

Course: Fundamentals of Radiology Science
(DRD- 200)

Lecture 1: Management of diagnostic radiography department

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Diagnostic radiography Technology
Department

Location and Layout

طابق قسم الأرواح للتمريض "احتياجات" الخاصة

- The location of the department and the relative positions of the examination rooms have a considerable bearing upon the protection requirements.

- Aspects for planning are

يجب أن تكون متصلة بالجناب
✓ Accessibility, convenience, privacy, traffic flow, etc. i.e. that should be well connected.
الملازمة

- ✓ Accessibility towards, OPD and emergency is a major point of consideration for this department.

أهم شيء سهولة الوصول
ED
بال > OPD

Main Building or Auxiliary

المبنى الرئيسي

المبنى المساعد

- Since irradiation to surrounding areas is a concern, the location of the department in a separate building preferably a single store may reduce such problems.

irradiation is a concern → Radiology department should be in a separate building. → reduce problems

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Ground or Upper Floors → ground floor is better to avoid

- Ground floor location can often avoid the problem of providing protection for the floor.
- Location of the department on the upper floor will require to take the position of **the adjacent buildings** into consideration. When the department is on the upper floor, it is important to attend to the **shielding of the floor**.

① Considerations of the position of adjacent buildings

② Shielding of the floor

* 1 + 2 are problems of upper floor location.

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Room Layout Typical Room Design

- Shielding and X-ray room design

The layout of rooms in a radiology **installation** shall be such that the **number of doors for entry should be kept minimum.**

يجب تقليل عدد الأبواب على قدر الامكان

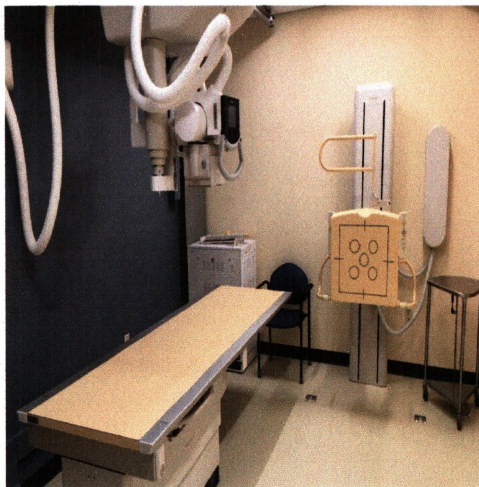
- The **unit should be placed so that radiation cannot be directed towards doors, windows, control panels, or high occupancy areas.**

يجب أن توضع وحدة التصوير بطريقة تكون فيها
الأبواب
السيارات
مناطق الأزدحام
وحدات التحكم

X-RAY ROOMS

- Must be large enough for the equipment
- Should have at least one patient change cubicle accessible from outside the room
- Must locate the operator's console where the primary beam will NEVER be directed towards it, but where the patient can be easily observed.
- Must be able to accommodate large beds/trolleys,
- Any aesthetic equipment likely able to be used
- Must locate holes in floors for cables away from radiation beams, or be shielded
- Must have radiation warning signs on all doors
- Should have radiation warning lights outside for fluoroscopy/angiography/and CT

Fluoroscopy / angiography / CT



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زاوية تغير المريض
واحد

شروط مطبخ الكونك

1. 1° beam will never be directed toward it
2. the patient should be easily observed

أي أداة
مادة عليك
استخدامها
(مريض ماسح)
المطبخ

cables should be

away from
radiation
beams

Shielded

by locating
holes in
floor

تكميل أم

لتقوية
الأضواء
الكبيرة

إشارات
تحذير على
الأبواب

X-ray Construction

بالتعمير

تقسيم الغرفة بالصفيح
2 سم

1. Shielding of X-Ray room with a lead equivalent of 2 mm

2. Concrete: 10 to 17 cm thick

خرسانة

3. Brick wall 20-25 cm thick, using clay bricks and cement

طوب

طوب طين +
أسمنت

4. Two important areas must be carefully examined:

الجانب خلف ادراج

✓ Wall behind chest stand

Chest Stand

✓ Wall of darkroom

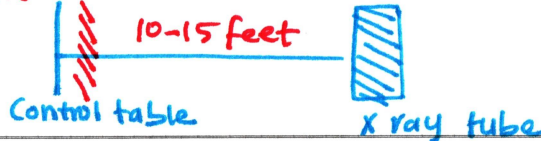
الغرفة المظلمة

5. lead glass window between operator and x-ray tube

النافذة بين أم تكم
مع الزجاج الرصاصي
بين الأخصائي
وكنوبة الـ
X-ray

6. Distance between the x-ray tube and control table should be as far as 10 to 15 feet

lead glass window



10-15 feet

Control table

X ray tube



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Room Size

• The room housing an X-ray unit shall not be less than 18m² for general purpose radiography and conventional fluoroscopy equipment.

• The size of the room housing the gantry of the unit shall not be less than 25m².

• Also not more than one unit of any type shall be installed in the same room and no single dimension of any room shall be less than four m.

لحجم الغرفة ما يتكبد بعدها أقل من 4 م

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الاستخدام
التقليد

ما يتكبد أكثر من
غرفة واحدة من أي
نوع في نفس الغرفة

Shielding

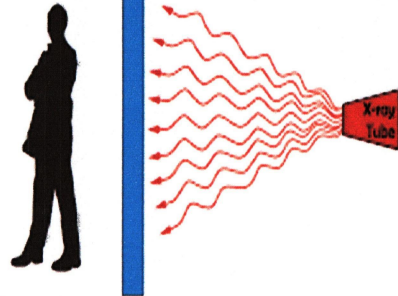
Appropriate structural shielding shall be provided for walls, doors, ceiling and floor of the room housing the X-ray unit so that doses received by workers and the members of public are kept to the minimum and shall not exceed the respective annual effective doses as prescribed by the competent authority.

نعمل تدريع
للغرفة تشمل
الموظفين والجمهور
بمجرد دخولهم للأول كمين
من الاستعاج .

Appropriate shielding shall also be provided for the dark room to ensure that the undeveloped X-ray films are not exposed to x-ray.

لغرفة المطامعة يربط
لازمن يصير فيها تدريع
عالم ما يدخل الـ X-ray إلى الأنفم وتخربها

X-ray Shielding



Guidelines

Purpose of Shielding

• To protect:

- الموظفين - the X Ray department staff
- المريض - the patients (when not being examined)
- الزوار - visitors and the public
- العاملين - persons working adjacent to or near the X Ray facility

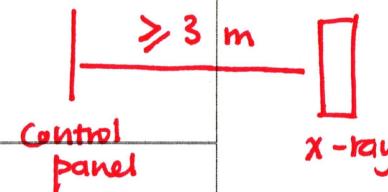
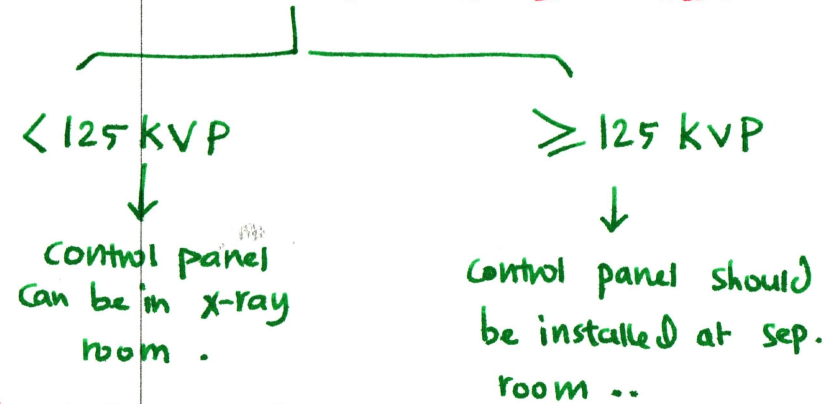
Control Panel

The control panel of diagnostic X-ray equipment operating at 125 kVp or above shall be installed in a separate room with appropriate shielding, direct viewing and oral communication facilities between the operator and the patient.

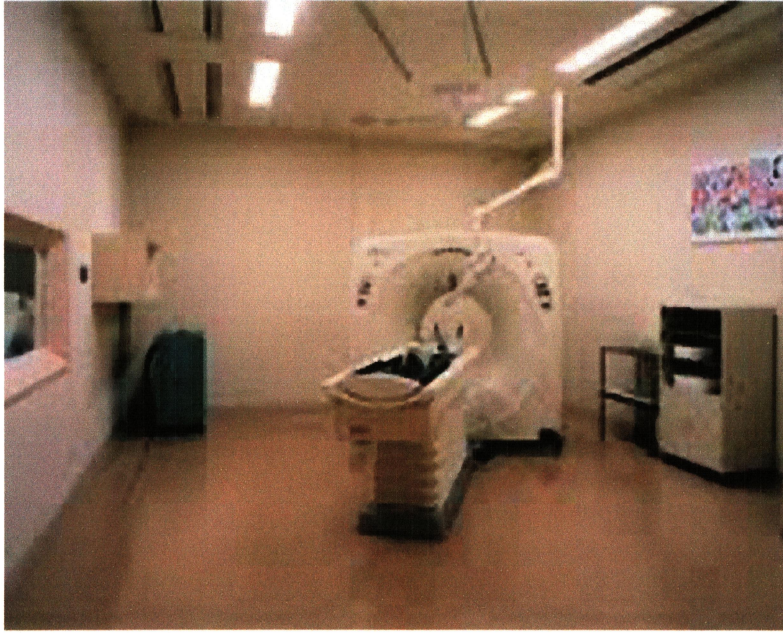
- In the case of X-ray equipment operating up to 125 kVp, the control panel can be located in the X-ray room. The distance between the control panel and X-ray unit/chest stand shall be not less than three m for general purpose fixed X-ray equipment



Site of Control panel according to type of Machine .



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Waiting Areas

- Patient waiting areas shall be provided outside the X-ray room.
- Warning Light and Placard
- A suitable warning signal such as red light shall be provided outside the X-ray room and kept "ON" in use to warn persons not connected with the particular examination from entering the room. An appropriate warning placard should be ideally placed

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الحفاظ على الأداة

Maintenance of equipment

Preventive maintenance- A visual checklist is maintained to ensure that all components of the radiographic system are working properly and that the mechanical rigidity and stability of the equipment in optimal.

Breakdown repairs- replacement of equipment, change or updating current equipment

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معايير الجودة

QCM

• Quality Control Measures

استخدام التمساح

المناسبة من

• Use of proper technique of exposure- time, intensity

etc.

① جيد وقت التعرض

② جودة التعرض

• Various tests are routinely carried out.

اختبارات روتينية

• Use of Good Equipment Films

استخدام أدوات جيدة

• Proper identification, reporting and storage

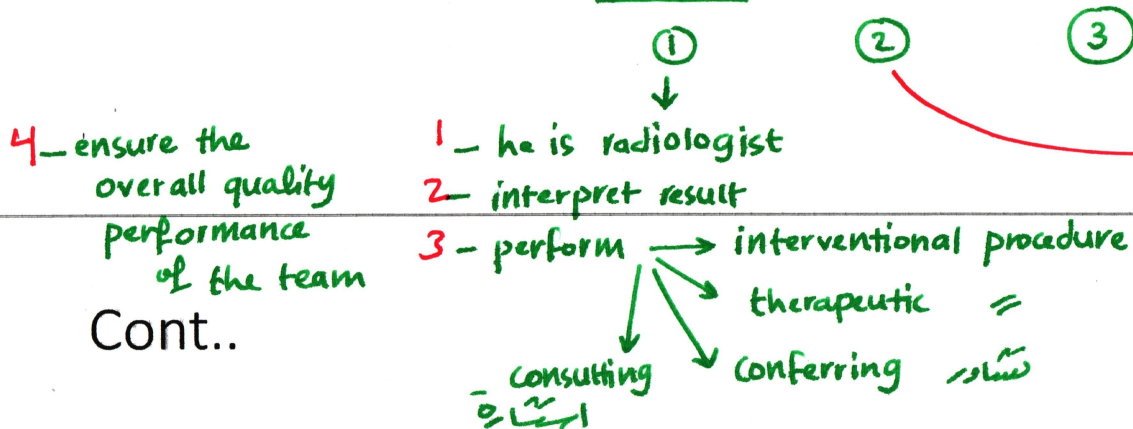
التخزين
كتابة التقارير
التعرف على المشاكل

Diagnostic Radiography Technology Team

Who are the members of the radiology team?

- A team of different healthcare professionals is responsible for the quality performance of radiology exams and procedures, and the accurate and timely interpretation of radiology procedure outcomes.

The radiology team includes physicians, technologists, and nurses.



4 - ensure the overall quality performance of the team

Cont..

- What do the radiology team members do?

- Physicians

- The radiology team is led by one or more radiologists, who are physicians specializing in the field of radiology. Radiologists are responsible for interpreting the results of examinations, performing certain procedures, such as **interventional radiology procedures** or **therapeutic procedures**, **conferring** and **consulting** with other physicians in other specialities, and ensuring the overall quality performance of the entire radiology team.

- 2 - assess / document patient status
- 3 - educational info. with patient.
- 4 - confer with radiologist regarding patient care needs.

- 1 - perform more complex radiology procedures as interventional procedures requiring
 - ↓ sedation
 - ↓ IV medications
 - ↓ contrast, nuclear substances

1 - perform radiology examinations

USS x-ray CT MRI Mammo.

- 2. receive formal training
- 3. provide educational info. to patients

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Cont..

Technologists

- Radiology technologists are responsible for performing many of the various types of radiology examinations, including x-rays, CT scans, MRI scans, mammograms, and ultrasound procedures.
- Technologists **receive formal training** in various types of educational programs and **provide educational information** to patients related to their radiology procedure.

Cont..

Nurses

- Nurses often perform more complex radiology procedures, such as **interventional procedures requiring sedation of the patient, or procedures requiring intravenous (IV) administration of medications,** contrast, and/or nuclear substances.
- Nurses may be responsible for assessing and documenting patient status, conferring with the radiologist for specific **patient care needs,** and providing educational information to patients related to their radiology procedure.

Summary

- The lecture contains information related to the Diagnostic Radiography Technology Department, including the location and building, the upper and lower floors, as well as the designs of the x-ray rooms and methods of the protection. It also includes the work team of the Department and the role for each of them within the department