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內文：

Purpose：The purpose of this study was to evaluate the effect of tube current reduction on image quality using medium and regular intensifying screens as well as a digital system for panoramic radiography.

Methods and materials：A total of 150 panoramic images of 75 patients (41 female and 34 male) were obtained in the study. Exclusion criteria were pregnancy, age 17 years or less, occupational X-ray exposure, and patients with previous extensive radiographic examinations. The patients were divided into five groups with each having 15 subjects. The initial images were taken at standard exposure settings, and secondary images were exposed with the tube current reduced at different rates.

Table 1. **Screen-digital system combinations and mA settings in the study.**

Combinations	Groups (n=15)	Dose Reduction (%)	First Exposure (kV/mA)	Second Exposure (kV/mA)
Regular-Regular Screen	Group 1	33.3	66/12	66/8
	Group 2	46.6	66/12	66/6.4
Medium-Medium Screen	Group 3	25	66/16	66/12
	Group 4	50	66/16	66/8
Digital-Digital Radiography	Group 5	25	70/4	70/3

All radiographs were assessed by three oral radiologists with at least ten years of experience each. The observers evaluated the images using a three-point scale1 (1=well visible, 0=partly visible, and -1=not or hardly visible) for anatomical structures and pathological findings (Table 2) which are commonly found on panoramic radiographs.

Table 2. Evaluated anatomical structures and pathological findings.

Anatomical Structures	Pathological Findings
Anterior nasal spine	Calculus
Articular eminence	Caries
Condylar process	Cyst and tumour like lesions
Coronoid process	Fracture of condyle
Disc space	Impacted teeth
External auditory meatus	Overextended root canal filling
External oblique ridge	Periapical lesion
Floor of maxillary sinus	Root fracture
Inferior concha	Root fragment
Inferior cortex	Strange material
Interdental septum	Underextended root canal filling
Mandibular canal	
Maxillary sinus	
Maxillary tuberosity	
Mental foramen	
Nasal septum	
Periapical lamina dura	
Periodontal ligament space	
Styloid process	
Zygomatic arch	
Zygomatic bone	

Results：There was no statistically significant difference ($p>0.05$) between the two exposures for Group 3 (the rate of dose reduction 25%) while a statistically significant difference ($p<0.05$) was found in Group 4 (the rate of dose reduction 50%) using medium intensifying screens for all observers. No statistically significant difference was found between the two exposures on digital panoramic images.

Conclusion:

1. According to the results of this study, dose reduction caused loss of image quality using regular intensifying screens when the tube current was reduced by 33.3% and 46.6%. In further studies, the reduction of tube current could be limited to only 16.6%.

2. A 25% dose reduction was achieved with a medium intensifying screen and digital panoramic radiography without any loss of image quality of either anatomical structures or pathological findings.

3. In further studies the reduction of tube current may be reduced by 37.5% using medium intensifying screens and by 50% for digital panoramic images.

題號	題目
1	關於TMJ的病變，何者為全關節置換術的適應症？ (A) 可復原的關節盤前移 (B) Mental foramen (C) Coronoid process (D) Frontal sinus
答案(D)	出處：Oral Radiology P.201~209
題號	題目
2	何種影像在需要包含大範圍顎骨時最常使用？ (A) Panoramic images (B) Lateral cephalometric projection (C) Waters projection (D) Computed tomography
答案(A)	出處：Oral Radiology P.191