A research opportunity: "3D-ROSE": virtual reality preparation for children having radiotherapy or imaging procedures

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Ethical approval: nil, as it has not been to clinical trial yet.

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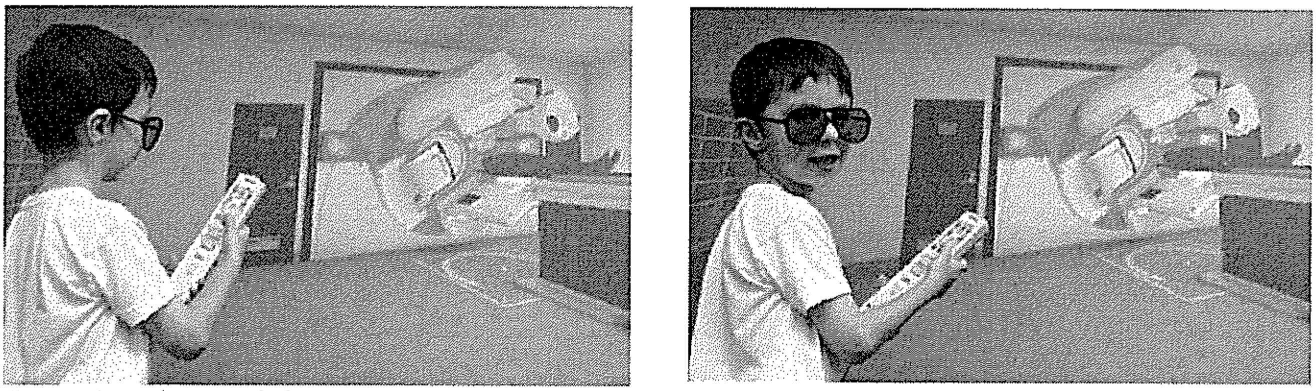
Professor Christian Langton is a medical physicist at Queensland University of Technology in Brisbane. He has developed a way of preparing children who are about to have either radiotherapy or MRI imaging procedures and is seeking research partners to develop and test these further. This is a great opportunity for nurses interested in research, and who have access to a children's hospital, to work with Professor Langton on some truly innovative, multidisciplinary research. Nurses are the best placed health professionals to undertake such research, as they are the most likely, from all disciplines, to liaise with children and parents when a child is being prepared to have a large and frightening procedure.

In brief, the project revolves around what is, in reality, a computer game. The websites below are for scientists and use adults as illustrations. Professor Langton has used photos of his 5-year-old son, Dylan, to illustrate how 3D-ROSE (radiation oncology simulation environment) can be used by children.

The two photos below are of the original 'room perspective' Immersive Visualised Simulator – essentially a 'flight simulator' for a radiotherapy machine, where various treatment procedures along with fault identification scenarios may be rehearsed. Using the 3D spectacles, one appears to be in the room and can walk around and zoom into different areas. Dylan is holding the same controller for the radiotherapy machine – where he can control the same functions – rotate gantry, move the bed and so on. It is possible to visualise the x-ray treatment beam, though this is not shown in these pictures.

The original aim for this system was for both preclinical and advanced training (emerging techniques) of radiation therapy operators, thereby minimising the time that the machines are not being used to treat cancer patients. An additional benefit is that the trainee can learn at their own pace and not that



Figures 1 & 2. Dylan controls the 'room perspective 3D-ROSE system', akin to a radiotherapy 'flight simulator'.

Figures 3 & 4. Dylan perceives the 'sights and sounds' of radiotherapy; MRI simulation is achieved simply by running a different version of the computer software.

dictated solely by clinical system access time. However, it quickly became apparent to Professor Langton and his team that it had a much wider application and would be invaluable to train the patients having the treatment and this quickly transposed to children.

To test its relevance, the team invited adult cancer patients to see the 3D-ROSE simulator. They suggested two further developments: first, to incorporate real sounds, "it's the sounds that freak us out, not what we are seeing". Consequently, the team added the sounds of the gantry and bed moving and also the 'last man out' alarm, (which is pressed when the last radiation therapist leaves the room, indicating that the radiation delivery can commence since only the patient can be in the room at this time – patients have been known to get off the bed thinking it was a fire alarm!)

Their second suggestion was a 'patient perspective' simulator, where the user lies on a couch and experiences the 'sights and sounds' of radiotherapy and this can be area-, disease- and patient-specific; for example, bone marrow or solid tumour in a discrete area – Professor Langton believes that it would be confusing and unhelpful to demonstrate a procedure that the patient isn't going to receive. The photos of the system are shown on the left. This uses novel curved-screen technology and twin projectors to fuse a 'flat' immersive image. The team then further developed the visualisation software to simulate a diagnostic MRI scanner. It is anticipated that with such easy to use preparation, children can be trained to lie still and so remove the necessity to have an anaesthetic.

All this now needs to be tested and nurses are the ideal health professionals to do this. Professor Langton anticipates applying for funding and is looking for research partners. If anyone is interested, or wants further information, please contact him at Christian.Langton@qut.edu.au

To follow are some websites that explain, in some detail, the equipment and the work behind it:

http://www.q-bic.org.au/projects_linac.html

http://www.q-bic.org.au/projects_3d-rose.html

http://www.q-bic-org.au/projects_desktop.html

http://www.q-bic.org.au/projects_mri.html

www.3d-rose.com.au

www.3d-rose.com.au/demo

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Guidelines for Authors appear on our website: <http://www.npchn.com>. One important point to note is that NPCHN uses the Vancouver system.

To see how to do it, open:

http://www.ncbi.nlm.nih.gov/books/bv.fcgi?rid=citmed.TOC&depth=2

Please note that these sites say that either numbers in brackets or superscript can be used. NPCHN USES **SUPERSCRIPT** ONLY.

Papers will not be accepted unless the Vancouver system is used correctly.