

**FACTORS AFFECTING IMAGE QUALITY
AND ENTRANCE SKIN EXPOSURE WHEN USING
AUTOMATIC EXPOSURE CONTROL (AEC)**

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ABSTRACT

The study was carried out to assess factors affecting image quality and entrance skin exposure (ESE) when using automatic exposure control (AEC). A total of 180 radiographs obtained from anthropomorphic phantom were evaluated in terms of clinical quality composite index (CQCI) and technical quality composite index (TQCI). All radiographs passing CQCI, scored by a radiologist, were taken into consideration for TQCI. Twenty experienced technologists blinded to experiment participated in TQCI evaluation. Three factors affecting the image quality and ESE, detector selection, object positioning and collimation, were assessed independently by comparison with the standard routine automatic exposure control procedures. Data were analyzed by means of descriptive statistics, and paired-t test. The p-values of less than 0.05 were deemed significant.

Proper vs. inaccurate detector selection, object positioning and collimation showed a mean TQCI of 1.36 vs. 1.40 ($p<0.02$), 1.37 vs. 1.36 ($p=0.24$) and 1.36 vs. 1.29 ($p<0.03$), and the mean entrance skin exposures (in mR) were 141.71 vs. 116.81 ($p<0.02$), 82.78 vs. 99.48 ($p=0.83$) and 83.65 vs. 98.32 ($p<0.02$) respectively. The data suggests that changing detectors combination may improve image quality if positions of the selected detectors are under the area of interest. The results also showed a variation of the ESE values from different detector combinations. In general, slightly poor positioning of the object from the selected detectors (± 2 cm) did not affect the technical image quality and the skin exposure. However, when the object positions were more than 3 cm away from the selected detectors, ESEs were increased significantly and the image quality was degraded. Improper collimation was also found to reduce the image quality. Reduction in size of collimation generally increased the entrance skin exposures due to the less contribution from scattered radiation to the detectors.

KEY WORDS: FACTORS / AUTOMATIC EXPOSURE CONTROL (AEC) / IMAGE QUALITY CRITERIA / ENTRANCE SKIN EXPOSURE (ESE)

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