

# In good hands

Bridging research with her clinical work, Dr. Heather Baltzer is treating more patients with severe hand injuries than almost any other doctor in Canada

*By Tamar Satov*



Craig Burgen is thrilled to be back at work after nearly losing his thumb in a workplace accident.

**OCTOBER 23, 2018, IS A DATE** Craig Burgen won't soon forget. The 48-year-old industrial mechanic was in the midst of a repair, removing a massive eight-foot steel roller at the Woodbridge, Ont., plastic sheeting company where he works, when one side of it slipped and came down on his left hand like a guillotine. His thumb was severed between the two knuckles, left to hang perilously from a small piece of skin. "I held my thumb in my right hand and started to freak out," recalls Burgen.

In shock, he didn't feel any pain. Paramedics took him directly to Toronto Western Hospital, which performs the largest number of hand and finger replacements in the province.

"I felt like I was going to be in good hands, so to speak," he says, reflecting on the experience. "You don't realize how much you need your thumb until you don't have use of it anymore."

Hand injuries are extremely common, sending more Canadians to the emergency room annually than any other cause. In Ontario alone, research suggests that there are more than 100,000 cases of traumatic hand injuries every year – including fractures, dislocations and amputations.

These injuries can be life-changing. Arthritis, for example, is extremely common in hand-injury patients and can cause long-term health consequences, even if the damaged

joint was treated properly. As well, many patients find themselves struggling with mental health and addiction issues after a traumatic hand injury, according to research conducted by Dr. Heather Baltzer, a hand surgeon and interim director of the Hand Program, and a clinician investigator at Krembil. "Hand trauma is an unrecognized public health issue that has a profound impact on the patient, limiting the ability to carry out activities of daily living," she says.

In an attempt to shed more light on hand trauma and improve patients' lives, Dr. Baltzer and other researchers are looking at the economic burden of hand and wrist injuries, how



Dr. Ryan Paul wants to make the recovery process smoother for patients with hand injuries.

different delivery-of-care models affect patient outcomes, and whether preventive measures such as improved workplace safety standards could reduce the incidence of hand injuries.

Using population health data, Dr. Baltzer identified two-million emergency department (ED) visits in Ontario for hand trauma over the past decade, with 500,000 being repeat visits. More than a third of surgical hand trauma patients access mental health and addiction services after their surgeries, compared to 10 per cent of the general population. The average length of an ED visit due to hand trauma is two and a half hours, which translates into over 1,300 hours of ED health care per day. That may be contributing to emergency room congestion.

With hand injuries potentially causing arthritis later in life, Dr. Baltzer and other Krembil researchers are looking at the different inflammatory profiles of patients with hand osteoarthritis. Their research could help identify personalized forms of treatment that could then reduce the progression of the disease.

By the time Burgen arrived at the hospital, he was starting to feel a bit of pain. Within about 10 minutes, before it could really take hold, the nurses hooked him up to an IV with a morphine drip. “Next thing I know, I’m waking up in my hospital bed in my room with my arm suspended,” he says.

What seemed like no time at all to Burgen was more than six hours of surgery performed by Dr. Baltzer and her team. They started by thoroughly cleaning his hand and wound, which was still greasy from the machinery he had been handling, then spent about an hour finding and tagging the tiny blood vessels in his thumb and hand they would need to reattach. “We put a very fine suture – a little blue stitch – in each one at the start, so we could easily see them later when we’d been in surgery for hours,” says Dr. Baltzer.

Next was an hour of what she calls heavy work, or fixing the bones with wires, plates and screws, so they had a stable base on which to do the delicate repair of nerves, arteries and veins. After about 40 minutes of repairing tendons, which allowed the thumb to bend, they moved on to the nerves and arteries. Some of the blood vessels, which are only 0.5 millimetres in diameter, had parts that were crushed, so those parts needed to be removed to open up blood flow. They used high-magnification microscopes and



micro-equipment – forceps, dilators and sutures finer than a piece of hair – to perform the painstaking work, one of the reasons why hand surgeries take as long as they do.

Another hour was spent harvesting a vein from Burgen’s arm to replace a segment of a badly damaged artery in his hand. It took one hour to set the vein, allowing blood to flow into his thumb. “I wasn’t sure how it was going to go, but his thumb pinked right up,” says Dr. Baltzer. Finally, they closed the skin and bandaged his hand.

Staff had to check Burgen’s circulation every hour in the days following the surgery to make sure his thumb was getting enough blood. If circulation was poor, they would have to return to the operating room, since fingers can only last about six to 12 hours without adequate blood supply.

Thankfully, that didn’t happen, and he was released – with his thumb intact – a week later. But leaving the hospital wasn’t the end of the story for Burgen, nor is it for most patients who undergo hand surgery.

“One of the biggest challenges we face is the length of recovery, which in certain cases can be in excess of six months to a year, and the fact that patients require a lot of post-operative care and therapy to restore motion and strength,” says Dr. Ryan Paul, an orthopedic surgeon in the hand surgery group at Toronto Western Hospital. That includes battling stiffness after surgery, as well as the emotional fallout from experiencing a trauma and loss of dexterity. “Even small deficits are really felt because we use our hands so frequently,” he explains.

In response to these challenges, Toronto Western Hospital’s Hand Program has set up a pilot project to help patients through the recovery process. A psychologist and pain management team screen patients to see who might benefit from additional treatment, such as group therapy or other mental health and addiction services. “The more we can identify individual needs, the better their outcomes will be,” says Dr. Baltzer.

For Burgen, recovery is ongoing. He’s back

in the machine shop and has been in physiotherapy since January, but many everyday tasks, such as doing up zippers, buttons and spreading butter on toast, are challenging.

In July, nearly nine months after his accident, he had a second surgery to help regain the sensation on the inside of his thumb where it meets the index finger. A third surgery, yet to be scheduled, will improve movement of his thumb, as the joint has become scarred and stiff.

Burgen is grateful for the care he’s received from Dr. Baltzer and the rest of the team at Toronto Western Hospital, and he’s doing what he can to help with his recovery. “I’m trying to lead a more stress-free life,” he says.

That’s music to Dr. Baltzer’s ears, who wants nothing more than to help her patients live their best lives, both through her actions as a clinician and as a researcher. “When someone has had part of their hand function taken away, and I can give it back to them, that’s an excellent feeling.”