



FEDERAL UNIVERSITY, NDUFU-ALIKE, IKWO, EBONYI STATE

STUDENT INDUSTRIAL WORK EXPERIENCE SCHEME (SIWES)

AT

LAGOSSTATE UNIVERSITY TEACHING HOSPITAL (LASUTH), IKEJA.

BY

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TITLE

A REPORT OF SIX (6) MONTHS STUDENT INDUSTRIAL WORK EXPERIENCE

SCHEME

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DEDICATION

I dedicate this work to my beloved mother; Mrs. Nwifuru Nwibo Grace

Who give birth to I, Mr. Nwifuru John Nwazunku and other 5 siblings of mine in the family of Nwifuru Ogalegu

ACKNOWLEDGEMENT

May Eternal honour and glory be to God Almighty who is; who was and who will forever be the source of living ,provider and strength.

Words are not adequate to explain my gratefulness to those whom God has used to bless my life.

With a mostly passion, I would like to acknowledge my friends, Parent, lecturers, business mates, who have contributed immensely towards my education. In particular, I wish to thank;

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ABSTRACT

This report reviews the knowledge gotten from six (6) months of student industrial work experience scheme(SIWES) at Lagos State University Teaching Hospital(LASUTH); Ikeja Lagos State Nigeria. SIWES is an acronym meaning student industrial work experience scheme. It is the accepted skill training programme which forms part of the approved minimum academic standards in various degree programs for all the Nigerian university. Its main aim and objective is an effort to bridge the gap between theories and practical class.

Lagos state university teaching hospital is formally known ascottage hospital ,in June 29,1955 and changed to General hospital, then renamed to lagos state university teaching hospital in 1999. However it lagos state college of medicine was attach to the lagos state university teaching hospital. This establishment comprises of different department and units but this report is mainly based on five (5) department which includes; mortuary section, autopsy, histopathology, museum technique and radiology.

In mortuary section, this is where embalming and preserving of deceased body are practiced, types of embalming includes; arterial embalming, cavity embalming, hypodermic embalming and surface embalmment. It has many workers and different rooms

An autopsy is post mortem examinations usually carry to find the cause of death. It is normally performed by pathologist. Types of autopsy include; forensic autopsy, clinical autopsy, anatomical autopsy, virtual or medical imaging autopsies. This test is usually conducted by a doctor called pathologist. There are two kind of examination which are; external and internal examinations.

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CHAPTER ONE

INTRODUCTION

MEANING OF SIWES

Siwes is an acronym which means student industrial work experience scheme. It is the accepted skill training program which forms part of the approved minimum academic standards in various degree programs for all the Nigerian university.

It is an effort to bridge the gap between theories and practical on engineering and technology, science, agriculture, medical, management and other professional educational programs in the tertiary institutions.

It is aimed at exposing the students to the machines, equipment, professional workers methods and ways of safe guarding the work areas and workers in the industries and organization.

In like manner, siwes is a cooperative industrial internship program that involves institution of higher learning, industries, the federal government of Nigeria, industrial training fund (ITF); Nigerian university commission(NUC) in Nigeria.

OBJECTIVES OF SIWES

There are much aims and objectives of student industrial work experience scheme (SIWES).

First; it was established to enhance student in their various areas of studies. They includes

To bridge the great gaps between theories and practical experience.

To promote industrialization in all part of Nigeria and avenue between the word of teaching and learning, industrial work with reference to a field of studies.

To expose the student to the work they are likely to meet after graduation.

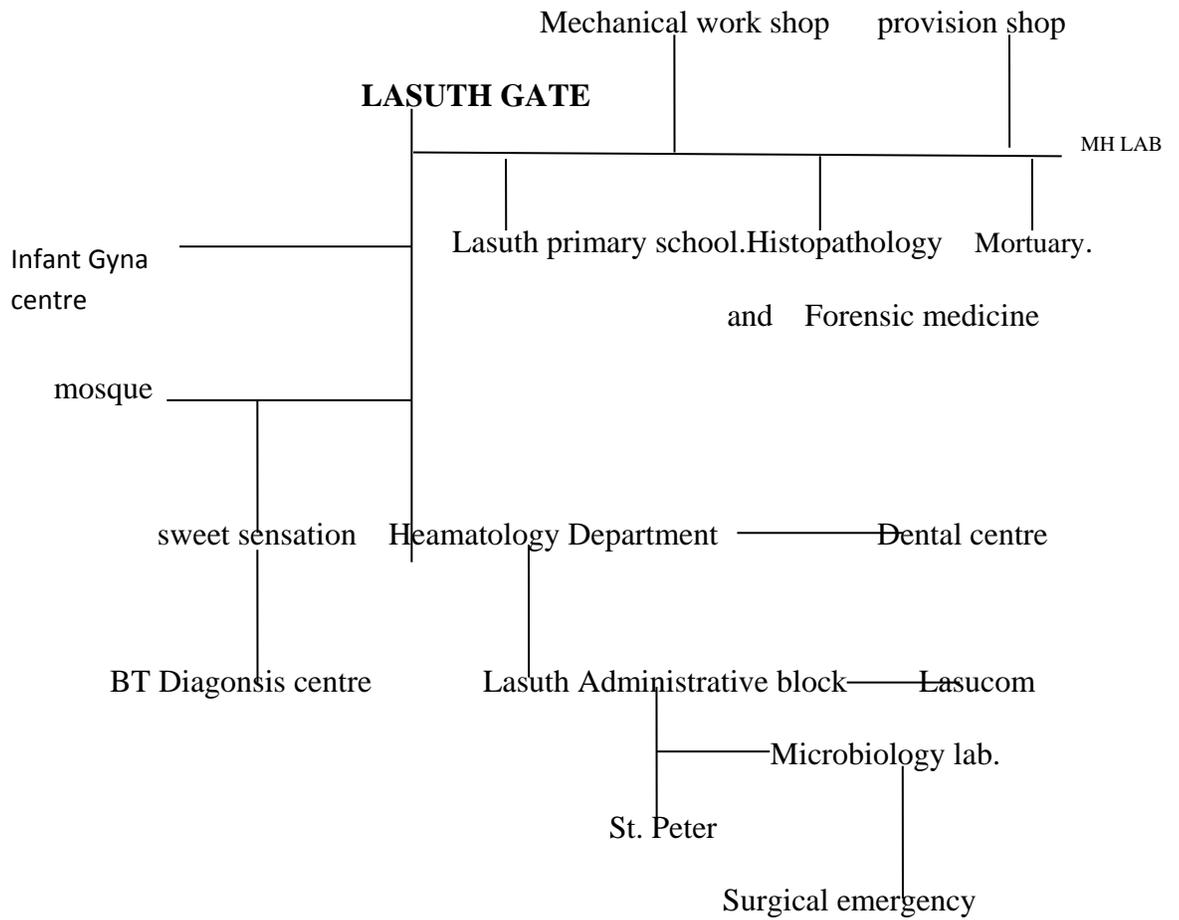
To provide student an opportunity to apply their theoretical knowledge in real time work situation.

To enlist and strengthen employers involvement in entire educational process of preparing university graduate for employing.

To make student to understand the important of life

ORGANOGRAM CHART OF LAGOS STATE UNIVERSITY TEACHING HOSPITAL

IKEJA, LAGOS STATE



2.1 PHILOSOPHY

Lagos State University Teaching Hospital (LASUTH) is an institution established by Lagos State Government of Nigeria. This establishment encompasses different sections, units and department which undertake different type of treatment.

The main mission of the establishment is to restore people's health, to treat and to cure people that are affected by different kind of diseases. Lagos state university teaching hospital is one the famous known hospital in Nigeria with experts and professional health workers and care takers. Within this institution, it foster academic and skill acquisition program. Its location and background or environment are fully aerated and thus fosters and up to health restoration.

2.2 HISTORICAL BACKGROUND OF LASUTH

The Lagos state university teaching hospital was established to provide health service, train doctors& conduct researchers, initially a cottage hospital serving a large but spersely populated area . The general hospital was commissioned on June 29,1955 primarily to delivered healthcare to the residents of Ikeja and its environs. It remained one of the largest and well known general hospital on Lagos mainland until February 19, 1999.when it elevated to the status of a teaching hospital to support the Lagos state university college of medicine (LASUCOM) which was established to provide service and train doctor with other health workers using the hospital facilities. Still a work in progress. The widely experienced, highly motivated and resourceful healthcare professionals and technical staff who are competent in wide range specially constitute the major assets and unique defining feature of this flagship multi a specialist teaching hospital owned by Lagos state Government

HISTOPATHOLOGY/TISSUE PROCESSING

PRINCIPLE

Histopathology refers to microscopic examination of tissue in order to study the manifestation of disease. It is an examination biopsy or surgical specimen by pathologist, after the specimen has been proceeds and histological sections have been placed onto glass slides.

Histology is the microscopic examination of normal tissues .it is the microscopic study of anatomy of cells and tissues of plants and animal. This is done by examining the cell or tissue under light microscope or electron microscope, the specimen having been sectioned, stain and mounted on the microscopic slide. Histological studies may be conducted using tissue culture, where human or animal cells are isolated and maintained in an artificial environment for various research projects. The ability to visualize or differential identify microscopic structure depends through the use of histological stains.

Histopathology in the order hand is the microscopic examination of disease tissues. it is an important tool in anatomical pathology because cancer and other diseases usually requires histopathological examination of samples. this is usually done by a trained physicians licensed pathologist who will provide diagnostic information based on their findings.

AIMS OF TISSUE PROCESSING

The principle aim of tissue processing is to remove water from tissue and replace with a medium that solidifies to allow a thin section to be cut. Biological tissue must be supported in a hard matrix to allow sufficiently thin sections to be cut, typically 5 μ m, 1mm for light microscope and 80-100nm for electron microscope. With tissue processing, tissue are rendered to more optical densities which increases the differential visibility in a microscope.

For this tissues to be prepared, paraffin wax is mostly frequently used since it is immiscible with water, the main constituent of biological tissues are removed in the process of dehydration. Samples are transferred to a bath of a progressively more concentrated ethanol to remove the water. This is followed by a hydrophobic clearing agent such as xylene to remove alcohol and finally molten paraffin wax, the infiltration agent which clears the xylene. Paraffin wax does not provide a sufficiently hard matrix for cutting very thin sections for light microscope.

PROCEDURE

When tissues are brought to be processed, they are certain procedures that are taken, though tissues can be processed in two methods which are the routine and the rapid method, but in any of the above mentioned methods, the following procedures are considered.

SAMPLE RECEPTION AND ACCESSIONING.

Reception is the section of the laboratory where specimens are received; sorted; entered into the laboratory information system or book; labelled with barcoded labels. Specimens are accepted from couriers; physicians; private collectors and the general public. Upon the arrival of specimen; it is given accession number. Because some tissues are brought inside normal saline solution; the specimen is examined to know if they are already fixed in formalin; if they are not then they are quickly removed from normal saline into formalin so as to allow it fix properly.

Reception book is well documented. Informations about the specimen are well noted. The details includes: the name of the patient; the nature of specimen; Age; Sex; folder number; hospital; etc.

OBJECTIVES AND SCOPE

This is to help maintain patient confidentiality;

prevent sample mix up;

Ensure sample integrity and overall quality handling of specimens.

SAFETY AND ENVIRONMENT

1. For safety measures personal protective equipment are used.

2. All contaminated materials are placed in the biohazard bag/ containers during working.

3. No contaminated waste should be thrown on the floor.

The tissue is allowed to settle in container with the fixative fluid till grossing.

Fixation

Fixation is the preservation after death of the shape, structure and constituent of tissues.

Chemical fixatives are used to preserve tissue from degradation and to maintain the structure of the cell and of the sub cellular component such as cell organelles, e.g. nucleus, endoplasmic reticulum, mitochondria.

The commonly used fixative is 10% formal saline, which contains water, formaldehyde and common salt. The tissues are then completely immersed in this solution and allowed for a period of a day for it to be completely fixed and restore cellular component.

AIMS OF FIXATION

To prevent autolysis and putrefaction.

To restore the cellular component.

To stop any shrinkage or swelling of tissue.

Should penetrate the tissue and cell rapidly even deeply.

Prevent distortion by any reagent used subsequently.

Should impart a suitable hardness and texture to allow easy section.

To render the tissues receptive of stains.

Should not be toxic non corrosive and non inflammable

Should allow for long time storage of specimen.

DEHYDRATION

This is the removal of water. At this stage, the tissues are passed from a progressive or sequence of alcohol media ranging from 70%-90%-100% and from absolute 1, absolute 11, absolute 111-alcohol at an interval of 2hours for each percent alcohol series. Dehydration is very important because most embedding are not miscible with water and the removal facilitate the subsequent impregnation with the embedding media. Dehydration is done by using a reagent that is miscible with water. The best reagent is the ethyl alcohol which has the advantage of not being poisonous. To check presence of water at tissue in bath, add small amount of dried copper sulphate, if water is present, it turns tinge of blue, when this happens; the alcohol should be replace. In histopathology, ethyl alcohol, methylated spirit, isopropanol, amylalcohol, rebutanol, textiarybutanol may be used. Acetone may be use because it is very good dehydrating agent and are cheap but volatile.

GROSSING

Grossing is the macroscopically examination of the tissue with naked eye. The tissue is observe, measured, weighed, the color, any adjoining tissues and the type of tissue are noted by the

pathologist. After this physical examination, the tissue will be cutted using surgical blade and knife or saw depending n the type of tissue. After this process is fixation.



CLEARING

This is the stage of tissue processing called de-alcoholization; here the tissues are passed into a progressive xylene solution. Xylene has the tendency to absorb alcohol thus it is miscible with alcohol. This solution is an ante-media because it clears the xylene in the tissue and renders the tissue transparent. The tissues here are passed from xylene 1, xylene11, xylene111, at an intervals of- 2hours for each solution of xylene. Xylene is mostly use as clearing agent.

INSTRUMENT USED IN TISSUE PROCESSING.

Hot air oven; for melting of paraffin wax

Automated tissue processor; for routine tissue processing.

Embedding machine; for casting or burring of tissues in the paraffin wax.

Incubator; for incubating the tissues.

Refrigerator; for forming of ice block and cooling of tissues.

Bunsen burner; for melting of wax.

Tissue container; for fixing and processing of specimens

Spatula ;

Saw, knife, surgical blade, for grossing.

Microtome machine; use for sectioning.

Tissue slide; for mounting of tissues.

Paraffin wax for embedding specimen.

Centrifuge

EMBEDDING

Embedding is the process of casting the tissue in a paraffin wax and allowing then to solidify and set in order to facilitate cutting of section. At this stage, a molten paraffin wax is poured on the embedding mould, while the tissue is buried or casted on it. The tissues are arranged in such that the face to be section is facing up and allow to solidify and form a block of tissue. The paraffin wax is always heated to 2^{0c}

The embedding mould could be of leukharts moulds which are more of traditionally made from L-shaped heavy metal such as brass and bass of copper plates. Others could be made of plastic trays which are mainly for conventional busy laboratories. This particular mould consistsof disposable plastics.



TRIMMING

When the block has been hardened, they are removed from the mould by cold water or refrigerator, the identity number is carefully removed and the block is free from the mould. Excess wax is trimmed from the block so that the block forms a four sided prism. The essence is to produce opposite sided parallel serial sections. The trimming away of excess wax prevents the block from cracking. Later the trimmed block will be attached to the block holder by placing a hot spatula between the block and the block, thus this confers strong adhesion between the wooden block and the tissue block.

SECTIONING

This is the stage where the tissue is cut into sections serially. The microtome machine is adjusted depending on one's choice. The microtome knife is set in place in order to attain correct cutting, section thickness are adjusted from 5-10 μ , the anti-roll plate is positioned in such that it is parallel with the edge of the knife. Allow the temperature in chamber to equilibrate by closing the cabinet for 22-3mins, cut the section slow and steady, while some harder tissues are best cut by fast stroke. With skill technique, the section will move smoothly underneath anti-roll plate.



FLOATING

The processes take place after sectioning of the tissue at the section unit with the help of the microtomes machine, then the slide will be merge into the water baths that contain warm water so as to ensure that the tissue is a the centre of the slide for easy viewing using microscope.



HEATING /DRYING

This stage take place after floating at the heater plate where the water will be take off or dry off from the slide before staining will take place.



STAINING

Staining is out of coloring or dying of a cut section of tissues; this increases its optical densities and renders it study with microscope easier. With help of stain, the physical features and relations of the tissue and their constituent cell can be study. Most cells have affinity for different dyes, thus no single stain will demonstrate all the tissue structures present. It is advice to carry out different staining methods in a particular tissue section to make diagnosis easier.



De-waxing; this is the removal of paraffin wax, because wax is not permeable to stains. Wax are remove for 2-3mins by immersing the tissue slide in two (2) series of xylene . This is usually sufficient for sections up to ten microns thick. This is facilitated by warming the slide up to 60^{0c} in the hot oven it begins to melt.

Removal of xylene; xylene is not miscible with water and low grade alcohol; it therefore important remove it with absolute alcohol for 1-2mins in each of two series of absolute alcohol.

Gradual hydration with lower grade alcohol; the sections are immersed for 1-2mins in 90% alc, and 7% alc. This is to avoid possibility of diffusion current bringing damage and detachment of the section.

Hydration with water; the section are now rinsed with a distilled with or tap water, thus section are ready to stain.

The section are now proceed to haematoxylin solution and allow to settle for about 25mins rinse in water and then;

Differentiate with 1% for 3mins.

Transfer the sections to eosin for about 15mins.

Rinse with water and dehydrate with absolute alcohol and allow to dry

MOUNTING OF A STAINED TISSUE

Due to great difference in refractive index of glass slide, the tissue components and air, unmounted stain section will show very little details when examined under microscope. They have to be mounted in a transparent medium that has a refractive index close to that of glass slide, thus it also has to the tendency to protect the stained section from physical injuries. This is done by applying mounting solution called DPX on the glass slide and cover it with cover slip and allow to dry



CHAPTER TWO

MORTUARY SECTION

This is the section of the establishment that undertakes the process of embalming and preserving of a deceased body or dead bodies. It consists of chief mortician and other mortuary attendant in order of hierarchy. This section is fully air conditioned for evacuating the reflux and actions of formalin reactions, and to avoid much inhalation of formalin and embalming chemicals.

This section encompasses different apartments which includes; the embalming and reception room, documentation room, storage hall, dressing and autopsy hall and last the resting room convenient room. This section is fully equipped with embalming tools, reagents and trolleys for ease the job.

2. AUTOPSY SECTION.

This is the section of the establishment that takes the job of post mortem examination of a deceased body to find out the cause of death. It consists of a specialized doctor called *pathologist* who performs the work and mortuary attendants who will reconstitute the body after examination. It is made of different rooms which includes; autopsy and dressing room, pathologist room, and mortuary attendant room and convenient room; this are fully aerated. It is fully equipped with autopsy tools and reagent to enhance the pathologist from discharging his job.

Autopsy

Principle

Autopsy also known as postmortem examination is a highly specialized surgical procedure that consist of a thorough examination of a corpse to determine the cause of and manner of death and

to evaluate any disease or injury that may be present. Autopsy is usually performed by a specialized medical doctor called *pathologist*.

Autopsies are performed for either legal or medical purposes. For example, a forensic autopsy is carried out when the cause of death may be a criminal matter, while a clinical or academic autopsy is performed to find the medical cause of death or for research purposes.

Autopsies can be further classified into case where external examination suffices and internal examination where the body is dissected and permissions from the next of kin may be required for internal autopsy. Once the autopsy is completed, the body is reconstituted by sewing it back together.

PURPOSE OF AUTOPSY

The principle aim of an autopsy is to determine the cause of death, the state of health of the person prior to his/her death and to assess whether the medical diagnosis assigned to it was appropriate. Autopsies are the key which reviews the negatively affecting the health care delivering hospitals, because when mistakes result in death, they are often not investigated and lessons therefore remain unlearned, thus autopsies are done in purpose of teaching and medical research.

Autopsies are mostly performed when there is frequently sudden death in which the doctor is not able to write the death certificate or when death is believe to result from an unnatural cause. Before autopsies are carried, a legal authority called ‘medical examiner, coroner, or procurator’ is issued.

TYPES OF AUTOPSY

There are four main types of autopsies, which includes the following.

Medico legal autopsy r forensic autopsy/ coroner; this is a type of autopsy which seeks to find the cause of death and the manner of death, to identify the decedent. it is performed as prescribed by applicable law, in case of violent, suspicious or sudden deaths without medical assistance or during procedures.

Clinical or academic autopsies; this is performed to diagnose a particular out breaking disease or for research purpose. It is aimed to clarify or to diagnose a medical treatment.

Anatomical or academic autopsy; this is a type of autopsy performed by student of anatomy or clinical student for study purpose.

Visual or medical imaging autopsy; this is performed for imaging through magnetic resonance imaging and computed tomography.

PROCEDURE

The body is received in examiner hall or in the mortuary.

The body is documented

The physical appearance, cloth color, height of the body is noted as it is still fresh.

A photograph of the deceased body is taking to connote the picture while he or she is brought in.

The body may be embalmed or subjected for examination depending on the pathologist choice.

A coroner or procurator must be issued by legal authorities before autopsy can be carried.

The pathologist can conduct two types of examination, which are

External examination;

Internal examination.

External examination

In external examination, it is mostly conducted by anatomical pathologist who will assist the pathologist in eviscerating the body and reconstitution after autopsy.

PROCEDURES FOR EXTERNAL EXAMINATION

The body is received.

A photography of the body is taken

The kind of cloth, color, is noted

The body is undressed

The body is clean and weighed

The height, hair color, eye color, foot color, facial appearance are noted

Any visible form wounds are noted.

A radiological image of x-ray and ultrasound may be taken to review invisible form wound.

Deductions and conclusions are made based on findings by the pathologist.

Internal examination

The body is received and documented.

All other procedures above are taken.

A plastic or rubber brick called block is placed on the posterior part of the body, letting the arm and the neck posteriorly while chest is pushed anteriorly.

A large and deep –Y shaped incision can be made starting at the top of shoulder and running down the chest, meet at the lower point of the sternum. This approach is most often use to prosect the body by the pathologist to view the visceral and hollow organs.

A –T incision is made from the tips of both shoulders, in a horizontal line across the collar bones to meet at the sternum in the middle.

A single vertical cut is made from the middle of the neck (in the region of adams apple.)

In the above cases, the cut then extends all the way to the pubic bone, making the deviation to either side of the navel. The prosector uses scalpel to flip the muscles and exposes the visceral and hollow organs. All the visceral and internal organs are exposed and examined, based on the findings and conclusion, deduction can be made.

Reconstitution of the body

After autopsy, the whole organs are brought out and must be return to the body unless permission is given by the deceased relations to retain any organ for further research and investigations. After autopsy, the chest cavity are flap, the skull is missing, the face becomes unusual, thus this becomes tedious, hence, the internal body cavity is lined with cotton wool, the organs are paced into a plastic bag to avoid leakage and return to the body cavity. The chest flaps are then closed sewn back and the skull is sewed back in a place.

The body is modified such that the deceased relation will not discover any disfigure in their relative during funeral services.

INSTRUMENT IN AUTOPSY

Hammmer; use for breaking the skull

Chisel; for piercing hard tissues

Surgical blade; for cutting of the body

Saw; use for cutting the ribs other hard bones

Autopsy bench; where the corpse will be laid before prosecting.

Suturing needle and thread use for sewing and reconstitution of the body.

Cotton wool; for closing of internal body

Rib cutter; for cutting of the rib.

2. MUSEUM TECHNIQUES SECTION

This is the section of the establishment deal with the collection of histological tissues, making tissue pot and displaying of the tissue for public view in order to foster academics activities especially students of medicine and anatomy.

This section consists of the receptionist, the curator and the pathologist. The receptionist receives and documents the tissue, the curator process the tissue pot and displays it while the pathologist examines the tissue. In this section, it encompasses different apartments which includes; reception room, curator's room, work shop, pathologist room, and display or presentation room and convenient room. This section is also fully air conditioned and equipped with tools to ease the job.

INSTRUMENT USED IN MUSEUM

Perspex cutter; use for cutting Perspex sheet.

Saw; also used for cutting Perspex sheet.

Workmate; a table for construction.

Perspex sheet; for construction of tissue pot.

Needle and thread for stitching tissues.

Weight; for pressing down the pot

Perspex sheet; for construction of tissue pot.

Perspex cement for gluing the pot

Tissue container; for fixing the tissue.

Drilling machine; for perforations.

Principle

Embalming is the art and science of preserving human remains by treating them with modern form and chemicals to forestall decomposition. The intension is to keep them suitable for public display at funeral, religious, medical or scientific purposes.

Embalming allows mourner or the deceased relation to remember and encode the past memory picture of their late relative. Embalming also has the potential to prevent mourners from having contact with the rotting and putrescence of the corpse.

Embalming is also a general legal requirement international repatriation of human remain, although exceptions also occurs and by a variety of laws depending on locality and religions such as for extended time between final deposition the above ground entombment, with help of embalming, a corpse can be transported from to another, thus rendering it harmless and avoid putrefaction and autolysis.

Types of embalming

The actual embalming process usually involves four parts;

Arterial embalming; this involves the injection of embalming chemicals into the blood vessels, usually through the carotid, femora, tibia, brachial arteries. While the embalming fluid is circulating, it displaces the interstitial fluids and bloods are expelled through the corresponding veins. The embalming fluid is injected by centrifugal pump.

Cavity embalming; this refers to replacement of internal fluid inside body cavities with embalming chemicals through the use of an aspirator and trocar. The embalmer makes a small incision just above the navel and pushes the trocar into the chest and the stomach cavities to

puncture the hollow organs and aspirate their contents. He then fills the cavities with concentrated formaldehyde. The incisions is then closed with trocar button.

Hypodermic; this is a supplemental type of embalming in which hypodermic needle and syringe is used to inject the embalming chemicals into the tissues, especially those areas where arterial embalmment could not get, depending on the trauma prior to the death.

Surface embalming; this is another type of supplemental method; here, the embalmer take corpse and dip into solution of embalming chemical to preserve and restore areas directly on the skin's surface and other superficial areas.

PROCEDURE

Prior to embalming, there is certain procedures one need to consider.

Pre-embalming procedure

When a body is brought to mortuary;

The body must be certified death by a medical doctor who is not part of the embalming.

ii. Pulsation, breathing, rigor mortis must be noted.

The body must be registered and have a document pertaining the cause of death, date, in which the body will leave the mortuary.

EMBALMING PROCEDURE

After the above processes, the corpse is undressed.

The body is wash and clean by disinfectant and germicidal solution.

The body is placed in anatomy supine position, the arm, hand, legs are flexed to release rigor mortis.

An incision is made along the femoral triangle to locate the femoral artery. Carotid artery, brachial artery and tibia may be used depending on one's choice, but mostly used are the femora and carotid arteries.

An embalming fluid is infused into the femoral artery with the help of trocar.

The fluid is allowed to circulate within the body.

The blood and other tissue fluids are drained through the corresponding vein.

Dressing embalmed body.

Before a deceased body can be sent to funeral home, the morticians have to make them look in life manner.

STEPS

The body is washed with a solution of disinfectant and germicidal solution.

The eyes are forced to close using adhesive glues.

The mouth is also closed using glues or sewing with needle to gently close it in order to look lively.

Shaving may be done to clear the mandibular hairs if overgrows.

The body is dressed with cloth, handglove, stockings and other applicable clothing material.

Dyes, cosmetics and jewelries may also be applied.

Glycerine oil may also be applied on the face to look like the deceased body is sweating.

The body laid on coffin and ready to be transported to the funeral home.

INSTRUMENT USED IN EMBALMING

Trolley; use to move the corpse from embalming place to storage place.

Tray; where the deceased body will be laid on

Needle and thread; use for sewing and stitching.

Surgical blade; use for cutting the body.

Forceps; use for holding the muscle of the body.

Gravity tank; for storing embalming fluid.

Cotton wool; for closing orifice.

Cold chamber refrigerator; for storing the corpse.

Reagents for embalming such as formalin, glycerin, methylated spirit.

Scissors for cutting.

Museum techniques

PRINCIPLE

Museum is a branch of morbid anatomy which preserves tissue and displays it for research or study purposes. It conserves a medical and surgical tissue for future generation. It is usually situated in the hospital and school to help the pathologist study the health condition of tissue and evaluate it and pass the knowledge to future general. Anatomy Museum can serve as tourist centre where humans and animal tissues can be displayed.

In anatomy museum, curator and the pathologist with the receptionist is the people who controls and prepare the tissues for displaying. The curator is mostly the one that creates the port and displays it on the shelves, while the pathologist reviews the clinical condition.

Objectives of museum

To preserve and conserve a tissue for research and study purpose

To prepare a tissue port for displaying

To create a tourist centre way funds can generated.

To make learning easier.

PROCEDURE

Any specimens for museum are handled by the following steps;

Reception.

Preparation.

Fixation.

Restoration.

Construction of tissue jar or pot

Preservation.

Presentation or displaying.

RECEPTION

Any specimen received in the museum should be recorded in a reception book and give a number following by year. This number will stay with the specimen even after it is catalogued in its respective place. This number is written on tie-ontype label in indelible ink is firmly attached or stitched to the specimen. The reception book contains all necessary information about the specimen.

FIXATION

The object of fixation is to preserve cells and tissue constituents in as close a life-like state as possible and to allow them to undergo further preparative procedures without change. Fixation arrest autolysis and bacterial decomposition and stabilizes the cellular and tissue constituents. The fixative used in museum all over are formalin based fixative technique, and are derived from kaiserling technique and his modifications. Kaiserling recommend that the initial fixation be a neutral formalin (k1) solution and then transferred to a final preserving glycerin solution (k111) for long term display, color preservation is also maintained with these solutions. The specimen needed to be kept in a large enough containers which can accommodate specimen along with 3-4 times volume of fixative. Specimen is stored on kaiserling solution 1 for one month depending on the size of the specimen. The composition of kaiserling solution 1 is as follows;

Formalin	1L
Potassium acetate	45g
Potassium nitrate	25g
Distilled water	make up to 10L

Restoration of specimen

It is require to restore the specimens, as they lose their natural color on fixation. The recommended method is the kaiserling 11 method. It involves removing the specimen, washing it in running and transfer to 90% alcohol for 10imns – 1hour depending on the size of the specimen. The specimen is then kept and observes for color change for around 1.5hrs. After this step specimen is ready for preservation. The composition for kaiserling solution ii is 95% alc.

CONSTRUCTION OF TISSUE POT OR JAR

When a specimen is received and fixed in museum by the curator, he takes the rough measurement of the specimen; the length, width, and breadth of the specimen are noted and transfer to Perspex sheet. With help of meter rule, Perspex cutter is used to cut the Perspex sheet according to the measurement and the dimension, after cutting the length, breadth and the bottom plate and the top plate is also cut. Having getting these, followed by forming the pot with the work bench which will be adjust to hold the two breadth of the cut out sheet, Perspex cement is applied on the two edges of the sheet for strong adhesion and another sheet is placed across the two sheet, after placing this, a weight as also placed between those sheets for quick adhesion with each other and allow to settle for some hours. While this has formed, the same thing is done on the other side. Having form the frame, the base plate which later forms the top plate is placed by applying the same Perspex cement and placed the weight material on it and allow for some hour to solidify.

Having form the frame and the base plate, the centre plate is also constructed which is 2inch less than the length of the pot. Having getting the center plate, it is perforated by drilling machine to create and orifice through which the specimen can be fasten with thread. The specimen is now fastened with thread tightly to avoid swinging with fluid inside the pot. After the fastening of the specimen, stoppers are put at the four edges of the pot to avoid swinging the tissue and the pot in contact. Having done with these, the top plate is constructed and perforated, then Perspex cement is applied and add weight on top of them. The pot is now filled with Preserving fluid through the orifice created on the top and after it is closed using Perspex rod and apply Perspex cement to hold it together, it now allowed to settle and solidify after which the rod is filed off and top plate is then turn outside down it becomes the down plate.

PRESERVATION

This is the final recommended solution which the specimen is mounted and it remains in it throughout the displaying period. It injected into the pot through the orifice create on the top. Its compositions are;

Potassium acetate	1416g
Glycerine	4L
Distilled water	make up to 10L.

PRESENTATION

This is out of displaying the specimen for public. The tissue pot is placed in the shelf with correct labeling and number for easy recommendation and accessible.

CHAPTER THREE

RADIOLOGY UNIT

This is a section on this establishment that takes the work of imaging and examination of internal organs of human which are invisible with n eye. Within this section, X-rays, ultrasound, computed tomography, magnetic resonance imaging modalities are used to produce the images of human body depending on the area of interest which can be analyze by the radiographer and send the report to the doctor who requested for that to carry his medication and treatment.

This section consists of workers that manage its affairs ranging from; H.O.D, H.O.U, Registrar, radiologist and radiographer, receptionist and other admin workers. In its apartment, it has the H.O.D and H.O.U room, Registrar room, radiology and radiographer's room, reception room, examination and machine room, convenient room. It is fully equipped with radiology machines.

Radiology

PRINCIPLE

Radiology is a medical specialty that uses imaging to diagnose and treat diseases seen within the body. The acquisition of medical images is carried out by the radiographer often known as radiologic technologist. Depending on the location, the diagnostic radiologist or reporting radiographer, then interprets or reads the images and produces a report of their findings and impression or diagnosis. This report is then transmitted to the clinician who requested the imaging, either routinely or emergently. They are different type of imaging modalities used in radiology to image. This includes;

X-rays

Ultrasound

Computed tomography (CT)

Magnetic resonance imaging.

Nuclear imaging

Mammography

Angiography

Contrast study

Doppler sonography

Hysterosalpingography

X-rays

PRINCIPLE

X-rays are type of electromagnetic radiation which travels in a straight line and cast objects in they paths. It is mostly used in medical field to check patient and also industry to check loop holes. In x-rays unit, it consists of the radiographer and the radiologist. The radiographer produces film while the radiologist interprets it. X-ray means an unknown ray.

PROCEDURE

The patient is laid on chair or on bed.

Depending on the plane of projection, the patient can be lay on supine position or in standing position.

The X-ray can be shoot in AP or PA; in AP the beam is shoot from anterior position and dictated at posterior position; while in PA, the beam is shoot from posterior position and dictated at anterior plane.

The dictator machine is place in anterior or posterior position depending on the plane of projection.

The film is then produced and interpreted by the radiologist

The report is finally sent to the doctor that requires it.

Generation of x-ray

X-ray consists of two poles which are the cathode and the anode inside a vacuum tube which has a high voltage built inside it. The cathode is heated about 2000^oc by a specific heating filament.

Electrons are emitted by the cathode and accelerated by the electric field between the cathode and the anode and hit the anode with a considerable amount of energy, where they induce electromagnetic radiation called x-ray. These rays are richer in energy, the higher the applied voltage the higher the energy. The area where the electron hit the anode is called the focus. A lot of energy is generated along this process, the anode consists of heat resistance disk covered with tungsten in most cases. The disk rotates quickly to disperse the heat along its circumference, thus forming a focal track. The vacuum tube is surrounded by oil inside a lead lined housing that features only one small opening for the radiation to escape. The generated radiation has a spectrum or spread of energies only a part of which can be used for imaging. It could be of low dose or high dose energy

Attenuation of x-rays

X-rays are attenuated as they pass through the patient's body. Two processes play a role; absorption and scatter with lower energy radiation (corresponding to lower exposure voltage) absorption dominates. With high energy (corresponding to high exposure voltage) scatter is mainly responsible for attenuation. In this process, the radiation beam loses energy and is diverted in all directions. The scattered radiation increases with irradiated body volume.

Detection of x-rays

A variety of detectors can make x-rays visible. The simplest is photographic film. Because of the high spatial resolution one can achieve, it is used in nondestructive testing of industrial materials such as pipeline, alloy, car wheel. To expose film alone an incredible dose of x-rays is necessary. Film is much more sensitive to light than x-rays, as light exposes film better, in diagnostic radiology, a combination use of film and intensifying screens that are made up of rare earth materials such as gadolinium, barium, lanthanum are used as gamma screen.

Computed tomography (CT)

PRINCIPLE

Computed tomography is one of the modalities used in radiology department to image the body system. It takes the body in slices; it makes use of high dose of voltage to produce a sophisticated 2dimensional and 3dimensional images which can be reconstructed or reformatted in with machine. It consists of two tubes which spin or revolve round the patient with high dose of energy which is 50 times more than that of the x-rays. Its advantage over other modalities is that it has a window for a particular tissue.

PROCEDURE

In computed tomography, the patient is laid on the spiral tray of CT, the x-ray tube continuously rotate around cranio-caudal axis of the patient. A beam of radiation passes through the body and hits a ring or moving ring segment of detectors. The incoming radiation is continuously registered; the signal is digitalized and fed into a data matrix taking into account the varying beam angulations. The data matrix can be transformed into output image.

ULTRASOUND

PRINCIPLE

This is another modalities used in radiology unit, which makes use of sound energy to image human body. It is ideally use to image the soft tissues majorly and not bone tissues. Soft tissues appears hyper –echoic while bone tissues are anechoic because of its highly content of calcium salt which absorbs all the sound, since the sound wave cannot pass through it, there is signal to record back as the reflected echo. Ultrasound is the safer modality of choice and cheapest because unlike CT, it does not emit radiation. It converts electric energy to sound energy with a high frequency of sound energy, when probe is face longitudinal, the organs as seen at the top of the machine is at the right and organ seen under is at the left. Transversally the organ at the right is seen on the lower part of the machine while top is at the left.

WORKING PRINCIPLE

Sound waves are generated artificially by means of piezoelectric crystals. These crystals are magic gadget; when connected to alternating current of a certain frequency; they will vibrate and must emit a sound wave of the same frequency. If on the other hand they are expose to sound wave of a certain frequency they will produce an alternating current of that frequency. If ultrasound gel is applied n the body surface, the crystal is brought into direct contact with body, the emitted ultrasound waves spread through the tissues, the tissue absorbs, scatter or reflect them. Absorption and spatial resolution increase with higher frequencies. Maximum of ultrasound penetration of ultrasound wave s and the depiction of fine image detail correlate with frequency.

MAGNETIC RESONANCE TOMOGRAPHY

Nuclear magnetic resonance tomography is the most complex medical imaging technique use in radiology to image the anatomy and the physiological processes of the body in health and in disease. MRI uses strong magnetic field, radio waves, and field gradients to form images of the body. Certain atomic nuclei can absorb and emit radio frequency energy when place in an external magnetic field. Hydrogen atoms are most often use to generate a detectable radio frequency signal that is received by antennas in close proximity to the anatomy being examine. Hydrogen atom exist naturally in people and other biological tissues organisms in abundant, particularly in water and fat. Most MRI scanner essentially map the location of water and fat in the body. MRI has two sequences T_1 and T_2 . In T_1 imaging, water appears black and in T_2 water appears white. Fat appears white in both T_1 and T_2 . MRI does not emit any form of radiation.

PRINCIPLE

When the patient lies inside the strong magnet, the hydrogen atom in the patient body water is use to produce MRI image. Pulse of radio waves excites the nuclear spin energy transition, and magnetic field gradients localize the signal in space. By varying the parameters of the pulse sequence, different contrast can be generated between tissues based on the relaxation properties of hydrogen atom

NUCLEAR MEDICAL IMAGING TECHNIQUE

Nuclear medical imaging is one the techniques used in radiology to image the body. Its work principle is based on the ability of the radioactive substance to emit radiations. Here, a radioactive element is injected into the body and imaged using a special gamma camera to detect

the radiation emitted from the body. The image quality is always low and depends on the localization of the radioactive element used.

MAMMOGRAPHY

This is another special technique used in radiology to image the breast. It is a special type of x-rays called soft x-ray with low ionizing dose to detect cancer and tumor cell in the breast.

Angiography

Angiography is one the modalities used in radiology to image the blood vessels. In this technique, radioactive element is injected into the blood stream and allows to localize in cardiovascular system. A special x-ray called fluoroscopy is used to image it and the bloods vessels can be examine and evaluate with the help of this.

Doppler Sonography

This another type of imaging modalities used in radiology to image the flow of blood in the blood vessels. It is a special ultrasound which in combination with contrast media, it shows the clear picture of the blood flow towards the circulatory system and blood vessels at large.

Hysterosalpingogram(H.S.G)

Hysterosalpingogram is a modality used by radiologist to image and check the infertility in woman. it works with the help of contrast media to show clear picture and evaluate the fallopian tube and uterus of a woman who is having difficulties in becoming pregnant. The contrast media is injected or ingested into the patient and image on a fluoroscope based x-ray to examine miscarriage resulting from abnormalities within the uterus and determine the presence and severity of tumor mass, adhesions and uterine fibroid. This reviews the abnormalities in the

female reproductive organs. It is best performed one week after menstruation but before ovulation to make certain that you are not pregnant.

This test is not normally conducted on one with active inflammatory conditions. Laxatives are given in order to empty the bowels such that the uterus and the overlying s can be seen clearly. Prior to this examination, a contrast may be given to take orally, or injected which is mainly iodinated contrast material.

INSTRUMENT USED IN RADIOLOGY.

X-ray machine; for imaging.

X-ray detector; for detecting ray beams.

CT machine; for imaging.

MRI for imaging

Ultrasound; for imaging.

Imaging bed; for laying the patient

Ultrasound gel; for robbing on the patient body.

OTHER RELEVANT EXPERIENCES

This program has broadening my knowledge in different field of endeavor. It has taught me a lesson more than class room teaching, which has bridged the gap between the theoretical class and impact this know into a retained knowledge. Thus it has exposed me to different experiences.

Mostly this program has exposed to know the radiologic anatomy of different part of human body; how they appears in the film of x-ray, ultrasound, magnetic resonance image, computed

tomography and to differentiate on the images produced by these modalities and how they appears.

It has also exposed me to understand the secret behind tissue processing and how to mount them and stain it in microscopic slide. In museum technique, it has enlightened me on how to pot tissue, mostly how to prepare mounting fluid such as the kaiserling solution 1-3. Which are the major fixing, restoring and preserving fluid.

CHAPTER FOUR

CONCLUSION

In conclusion, student industrial work experience is like a bridge that link up the theory class and the practical aspect of teaching. It is a light that cast away darkness before the students because it elucidate the practical ignorant in student thus given the student the chance to perform practical's that are relevant to their program,thus enhancing and upgrading they intelligent quotient.

It prepares the student to be smart and to understand the jobs which there are like to meet at future and how to get use of machines and other working equipment that they may enhance the performance in a particular task.So industrial training is a key to success of every student as it taughtmore than theoretical class thus student industrial work experience should as a program should not to be separated from student.

PROBLEM ENCOUNTER DURING INDUSTRIAL TRAINING

The problem which I encounter during my industrial training included the following

1. The stress that is being involve on the process that it takes to found the area of attachment is to much and very unbearable
2. It is difficult to adapt the condition they area where offensive and harmful chemical are being kept for the preservation of the tissue collected for the processing in histopathology/cytology laboratory.
3. It give a very tough condition which are very new to the student; such as perceiving an offensive odour from the patient in the laboratory
4. It gives student unrest of mind because, any machine damaged in the industry will be replaced by the person
5. The staffs in the industry do discriminate the student.

RECOMMENDATIONS

The government and industrial training fund should keep this program on and never to separate it from student because it is the principle key that guide and prepare the student for future development.

The federal government should fully sport the ITF and the student by paying the student and not only paying but regular payment in order to carry this program because most challenges that we encounter is lack of finance to feed ourselves and to transport ourselves to the place of work. This has been the worse situation because student will be late in the working office and more over they suffer from starvations. We therefore apologize and recommend that the government of this federation should put remedy into these situations.