world is her oyster.

Q: Could you highlight a case where the robot really made a difference, through you.

That's a difficult one because I get really emotionally involved with all my patients. I did a robotic case yesterday, and I think one of the things with this patient is—I obviously can't give you too many details – but she's in her mid-30s and for someone like that, the surgery that she had been offered previously is a surgery that is known to fail. She likely would have needed more and more and more surgeries. It would have affected her sex life, it would have affected her body image. And we managed to do it all yesterday robotically, with these tiny little cuts, and she can just move on with her life and not think about it any more. And she will go home today. Its quick in and quick out.

I can't highlight one specific case, but what inspires me is being able to help so many patients, and give them the best outcomes, the best options, with fewer compilations, and the ability to get back to their lives – they can just literally forget about it. They're not going to have pain from big scars, they're unlikely to need further surgeries. Being able to offer that is phenomenal.

My colleagues are also able to do phenomenal work. At the moment we are each specializing in one type of robotic surgery until we are fully competent, and then we will pivot and learn to do other types of surgeries with it. So my colleagues are doing the radical prostatectomies and it's amazing!



These young patients who before would have had a big cut and been in ICU and been here for a week, and they are out of hospital within a day or two. You will see them the afternoon of the surgery and they're like "great, Doctor, when can I go home!" and you're just like "relax, relax, take it easy, let's see how you are tomorrow." And the partial nephrectomies: patients with cancers in their kidneys previously would have faced so many risks, both from the big cuts, and the risk of hernias—and now we can just go in and nip out the little cancer and they can carry on with their lives. So it really has, for our patients, made a huge difference.

Q: How do you see the future of robotics, and of women in robotic-assisted surgery, in Africa?

I didn't ever think I'd see the robot in the state [public] sector, and here it is, and I am using it. So my message is: don't ever lose sight of what is possible, and don't ever think anything is impossible. In terms of being the first woman, I have to be honest and say I have very mixed feelings. It's obviously very exciting and it's wonderful to be a pioneer, and I really want to use this platform to help other young women—but it's a bit bittersweet, because why am I the first? Why has it taken until 2022—I mean yes the robot has only been in the state sector now, but we have had robots in this country for close to a decade, and there are some phenomenal female surgeons in private practice, why have they not been trained? I don't know if it's a lack of interest from the surgeons' side, which is also possible, or if it was due to a lack of encouragement—I don't know what it is.

I feel a bit ungrateful saying "but why am I the first?" and I want to emphasize that I am not ungrateful, I'm very grateful for the opportunities I have had but ... it just highlights how little has actually changed in terms of women in surgery. In terms of being a female surgeon, you have to work that much harder and spend that much more time just to show that you're as good as the men, even if you're 10 times better.

I have learned to never think anything is impossible. We can literally do anything we put our minds to. Put the goal out there, say it out loud so that it's out there and it becomes real, and it will happen. There are always ways to make things happen. And let's support each other. As women, we need to stand together. I'm a feminist in that I want equality—I want us to have the same opportunities, to be looked at in the same way. I want it to be fair. If we stand together and we support each other, and we build each other up and we mentor each other, everyone can learn something every single day. So, let's help each other out! Our support and our help and our cheerleaders don't always come from where or who we think, so appreciate every single person along the way.

Dr. Farzana Cassim can be contacted at farzanac@icloud.com

GLOBAL SURGERY, DIGITAL HEALTH, AND GROUND TRUTH

DR. ALLAN D. KIRK

Chairman of the Department of Surgery in the Duke University School of Medicine and Surgeon-in-chief for Duke University Health System. He is the David C. Sabiston Jr. Professor of Surgery and a Professor of Immunology and Paediatrics.

WHAT IS SURGERY; WHEN DID IT BEGIN?

I'd argue that surgery began when the first human aided another. As humans (homo sapiens) have existed for approximately 300,000 years, and trauma has been ubiquitous long before humans, I can imagine one tribe member instinctively reaching toward another, perhaps to stop bleeding after a fall, learning from the experience, and then teaching it to others: and that begot surgery. Whether that is how it started is unknowable, but the earliest written accounts of medicine, e.g., the Edwin Smith papyrus, recount the diagnosis, treatment, and prognosis of traumatic injuries.

Thus, I'm comfortable believing that surgery has its roots in coming to the aid of others, using intuitive, physical means, to diagnose, treat, and cure disease. I also believe that throughout most of time, surgeons have understood diseases through direct tactile experience. Disease to a surgeon is not conceptual, but a real thing to be sensed—seen, felt, smelled, …

WHAT IS GROUND TRUTH?

How do primitive approaches to mechanical wounds relate to modern medicine with its electronic medical records (EMRs) overflowing with unending data derived from endless lines of code? How can our origins influence advanced analytics, artificial intelligence, machine learning, neural networks? Indeed, most would argue that digital health creates a virtual reality that empowers remote care and distance learning, progressively eliminating the need for human interaction. Actually, the exact opposite is true; the future of digital health is not only related to surgery, it is completely dependent on surgery.

I'll define surgeons broadly as people coming to the aid of other people through direct, tactile interaction. People who experience disease directly. People who are with the patient, understanding exactly what is going on physically, emotionally, and socially. People who are "in the room where it happens". These are the people who have what all the data in the world cannot create; they have ground truth.

WHAT DOES THIS HAVE TO DO WITH DIGITAL HEALTH?

Ground truth is defined as the real world. Derived from meteorology, it originally meant what happened on the ground, as opposed to what models predicted. Is it raining? Every model driven by every computer yields to the simple hand cupped toward the sky to feel the raindrops. Contemporarily, the meaning of ground truth has been broadened to mean how statistical models are calibrated and how digital machines are trained.

Yet, modern society has become so inundated with data that we forget that digital data merely attempt to describe a reality, they are not themselves real. They are approximations and stories of what surgeons hold in their hands. Indeed, all EMRs are stories told, many times removed from what we know to be. They are worthless without clinical correlation.

Our digital world is primitive. It is full of data—ones and zeros—but comparatively void of information. The difference between data and information, simply put and elegantly described by Claude E. Shannon, is noise. A signal derived from a source and intended to be understood by a recipient is inevitably contaminated with irrelevant noise that makes the interpretation of the message proportionately difficult.

The farther one is from direct experience, the more noise introduced, the less reliable the message. Anyone who has read an EMR knows that there is far more noise than signal, with errors unwittingly spread by people who did not have a direct experience, but rather, are taking the digital story and working on from there. Once the story gets sufficiently removed from the actual event, it becomes mythical, and interestingly, myths are things that homo sapiens are uniquely adept in propagating.

DR. KIRK IN THE OPERATING ROOM

The major concern is that since the major factor There is great promise in our use of computers using advanced machine learning algorithms to provide real time clinical support. According to Jan Gulliksen, digitalization also provides completely new ways of addressing issues related to global health. Indeed, the medical world is driven by ever increasing knowledge that now exceeds a human's integrative ability.

Surgeons cannot do what we do without machines. We cannot process all the data and make the best decisions based solely on intuition. However, the machines cannot provide anything useful without being grounded, and we are uniquely able to provide the needed touch stone. Digitalization to support global health requires a profound understanding of the users and their context. Thus, we are obligated to provide the link between the digital myth and the experiential flesh.

Our ability to perform what would be considered miracles a mere century ago—transplants, cardiac surgery, device implants, etc.—is dependent on looking beyond what is evident to the observer, to the mechanistic biology in all its dense complexity, and at the same time, dependent on the observer.

WHAT THEN IS ONE TO DO?

Don't shy away from the digital world. Learn how data are stored and how algorithms work. Understand how data are contaminated with noise and how bias is introduced into digital portrayals. Do this so that you can make sure that what emerges digitally is plausible; that it accurately described the real-world experience of the patient; and when it doesn't, correct it. We are forever linked to digital health. Let's make sure we remain forever linked to, indeed literally attached to, our patients. They are the reality on which all of digital health is dependent.

ABOUT THE AUTHOR

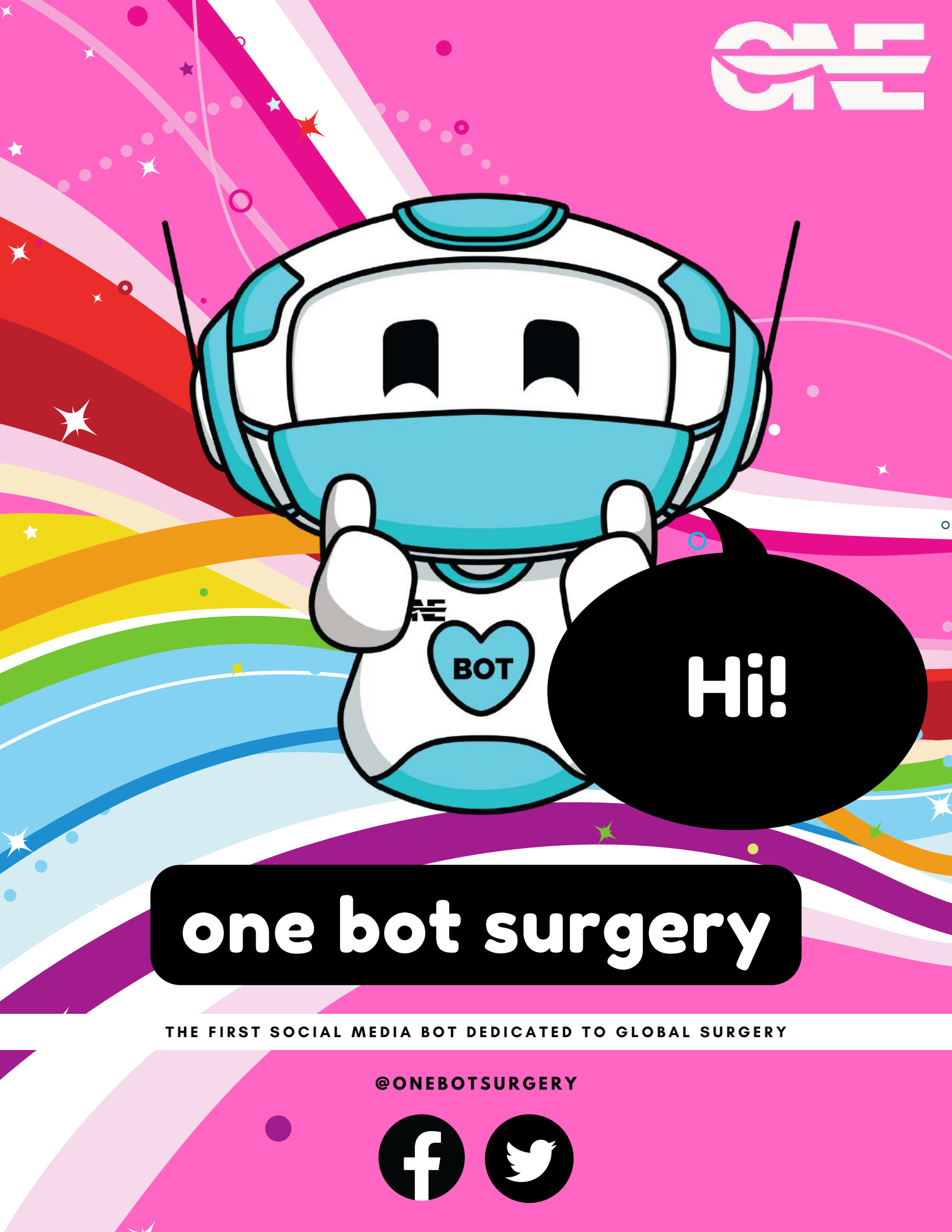
I am a surgeon interested in immune management of transplant recipients. I am particularly interested in therapies that influence T cell costimulation pathways and adjuvant therapies that facilitate costimulation blockade to prevent the rejection of transplanted organs without undue suppression of protective immunity. I am also interested in understanding how injury, such as that occurring during trauma or in elective surgery, influences immune responses and subsequent healing following injury.

In my surgical career, I have specialized in kidney transplantation, which is unique in surgery because you're providing a cure for a disease. It's very rewarding to see the patients succeed after surgery; the donors also make my practice very special.

We can't do a transplant without them providing this wonderful gift. Duke has been performing kidney transplants for 50+ years – since the very beginnings of the field. In fact, the process of how we match tissues for transplants was started at Duke. We've done thousands of kidney transplants here, so it's great to be a part of a program with such a rich history.

I'm also the chairman of the Department of Surgery and the surgeon-in-chief for the Duke University Health System, where we perform all types of transplants.

ALLAN D. KIRK, MD, PHD, FACS



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DIGITAL THERAPUTICS HAVE THE POWER TO EDUCATE AND INFORM

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KNOWLEDGE IS POWER

'Knowledge is power,' the age-old saying goes. For patients with long term, chronic health conditions, understanding is the first step to establishing a successful treatment plan. The right education empowers people to take control of their healthcare and improve their overall quality of life.

Here, we'll explore the exciting potential of digital healthcare and how Sidekick Health utilizes its power as an innovative educational medium for patients and healthcare professionals alike.

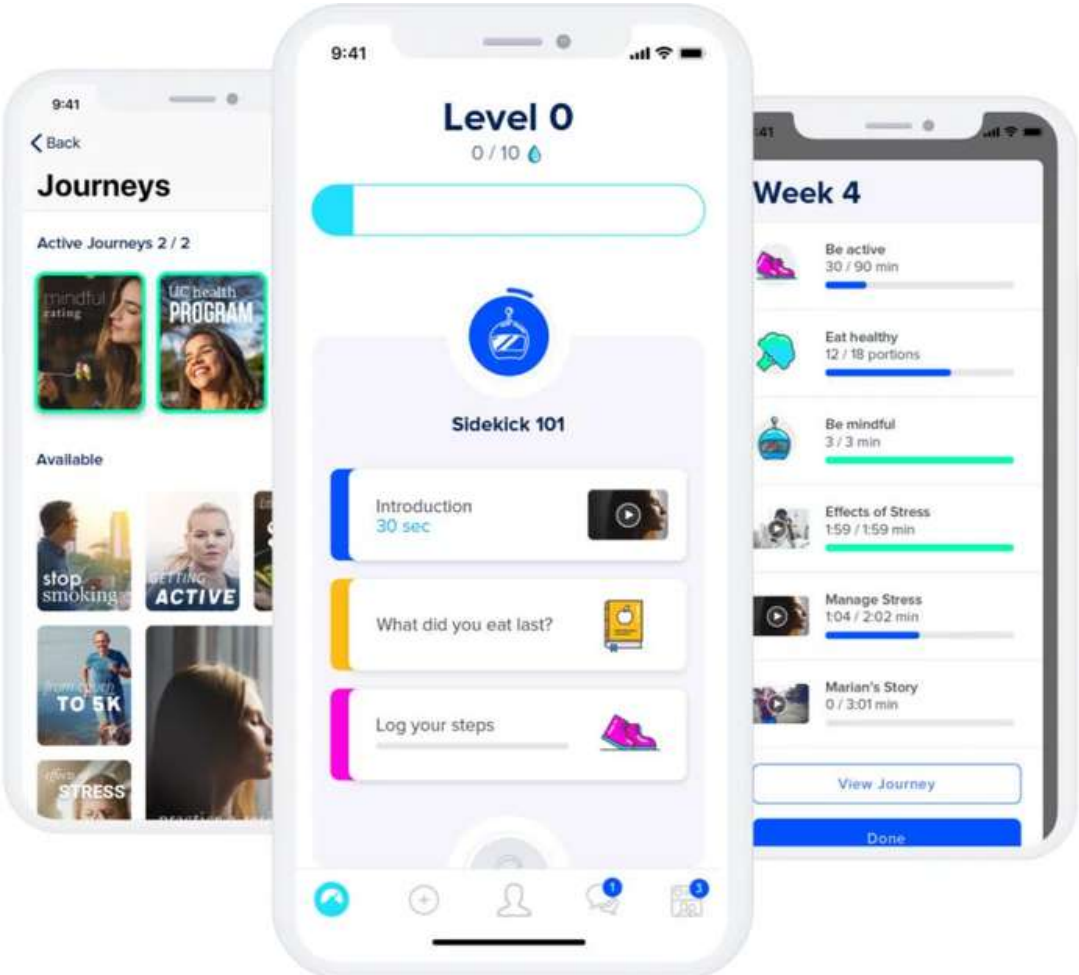
WHY EDUCATION MATTERS

In a world where information is instantly accessible and sharable, reliable educational material has arguably never been more important. While today's digital world has undoubtedly made sharing knowledge easier and faster, it has also triggered the spread of misinformation and fake news—dangerous elements when it comes to healthcare.

The right education is essential for everyone living with an illness. From those who have been recently diagnosed to those who have been living with their condition for a long time, as well as caregivers who provide support. Accurate and scientifically sound information about conditions and their treatments is vital in order for patients to reach a place of understanding and acceptance.

EDUCATION BREEDS ACCEPTANCE

A long term health condition can have a huge impact on the mental health of not only the patient but also their support network. Feelings of anxiety, stress, and struggles with identity are often influenced by a lack of understanding of the condition itself. Having unanswered questions about treatment and side effects can leave patients feeling isolated and confused, further impacting their quality of life.



The right education and knowledge serve to address these feelings and empower patients to take back control of their healthcare journey. Knowledge and understanding provide the foundation for acceptance, an important step when it comes to improving overall well-being.

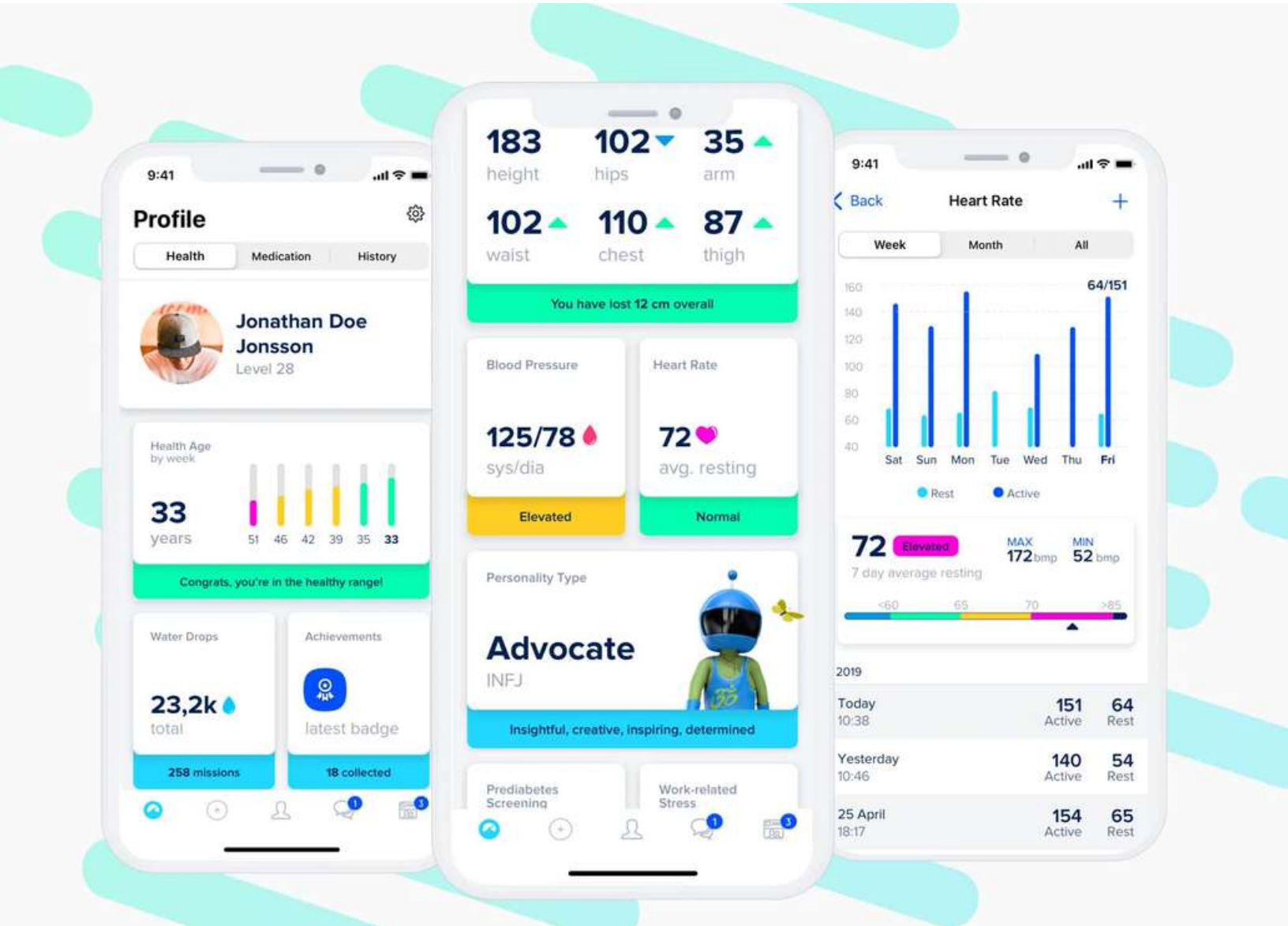
But, how can reliable and vital educational material be provided to patients on a grand scale? That's where DTx—digital therapeutics—come in.

THE POWER OF DTx

The rise of modern technology has witnessed the emergence of many digital applications that aim to improve the lives of their users. Digital therapeutics (DTx) are a prime example.

DTx have the power to promote and enhance reliable education and knowledge, supplying users with an essential tool for healthcare management. Digital therapeutics offer a practical and convenient way for users to access educational materials about their condition. Through DTx, educational materials can be presented in numerous formats. Through the use of gamification, videos, text, and audio, DTx provide reliable educational content that also engages and motivates.

Sidekick develops programs that are based on science and built on behavior. Sidekick's DTx programs are made up of educational content, behavioral management tools, and numerous other convenient digital functions that aim to improve users' overall quality of life.



An emphasis on education is central to Sidekick's programs. In an effort to empower patients to better manage their condition, boost their quality of life, and trigger improved health outcomes, the inclusion of reliable and engaging education content is at the heart of Sidekick's DTx.

Everyone's experience with their condition and healthcare journey is different. Sidekick recognizes this and, in response, has focused on developing programs that provide educational content covering a number of key areas. Chronic conditions and illnesses are complex and far-reaching, which is why the DTx created by Sidekick go into extensive detail on numerous topics, including treatment areas, side effects, and behavioral management.

As an example, for people living with breast cancer, Sidekick's Breast Cancer program is incredibly comprehensive, providing educational content on physical activity, nutrition, menstruation, stress, treatment and side effects, pain, sleep, and much more.

Taking this particular program as an example, such in-depth educational material emerges as invaluable for the patient as well as their caregiver. An understanding of the above treatment areas and side effects has the power to reduce feelings of confusion and isolation among those living with breast cancer. DTx are able to fill in the gaps and arm patients with the right knowledge to achieve greater peace of mind.

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Addressing inequality in the healthcare system is a further exciting potential of DTx. In an attempt to make healthcare more accessible, DTx utilize a form of technology that the majority of the world's population have access to: mobile phones. Inequalities in the healthcare system emerge due to a combination of institutional and societal forces. DTx have the power to address these inequalities and create a more patient centric approach, even in lower-resourced settings, bringing a personalized approach to every individual.

CONCLUSION

Education has the power not only to inform, but to inspire, motivate, and improve overall well-being. The future of digital health and education looks bright, largely thanks to the exciting potential of DTx. Digital healthcare programs, like the ones developed by Sidekick Health, are far-reaching, accessible, and incredibly powerful. DTx allow the right education to be provided on a grand scale, and Sidekick looks forward to improving the lives of as many users as possible through the powerful medium of knowledge.

ABOUT SIDEKICK

Sidekick was founded by two medical doctors, who had worked for years treating patients with lifestyle-related illnesses. A staggering 68% of all deaths are related to lifestyle-related illnesses and the two co-founders, frustrated with dealing with the consequences, decided to explore ways to prevent chronic illnesses and help patients already suffering from such diseases to better manage them, boosting their quality of life and triggering much improved health outcomes.

The result of this collaboration was the idea to create technical solutions built on science, rooted in behavioral economics, which would be scalable across multiple therapeutic areas. The DTx developed by Sidekick are driven by gamification to maximize engagement and positive health outcomes.

The Sidekick platform combines strong clinical validation with gamification, behavioral economics, and artificial intelligence (A.I.) to deliver a truly engaging and personalized patient experience that removes barriers to healthcare. For more information, visit sidekickhealth.com.

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CO-FOUNDERS SAEMUNDUR ODDSSON, CHIEF MEDICAL OFFICER, AND DR. TRYGGVI THORGEIRSSON, CEO, SIDEKICK HEALTH

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Imagine if we introduce the technology of cryptocurrency to creative minds in completely different scientific fields: A new generation of innovation beckons!

As one of the conference delegates at the First International Congress for Innovations in Global Surgery said to me, “this technology is very good for a new generation of surgeons!”

One.Surgery sponsored the conference, which took place in New Delhi, India, from April 20th -21st. There, we had a booth outside where delegates could come and speak to the One.Surgery representatives about the global surgery movement, as well as all things cryptocurrency.

By signing up to our site at the booth, they gained access to our ground-breaking research journal (powered by Bitcoin Cash), research index, surgical logbook, free educational courses, magazine, audiograms, and all of our broad resources – and they also got free Bitcoin Cash! The representatives at the booth – Elizabeth Lacey and Ankit Raj– helped them to set up their wallets, and had lengthy discussions with them about the power of peer-to-peer global currency for economic freedom and global development, including how it can raise the voices of surgeons in low and middle income countries, enhancing the global surgery movement.

"Imagine if we introduce the technology of cryptocurrency to creative minds in completely different scientific fields: A new generation of innovation beckons!"

Dr. Saqib Noor, the founder one One.Surgery, gave two different presentations at the conference, and though he gave the talks remotely, multiple delegates came up to us afterwards to comment about how close Dr. Saqib felt, that it was like he was here in the room with us, and how much his talks had opened their mind and inspired them! His first talk was entitled “Decrypting Cryptocurrency”, and the booth was totally filled with people coming to register, as soon as he was off the stage.

The following day, he was a participant in a panel, and took the opportunity to showcase some of One.Surgery’s videos and really explain how innovative it is to the Global Surgery Movement to have a project entirely driven by surgeons at the grassroots, and crowd-funded using BCH. He created a lot of excitement about the project!

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According to Dr. Lalit Gupta, one of the professors in the Surgery Department at Maulana Azad Medical School, which hosted the conference, "I will love to read your magazine and journal and everything supported by One.Surgery – I'm following you on Instagram and Twitter! Bitcoin Cash is a good thing, I didn't know how to use it, and now I have a platform!" And student Prem Kumar Rathod said, "its an innovative way to make publications open and accessible!"

It was so exciting watching the ideas of economic freedom resonate with the delegates as they visited the booth – some would come questioning crypto validity, and leave with huge smiles and deep understanding of its use, not just as an innovative technology for scientists, but as a currency that will raise up all people on earth harmoniously. The conversations were vibrant and deep, and with 200 delegates, the booth was always busy!

Dr. Priyansh Nathani said to us at the booth: "thank you One.Surgery! Be it your journal, or Bitcoin advocacy, or research advocacy, you get it. Bitcoin seems fascinating as all – it seems like a great investment, and especially as its usage in global surgery seems promising."

Dr. Priyansh was also one of the winners of the award for Innovation Challenge at the conference, and was super enthused to receive his prize in Bitcoin Cash.

Overall, we distributed 5.41 BCH to 48 people, including 13 people who won awards for their Paper Presentations, and others for "The Most Valuable Innovation". The prize winners were all entrepreneurs in engineering and medicine who were exposed to cryptocurrency for the first time, through our efforts.

It was so fast and easy to distribute the prize money, and they were all so happy to receive it instantly to their wallets.
It is clear that innovations in tech and innovations in health go hand-in-hand, and this was just the very beginning of demonstrating BCH use-cases to the public within the Global Surgery Movement – we look forward to more to come!

Thanks to the BCH community for supporting our vision, we are Made with Love.

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SURGERY IN GHANA: THE CHALLENGES OF MANUAL ANAESTHESIA

AN INTERVIEW WITH KELLY MATHIAS ACHENTIR

One.Surgery had the opportunity to interview Kelly Mathias Achentir in Ghana, who is saving lives without an anaesthesia machine:

Q: Where are you based at the moment? What is your background/specialty?

My name is Kelly Mathias Achentir, I am from Ghana, Gonja by tribe. I live in West Gonja, in Busunu, but I have been working in Tatale at the Tatale District Hospital. We are closer to Togo, in the northern part of Ghana.

I started my career as an enrolled nurse, subsequently I completed training as a registered general nurse, after which I finished another 2-year course in anaesthesia. I have a BSc in Anaesthesia.

My reason for choosing anaesthesia is that the community in Gonja where I was working is far from the developed hospitals. A woman could be in labour needing urgent attention, like a Caesarian Section, but they have to travel so many kilometers to reach a facility where the surgery could take place.

You can just imagine the pain the woman is going through. The funny thing is that most of the time it's a challenge to even have a car available for their transport, they have to rely on motorbikes – to put a pregnant woman on a motorbike to travel that distance, some of them end by losing their lives, some of them lose their babies whom they have carried for 9 months, which is very very pathetic. So I started to wonder, I said what is it about anaesthesia that they need in the hospital but are not able to get.

I decided I should take it upon myself to take up their cause, so that I could save more lives in the community. I took it to heart and decided to study, despite all the suffering, to become an anesthetist.

A MIDWIFE LISTENING TO A FETAL HEARTBEAT

KELLY AT TATALE DISTRICT HOSPITAL IN GHANA

I came back to my home community clinic without an anaesthesia machine but I try my best to save patients, and I have reduced the distance pregnant women need to travel to get care.

Currently I am working in a facility without an anaesthesia machine, but I am trying my best to save more lives. That is what I am doing, but the issue is a lack of resources. I did a laparotomy without an anaesthesia machine, I only used TIVA to do the laparotomy, it was a referral from Togo. When the obstruction came, he had to wait in the house for about 2 days. I didn't even have a chance to do electrolytes. I just went in for the purpose of saving the patient's life, and he is now fine.

We don't even have an electrolyte analyzer in the facility, no chest X-ray, no scan; I'm just doing the best that I can do.

Q: What kind of anesthesia machine did you used to have, and how long have you been doing anesthesia without a machine?

I started my anaesthesia course in 2018, which is a 2 year program, and finished it in 2020. I took my rotation very seriously, working in a big facility that really has so many patients. I did over 300 intubations, neonatal ICU patients, paediatrics, and adults. I even worked with patients with very serious conditions such as head injuries. So I got all of my experience from that facility, and even when I was in school, I took clinic hours all very seriously, and I spent as many hours in the theatre as I could, to lay my hands on so many cases.

I had my experience during school, and when I was in school I would sometimes travel back home to my facility so I could start my work there, small small, little by little. I completed my competitive examinations, qualified, and I did a one year rotation in that big facility, which exposed me and gave me confidence. I don't panic when I'm going in for a case; I know what I'm about and I know what I am supposed to do, and I know how to go around things.

Q: What has given you the skills and confidence to be able to hold patients' lives on earth during surgeries, without the proper machines?

I haven't been practicing for a long time yet, I have only been practicing for barely one year, but in that year I have been gaining confidence to do all types of cases.

One difficult case I had in that big facility was a gastric perforation with an unconscious patient. Even my bosses refused to take on the case, as the patient would likely die under anaesthesia. They estimated his chance of survival as under 30% . I spoke to my boss and told him that, why not give the patient that small chance, better than declining the patient because he isn't fit for anaesthesia when chances of survival without the surgery were almost zero. So he told me, "Kelly, what are we going to do? Go, I am in support of you. Go, and try your luck."

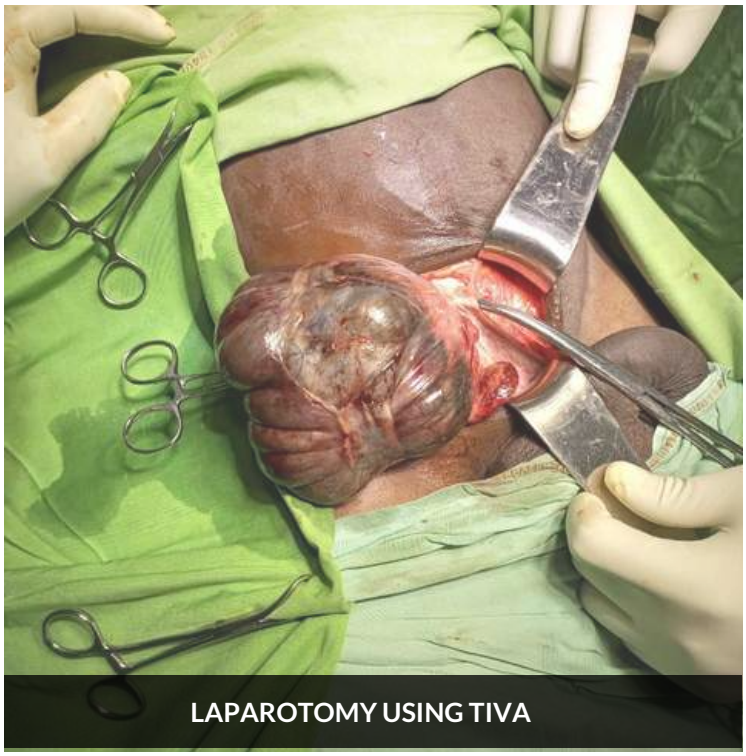
What I did was, I had to get the intensive unit ready in case at the end of surgery I could not extubate the patient and I would need to put the patient on a ventilator. Luckily this was at the big facility where I did my one year rotation, so we had the necessary facilities and I made all of the necessary arrangements before sending the patient inside. After starting the anaesthesia and intubating, I told the surgeon that we were on a limited time span with this patient and that for the patient's sake the surgery shouldn't last for more than 45 minutes, one hour at most. So he had to be fast, and he made it happen; in less than 30 minutes we were done.

But weaning the patient, safely extubating the patient, wasn't an option right after the surgery. So I put the patient on the ventilator I had prepared in the ICU. After putting the patient on a ventilator I followed him up, monitoring him closely. In the evening, he was doing really well, and we were able to successfully extubate the patient. But the next morning the patient again took a turn for the worst, and I found the ICU nurses bagging the patient, with a saturation of 15% oxygen. I took over, manually bagged the patient, and got the patient to 40% saturation, and called for equipment to reintubate the patient.

I reintubated the patient and put the patient back on the ventilator, he stabilized quickly and after some more time on the ventilator, he did increasingly well until we could safely wean him from the ventilator and extubate him.

He recovered well and was able to go home in good health. His going home safely was without a doubt one of my most precious moments in my history in anaesthesia. It has also helped me build confidence in my own practice.

Lately I have needed this courage a lot, to keep practicing while faced with extreme challenges. For example, the anaesthesia machine at the facility where I work now has broken down. And I've had to practice anaesthesia without an anaesthesia machine.



LAPAROTOMY USING TIVA

The equipment I have now can only give oxygen; I cannot give any positive pressure ventilation or deliver anaesthesia gasses. It's essentially not even a ventilator, it can just deliver oxygen. There is no vaporizer on it, so I can't use any anaesthetic gasses. Once I need to intubate a patient, I need to bag the patient to keep ventilating the patient and I need to use total intravenous anaesthesia (TIVA) to maintain the patient under anaesthesia.

I am the type of person who loves learning new things. So I keep educating myself, by reading a lot about anaesthesia, and furthermore watching many YouTube videos.

Because I can't rely on an anaesthesia machine I tend to try to work with spinal anaesthesia or nerve blocks quite often, so there's no need to ventilate the patient.

However, I also have no ultrasound, so I learned to perform my nerve blocks without ultrasound. I can do a femoral nerve block, a wrist block, an ankle block, a penile block, all without an ultrasound. And I keep educating myself by reading and studying videos and practicing, improving my technique so that I am always successful in whatever I am doing.

My only motivation is to save lives. I don't understand why human beings need to suffer. In this day and age, why would a pregnant woman need to carry a pregnancy to term—carry the baby for 9 months—and then lose her baby? It touches my heart and I've promised myself that I will do anything to help.

I also have passion for whatever I am doing, I give it full attention and commitment, and try to do it to the best of my knowledge. I don't ever say "I am tired"; I work as much as I possibly can, to save as many lives as I can.

Q: What type of anaesthesia machine would it be your dream to have?

I would prefer Drager with a ventilator, or Mindray. That would be the best, because they are good for African wards. Most of our facilities use them. But I'd be happy with any anaesthesia machine.

Q: Can you describe for us what your operating theatre (OT), and the facility, looks like? Do you have all day electricity? Running water? How many doctors?

Luckily our community has 24 hour electricity. Our operating theatre was not designed to be an operating theatre, it was first installed as a "first-aid room". But because we urgently needed an operating theatre, we didn't have any other option than to convert the room into an OT.

We had a theatre bed donated and started building from there. At first we didn't even have a patient monitor, I used to use just a blood pressure (BP) cuff and a pulsoxymeter to be able to conduct caesarean sections (CS). That's what I first used. Later, I put pressure on my medical supervisor and he was able to get me a patient monitor, and that is what I am using for now, with that old machine that cannot give positive pressure ventilation, that has no vaporizer, that only delivers oxygen and that's full of leaks. But I have managed to use those things just to save lives.

We don't have much, it's actually ridiculous. If you were to see our environment and hear us calling it a theatre, you would not believe it. But once I am serving a purpose, working for the people, saving lives, I think I am fine. I manage. I give it all of my efforts. At times I have to travel to other facilities and beg for supplies, just to be able to make my work somewhat comfortable. But even though I am in this environment, I am happy.

I also have passion for the work. I am happy that I have been able to save quite a number of lives. I am doing caesarean sections—women who are not supposed to travel for a long distance to get the service of an anaesthetist—I'm right around the corner. Currently, we have almost no doctors in the area. We only have one medical officer. He does everything, and he's not a specialist, just a medical officer. Our perioperative nurses are not formally trained—they were just trained on the job. So we are just managing, to save as many lives as possible.

Q: About how many surgery's do you do in a week?

The majority of cases we do are caesarean sections. Because we don't have an anaesthesia machine, any other case that comes in, for example a patient in need of a laparotomy, we will try to send to another facility. Unless of course its an emergency involving life—if after assessing the situation we see that s/he won't reach the next facility, I'll take the risk and do it.

Most of our cases include hernias, caesarean sections, and other minor cases like resecting lipomas. For some of hernia cases that we do, I don't give spinal anaesthesia, but rather use a femoral nerve block, to be on the safer side. That's what I do.

The number of cases depends, the caesarean sections are the most common and we can do about 20, 30, or 40 in a month, sometimes more. In a week, if it's a busy week, we can do more than 10 c-sections, and hernia cases can also be more than 5 or 6. Mostly with the hernias, if its farming season, many of our patients tend to postpone any medical visits for as long as possible, because they are working in the fields. So cases that first were just small hernias become strangulated obstruction cases. An uncomplicated hernia we I can do quite safely, but for strangulations, obstructions, complicated hernias we urgently need more equipment. We're not only in urgent need of an anaesthesia machine, we also need diagnostic tools like equipment to perform lab tests. At the moment, we can't even examine electrolytes, or do a full blood count. We can examine Hb, do tests for HIV, Syphilis, Hepatitis C and B and malaria and we can do grouping and cross matching for blood transfusions, but when it comes to ion disturbances, liver function, renal function etc., we are basically blind. Furthermore, we cannot perform chest X-rays, and the ultrasound has been broken for 2 years now.

Q: Can you tell me about some of your greatest success stories? Some cases you are proud of? Have you gotten to see the children growing healthy after being born, do the mum's bring them by?!

I have done so many cases. One of the terrible moments I've had was following a case, after we delivered the baby, later the patient was bleeding. She bled severely, and she was 0- blood type, and we couldn't get 0- blood to give to her. So I had to personally refer the patient, in an ambulance, to Tamale Teaching Hospital, which is so far! Its about 100 kilometers from my facility. I personally followed the patient and stayed with her in the ambulance.

So on the way, her blood pressure was going down quickly and I didn't know what to do, so I had to set up an adrenaline infusion to keep the BP up. We only had 1li of blood and we needed more than 1li of blood. I had to refer the patient that night, and we got to Tamale at 2am. I handed over the patient and I even followed her back to the ward and she had a hysterectomy, we didn't have any other option. After the hysterectomy, I stayed with the patient even inside the operating theatre, to see what we could do. We had to save her life, and we did! The baby is fine, and recently the mother brought the baby to visit me.

Most of the people I have worked on come back to give me appreciation for the work I have done, and that is what keeps me motivated. I am not motivated by money, but my motivation is to see the patients I have worked with, and it means so much to me when they come back to visit and to say, “thank you”. Its one of the greatest moments I can ever have. Most of these cases have become normal, because I’ve been doing this work so consistently.

My greatest success story was supporting the operation on a strangulated hernia. Without an anaesthesia machine, I intubated the patient, connected oxygen, did TIVA, and bagged the patient throughout the procedure. We did a recession anaesthesia, and the patient was fine. I brought the patient out of the theatre and managed the patient very well. That was my greatest moment.

Q: Are there any other trainings you would dream of doing?

I would like to specialize in pain management. I wish I could study medicine, that would be my dream—I want to do any and all other courses in anaesthesia that would enable me to help my patients better in life. If I had the opportunity I would love to study anaesthesiology and become a full anaesthesiologist —as of now I am a nurse anaesthetist.

Q: What message to you have for other doctors / anaesthesiologists working in lower and middle income countries or in rural settings to keep them positive and keep them hopeful?

My message is that you should try as much as possible to save lives. Money is not everything, I would never put money first. Life comes first—I save lives. I am always fulfilled when life is being saved. I think they should put all of their effort, even with the little resources they might have, into saving lives.

KELLY MATHIAS ACHENTIR

To help support Tatele District Hospital, or Kelly Mathias Achentir's further studies, please reach out to him directly.

Email: mathiaskelly6@gmail.com
WhatsApp: +233 24 876 6508

I understand that in most African countries, because of our financial problems, most people are thinking about money. I am not like that. My story is very emotional—when I enrolled as a nurse in 2011 I was not working, I was not being paid, and I decided to study and practice registered nursing, without any salary or even being paid at all. Then, I told my parents that I wished to study anaesthesia, and they were so supportive of my dreams that they paid to send me back to school, in Accra.

I always become emotional when I remember my days in anaesthesia school in Accra and the suffering I went through. I was literally, literally sleeping in the classroom. Where my colleagues were sleeping in a hostel that they paid for, I couldn't afford a hostel. And I used to eat just once I day. But I have an aim: my aim is to become who I want to become, and to save more lives. That is my motivation.

Life-saving is my motivation. It is only recently that I have been able to enter the government payroll, and they are working on my salary. In 2019 when my salary came I was paid 1200 Ghanaian Cedi (135 USD) a month, but I am feeling ok. I have become the anaesthetist I dreamed to be.

Any person who is out there and who is reading this, be it a nurse or anaesthesiologist or a doctor, let the human life be paramount. It's the first and only thing we have to think about. That is my message for my colleagues.

Integrity is what I am looking for, and the legacy I wish to leave is that people will say, this person cared for human lives.

ISSUE 16 | DECEMBER 2022

VOICES OF SURGERY

CALL FOR ARTICLES

SHARE YOUR VOICE AT ONE.SURGERY

ISSUE 16: GREEN SURGERY

In "Green Surgery", we discuss ways in which the global surgery movement can be more environmentally conscience.

Voices of One Surgery is a free, periodical, not-for-profit magazine dedicated to global surgery and is part of the One Surgery project. One Surgery is run by a growing international team passionate about surgery and improving standards of care worldwide.

We aim to unite and promote the advocacy efforts for global surgery by providing a platform for sharing ideas, projects and stories. Through a combination of story-telling, interviews and web technology, we aim to address the plight of unequal access to surgical care.

We aim to represent as many voices as possible from all over the world. Medical and allied health students, anaesthetists, surgeons, physicians, nurses, global surgery advocates, public health professionals, patients or anyone with an interest, passion or experience in global surgery are all welcome to submit articles. If you are passionate about the global surgery movement, have unique stories, projects or ideas to share with the world, please send a full article to voices@one.surgery no later than 30th October, 2022 23:59 GMT.

WHO MAY SUBMIT?

We aim to represent as many voices as possible from all over the world. Medical and allied health students, anaesthetists, surgeons, physicians, nurses, global surgery advocates, public health professionals, patients or anyone with an interest, passion or experience in global surgery are all welcome to submit articles.

WHAT SHOULD BE SUBMITTED FOR THIS ISSUE?

Commentaries, op-eds, infographics or photo essays focusing on the theme issue “Green Surgery”.

The incoming articles need to adhere to the following guidelines:
1. Clearly defined brief title.
2. Up to 1000 word body text.
3. Profile picture, brief resume and email address of the author.
4. Clear, high-resolution photographs supporting the article.
5. Our style aims to be easy reading that is inviting to the general public as well as engaging to healthcare professionals.
6. Avoidance of controversy including discussing any political topics that may cause unrest, or any offensive, negative material.
7. Permission from relevant stakeholders involved in the article should be obtained.

Submissions do not have to conform to the given theme. If you have stories or ideas outside our theme for the next issue, feel free to share it with us. We consider all voices for global surgery! For more details or to read our previous publications, visit: **http://voices.one.surgery/**

In case of queries, write to us at: **voices@one.surgery**

WHAT IS THE EDITORIAL PROCESS?

Your submission or proposal will be reviewed by the editorial team. If accepted, an in-house editing process will take place and the article will be carefully drafted.

The draft will be then returned back to the author to ensure approval for publication. Authors will have full freedom to withdraw consent during this preparation time. Once the publication is formally published, the magazine will be distributed under a creative commons licence and free to share for non-commercial use. Once published, we may not be able to retract it from the world wide web.

All authors are legible to recieve a certificate of appreciation from One.Surgery for their published article upon request.

STYLE GUIDE

As the Voices of One Surgery continues to grow, we are aiming to improve our consistency in our presentation and editorial output. Please adhere to the following guidelines for your submission. Failure to do so will lead to inevitable delays in our processes!

Commentaries, op-eds, infographics or photo essays focusing on the theme issue "Made With Love".

The incoming articles need to adhere to the following guidelines:
1. Clearly defined brief title.
2. Up to 1000 word body text.
3. Profile picture, brief resume and email address of the author.
4. Clear, high-resolution photographs supporting the article.
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