

Lay summary for completed research projects

CCR No and Study Title:	CCR4296 Non-contact monitoring for breath holding radiotherapy		
CI and Sponsor names:	Dr Anna Kirby The Royal Marsden NHS Foundation Trust		
Study opening date:	26/02/2016	Study closing date:	26/02/2017
Proposal and Objectives:	<p>The purpose of this study was to test whether a low cost commercial movement sensing device (a Microsoft Kinect v2) (referred to as “Kinect” below) can detect when patients are holding their breath during radiotherapy treatment.</p> <p>Patients who receive radiotherapy for cancer in the left breast are asked to hold their breath during the treatment as this reduces the radiation dose to their heart. At the Marsden, we have developed a simple method for checking by eye (using cameras and lights) that a patient remains in breath hold throughout their radiotherapy treatment.</p> <p>However, this simple method is less effective when used with more complex radiotherapy techniques in which the treatment machine rotates around the patient during treatment, obscuring the cameras.</p> <p>We proposed that by using the Kinect movement-sensing device, we could simply and cheaply check that patients are maintaining breath-hold during rotating radiotherapy treatment.</p> <p>The main objective of this study was to test whether the Kinect device could collect data correctly on the breathing movement of all patients each time they held a breath.</p> <p>We required a minimum of five patients to hold their breath 10 times each to ensure that the study was sound. Each breath hold was 20 seconds long.</p> <p>Patient volunteers were recruited from those treated in the HeartSpare trial undertaken at the Royal Marsden NHS Foundation Trust. These patients were experts in the breath hold method. It should be noted that NO radiation was delivered in this study.</p>		
Main Findings:	10 patients were contacted and 6 agreed to join the study. The patients were invited to attend an appointment at the Royal Marsden on 2nd July		

	<p>2016. The data collection was completed on this day.</p> <p>Our main result is that the Kinect system monitored and recorded all breath holds for all patients correctly. This was a total of 60 breath holds.</p> <p>The study team has looked at the information in more detail to understand what is needed to make this a practical system for use in radiotherapy. We need to carry out work to find the best position in the treatment room for the equipment and to make the software easier to use.</p> <p>As part of this study, we carried out some non-patient work to see if the radiotherapy treatment machine could turn on and off automatically based on the information from the Kinect. This would mean that the radiotherapy machine would only produce radiation when the patient was holding her breath.</p> <p>This experiment was successful and showed that the radiation would turn on only with a breath hold and turn off when the breath hold was released based on the Kinect system information.</p>
<p>Implications for practice/future research:</p>	<p>These results are encouraging. The next stage would be to carry out the monitoring during treatment once the practical issues had been sorted out.</p>
<p>Dissemination Plan:</p>	<p>A manuscript is under preparation for submission to a medical physics journal. A poster presentation was given by two members of the team at the College of Radiographers Annual Radiotherapy Conference 27-29 January 2017.</p> <p>All patient volunteers were asked whether they would like to receive a summary of the results of the study. All stated that they would and this was sent to them in February 2017.</p>

