

Editorial

The Hidden Cost of Healing: Reducing the Carbon Footprint of Carpal Tunnel Surgery

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As healthcare professionals, our primary mandate has always been clear: help people live better, healthier lives. Yet, there is a quiet, uncomfortable irony in how we deliver that care. The very systems we rely on to heal are leaving behind a destructive trail of greenhouse gases, massive energy consumption, and mountains of physical waste. Globally, healthcare is responsible for roughly 4% to 5% of all greenhouse gas emissions, and inside our hospitals, the operating room is the single largest offender. As the climate crisis accelerates—a reality we are already feeling acutely here in Sri Lanka—we in the medical community have to finally reckon with our own environmental footprint.

When people think of surgical emissions, they usually picture massive, multi-hour operations. But in reality, volume matters just as much as complexity. Take carpal tunnel release (CTR), for instance. It is one of the most frequently performed hand surgeries on the planet. Because we do so many of these procedures every single year, even tiny adjustments to how we manage them can compound into massive environmental gains. The beautiful thing is that we don't need expensive, futuristic technology to make surgery greener. We just need the willingness to look at our daily routines and strip away what isn't truly necessary.

To fix a problem, we first have to understand its weight. In our field, we often look at a "Life Cycle Assessment," which essentially tracks the environmental impact of a procedure from cradle to grave—from the raw materials used to manufacture a tool to the moment it hits the waste bin. For a quick outpatient procedure like a carpal tunnel release, the per-case footprint feels negligible, but the cumulative math tells a different story. A basic outpatient visit usually generates about 2 to 3 kg of CO₂. A simple 20 km round trip by a diesel bus contributes about 1.6 kg, while cleaning and autoclaving just one standard surgical tray adds another 0.12 kg, with facility electricity making up the rest. Multiply that by thousands of patients nationwide, and the collective impact is staggering. If we unnecessarily push that same minor case into a traditional, high-energy main operating room or use heavy anesthesia, that

carbon footprint explodes.

Reducing this impact is less about finding new ways to recycle and more about the art of omission—what I like to think of as "addition by subtraction." It starts with questioning where we choose to operate. Traditional main operating theatres carry a massive energy overhead, constantly running intense lighting and high-volume HEPA air filtration systems. By simply moving minor procedures like a CTR into an ambulatory procedure room or a clinic setting, we can cut that facility energy consumption to a fraction of the cost without compromising patient safety.

We can also change how we approach anesthesia. Inhaled volatile gases are incredibly potent drivers of global warming, and the physical pain of a tourniquet often forces us to use deeper sedation than we otherwise would. By embracing techniques like WALANT (Wide Awake Local Anesthesia No Tourniquet), we completely eliminate the need for these gases, skip complex preoperative testing, and radically shrink the waste generated by the anesthesia machine itself.

We also need to look closely at the steel on our tables. It is incredibly common to open a standard surgical tray packed with 30 to 40 instruments for a carpal tunnel release, even though we might only use four or five of them. Yet, every single unused instrument on that tray still has to go through the high-energy, water-heavy steam sterilization process afterward. Streamlining our trays down to the absolute essentials can lower the sterilization footprint by 75%.

Similarly, while advanced endoscopic techniques are highly innovative, they often come wrapped in disposable plastics and specialized single-use blade assemblies. When clinically appropriate, sticking to a classic open approach is simply kinder to the environment. Finally, we must look outside our hospital walls at the journey our patients take. Incorporating telemedicine for routine preoperative chats or simple postoperative wound checks can spare patients a physical trip to the clinic, effectively cutting the total carbon footprint of that entire surgical episode nearly in half.

Our foundational medical ethic is *primum non nocere*—first, do no harm. In the twenty-first century, it is time we extend that promise to the very environment we inhabit. Making our surgical practices more sustainable does not mean lowering our standards of care or sacrificing excellent clinical outcomes. It just requires a shift in mindset. When we begin to treat environmental sustainability as a core component of clinical quality rather than an optional "green" afterthought, we protect both the patient on our table today and the world they will walk out into tomorrow.