

## **Improvement Cycle [1]**

### **Aim:** what are you trying to accomplish?

We aim to improve radiographic imaging of the shoulder at the orthopaedic outpatient clinics held by one orthopaedic surgeon at Southport and Ormskirk Hospitals NHS Trust (three clinics per week). Using the Fulcrum technique for AP views, the Braunstein et al trial improved their number of adequate radiographs to 64%. We hoped to match this achievement and improve our baseline adequate percentages of 19.4% (AP) and 57.9% (Axillary) to at least 64% over 6 months.

### **Plan:** what will your test be?

In order to deem a shoulder radiograph adequate a number of evaluation criteria were created for each view using background information and following discussion with an orthopaedic surgeon with a specialist interest in shoulder surgery. It was recognised that radiographers were unaware what criteria determined an adequate radiograph thus highlighting the need for education.

An educational package was developed and delivered to the radiographers performing these x-rays which consisted of educational posters outlining the evaluation criteria and a step-by-step guide to carrying out each view. A teaching session was also carried out using a PowerPoint presentation and a practical demonstration.

Two weeks following the intervention, data will be collected again across the three clinics. We will compare the radiographs taken with the evaluation criteria created and record whether it was adequate or inadequate.

### **Prediction:** what do you think will happen as a result of your test?

We believe, providing our teaching and its associated resources are clear and user friendly, we should see a noticeable improvement in the number of adequate x-rays performed by the radiography department during these clinics.

### **Do:** what happened when you carried out your test?

The radiographers really engaged with the teaching. They were very interested and a number of discussions were sparked. The practical teaching using the skeleton was particularly useful and showed immediate improvement in the adequacy of the x-rays.

### **Study:** how did the results of your test compare with predictions?

We observed a considerable improvement in the number of adequate x-rays, right in line with our predictions. The data collected two weeks following the intervention show an improvement of adequate AP x-rays from 19.4% to 93.3% and axillary x-rays from 57.9% to 92.3%!

### **Act:** how will you change your previous test in light of what you have learned?

Follow-up discussions were held with the radiographers to see how they were utilising the posters provided as part of the education package. These revealed that they would find them more useful if they could access them more easily. Due to the ever changing posters on the noticeboards within the radiography rooms there was not always a poster to hand. Due to this, it was decided by the team to create a PDF of the poster which could be e-mailed to the radiographers so they could access it via their mobile phones at any time. In addition, we will create a PDF checklist which consists of 'pre-radiograph' steps (positioning the patient and the x-ray beam) and 'post-radiograph' steps (checking the image against the evaluation criteria). The reason for this is that we hope to show sustainability over a longer period of time and the team decided an aide memoire would be helpful in achieving this.

## **Improvement Cycle [2]**

**Aim:** what are you trying to accomplish?

Our aim for this cycle is to improve, or at least maintain, the high percentages of adequate shoulder x-rays achieved following our first improvement cycle. These were 93.3% adequate AP views and 92% adequate axillary views. We hope to show sustainability by carrying out data collection at 3 months. We also want to act on the feedback from the radiographers after the first cycle.

**Plan:** what will your test be?

Following discussions with the radiography team after the last data collection we emailed a PDF copy of the posters to each radiographer so they could access them via their mobile phones when they needed them. This was because they brought to the attention of the team that a poster was not always in view of them when they were carrying out the x-rays. In addition we provided a PDF checklist consisting of the x-ray instructions and the devised evaluation criteria for each view. This was because we wanted the change to be sustainable and so decided that an aide memoire would help this.

Three months following the introduction of these resources we will again collect data across the surgeon's 3 outpatient orthopaedic clinics. As we have done for each collection, we will compare the radiographs taken with the evaluation criteria created and record whether it was adequate or inadequate. A period of 3 months was chosen so we are able to evaluate whether the improvement can be maintained long term.

**Prediction:** what do you think will happen as a result of your test?

We do not believe we will see a regression in our improvement. Hopefully we will see further improvement closer to 100% however, I think the most likely outcome is that we maintain the percentages of adequate x-rays. Referring back to our original SMART aim, the team decided we would be happy if we maintain the number of adequate x-rays above our 64% target.

**Do:** what happened when you carried out your test?

The radiographers gave us positive feedback regarding the new resources. They said having the PDF posters and checklist available to hand meant they referred to them more than previously. They also said that having the choice between which aide memoire to use was ideal as some preferred the poster format and some the checklist.

**Study:** how did the results of your test compare with predictions?

As predicted, we did not significantly exceed the results of the previous data collection and unfortunately in the case of the AP views we actually decreased from 93.3% to 80%. The axillary views improved from 92.3% to 93.3%. However, as aforementioned, our original aim was to improve the percentage of adequate x-rays to above 64% and we have achieved that. Therefore, the team was still very happy with the outcome of this improvement cycle

**Act:** how will you change your previous test in light of what you have learned?

Discussion following this second improvement cycle has generated a future action plan which aims to improve the adequacy of shoulder x-rays at the clinics of other orthopaedic consultants within the trust by introducing these views as the default shoulder views for all radiographs requested by the orthopaedic department.