

Sunnybrook's Ukrainian
Humanitarian Initiative:
Restoring a life



REBUILDING A LIFE

After suffering devastating injuries to his left lower face and jaw in Ukraine's grueling war, 36-year-old Andriy Usach had one hope: the skilled specialty surgeons at Sunnybrook. Thanks to the incredible compassion and generosity of donors, and the volunteer commitments of Sunnybrook's talented surgeons, anaesthesiologists and nurses, Andriy underwent a 13-hour, life-changing procedure at Sunnybrook on December 13, 2017. He returned home January 4, 2018, able to speak, eat and enjoy a pain-free life with his family – and committed to giving back as a future psychologist caring for Ukrainian war veterans.



Andriy observes a 3D scan of his jaw pre-surgery

EMPOWERING A COUNTRY IN NEED: SUNNYBROOK'S UKRAINE CRANIOFACIAL TRAUMA FELLOWSHIP

Thousands of Ukrainian civilians and soldiers have suffered horrific and life-changing deformities, commonly to the face and skull. Many of their wounds result from explosive blasts and high velocity missiles and present major reconstructive challenges. Unfortunately, Ukrainian surgeons typically lack the advanced training and technology to repair these complex wounds.

To address these challenges, the Canada-Ukraine Foundation developed the Canada-Ukraine Surgery Mission Program in 2014. The aim is to treat those most profoundly affected by the war and to equip Ukrainian medical professionals with the skills and resources to care for them.

Plastic surgeon Dr. Oleh Antonyshyn leads Sunnybrook's Adult Craniofacial Program and has headed five surgical fellowship missions to Ukraine to date. Each mission

relies on a dedicated team of 25 Canadian volunteer surgeons, anaesthesiologists, nurses and a hand therapist. The Canadian team works alongside their Ukrainian counterparts to maximize both education and patient outcomes.

Missions typically start with two days of consultations and surgical planning for more than 100 patients. During the next five days, three surgical beds are simultaneously operated on for 10-12 hours per day.

In addition to giving individual patients their lives back, the Canadians have offered intensive practical clinical training for specialists in maxillofacial surgery, plastic surgery, ear, nose and throat surgery, neurosurgery, traumatology, hand surgery, anaesthesia and nursing. They have also provided resources and equipment that will allow Ukrainian surgeons to offer these same services.

"We will have the greatest impact and long-term benefit if we focus on increasing the capacity and self-sufficiency of local health professionals in Ukraine to treat trauma and posttraumatic deformities. In this way we will transform the lives of trauma victims."

- Dr. Oleh Antonyshyn, Sunnybrook plastic surgeon



ANDRIY'S JOURNEY

In 2014, eastern Ukraine was a battle zone. Russian forces had moved in to back the cause of separatist rebels, and the intervention soon escalated into an armed conflict that spared no one, least of all the Ukrainian soldiers on the front line.

Andriy Usach was one such soldier. The 36-year-old husband and father of two young daughters lived in Rivne, a historic city in western Ukraine. In July 2014, he voluntarily enlisted in the Ukrainian army and was deployed to the 80th Airborne Division of Lviv to defend the airport in Luhansk. His military unit quickly came under heavy artillery fire.

For four days, Andriy and his colleagues fought to hold the line against the rebel forces – at an enormous cost: Andriy suffered devastating shrapnel injuries, which ultimately resulted in the amputation of his left leg above the knee, the loss of bone and soft tissue in his left forearm and serious damage to his left lower face and jaw.

He underwent multiple operations to correct the damage, but none was completely successful. Andriy was left with extensive scarring of his lips, a left facial defect and a painful, infected, unstable jaw, which limited his ability to speak and eat.

Looking for ways to help the casualties of the Ukrainian war, the Canada-Ukraine Foundation organized a needs assessment and invited Dr. Oleh Antonyshyn, a Sunnybrook plastic surgeon of Ukrainian descent, to play a role. Dr. Antonyshyn proposed to lead a series of Canadian humanitarian surgical missions that would provide direct care to the wounded while increasing the capacity of local surgeons to manage craniofacial and upper-extremity trauma.

It was November 2014 and just three months after the firestorm that left Andriy seriously injured when Dr. Antonyshyn and his team established their first medical clinic in Kyiv. Desperate to find help for his patient, Andriy's Ukrainian doctor drove the young man to the clinic from the other side of the country. Seeing Andriy's open facial wound, Dr. Antonyshyn and his colleagues set to work. They stabilized the jaw using a bone from Andriy's hip – a high-risk manoeuvre given the size of the wound and the limited available blood supply.

"We had to try something," Dr. Antonyshyn says. "We weren't sure if we would have another opportunity to help."

Unfortunately, the risk didn't pay off and the bone graft failed. Over the next three years, Andriy had multiple surgeries at the hands of doctors in the Ukraine and the United States. None was successful.

Finally, in February 2017, while on his fifth Canada-Ukraine Foundation Humanitarian Surgical Mission, Dr. Antonyshyn had the chance to examine Andriy again. "He still had a significant defect. The metal plate from 2014 was still there, but it was the only thing holding the two pieces of bone together." On top of that, Andriy had a serious infection of his jaw.

The surgeons cleaned the wound the best they could, but there was little more they could do for their patient without access to more advanced technology and expertise.

"He needed to come to Sunnybrook," says Dr. Antonyshyn.



Dr. Oleh Antonyshyn and Andriy have a brief chat before surgery



Drs. Kevin Higgins and
Oleh Antonyshyn examine
Andriy prior to surgery

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He needed to come to Sunnybrook”

- Dr. Oleh Antonyshyn, Sunnybrook plastic surgeon

THE TEAM

Soon after returning from Ukraine, Dr. Antonyshyn set out to assemble a surgical team. Three plastic surgeons (with help from a plastic surgery resident), four head and neck surgeons, four anaesthesiologists and multiple specialized nurses committed to completing the demanding surgery pro bono and after hours, so as not to detract from Sunnybrook's regular patient load. These extraordinary gifts of expertise and time were complemented by generous donor investment to offset the hospital-related costs and support from the Canada-Ukraine Foundation to bring Andriy and his wife to Canada and care for them during their stay.

Sunnybrook's volunteer surgical team

Dr. Oleh Antonyshyn, Plastic Surgeon

Dr. Paul Binhammer, Head, Division of Plastic Surgery

Dr. Serge Goekjian, Plastic Surgeon

Dr. Dale Podolsky, Plastic Surgery Resident

Dr. Danny Enepekides, Chief, Surgical Oncology

Dr. Kevin Higgins, Head and Neck Surgeon

Dr. Tony Eskander, Head and Neck Surgeon

Dr. Ryan McSpadden, Head and Neck Surgeon

Dr. Harry Foster, Anaesthesiologist

Dr. Kelly Fedoruk, Anaesthesiologist

Dr. Sophia Wong, Anaesthesiologist

Dr. Jane Huang, Anaesthesiologist

Becky Wong, Head Operating Room Nurse



Members of Andriy's surgical team. From left to right: Becky Wong, Dr. Oleh Antonyshyn, Dr. Kevin Higgins, Dr. Tony Eskander, Dr. Kelly Fedoruk, Dr. Harry Foster, Dr. Danny Enepekides



Andriy receiving a CT scan prior to surgery

A MARATHON SURGERY

Sunnybrook's Adult Craniofacial Program is one of the world's best. Led by Dr. Antonyshyn, the program's experts in plastic surgery and otolaryngology (head and neck surgery) collaborate on complex cases using high-tech imaging and "free flap" microsurgery to transplant bone, tissue and skin and reattach tiny blood vessels. Sunnybrook head and neck surgeons Dr. Kevin Higgins, Dr. Danny Enepekides and Dr. Tony Eskander are three of only a small number of surgeons in the world able to complete this kind of advanced reconstructive surgery using bone and tissue from the shoulder blade instead of the arm or leg – especially important in Andriy's case, given the damage he had already sustained to his leg and arm.

Calavera Surgical Design, a Sunnybrook medical device company co-founded by Dr. Antonyshyn, was invited to create an ideal anatomical specimen of Andriy's jaw for the surgeons to use as a guide during the operation. Using image data of Andriy's injuries, Calavera's engineers constructed a computerized 3D image of the repaired jaw complete with the missing bone and then printed it using a 3D printer.

Dr. Antonyshyn and his team met with Andriy on December 10, 2017, three days before the scheduled surgery. Their intensive examination,

including CT scans, blood work and an angiogram to confirm the health of the injured and donor tissue revealed what everyone hoped – the surgery was a go!

The surgical team got off to an early start on December 13. "We knew we were in for a long day," Dr. Antonyshyn recalls.

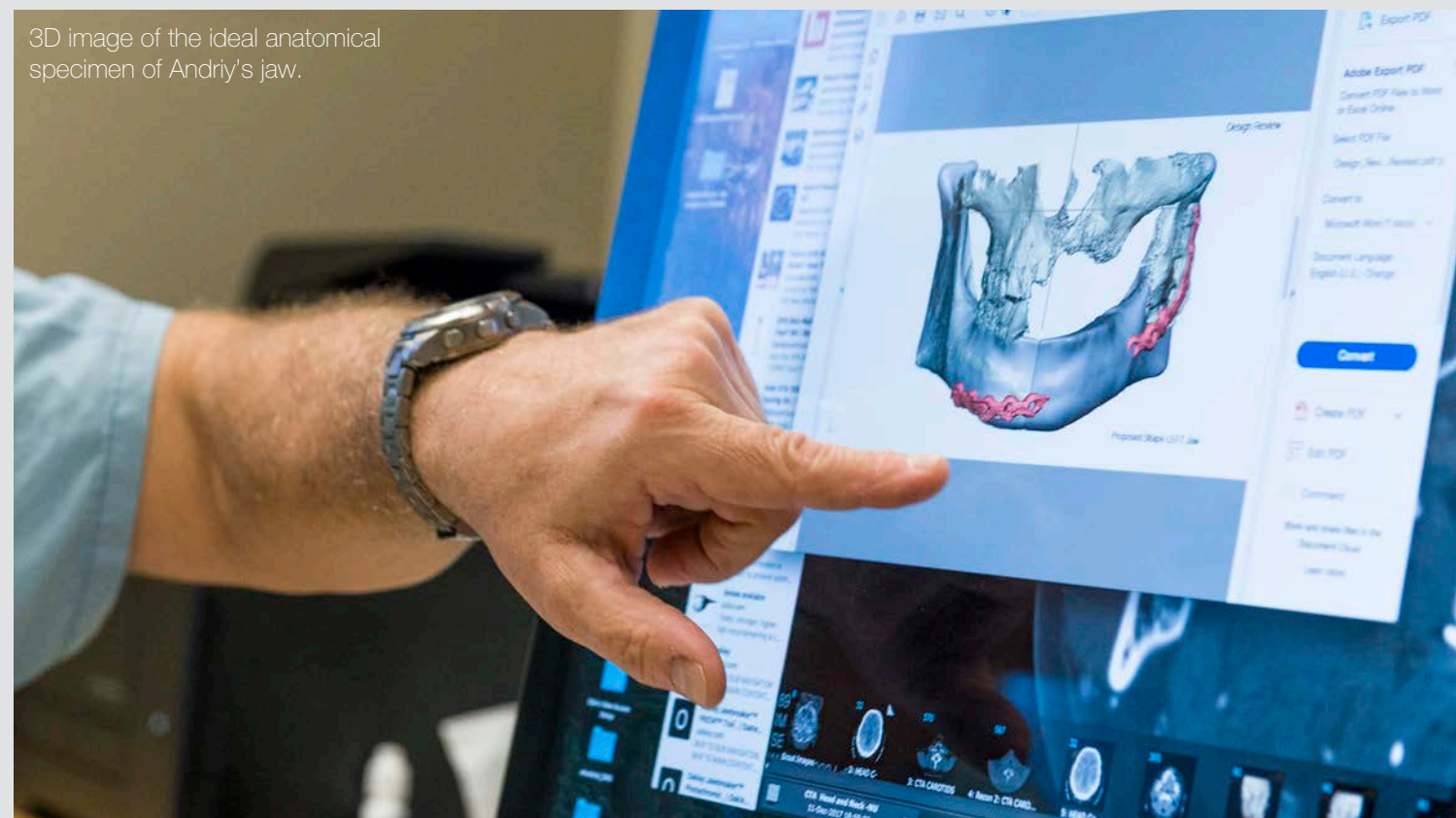
In the first surgical phase, Drs. Higgins and Enepekides completed a tracheostomy, a surgical hole in Andriy's windpipe to help manage his breathing during the surgery and his initial recovery.

Dr. Antonyshyn then stepped in to prepare the jaw for transplant. He cleaned the infected mandible, removed the loose hardware and created a normal bite using new, custom-designed hardware based on Calavera's 3D model.

Throughout the next and final delicate phase of surgery, Sunnybrook's head and neck microsurgeons harvested a portion of Andriy's scapula and used it to re-build his jaw. They then spent multiple hours painstakingly reattaching the arteries and veins to his neck to ensure healthy blood flow to the donor tissue.

All told, the surgery took more than 13 hours.

3D image of the ideal anatomical specimen of Andriy's jaw.





Members of the surgical team working together to correct Andriy's facial deformities

ANDRIY

USACH



12 HOURS | **7,313 KM**
FROM RIVNE, UKRAINE TO TORONTO, CANADA



26 DAYS TOTAL
IN TORONTO



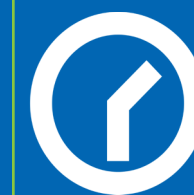
10 DAYS TOTAL
IN HOSPITAL

Thanks to the generous support of leadership donors, the dedication of volunteers within the Ukrainian community, and a team of Sunnybrook physicians and staff who graciously volunteered their time and services, Andriy was given the opportunity to receive extensive surgery to correct severe facial deformities and help him regain normalcy in his life.

A specialized multidisciplinary team of Sunnybrook specialists, including four anesthesiologists, three plastic surgeons, one plastic surgery resident, four head and neck surgeons, several nurses and a group of medical device specialists were involved in the major, complex jaw reconstruction, restoring Andriy's ability to speak and eat.



12 SUNNYBROOK
PHYSICIANS



13 HOURS OF
SURGERY



1) TRACHEOSTOMY

a surgical hole was made in Andriy's windpipe to help manage his breathing during the surgery and his initial recovery

2) REMOVAL OF INFECTED HARDWARE

the old, infected hardware was removed and the area cleaned in preparation for the jaw transplant

3) JAW TRANSPLANT

a normal bite was created by transplanting new, custom-designed hardware based on a 3D model jaw

4) JAW RECONSTRUCTION

a portion of the scapula was harvested and used to rebuild the jaw, followed by careful and delicate reattachment of all arteries and veins to the neck



Sunnybrook
FOUNDATION



Andriy and his wife Svitlana share a tender moment before Andriy is prepped for surgery

THE POWER OF HOPE

Throughout the entire marathon surgery, Andriy's wife, Svitlana, sat anxiously in Sunnybrook's surgical waiting area.

Dr. Antonyshyn went to her side as soon as Andriy was moved to recovery. He described the surgery and told her what she could expect next. Swelling and the tracheostomy would prevent Andriy from communicating directly for several days.

"She was understandably anxious," says Dr. Antonyshyn. "She hadn't travelled to Canada before, she couldn't speak English and she was alone in the waiting room." After so many failed attempts to repair Andriy's injuries, the couple was a bit wary, but also hopeful that this effort would be a success.

"Hope – that's what I remember feeling the most," Dr. Antonyshyn says. "She's a very strong woman."

A NEW CHAPTER

Over the next three weeks, Andriy continued to recover with the support of his wife and the Sunnybrook team. When he returned home to Ukraine on January 4, 2018, he was mobile, free of stitches and wearing only a small bandage on his face. Best of all, he was pain-free, able to eat and speak normally and ready to celebrate the Ukrainian Christmas on January 7 with his family.

In the weeks since, Dr. Antonyshyn has remained in touch with the family. Regular pictures inform him of Andriy's steady progress, which he describes as "remarkable." Andriy's face and jaw have almost completely healed and Dr. Antonyshyn says he has "a jaw for life." Other than for minor plastic surgery to manage some of the scarring, he expects Andriy will not see the inside of an operating room again.

"This was a life-changing procedure for Andriy and his family."

When the two men last met during Andriy's final exam in January, Dr. Antonyshyn recalls thinking something was wrong. "He was very quiet. I was worried." And then Andriy reached out and gave his surgeon a tight hug. "He told me he didn't think this would ever happen for him. 'Without us,' he told me, 'there was no hope.'"

The surgery has not only given Andriy his life back, it has cemented his plans for a new career – as a psychologist helping other victims of war. He's currently studying to complete his psychology degree in Ukraine. In fact, he asked Dr. Antonyshyn to write a note explaining his absence from class.

The two look forward to reuniting this May when Dr. Antonyshyn returns to Ukraine for his next mission to help more victims of the country's devastating war.



Andriy and Dr. Oleh Antonyshyn post-surgery



