

# X-ray exposure components



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X-Ray Exposure Components of X-Ray Exposure Components The X-ray equipment uses electromagnetic radiations to develop an object's image, commonly with the intention of envisioning something situated beneath the surface of that object. The radiation emitting from the x-ray machine relies mainly upon kVp (tube voltage), mA (the x-ray tube current), s (exposure time) and cm (the distance between focus and detector). The dosage is defined by these parameters. So the major technical factors that affect an X-ray exposure are time, kVp, mA and distance. Each of them is briefly discussed below.

The variability in the electrons' speed is given by kVp (kilovolt potential) which then determines the x-ray beam's penetration, thus impacting the x-ray production's efficiency, and determining the level of image contrast. The right kVp yields differential x-ray immersion of dense and soft anatomic structures. Increasing kVp results in an increase in the penetration of an x-ray beam. If kVp is set too low, the resultant image will be devoid of density leading to a sooty or a whitewashed appearance while in case of too high kVp, the resultant image will be too dark and over exposed. The kVp controls the electrons' energy as they displace across the tube, or it may be said that kVp controls the electron's speed. Therefore, the higher tube potential (kVp), the larger will be the affect of the electrons. Moreover, the greater the tube potential the greater will be the penetration. Thus, kVp monitors the beam quality by monitoring the x-ray beam energy (Gray et al., 1983).

The tube intensity and exposure time could be an unequalled exposure factor (mAs). The factor, " mAs" refers to the rate of electrons flow in a predetermined time. Where, mA refers to tube current while s denotes time in seconds. Thus the two exposure factors work in combination to control the

quantity of electrons discharged at the cathode and afterward the quantity of x-rays developed at the anode. The milliampere seconds (mAs) ascertains the quantity of x-rays developed per unit time, while the quantity of x-rays arriving at the film ascertains the scale of film's blackening. Both of these factors monitor and adjust the exposure factor's quantitative character.

These exposure factors determine and influence the quality and quantity of the x-ray beam (Hecker, & Garreau, 2012).

Another important factor is the distance between the focus and detector that impacts the x-ray exposure. This relationship is quite simple as the nearer the x-ray tube is placed to the film the higher will be the intensity of the exposure of radiation to the film. So by manipulating or changing, the film to x-ray tube distance, the blackening of a film can be effectively increased or decreased. So in order to have best exposure it is better to standardize this distance and the easiest way of doing this is with an x-ray machine that possesses tube placed on a stand fastened to a table as well as a film holder (Kumar, Kumar and Malleswararao, 2011).

#### References

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