

高等医药院校规划教材
供医学影像技术专业使用

医学影像技术 专业英语

主 编 蔡惠芳 董 谦

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内 容 简 介

本教材是根据高素质技能型人才培养目标,结合教学实际和临床实践而编写。本教材内容选择和结构体系适应了高职高专的教学需要,注重培养学生影像技术专业英语的阅读能力。编写过程中努力贯彻“必需、够用、实用”的原则,淡化学科意识,强调实践,力求突出教学过程的实践性、开放性和职业性,强化学生职业能力的培养,以满足高职高专学生对学习的要求。整体编写格式上更加符合高职高专教育规律,每章均设有项目目标、学习目的要求、知识导入、课文、生词、专业词汇组、注释以及目标检测等模块,有利于教师教学和学生的学习,有助于教学质量的提高和学生获得良好的学习效果。

本教材供医学影像技术专业师生使用。

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前 言

高等医药院校规划教材《医学影像技术专业英语》是根据高职高专教育医学影像技术专业学生对专业英语的需求而编写的。

根据高素质技能型人才培养目标,结合教学实际和临床实践,本教材内容选择和结构体系适应了高职高专的教学需要,注重培养学生影像技术专业英语的阅读能力。本教材在编写过程中努力贯彻“必需、够用、实用”的原则,淡化学科意识,强调实践,力求突出教学过程的实践性、开放性和职业性,强化学生职业能力的培养,以满足高职高专学生对学习的要求。整体编写格式上更加符合高职高专教育规律,每章均设有项目目标、学习目的要求,以及知识导入、课文、生词、专业词汇组、注释及目标检测等模块,有利于教师教学和学生学习,有助于教学质量的提高和学生获得良好的学习效果。

本教材主要涉及了医院影像科基本情况及要求、常见设备(包括CR、DR、DSA、CT、MRI、超声成像设备、核医学设备等)和PACS的功能特点、结构组成和使用等方面的内容。通过本教材的学习,能够掌握大量的专业英语词汇、专业英语的表达方式等,能够有效提高影像技术专业学生英语的阅读能力、理解能力、翻译能力,为其今后从事影像技术行业工作打下坚实基础。

本书编写过程中积聚了多位编者的心血,参考了相关专著和资料,在此特别感谢有关作者!同时还得到了相关院校的大力支持,在此一并致谢!

由于编者经验和水平有限,书中不足之处在所难免,敬请读者们批评指正。

编 者

2015年10月

目 录

Item 1 Radiology Department	1
Section 1 Function of Radiology Department	1
Section 2 Works of Radiology Department	4
Section 3 Requirements of Radiology Department	7
Item 2 Digital X-ray Imaging Equipment	11
Section 1 Overview	11
Section 2 Computed Radiography (CR)	16
Section 3 Digital Radiography (DR)	21
Section 4 Digital Subtraction Angiography (DSA)	30
Section 5 Digital Gastrointestinal Machine	35
Section 6 Medical Laser Imager	38
Item 3 X-ray Computed Tomography	42
Section 1 Function & Characteristics	42
Section 2 Equipment Structure	46
Section 3 Operation Guide	50
Item 4 Magnetic Resonance Imaging	56
Section 1 Function & Characteristics	56
Section 2 Equipment Structure	61
Section 3 Operation Guide	66
Item 5 Medical Ultrasonic Equipment	72
Section 1 Function & Characteristics	72
Section 2 Equipment Structure	76
Section 3 Operation Guide	80
Item 6 Nuclear Medicine Equipment	85
Section 1 Function and Characteristics	85
Section 2 Equipment Structure	89
Section 3 Operation Guide	96
Item 7 Picture Archiving and Communication System	100
Section 1 Overview	100
Section 2 Components & Application	105
Section 3 Application Criterion	112
VOCABULARY	119
解剖常用词汇	129

Item 1 Radiology Department

Item Goals

Studying Objectives

In this item, we will present you some basic information about the radiology department. After that, it could give you an overall understanding of the radiology department.

Knowledge Requirements

Mastery: To grasp the basic functions and some equipment of the radiology department.

Acquaintance: To get acquainted with the contents of the radiology department.

Understanding: To understand the requirements of the radiology department.

Section 1 Function of Radiology Department

Lead-in Questions

1. You must have seen a doctor in the hospital, but have you seen the radiology department, do you know where it is and what it is?
2. What is the function of the radiology department?
3. What are the main equipment in the radiology department?

Text

Radiography started in 1895 with the discovery of X-rays, a type of electromagnetic radiation. Soon these found various applications, from helping to find shoes that fit, to the more lasting medical uses. X-rays were put to diagnostic use very early, before the dangers of ionizing radiation were discovered. Initially, many groups of staff conducted radiography in hospitals, including physicists, photographers, doctors, nurses and engineers. The medical speciality of radiology grew up around the new technology and this lasted for many years. When new diagnostic tests involving X-rays were developed, it was natural for the radiographers to be trained and adopt this new technology. This happened first with fluoroscopy, computed tomography and mammography. Ultrasound and magnetic resonance imaging was added to the list of skills used by radiographers

because they are also medical imaging, but these disciplines do not use ionizing radiation or X-rays. Although a nonspecialist dictionary might define radiography quite narrowly as “taking X-ray images”, this has only been part of the work of radiographers and radiologists for a very long time. X-rays are also exploited by industrial radiographers in the field of nondestructive testing, where the newer technology of ultrasound is also used.

And radiology department is just a division which takes imaging exam of human body using X-rays in the hospital or some institutes. It is a very important examination section in the hospital. In the modern hospital, radiology department is a section which is a set of exam, diagnosis and treatment. Many diseases in clinical departments are required to achieve the definite diagnosis by the exam of radiology equipment.

In our country, radiology departments of most hospitals are located in the 1F or underground of the outpatient and inpatient department. Radiology department uses its equipment to take imaging examination of the human body. The imaging exam includes X-rays, magnetic resonance (MR), ultrasonography (USG), etc. Thus, the main equipment of radiology department include X-ray machine, computed tomography (CT), magnetic resonance imaging (MRI), ultrasonography (USG) and nuclear medical imaging equipment. In some special hospitals, a number of dedicated medical imaging equipment should be equipped, for example, X-ray machine for chest radiography must be used in the chest hospital, and the orthopedics hospital should be equipped with X-ray machine for the limbs radiography. Beyond that, internal radiology information system (RIS), hospital information system (HIS), picture archiving and communication system (PACS) and some other auxiliary devices should be equipped in the radiography department. Table 1-1-1 shows the basic equipment in the radiography department.

Table 1-1-1 Basic equipment in the radiography department

Equipment	Equipment use	Equipment	Equipment use
Ordinary photographic X-ray machine	X-ray radiography for thinner part	CT machine	X-ray computed tomography
Bucky photographic X-ray machine	X-ray radiography for thicker part	MRI machine	Magnetic resonance imaging
Gastrointestinal X-ray machine	Fluoroscopy, spot shot	B-mode instrument	B-mode ultrasonography
CR, DR	Digital X-ray radiography	Color ultrasound equipment	Color ultrasound imaging and ultrasonic doppler imaging
DSA	Digital subtraction angiography	Nuclear medicine equipment	Radionuclide imaging
Molybdenum target photography machine	Mammography	Auxiliary devices	Automatic processor and laser camera
Bedside X-ray machine	Radiography for bedside or in operation	RIS, HIS and PACS	Medical digital image archiving and communication

New Words

radiology [reɪdɪ'ɒlədʒi]

electromagnetic [ɪˌlektroʊmæg'netɪk]

n. <医>放射学, 辐射学

adj. <物>电磁的

ionizing ['aɪənaɪzɪŋ]	v. (使) 电离, (使) 成离子 (ionize 的现在分词)
tomography [tə'mɒgrəfi]	n. X 线断层摄影术
mammography [mæ'mɒgrəfi]	n. 乳房 X 线照相术
ultrasound ['ʌltrəsəʊnd]	n. 超声, 超声波
magnetic [mæg'netɪk]	adj. 磁性的, 有吸引力的
resonance ['rezənəns]	n. 共鸣, 共振
outpatient ['aʊtpeɪfnt]	n. 门诊病人
inpatient ['ɪnpeɪfnt]	n. 住院病人
ultrasonography [ʌltrəsə'nɒgrəfi]	n. 超声波检查法, 超声波扫描术
nuclear ['nju: kliə (r)]	adj. 原子核的, 原子能的
orthopedics [ˌɔ: θə'pi: dɪks]	n. 整形外科, 骨科
limb [lɪm]	n. 四肢, 枝干
auxiliary [ɔ: g'zɪliəri]	adj. 辅助的, 备用的
bucky ['bʌki]	n. <医>活动滤线器, 滤线器
gastrointestinal [ˌgæstrəʊɪn'testɪnl]	adj. 胃与肠的
fluoroscopy [ˌflʊə'rɒskəpi]	n. 荧光透视法
doppler ['dɒplə]	adj. 多普勒的
subtraction [səb'trækʃn]	n. 减, 减法
angiography [ændʒɪ'ɒgrəfi]	n. <医>血管造影法
radionuclide ['reɪdɪəʊ'nju: klaid]	n. 放射性核素
molybdenum [mə'libdənəm]	n. 钼

Professional Phrases

1. electromagnetic radiation	电磁辐射
2. ionizing radiation	电离辐射
3. computed tomography	计算机 X 线断层摄影 (CT)
4. magnetic resonance imaging	磁共振成像 (MRI)
5. radiology information system	放射信息系统 (RIS)
6. hospital information system	医院信息系统 (HIS)
7. picture archiving and communication system	影像归档和通信系统 (PACS)
8. spot shot	点片摄影
9. digital subtraction angiography	数字减影血管造影 (DSA)

Key Notes to the Text

1. X-rays were put to diagnostic use very early, before the dangers of ionizing radiation were discovered.

在电离辐射的危害被发现之前, X 射线很早就应用于诊断。

2. In the modern hospital, radiology department is a section which is a set of exam,

diagnosis and treatment.

在现代医院中,放射科是一个集检查、诊断与治疗于一体的部门。

3. In some special hospitals, a number of dedicated medical imaging equipment should be equipped, for example, X-ray machine for chest radiography must be used in the chest hospital, and the orthopedics hospital should be equipped with X-ray machine for the limbs radiography.

在某些专科医院,还需要配备一些专用的医学影像设备。例如,胸科医院中应包括胸部摄影专用 X 线机,骨科医院中应配备用于四肢摄影的专用 X 线机。

Item Detection

I. Answer the following questions according to the text.

1. What's the radiology department?
2. What equipment is there in the radiology department?
3. Which kind of exam are the different equipment used for?

II. Translate the following professional words into Chinese.

1. radiology
2. tomography
3. magnetic
4. ultrasonography
5. bucky
6. fluoroscopy
7. angiography

III. Translate the following professional phrases into Chinese.

1. computed tomography
2. electromagnetic radiation
3. magnetic resonance imaging
4. spot shot
5. picture archiving and communication system
6. digital subtraction angiography

IV. Translate the following sentences into Chinese.

1. Ultrasound and magnetic resonance imaging was added to the list of skills used by radiographers because they are also medical imaging, but these disciplines do not use ionizing radiation or X-rays.
2. Many diseases in clinical departments are required to achieve the definite diagnosis by the exam of radiology equipment.

Section 2 Works of Radiology Department

Lead-in Questions

1. What are the staff members in radiography department?
2. What is the daily work of the staff in the radiography department?

Text

Radiology department has always been the traditional essential department in the general

hospital, which has made a great contribution to the medical care, scientific research and medical teaching. With the integration of computer technology, modern physics, electronics and traditional radiology, modern radiomedicine is like getting wings with high-tech. It offers a comprehensive range of imaging services and advanced procedures to diagnose a wide variety of conditions. Radiology department has shown a new vitality in the medical field, it is more and more irreplaceable in the medical diagnosis and treatment works. So the staff in radiography department is of great concern to the hospital.

According to different work contents, the radiology staff can be mainly divided into five groups: diagnosis doctors, radiation technologists, nurses, engineers and assistant personnel.

The work of all kinds of personnel is as follows.

1. Diagnosis doctors

(1) Deal with fluoroscopy, angiography, CT, MRI and interventional therapy according to the clinical request, standardized written diagnosis report and regular check of diagnostic accuracy.

(2) Timely report the diagnosis of emergency radiological examination, and in charge of rescue in some special exams.

(3) Comply with all kinds of exam procedures, operate machines correctly, maintain the machines, accept the guidance and supervision of the machine operation from specially-assigned person.

(4) Teach training and research works in radiology diagnosis.

2. Radiation technologists

(1) Take routine and some special radiography, operate machines in concert with diagnosis doctors to ensure the image quality, complete the emergency rescue work with the diagnosis doctors.

(2) Maintain the machines, coach and supervise the use of machines for non-special operators.

(3) Teach training and research works in radiological technology.

3. Nurses

(1) Cooperate with the doctor to carry out the exam (angiography, CT, MR, interventional therapy), sterilization operation and disinfection preparation.

(2) Preoperative, in operation and postoperative patient care under the guidance of doctor, and rescue works.

(3) Responsible for the check and management of equipment, drugs, goods.

4. Engineers

(1) In charge of the equipment installation, debugging, overhaul, regular maintenance and stability detection.

(2) Coach and supervise the use of machine.

5. Assistant personnel

(1) Responsible for the exam registration, reservation, pricing of the outpatient and inpatient, etc.

(2) Be in charge of explaining the preparation and attentions for the exam.

Through the collaboration of all kinds of radiological staff, patients will get the films and reports, so that the clinical doctors can make further diagnosis and treatment.

New Words

essential [ɪ'senʃl]	<i>adj.</i> 基本的, 必要的
integrated ['ɪntɪɡreɪtɪd]	<i>adj.</i> 完整的, 整体的; <i>v.</i> 一体化
irreplaceable [ˌɪrɪ'pleɪsəbl]	<i>adj.</i> 不可替代的
technologist [tek'nɒlədʒɪst]	<i>n.</i> 技术专家
interventional [ˌɪntə'veɪʃnəl]	<i>adj.</i> <医>介入的, 干涉的
therapy ['θerəpi]	<i>n.</i> 治疗
timely ['taɪmlɪ]	<i>adj.</i> 及时的
supervision [ˌsju:pə'vɪʒn]	<i>n.</i> 监督
sterilization [ˌsterəlaɪ'zeɪʃn]	<i>n.</i> 杀菌, 灭菌
disinfection [ˌdɪsɪn'fekʃən]	<i>n.</i> 消毒
preoperative [prɪ'ɒpəreɪtɪv]	<i>adj.</i> 术前的
postoperative [ˌpəʊst'ɒpəreɪtɪv]	<i>adj.</i> 术后的
installation [ˌɪnstə'leɪʃn]	<i>n.</i> 安装
debugging ['di:'bʌɡɪŋ]	<i>n.</i> 调试
overhaul ['əʊvəhɔ:l]	<i>n.</i> 检修
reservation [ˌrezə'veɪʃn]	<i>n.</i> 预约
collaboration [kə'læbə'reɪʃn]	<i>n.</i> 合作

Professional Phrases

1. of great concern	至关重要
2. interventional therapy	介入治疗
3. in charge of	负责
4. comply with	遵守
5. specially-assigned person	专人
6. in concert with	和……合作
7. sterilization operation	灭菌操作
8. disinfection preparation	消毒准备
9. patient care	病人护理

Key Notes to the Text

1. With the integration of computer technology, modern physics, electronics and traditional radiology, modern radiomedicine is like getting wings with high-tech.

随着计算机技术、现代物理学、电子学与传统放射学的有机结合，现代放射医学插上了高科技的翅膀。

2. Radiology department has shown a new vitality in the medical field, it is more and more irreplaceable in the medical diagnosis and treatment works. So the staff in radiography department is of great concern to the hospital.

放射科已经在医学领域显示出了新的活力，它在医疗诊治工作中的地位越来越不可替代。因此，放射科工作人员对医院来说也尤为重要。

3. Deal with fluoroscopy, angiography, CT, MRI and interventional therapy according to the clinical request, standardized written diagnosis report, regular check of diagnostic accuracy.

根据临床申请要求，处理透视、造影、CT、MRI 及介入治疗等，规范书写诊断报告，定期检查诊断准确率。

Item Detection

I. Answer the following questions according to the text.

1. What is the staff composition of the radiology department?
2. What do the kinds of staff do in the radiology department?
3. What will the patient get after the examination?

II. Translate the following professional words into Chinese.

- | | | | |
|------------------|-----------------|-------------------|------------------|
| 1. irreplaceable | 2. technologist | 3. interventional | 4. sterilization |
| 5. preoperative | 6. debugging | 7. overhaul | 8. collaboration |

III. Translate the following professional phrases into Chinese.

- | | | |
|---------------------|-----------------|------------------------------|
| 1. of great concern | 2. in charge of | 3. specially-assigned person |
| 4. in concert with | 5. comply with | |

IV. Translate the following sentences into Chinese.

1. It offers a comprehensive range of imaging services and advanced procedures to diagnose a wide variety of conditions.
2. Take routine and some special radiography, operate machine in concert with diagnosis doctors to ensure the image quality, complete the emergency rescue work with the diagnosis doctors.

Section 3 Requirements of Radiology Department

Lead-in Questions

1. What are the requirements of the radiology department staff to comply with?
2. Before the examination, what information should be confirmed of the patients?

Text

There are many requirements in different working contents of radiology department. Here we only introduce some major and common requirements.

First of all, the staff must have basic medical ethics, practice the Hippocratic Oath at work. And then, it is also very important that the staff must carefully check the patient's basic information, such as the whole name, gender, age, patient number and radiation number, read the inspection application carefully, take notice of medical history, clinical diagnosis, inspection item and body part. By doing so, it could ensure that the exam is carried out on right patient and correct inspection part.

For each inspection item, staff in radiology department must focus on the medical history and drug allergy history of every patient. The diagnosis doctor would make sure the exam plan according to the medical history, and the nurse would confirm that the patient do not have contrast medium allergy on the basis of drug allergy history. The registration personnel should do some necessary explanation to the patient, and the radiation technologist must affirm that the patient have removed foreign matters such as necklace, denture, jade pendant, glasses and other metal items, because that the foreign matters like metal will bring some artifacts in CT and MRI images, which may even cause fatal harm to the human body and MRI machine.

According to the inspected body part, radiologists select appropriate conditions and range of radiography, and give lead protection for non-inspection part in necessary. The conditions include body size, tube voltage (kV), tube current (mA), exposure time (s), pitch, reconstruction algorithm, and so on. Moreover, it's significant that the staff must comply with the radiation safety operation regulations and specification for equipment use. According to the radiological protection regulations promulgated by the State Council, exposure dose must be strictly controlled while the patient is diagnosed, treated and checked by radioactive isotope or rays, to avoid unnecessary exposure.

New Words

ethics ['eθɪks]	<i>n.</i> 道德规范
gender ['dʒendə]	<i>n.</i> 性别
inspection [ɪn'spekʃn]	<i>n.</i> 检查
appropriate [ə'prəʊpriət]	<i>adj.</i> 适当的, 合适的
lead [li: d]	<i>n.</i> 铅
ensure [ɪn'ʃʊə(r)]	<i>v.</i> 确保
significant [sɪg'nɪfɪkənt]	<i>adj.</i> 重要的, 有意义的
allergy ['ælədʒi]	<i>n.</i> 过敏性反应
affirm [ə'fɜ: m]	<i>v.</i> 证实, 确认
denture ['dentʃə]	<i>n.</i> 假牙, 义齿

fatal ['fɜːtl]	<i>adj.</i> 重大的, 致命的
exposure [ɪk'spəʊʒə (r)]	<i>n.</i> 曝光
pitch [pɪtʃ]	<i>n.</i> 螺距
algorithm ['ælgərɪðəm]	<i>n.</i> 算法
promulgate ['prɒmlgeɪt]	<i>v.</i> 颁布
isotope ['aɪsətəʊp]	<i>n.</i> 同位素

Professional Phrases

1. Hippocratic Oath	希波克拉底誓言
2. patient number	病人编号
3. radiation number	放射编号
4. inspection item	检查项目
5. carry out	实施, 进行
6. focus on	集中于
7. contrast medium	造影剂
8. on the basis of	依据, 根据
9. jade pendant	玉坠
10. non-inspection part	非检查部位
11. tube voltage	管电压
12. tube current	管电流
13. State Council	国务院

Key Notes to the Text

1. And then, it is also very important that the staff must carefully check the patient's basic information, such as the whole name, gender, age, patient number and radiation number, read the inspection application carefully, take notice of medical history, clinical diagnosis, inspection item and body part.

其次, 同样很重要的是, 放射科工作人员必须认真核对病人基本信息, 包括姓名、性别、年龄、病人编号及放射编号, 认真阅读检查申请单, 注意病史、诊断、检查项目和检查部位。

2. The registration personnel should do some necessary explanation to the patient, and the radiation technologist must affirm that the patient have removed foreign matters such as necklace, denture, jade pendant, glasses and other metal items, because that the foreign matters like metal will bring some artifacts in CT and MRI images, which may even cause fatal harm to the human body and MRI machine.

登记人员需要对患者进行必要的解释工作, 放射技师则必须确认患者已经去除身上的异物, 如项链、假牙、玉坠、眼镜及其他金属物品, 因为这些物品不仅会对 CT 和 MRI 图像产生伪影, 甚至可能会对人体和 MRI 设备产生严重伤害。

3. According to the inspection body part, radiologists select appropriate conditions and range of radiography, and give lead protection for non-inspection part in necessary.

根据检查部位,选择合适的放射检查条件和范围,对非检查部位进行必要的铅屏蔽防护。

4. According to the radiological protection regulations promulgated by the State Council, exposure dose must be strictly controlled while the patient is diagnosed, treated and checked by radioactive isotope or rays, to avoid unnecessary exposure.

根据国务院颁布的放射防护条例,对患者使用放射性同位素或者射线进行诊断、治疗、检查时,必须严格控制受照剂量,避免不必要的照射。

Item Detection

I. Answer the following questions according to the text.

What are the requirements of the radiology department staff to comply with?

II. Translate the following professional words into Chinese.

- | | | | | |
|------------|-----------|----------------|------------|------------|
| 1. lead | 2. gender | 3. appropriate | 4. ensure | 5. allergy |
| 6. denture | 7. fatal | 8. pitch | 9. isotope | |

III. Translate the following professional phrases into Chinese.

- | | | |
|------------------------|---------------------|--------------------|
| 1. Hippocratic Oath | 2. radiation number | 3. inspection item |
| 4. non-inspection part | 5. focus on | 6. contrast medium |
| 7. tube voltage | 8. State Council | |

IV. Translate the following sentences into Chinese.

1. By doing so, it could ensure that the exam was carried out on right patient and correct inspection part.
2. The diagnosis doctor would make sure the exam plan according to the medical history, and the nurse would confirm that the patient do not have contrast medium allergy on the basis of drug allergy history.
3. The conditions include body size, tube voltage (kV), tube current (mA), exposure time (s), pitch, reconstruction algorithm, and so on.

Item 2 Digital X-ray Imaging Equipment

Item Goals

Studying Objectives

In this item, digital X-ray imaging equipment are introduced, including computed radiography (CR), digital radiography (DR), digital subtraction angiography (DSA), digital gastrointestinal machine and laser imager. With the study of these items, it is essential to learn about the operating principle, operation procedure and systematic configuration of every equipment.

Knowledge Requirements

Mastery: To grasp some concepts, key points and professional terms about imaging process, operation procedure and systematic configuration of digital X-ray imaging equipment.

Acquaintance: To get acquainted with characteristics of CR, DR, DSA and digital gastrointestinal machine.

Understanding: To understand the components and operation of laser imager.

Section 1 Overview

Lead-in Questions

1. With the help of X-ray, have you ever thought of looking inside your body? How can we transform the information of organs and tissues into digital images?
2. Could you list several kinds of digital X-ray imaging equipment?
3. In accordance with your knowledge, which characteristics should digital X-ray imaging equipment in the future have?

Text

X-ray is a form of electromagnetic wave. It behaves in the same way as light, but with

shorter wavelength.

When directed at a target of low density, X-ray can pass through the substance uninterrupted. Higher density targets will reflect or absorb X-ray. Thus, an X-ray image shows dark areas for soft tissues and shows light areas for bone. Passing through human body, it can carry important characteristic information of inner structure, in virtue of different density features among bone, tissue and muscle.

X-ray was discovered accidentally in 1895 by the German scientist Wilhelm Roentgen. Its most important application has been in medicine. X-ray revolutionizes the way how doctors detect diseases and injuries. For the first time, we could see bones and other structures inside the living body instead of relying on symptoms, samples or surgery.

Since the first X-ray machine was invented, various kinds of X-ray machines have been developed for diagnosing and treating many diseases. In this item, we only discuss the diagnostic X-ray machine and focus on computed radiography (CR), digital radiography (DR), digital subtraction angiography (DSA) and digital gastrointestinal machine. Meanwhile, laser imager is also discussed for its application as auxiliary equipment.

Although there are great differences among diagnostic X-ray machines for different diagnostic objectives, the fundamental structure of X-ray machines is similar, which consists of X-ray generating device, X-ray imaging device and X-ray auxiliary device, as is shown in Fig. 2-1-1.

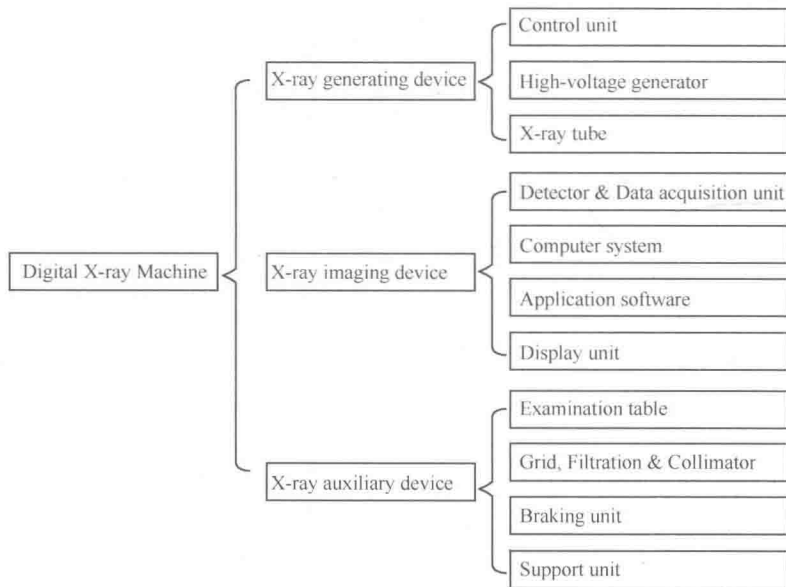


Fig. 2-1-1 System composition of X-ray machine

In X-ray generating device, X-ray tube is to generate X-ray, high-voltage generator is to supply filament voltage and tube voltage, and control unit takes charge of X-ray's quality, quantity and exposure time.

X-ray tube can transform electric energy into X-ray. High voltage generated by high-voltage generator is applied between cathode and anode of X-ray tube. It directly determines