

Video distraction helps kids undergo cancer radiotherapy, study finds

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Credit: Stanford University

Watching distracting videos helps children with cancer avoid the need for anesthesia during radiation treatments, a Stanford Medicine-led study has found. Video-based distraction also reduces children's anxiety and improves their quality of life as they undergo radiation therapy.

A final version of the study was published online May 8 in the *International Journal of Radiation Oncology, Biology, Physics*. The

study's participants, 81 children who were 3 to 10 years old, were being treated for various forms of cancer at 10 pediatric hospitals across the United States.

"It's very important that patients don't move during radiation treatment, and that they're not upset or having a traumatizing time during treatment," said co-senior study author Susan Hiniker, MD, assistant professor of radiation oncology at the Stanford School of Medicine. Hiniker is a radiation oncologist at Stanford Medicine Children's Health and Stanford Health Care and was part of the team that developed the video setup.

"Many [young kids](#) can almost cooperate with the treatment, but being alone in a treatment room for 20 to 30 minutes and having to be really still can be quite challenging," she said. "If we can get them engrossed in paying attention to something, such as a video they enjoy, that really helps."

Hiniker shares senior authorship of the study with Karl Bush, Ph.D., who was a clinical associate professor of radiation oncology at the Stanford School of Medicine at the time the study was conducted. The study's co-lead authors are Paulina Gutkin, who was a clinical researcher at Stanford Medicine when the study was conducted and is now a [medical student](#) at the Medical College of Wisconsin, and Lawrie Skinner, Ph.D., clinical assistant professor of radiation oncology at the Stanford School of Medicine.

Most [young children](#) who need radiotherapy receive general [anesthesia](#) to keep them still during treatment, which allows the radiation beams to be aimed precisely at their tumors. But anesthesia has disadvantages. Repeated doses of [general anesthesia](#) carry risks for children's brains. Anesthesia also requires overnight fasting, lengthens the time that children and families must spend at the hospital for each treatment,

increases the cost of treatment, and requires the kids to endure more poking and prodding.

For many children, "zoning out" to a favorite video is a better option, the researchers found—especially given that children may need up to 35 sessions of [radiation treatment](#), usually delivered five days a week for multiple weeks.

"We think, for kids and their families, the experience over those weeks of treatment really matters," Hiniker said.

Biggest gains for the smallest kids

To receive radiotherapy, the patient lies on a treatment table while beams of radiation are directed at their tumor. Depending on the tumor's location, the patient may be fitted with a device that's attached to the table to prevent them from moving the body part being treated.

The researchers tested a video-viewing setup developed at Stanford Medicine Children's Health. It consists of a wireless projector attached to the table behind the child and a thin, radiation-permeable plastic screen, which is mounted where the child can see it while receiving treatment. The viewing screen does not significantly affect the radiation dose.

With video distraction instead of anesthesia, children did not have to fast overnight before radiation treatments, which meant they could schedule the treatment at different times of the day, not just in the early morning. Each patient selected the videos they wanted to watch, typically children's shows available on a streaming service. A parent could accompany the child into the treatment room and stay until the child was positioned on the table and began watching their chosen video.

With video distraction, 78% of children in the study could hold still through at least one 10- to 30-minute radiotherapy session without anesthesia. Prior studies found that less than half of kids aged 3 to 10 could tolerate radiotherapy without anesthesia. Children in the study received a median of 28 treatment sessions and avoided anesthesia for a median of 20 sessions each. All 10 cancer treatment centers succeeded at delivering video distraction, meaning at least half of their patients were able to avoid anesthesia.

Success with video distraction depended partly on the child's age: Among children who were 3 or 4 years old, 55% avoided anesthesia, while the rates for 5- to 7-year-olds and 8- to 10-year-olds were 81% and 85%, respectively.

The gains from using video distraction were greatest in 3- and 4-year-olds, Hiniker said. Without distraction, other studies had found that fewer than 10% of children in this age group could avoid anesthesia.

"For the littlest patients, it can make the most difference," she said.

The researchers also measured quality of life with standardized questionnaires given to parents of all patients, and also to patients aged 5 to 10 years. For children aged 5 to 7, both patients and their parents reported that patients' total quality of life and physical appearance improved, and treatment anxiety declined, over the course of [radiation therapy](#). Treatment anxiety also significantly declined in 8- to 10-year-olds. Anxiety scores decreased more for children who succeeded in using video distraction than for those who needed anesthesia.

Avoiding anesthesia also reduced the cost of the [children's](#) treatments. Prior research estimated that a typical anesthesia charge for a six-week course of pediatric radiotherapy was \$50,000, or around \$1,667 per treatment session. The researchers estimate that the cost savings from

avoiding anesthesia in the current study are about \$2.3 million. The one-time cost for installing the video distraction system at a medical facility is about \$500, Hiniker said.

More can benefit

The researchers are expanding the types of patients who can benefit. Any child receiving [radiation](#) therapy at Lucile Packard Children's Hospital Stanford can use video distraction, and the team is offering it to certain adult patients who may benefit from distraction, such as those with developmental delays, anxiety or significant pain. The Stanford Medicine team plans to share the technology with other U.S. cancer centers.

They are also launching research projects to test the technology in low-resource locations in Tanzania and India, where access to anesthesia is limited.

"In these settings, you see higher rates of treatment abandonment, and some patients can't be treated at all," Hiniker said, adding that she is excited about making radiotherapy accessible to child cancer patients who might not otherwise receive it.

More information: Paulina M. Gutkin et al, Feasibility of the Audio-Visual Assisted Therapeutic Ambience in Radiotherapy (AVATAR) System for Anesthesia Avoidance in Pediatric Patients: A Multicenter Trial, *International Journal of Radiation Oncology, Biology, Physics* (2023). [DOI: 10.1016/j.ijrobp.2023.03.063](https://doi.org/10.1016/j.ijrobp.2023.03.063)

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