

KARNATAKA RADIOLOGY EDUCATION PROGRAM

XERORADIOGRAPHY

Various methods have been introduced for obtaining radiographs among which xeroradiographic copying process to record images produced by diagnostic x-rays.

It is a method of x-ray imaging in which a visible electrostatic pattern is produced on the surface of a photoconductor

HISTORY

The imaging method was discovered by an American physicist, Chestor Carlson in 1937.

Pogorzelska- Stronczak became the first to use xeroradiography, to produce dental images.

TYPES

- 1. The Medical 125 systems :-Used mainly in mammography and generalradiography.-Also been used for Cephalometric radiography and Tomography of TMJ.2.
- 2. The Dental 110 system :-Designed for dental xeroradiographs

Medical Xeroradiography :

Conventional X-ray source is needed.

Image is recorded on selenium coated plate.

Dental Xeroradiography Dental 110 xeroradiographic unit system is similar to medical 125 system in concept but its design is physically different. COMPONENTS

- . Xerographic plate
- Corotron
- •Cassette
- •Toner

•Special paper

The plate is made up of a 9.5 to 14 inch sheetof aluminium, a thin layer of amorphousselenium photo conductor, an interface layerand over cutting on the thin selenium layer.

A.The Aluminium substrate : The substrate for the selenium photoconductor should present a clean and smooth surface.

B.The interface layer : This is a thin layer of aluminium oxide between the selenium photo conductor and aluminium substrate.

C. Selenium Coating : The layer of amorphous selenium isapproximately 130 microns in thickness



Principle :

The xero radiographic plate is charged to a high positive potential by corotron

It is then placed in a cassette and used in a manner similar to that with conventional film in its cassette

When x-rays strike the selenium, photo conduction occurs and this produces a charge image of the part examined

The image is made visible by bringing into proximity to the plate charged developer

The resultant powder image is subsequently transferred to paper and fused providing anopaque xeroradiograph for interpretation and storage.

Applications:

The xeroradiography has found application in soft tissue imaging in radiographic examination of the mammary glands, muscles, tendons and ligaments.

Useful in detecting progress of remineralisation and demineralisation pattern of dentinal caries, diagnosis of incipient caries.

Assess success of root canal treatment detecting periapical lesions.

Advantages:

Elimination of accidental film exposure. High resolution : Xeroradiography has excellent characteristics of the forces around the electrostatic charges which form the latent image. Can be viewed without transillumination Better ease and speed of production : No special skills are required, dark room requirments are unnecessary and the entire xeroradiographic process may be completed within 60 seconds. Reduced exposure to radiation hazards. Economic benefit : When compared with halide radiography the expenditure is one-eight. Disadvantages :

Technical difficulties. Fragile selenium coat. Transient image retention. Slower speed.

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REF : Christensen's Physics of Diagnostic Radiology

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