

# Chez nous

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## The big switch: Repairing a newborn's heart

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Hôpital de Montréal  
pour enfants  
Centre universitaire  
de santé McGill



Montreal Children's  
Hospital  
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# The big switch

## Three-week-old boy undergoes open heart surgery to repair congenital heart defect

By Stephanie Tsirgiotis

Émilie Ménard knew something was wrong.

During delivery, her baby's heart rate kept dropping and sometimes she couldn't hear it at all. When she finally gave one last push, the solemn expression on the nurse's face immediately caused her to panic.

"What's wrong? What's wrong with my son?"

She could hear someone nearby whisper, "Come back to me...come back to me..."

[continued >](#)

► (Top: l. to r.) Émilie, Éthan, Éve, and Nicolas.

The nurse placed Éthan on Émilie's belly and she gave him a kiss before he was rushed to the Montreal Children's Hospital.

"I didn't know if I was going to see him again," she says.

### Reversing the blood flow

Less than 10 hours after giving birth, Émilie checked out of the hospital and made her way over to the Children's to be with her son and her partner, Nicolas. She was informed that he was suffering from a serious congenital heart malformation, known as transposition of the great arteries. Éthan's pulmonary artery and aorta were switched thus changing his body's blood flow.

In a normal heart, the pulmonary artery is attached to the right ventricle and carries blood from the heart to the lungs to receive oxygen, and then the aorta—which is attached to the left ventricle—carries that oxygen-rich blood to the rest of the body. In Éthan's case, his main arteries were connected to the wrong ventricles, so his body wasn't receiving enough oxygen to survive.



► Pediatric cardiac surgeon, Dr. Pierre-Luc Bernier, performed the open heart surgery on Éthan.

Time was also not on their side. Before a baby is born, blood flows from the pulmonary artery to the aorta through an open duct, called the ductus arteriosus, but it closes in the first hours after birth. "We're able to keep the duct open with medication until the child is strong enough to undergo an arterial switch," explains pediatric cardiac surgeon, Dr. Pierre-Luc Bernier. "But ideally we need to perform the surgery soon after birth."

An arterial switch is a complex and very delicate type of open heart surgery. The operation consists of correcting the position of the arteries, and cutting the coronary arteries out of the transposed aorta and attaching them to the neo-aorta.

"We usually perform this type of surgery between the first and third week of life, because we want to prevent the

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*On the cover:*  
Émilie, Éthan, Éve, and Nicolas.

*Cover photo:* Owen Egan

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► Éthan underwent a five hour open heart surgery on April 3, 2018.

left ventricle from becoming untrained,” explains Dr. Bernier. “Normally, the left side pumps blood to the entire body and is a lot stronger than the right side, which pumps blood to the lungs. In children suffering from this condition, the blood flow is reversed and if it’s not corrected quickly, the left side will adjust to pumping at a lower pressure and will never be strong enough to do the work it’s supposed to do.”

Éthan was lucky to have a ventricular septal defect, which is a hole between the two ventricles that equalizes the

pressures and prevents the left ventricle from becoming untrained too quickly; however, this added a level of complexity to the surgery because it would have to be closed at the same time as the arterial switch operation.

### **Preparing for surgery**

On April 3, 2018, three weeks after birth, Éthan was ready for surgery. Leading up to the operation, Dr. Bernier reviewed the case with the Children’s Cardiology team, and also spoke with members of the Anaesthesia department, Pediatric Intensive Care Unit (PICU) and the hos-

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pital’s perfusionists. “We also involve nursing in all our clinical discussions, because they work directly with the families every step of the way,” says Dr. Bernier. “Neonatal cardiac surgery is very delicate and extremely technical. The heart is so small. It’s about the same size as the baby’s closed fist.”

Over the next five hours, Dr. Bernier operated on Éthan with help from two surgical trainees, three OR nurses, two perfusionists, one anaesthesiologist, as well as an anaesthesia fellow and respiratory therapist. “The heart is such a dynamic organ and it’s constantly adapting and changing. When going into a surgery, we know what needs to be done, but you have to be able to adapt along the way,” says Dr. Bernier. While sitting in the waiting room, Émilie and Nicolas were briefed every hour by cardiology nurse Michele Zegray. “We really appreciated the updates,”

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she says. “We knew he was in good hands.” Émilie was surprised by how calm she felt during the surgery, considering her breakdown the night before. “I was hysterical before the surgery. I couldn’t stand, I couldn’t walk, I couldn’t talk. I didn’t know if my son was going to survive and it was the worst feeling in the whole world.”

When the surgery was finally over, Émilie was brought up to the PICU to see her son. “I wasn’t sure if I was allowed to touch him or talk to him. He looked so fragile,” she remembers. The operation was a huge success. Éthan underwent an echocardiogram before and after surgery to assess the quality of the repair and his heart was now pumping properly.

The team had inserted a set of temporary electrical wires that could easily be attached to an external pacemaker in case his heart needed to be stimulated after surgery – luckily, that was not the case. Éthan’s organs, however, had undergone an invasive, and lengthy surgery and were very swollen.

“After a complex neonatal surgery, we sometimes leave the ribcage open, because the organs need time to return to their normal size,” says Dr. Bernier. “Swelling is more significant in a newborn compared to an adult, because there’s less room inside the body. We seal off the area with a silicone dressing to reduce the risk of infection, until we’re able to close the ribcage.”

### **A surprisingly quick recovery**

Six days after surgery, Éthan was doing so well that his medical team began



► Today, Éthan is still being followed by the Children’s Neonatal Follow-Up Clinic, but he’s hitting all of his milestones.

discussing the possibility of him going home. “I couldn’t believe how quickly he recovered,” recalls Émilie. Today, the one year old from Lachine is still being followed by the Children’s Neonatal Follow-Up Clinic, but he’s hitting all of his milestones. “He’s very developed for his age. He even started walking at nine months old!” beams his proud mother. “He’s also very close to his older sister, Éve, and is always giving her hugs and kisses.”

Dr. Bernier says what strikes him on a daily basis is that 60 years ago, children

like Éthan would not have survived. “One per cent of babies are born with some type of heart malformation and the most common type of congenital malformation is cardiac. Thankfully, we’ve come a very long way in neonatal cardiac surgery. The complexity of the care provided by our dedicated multidisciplinary team is outstanding,” says Dr. Bernier. “We can’t cure everything, but for Éthan, he will likely live a normal life and that is truly amazing to see and something very special to be part of.” ●





# A Quebec first:

## medical imaging team at the Children's now trained in medical hypnosis

By Stephanie Tsirgiotis

Medical hypnosis is a popular practice in countries like France, and is slowly becoming more mainstream in hospitals across North America. The Montreal Children's Hospital is now the first hospital in Quebec to use medical hypnosis to reduce pain and anxiety during certain medical imaging procedures.

Johanne L'Écuyer, Chief Medical Imaging Technologist at the Children's, was approached by the *Ordre des technologues en imagerie*

*médicale, en radio-oncologie et en électro-physiologie médicale du Québec (OTIMROEPMQ)* last year. Their director had just attended a conference on the topic and asked Johanne if their department would be interested in seeing if medical hypnosis could be used in their area.

"I was skeptical at first. I didn't realize that hypnosis was used so extensively in some medical environments," she says. "I wanted to see it, [continued >](#)

► Top: Johanne L'Écuyer, Chief Medical Imaging Technologist at the Children's.

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 ”

to believe it.” Johanne and Maryanne Fortin, a medical imaging technologist specialized in interventional radiology, flew to France to meet and learn from teams working at the *Centre hospitalier universitaire de Rouen* and *l’Hôpital Femme Mère Enfant* in Lyon. “We were completely blown away,” says Johanne. “We returned feeling very inspired.”

After submitting a detailed proposal to the *Ordre*, which was accepted for funding, Johanne quickly obtained permission to begin a pilot project at the Children’s. The main goal was to see if medical hypnosis could help reduce pain and anxiety in children undergoing anxiety-provoking procedures, like PICC line insertions, or voiding cystourethrograms (VCUGs), a minimally invasive test that uses fluoroscopy to examine a child’s urinary tract and bladder.

**Teaching the team**

► After each procedure, the young patients are asked to rate their level of discomfort and pain on a scale from zero to 10.

In January 2019, Johanne invited Claire Benoit-Ruby, a medical imaging technologist and hypnotherapist from Lyon, to come to Montreal to train four members of her team over a seven-day period. “The first thing she taught us was that medical hypnosis is a technique. It’s like following a recipe,” explains Maryanne. “And the first step is by far the most critical.”

That crucial first step is the initial introduction between the medical imaging technologist and the patient. “It’s a lot about how you approach the patient and the types of words you use. Your non-verbal behaviour is also key. We position ourselves at the same level as the young patient; we smile and start the conversation paying particular attention to our vocabulary, which has to be positive. We avoid words with negative connotations, like ‘fear’, ‘hurt’, and ‘cold,’” she adds.

The child is then escorted to the procedure room and asked to focus on different elements in the room to begin stimulating all of their five senses. “We ask them what they see, hear, smell, feel, or taste. By getting them to focus



► Maryanne Fortin is a medical imaging technologist specialized in interventional radiology.

on these things, we end up oversaturating their senses, which facilitates a transition from their critical consciousness to their imaginary consciousness,” says Maryanne. “Even though they are physically present, their mind and imagination go somewhere else.”

Once the patient is comfortable, the medical imaging technologist begins telling them a story based on one of their favourite interests or hobbies. “We speak to them the whole time in a quiet and calm voice until the procedure

[continued >](#)





is over. Most of the time the young patient doesn't even feel the pain caused by the needle prick, because we incorporate it into the story we're creating," she explains.

For example, if a child loves going to the beach, Maryanne will begin a story about the sand and the waves, and right before the child feels, for example, a burning sensation from the local anesthesia, she'll say something like, 'the sun is warming up your arm.' "The child is not sleeping during the procedure and their senses are hyper sensitized, so they will feel everything, but because they're calm and happy in this imaginary world, the pain is greatly reduced."

### Expanding the project

Every week, approximately three to four patients are selected for medical hypnosis. "We choose our candidates based on their age and the type of procedure they need," explains Johanne. "Children aged six and up respond particularly well to this practice." As for the type of procedure, the technologists approach patients who don't have to be sedated, but who often experience higher levels of pain and anxiety. "An anxious child will experience pain more intensely, so these two elements go hand in hand," reinforces Maryanne.

To date, 45 patients have undergone medical hypnosis at the Children's. The majority were for PICC lines but Johanne has expanded the scope of the project to include procedures such as renal and neck biopsies, IV insertions, and lumbar punctures. After each procedure, the young patients are asked to rate their level of discomfort and pain on a scale from zero to 10. "So far the average is 1.7," says Johanne. "Without medical hypnosis, the level of discomfort is, on average, 5.1."

Dr. Karl Muchantef, an interventional radiologist at the MCH, has noticed a significant difference since the team introduced medical hypnosis. "Patients move much less. In one case, for example, two people were needed to immobilize a 6-year-old patient for a peripheral IV line because the child was scared. The next day, under medical hypnosis, this same patient had a peripheral central catheter inserted, and remained calm throughout the procedure," he says.

Maryanne has also noticed a long list of positive changes. "I was tired of going home after work feeling like I spent my day making children cry. It didn't feel

good," she says. "Medical hypnosis is not only helping our patients, but it has also contributed to improving our working environment. We continue to learn, develop and perfect our technique, but we've come a long way over the last six months."

All in all, Johanne's ultimate goal with this project is to provide better care to her patients, and so far, it's working. "Many departments within our hospital could benefit greatly from medical hypnosis, so I look forward to seeing the follow-up on this initiative, because the pilot project is already showing very positive results!" ●



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## A day in the life of a... **Pediatric Nurse Practitioner**

By Pamela Toman

*After many years of hard work, Linda Massé will soon be the first Quebec-trained Pediatric Nurse Practitioner in the province.*

Linda Massé has been working at the Children's for 34 years, and 31 of them have been in the Pediatric Intensive Care Unit (PICU). "I'm an action person," she says. "I love taking care of people and I like following through from start to finish. I think that's why I've always loved working in critical care."

Naturally curious and self-motivated, Linda has always been interested in furthering her knowledge and advancing her profession. But it was her experience at the bedside, hearing about the role of Pediatric Nurse Practitioners (PNPs) abroad and following through on the vision of previous PICU medical and nursing leaders that prompted her to work on developing this new role at the Children's and across the province several years ago.

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► Top: Linda Massé



► Linda Massé and six-year-old Eugénie Blanchette, a patient she has been following since birth.

“It’s been proven that having PNPs as part of care teams helps to reduce patients’ length of stay and improves the continuity of care,” she explains. “My experience with my own patients convinced me that these benefits could also be advantageous in Quebec in a pediatric hospital setting.”

### **Making a vision a reality**

Thus began a lengthy collaborative process to turn this vision into reality. With the pivotal help of the MUHC and MCH’s senior nursing administration, along with collaboration from McGill’s Ingram

School of Nursing, Linda began lobbying the government for a program to be developed to train PNPs in the province of Quebec. With their help, she was named Nurse Coordinator for the PNP program at McGill University, and in collaboration with Dr. Tanya Di Genova, the program’s Medical Director, along with MCH physicians who generously offered their time, she developed a new curriculum to train PNPs and to offer them clinical rotations within the hospital.

As a contributor to this new stream of Nurse Practitioners, Linda is a pioneer

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in her own right, becoming the first Quebec-trained Pediatric Nurse Practitioner in the province. This June, four PNP students will be embarking on their clinical rotation at the Children’s, with more than five students per year following in their footsteps in the years to come. Their new roles will be embraced by specialties across the hospital, in departments like the PICU, Complex Care and many more.

### **Embodying a new role in pediatrics**

When it comes to her day-to-day duties, Linda’s role as a PNP in the PICU is both autonomous and collaborative. “A PNP is ultimately an experienced nurse, with extensive medical knowledge,” she asserts. “I have my own patient load of four to six patients at a time. It’s my job to evaluate them, develop a care plan and readjust it as needed throughout their stay.” This requires daily participation in Medical Rounds to ensure she is up-to-date on the assessments of other

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healthcare professionals in the team, and frequent discussions with patients and their families.

"I gather all the information I can before developing a therapeutic plan, organize admissions, transfers and create summaries and notes to optimize patient care. Because of my role, I get to know my patient population intimately, and I have additional latitude to order consultations to conduct more thorough investigations or order medications." If and when Linda reaches the limit of her capacity to help a patient and family, she reaches out to her partner physician to ensure her patient receives the best required care possible.

This amplified nursing role is key, particularly for patients with chronic medical issues and complex needs, says

Linda, because it fills a gap in patient care. "The patients that I help care for have complicated medical needs, but these needs might be considered less critical to the medical staff who are frequently very busy with the most critical and intense cases," she says. "As a PNP, I can step in and offer them a more thorough follow-up with a more global overview of all the moving parts in their care, with the ultimate benefit of working to prevent problems and avoid them reaching a critical status."

### Experience and knowledge combined

As a PNP, Linda can also tap in to her extensive nursing training to provide teaching, develop new protocols and conduct research. As a veteran nurse on the unit, Linda's experience with tracheostomies has made her a special-

ist on the subject. She is therefore the unit's go-to tracheostomy troubleshooting resource, conducting workshops for nurses, residents and fellows, as well as doing one-on-one sessions with parents in partnerships with the hospital's Complex Care Service.

The most rewarding part of her journey, says Linda, is being able to use the experience and knowledge she has gained over the course of an entire career to provide the right care at the right time for patients and families. "It's been a long journey to get this training recognized and formalized," she says. "It's truly been a team effort between our physicians, administrators and stakeholders at the government level, and I'm excited to see this vision become a reality for our patients and our care teams." ●

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# Kangaroo Care:

## NICU parents cuddle their kids for week-long challenge

Parents all over the world know that holding babies skin to skin is the best feeling. But there's a lot more to it than just feeling good. The practice, known as kangaroo care, is also considered medically beneficial, and babies aren't the only ones who experience its advantages. For parents whose infants are in a neonatal intensive care unit (NICU), kangaroo care can help them manage the stress that often accompanies hospitalization.

From May 9 to 15, the Children's NICU, with support from the Just for Kids Foundation, took part in the Kangaroo Challenge along with a number of hospitals across Canada and many others throughout the world. Over the seven-day period, NICU team members encouraged parents to practice kangaroo care whenever possible. By the end of the week-long challenge, parents on the unit had logged a total of 676 hours of kangaroo care.

Catherine Chaput is one of the dozens of parents who took part in the challenge. "We never could have imagined that we'd be going home without our baby as new parents. Practicing



► Catherine Chaput and daughter Rosalie.

kangaroo care is a way to help me feel like even though my daughter is no longer in my belly, she couldn't be any closer to me, and I feel a thousand times better. When I get worried and stressed, I think about these moments that she's with me and it keeps me going. It's not the same as being at home, but it makes us feel like we are still getting that special time with her, just like we would if we weren't in the hospital." ●

## Celebrating National Nursing Week

They're advocates, protectors, innovators and leaders. They're mothers, fathers, daughters and sons. They witness pain, joy and resilience every single day. They are nurses. But they are so much more.



At the Children's, our nurses work in highly specialized units, departments and clinical teams and collaborate with various health professionals to provide the best possible care to our patients and their families day in and day out. Please join us in thanking them for all they do!

Head to our MCH Facebook page to watch a special video. ●