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## Background/ Introduction

- Knee X-rays are commonly used as the initial imaging modality in the investigation of suspected knee or lower limb pathology. By performing scans from various views, it is possible to obtain information about joint alignment, bone quality, and the extent of any degenerative changes within the knee joint.
- To allow meaningful interpretation of images, knee X-rays must adhere to rules and parameters regarding positioning of patients.

## Aims

- To assess the quality of knee XRs in two main areas of focus:
  - Assessment of the quality of anteroposterior (AP) and lateral films
  - Assessment of the quality of skyline films before and after new positioning method

## Set standards<sup>1,2,3</sup>

### Positioning of AP view:

- Centering point 2.5cm below apex of patella
- Collimation to include:
  - Proximally: patella and distal femur
  - Distally: proximal tibia and fibula
  - Laterally: soft tissue borders
- Patella positioned centrally over distal femur
- Joint spaces open and equidistant

### Positioning for lateral view:

- Centering point over the superior border of the medial tibial condyle
- Collimation to include:
  - Proximally: patella and distal femur
  - Distally: proximal tibia and fibula
  - Laterally: soft tissue borders
- Patella should be projected clear of the femur
- The femoral condyles should be superimposed within 7mm<sup>4</sup>

### Positioning for skyline views

- Centering point is patellofemoral joint space
- Images should clearly show patellofemoral joint space
- Collimation to patella and femoral condyles

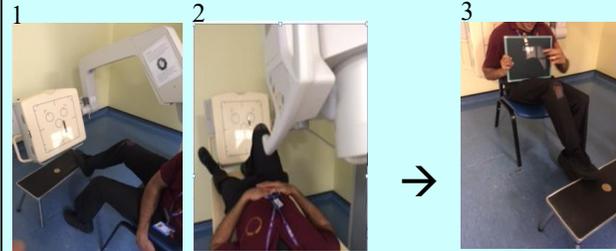


Figure 1: Previous method of positioning patients (1 and 2) and new method (3)

## Data collection

- Knee XR images between January and February 2018 via Sectra PACS
- 100 AP, 100 lateral and 100 skyline knee radiographs were viewed to establish:
  - Correct positioning?
  - Anatomical lead marker used?

## Results

Percentage of films (%)	AP films	
	Correct	Incorrect
AP films	76	24
Lateral films	65	35

Percentage of films before hand held cassette (%)	Skyline	
	Correct	Incorrect
Percentage of films before hand held cassette (%)	60	40
Percentage of films after hand held cassette (%)	63	37

Lead marker use: Average 60% from all views

## Discussion

- Positioning for AP, lateral and skyline radiographs in majority of cases meets targets (but under 80%)
- No change in skyline XR quality following hand held cassette introduction
- Lead anatomical marker usage low (90% departmental aim)

## Conclusions

- Correct positioning of patient important to produce high quality images
- Lead marker usage should be increased.
  - Society of Radiography: “markers applied to an image at the post-processing stage should be regarded as a safety net and as not standard practice”
- Possible reasons for incorrect technique/lack of lead marker:
  - Constraints such as patient age and morbidity
  - Technical aspects of imaging must be taken into account (eg C-arm equipment which can be difficult to use)

## Recommendations

- Discussion in radiography meetings/huddles about use of markers and positioning of patient
- Markers
  - Add it into the routine along with ID check
  - Ease of use: Self adhesive lead markers, make them easier to carry around
  - Personalised markers

## References

- <https://ce4rt.com/positioning/radiographic-positioning-of-the-leg-and-knee>
- Ruth Sutherland and Calum Thomson 2007 “Pocketbook of Radiographic Positioning”
- Kenneth L. Bontrager and John P. Lampignano 2010 “Textbook of Radiographic Positioning and Related anatomy”
- <https://www.rcr.ac.uk/audit/adequacy-lateral-knee-radiographs-performed-trauma>