Dr. Gearhead

Overriding the 'Culture of Music' in the OR

Robin Hocevar

It's every anesthesiologist's worst nightmare.

On a Friday afternoon, a teenage boy presents to the OR for a routine ACL surgery. The surgical team worked while listening to music and chatting about weekend plans. Nobody on the team could hear the descending pitch of the pulse oximeter over the sound of the music. The young man would suffer an anoxic brain injury and die two days later. The anesthesiologist left medical practice for good.

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There's a great deal of "OR folklore" on the dangers of music in the OR, but researchers have been sounding the alarm for years. The Environmental Protection Agency's (EPA) recommended level for continuous background noise in hospitals is 45 decibels (dB), but most surgical areas operate at a much louder volume. Orthopedic and neurosurgery are the worst offenders, with higher sustained continuous background noise levels and intermittent peak levels exceeding 100dB more than 40% of the time (asamonitor.pub/3U9S0z2). Higher noise levels during surgery are associated with an increased rate of surgical-site infections in patients, not to mention increased stress hormones and autonomic nervous system activity for OR staff (*Journal of Surgical Research* 2021;263:193-206; *The American Surgeon* 2022; 0:1-6).

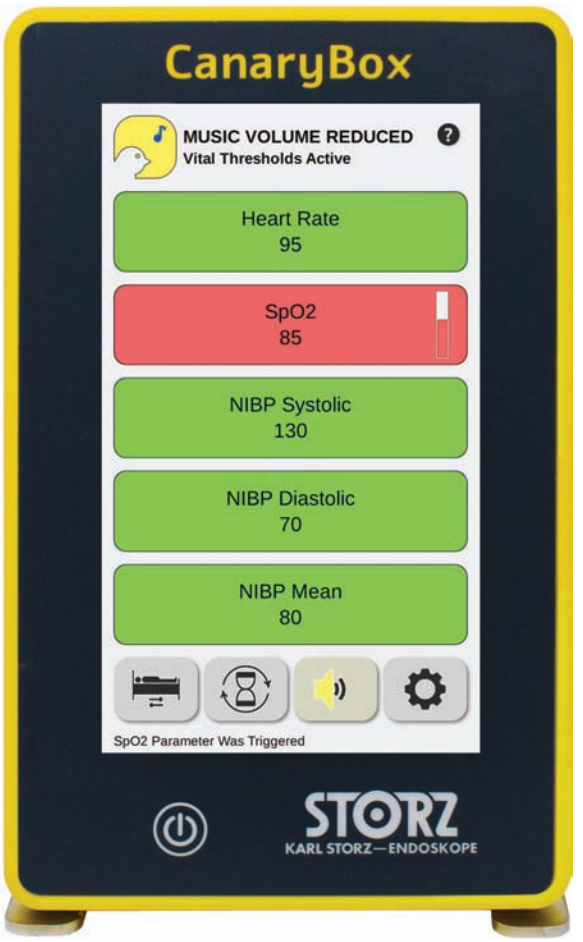
Though music can be calming and help clinicians focus in a stressful work environment, most OR staff are on board with turning down the music and quieting other distractions. Current noise levels are subjectively perceived to be a disturbance in the OR by over half of surveyed surgeons, anesthesiologists, and nurses, with the majority considering it to have a negative influence on the job. Not to mention, noise-induced hearing loss seems to be prevalent in 50% of OR personnel involved in orthopedic surgery (*Journal of Surgical Research* 2021;263:193-206).

Who controls the playlist?

Alistair MacDonald, MD, an anesthesiologist in Missoula, Montana, places himself firmly in the category of those clinicians requesting lower musical volume in the OR. His opinion on the matter became even firmer in 2015, when he noticed a patient turning blue and had to shout "turn down the music" to the surgical staff. Working with the music on was nothing new to Dr. MacDonald in 2015, but he observed a trend of the noise intensifying over the years. While Dr. MacDonald points out that he understands the role of music to break up the monotony of a long surgical procedure – especially given today's older and sicker population – he remarked that patients are often the most vulnerable at the end of the procedure.

"The real shift happened when we moved from a boom box at the head of the bed to Pandora and streaming services. To a large extent, this is when anesthesiologists lost control," he noted.

In a 2022 survey featuring surgeons, anesthesiologists, and nurses, 91% of the combined group agreed that music should be allowed in the OR. However, when considering the question of who should determine volume and the genre of music, responses fell along clinical professional lines. Among nurses and anesthesiologists, 80% felt it should be a joint decision. Only 52% of surgeons agreed with that statement, and another 46.7% of surgeons felt they should have sole control over music (*The American Surgeon* 2022; 0:1-6).



With the battle over the volume button getting worse instead of better, Dr. MacDonald had an idea: an automated system that lowered volume if a patient's vital signs changed.

Sound of silence

Dr. MacDonald considered his concept further and wanted to develop something for the OR that worked like a car in which music didn't play until the seatbelt was engaged. Contrary to what was appearing on the medical market at the time, the last thing Dr. MacDonald wanted was to create another alarm. "If you have a patient who is starting to decline, adding another alarm to the mix can have the opposite effect."

Together with Eric Crimmins, MD, an anesthesiologist in Lincoln, and his wife, Annie Crimmins, a critical care nurse, the trio formed Canary Sound LLC in 2016 and obtained a $50,000 grant through the Nebraska Department of Economic Development for the prototype, as well as a $25,000 matching grant from the Lincoln Partnership for Economic Development.

In 2018, CanaryBox™, a tablet-sized device integrating music with data from the anesthesia monitor for semi-automated volume control, was officially launched. Working with the hospital's existing music system, the CanaryBox™ lowers the volume as patient vitals drop. It integrates with GE Carescape™, Philips Intellivue™ MP/MX series, Drager Delta Infinity™, Spacelabs (PDL), and Datex-Ohmeda CardioCap 5™. Though the CanaryBox™ has the capacity to shut off the music altogether, that's not a feature Dr. MacDonald wanted to activate all the time. Rather, teams set their own algorithms based on heart rate, oxygen saturation, and blood pressure as liberally or conservatively as desired. Users can also set delay intervals to minimize nuisance triggers such as an oximetry probe falling off a finger or a surgeon leaning on a blood pressure cuff. A heart rate fallback to oximetry prevents triggers from electrocautery.

Next up for CanaryBox™, already in 10 hospitals, is built-in Bluetooth functionality. For now, though, Dr. MacDonald and the Canary Sound team feel confident that the CanaryBox™ has played a role in changing the "power dynamic" of music in the OR. "We've all heard cases where the co-pilot didn't speak up about the gas being too low and lived to regret it," he said. "Many residents and anesthesiologists don't feel comfortable asking for quieter music, or fear being 'disinvited' to that surgical suite in the future. That's where the technology comes in and does its job." ■

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