

# **POSSIBILITY FOR DEVELOPMENT OF SPECIALIZED WORKING PLACES FOR ON-LINE X-RAY EXAMINATIONS OF INFANTS BASED ON APPLICATION OF DIGITAL MICRO FOCUS RADIOGRAPHY**

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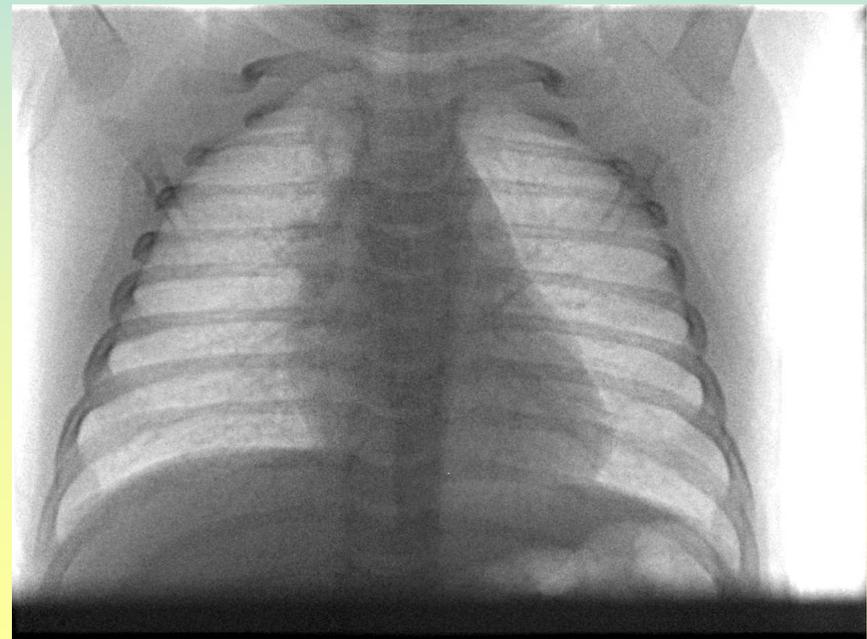
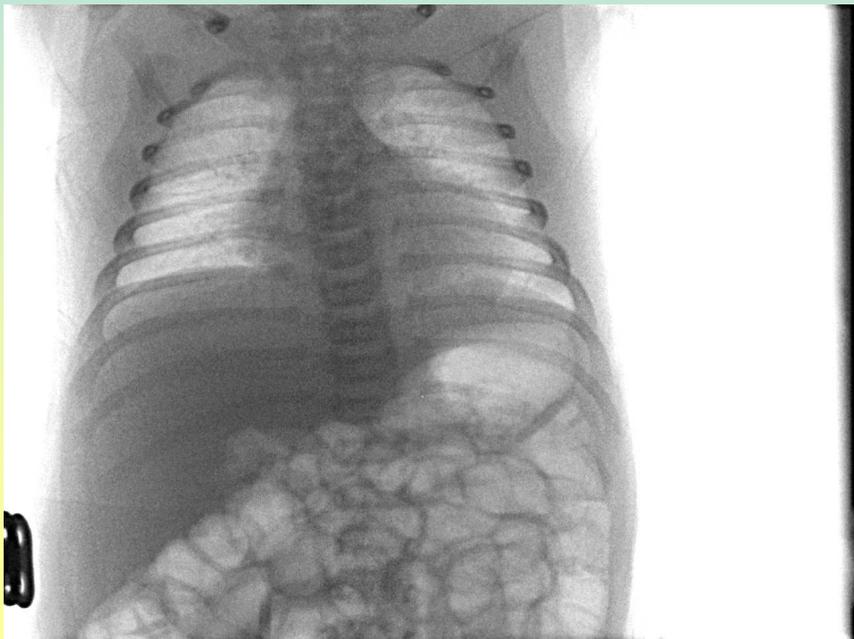
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**Purpose of work.** Currently, x-ray exams of the infants in Ukraine is often conducted with the use of film mobile x-ray units, resulting in long-time getting of the necessary diagnostic information and the need for continuous duty of an x-ray technician at the neonatal resuscitation. The aim of the study was to investigate the possibility for the development of the specialized working places for on-line x-ray examinations of the infants based on open intensive care units using digital micro focus radiography.



**Materials and methods.** There were used in the work: micro focus x-ray unit with a focal spot less than 0.05 mm, maximum anode voltage of 50kV and output power of 20 W, digital receptor with the size of the working field of 18x24 cm and a spatial resolution of 7.0 pp / mm, water (d = 10.0 cm) and the certification (18-220 #000V381) phantoms, X-ray test pattern and radiation monitor controller model 2026C (Radcal Corporation, USA).

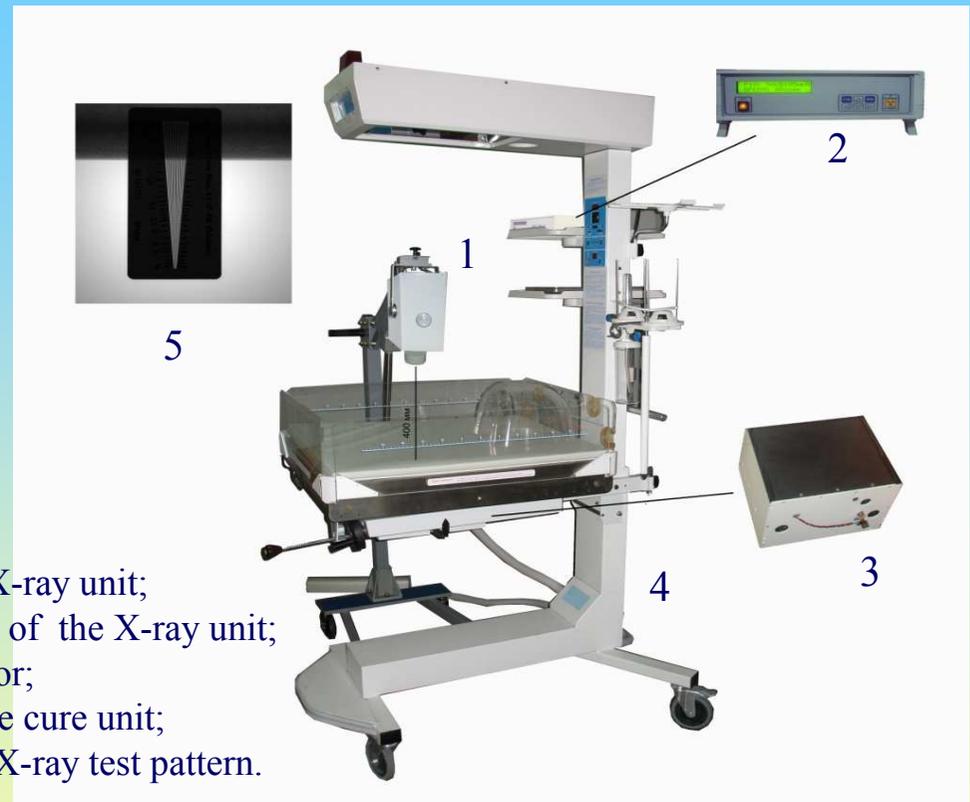
**Results.** A 10 objects was visually observed at a source-detector distance  $SSD = 200$  mm during the study of the complex effectiveness in the mode:  $U = 36$  kV,  $q = 0.27$  mAs (exposure dose in the receptors' plane less 19.0 mR) on the certification phantom. Radiation exposures can still be reduced by using micro focus x-ray unit with higher anode voltage. Time for a diagnostic image on a computer monitor did not exceed 15 seconds. With increasing the source-detector distance in 1.5 times and twice reducing the entrance dose the number of the observed objects reduced to 9. In the mode of the increasing the spatial resolution of the receptor increased from 7.0 to 12.0 pp/mm.

## Using of the mobile X-ray unit for infants radiography



Exposure setting:  
SDD = 60-70 cm;  
U = 65-70 kV;  
q = 0.5-1.0 mAs.  
Calculated effective dose for infants:  
chest radiography (PA) – 10- 14  $\mu$ Sv.

## Using of the digital micro focus X-ray unit for infants radiography



1 – micro focus X-ray unit;  
2 – power supply of the X-ray unit;  
3 – digital receptor;  
4 – open intensive care unit;  
5 – image of the X-ray test pattern.

Exposure setting:  
SDD = 20-40 cm;  
U = 40-50 kV;  
q = 0.1 - 0.4 mAs.  
Calculated effective dose for infants:  
chest radiography (PA) – 12- 16  $\mu$ Sv.

**Conclusions.** Specialized working places can be created based on the digital micro focus radiography for on-line x-ray examinations of the infants. It will allow obtaining the necessary on-line diagnostic information and send it for radiologists' analysis via telecommunication networks without the assistance of the x-ray technicians. Thus, digital micro focus radiography allows getting high-quality diagnostic images of the infants with the allowable radiation exposure on the newborn.

# Thank you for attention!

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