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Towards Zero Redundancy: Improving the repetition rate of routine X-ray imaging

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Introduction

High demand for image quality leads to increased repetition rates in radiography, resulting in higher radiation doses for patients. Quality control activities are essential for identifying issues, applying techniques, and revising procedures to lower repetition rates, decrease patient radiation doses, and reduce operational inconveniences

Method

1.Adjusted positioning methods for KUB and lumbar spine AP imaging to ensure complete coverage of vulnerable areas.
2.Conducted staff training sessions.
3.Encouraged staff with minimal positioning errors to share their techniques.
4.Organized departmental case discussions.Initiated nightly equipment reboots by night shift staff.
5.Implemented a two-stage button press system during X-ray exposure.
6.Placed reminder notes on X-ray machines.
7.Advised patients to change clothing, especially in shoulder areas affected by bra straps.
8.Created posters and lists for patient clothing changes.
9.Instructed front desk staff to inform patients undergoing lower body imaging to change pants and skirts.

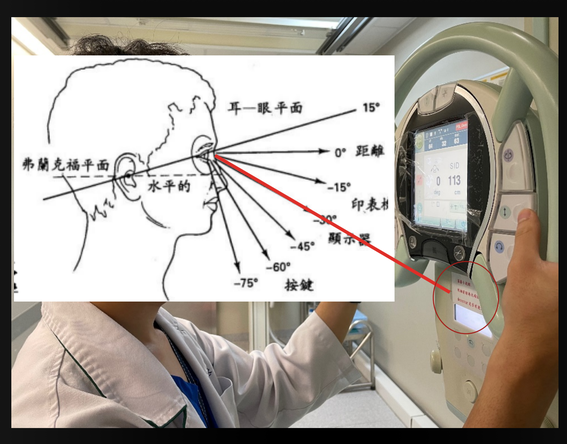
Conclusion

Implementing quality control techniques and revising standard procedures effectively reduced repetition rates and patient radiation doses while minimizing operational inconveniences. Positioning errors were identified as the most common cause of repetition, and while education is crucial, improving positioning skills relies on the experience of radiographers. Ongoing team collaboration and brainstorming are essential for sustained improvement.

Result



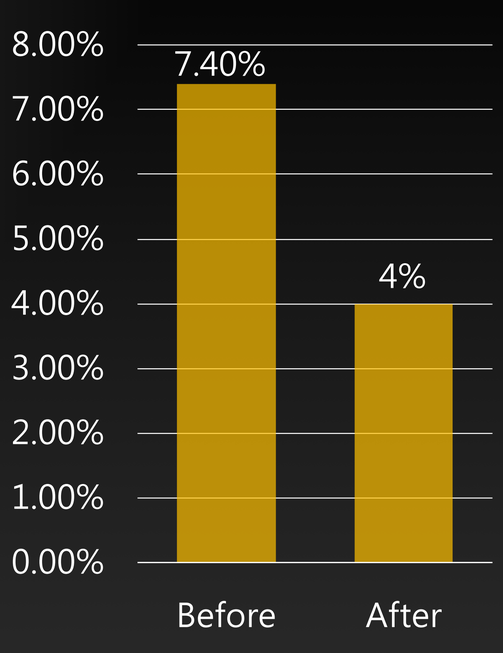
← *Figure 1:* When doing (KUB) and Lumbar Spine AP positioning, our alignment point is iliac Crest. However, it is easy to align to ASIS.Let the patient raise both hands so that it is easier to touch the iliac. Crest.



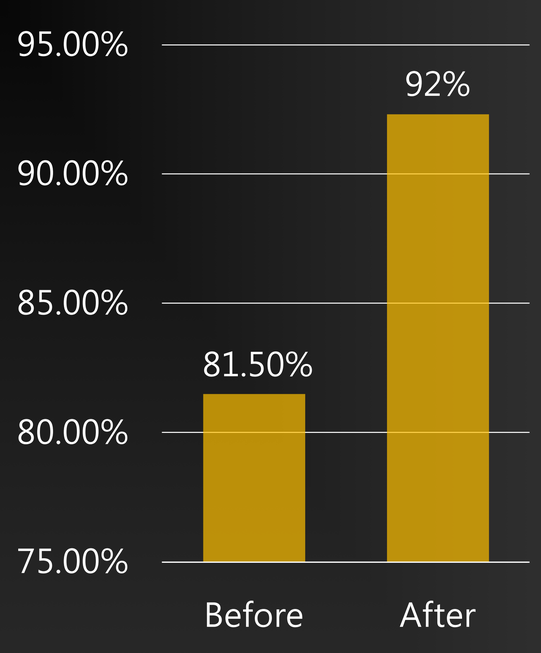
← *Figure 2:* We use human factors engineering and sensory characteristics theory to study how to post reminder notes on X-ray machines. The most suitable angle range is 0 to -30 degrees. The note is finally posted at this position on the X-ray tube.



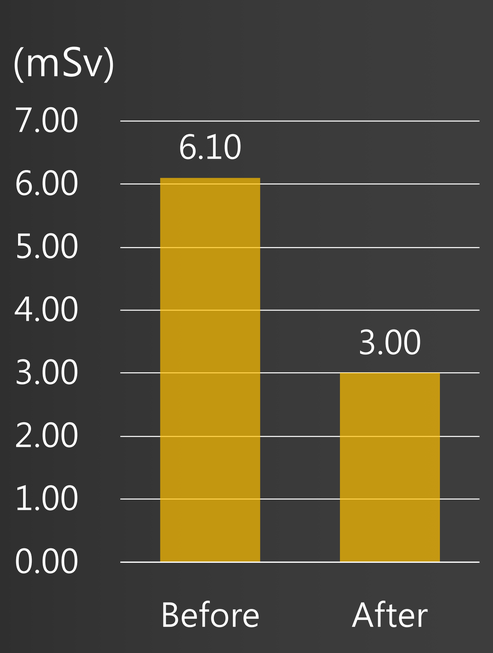
↑ *Figure 3:* We have redesigned and beautified the dressing posters and enlarged the key parts to make them easier for patients to read.



↑ *Figure 4:* Repetition rate



↑ *Figure 5:* The satisfaction rate of colleagues



↑ *Figure 6:* The total effective dose of patients

Before the improvement, the repetition rate was 7.4%, and after the improvement, it decreased to 4.0%. The satisfaction rate of colleagues increased from 81.5% to 92.3%. The total effective dose on patients was reduced by 3.1 mSv.

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