Indira Gandhi National Open University
SCHOOL OF HEALTH SCIENCE

BNSL-043

Public Health and Primary Health Care Skills

General Skills and Laboratory Skills

2

BNSL-043
Public Health and Primary Health Care Skills

Indira Gandhi
National Open University
School of Health Sciences

Block

2

GENERAL SKILLS AND LABORATORY SKILLS

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BLOCK INTRODUCTION

This block has been developed in such a manner so that you will be able to develop and apply the skills, based on knowledge gained during study of theory course material and contact session which will help you to carry out specific practical activities including investigations and procedures, perform assessment and examination and manage various problems presented by a patient during his/her visit to the sub-centre. The practical on universal precautions and Bio-medical waste management focuses on safety of the patient and health worker. Any ignorance or mistake could be disastrous such as needle prick etc. So you have to be responsible for your own safety and safety of others in the community. You will also be leading the group of health workers while supervising bio-medical waste management site in your area.

Focus on sample collection, basic and common tests and procedures will help you to take precautions while collecting samples and performing procedures. You will also learn to examine, manage and refer the cases with complaints of swellings/ lump or joint pain etc. The unit dealing with Eye and ENT examination will help you to link up community with hospital by early detection of risk factors and signs and symptoms and appropriate referral for further treatment.

This Block is consist of eight units as given below

Unit 1 deals with Universal Precautions and Bio-Medical Waste Management

Unit 2 focuses on Procedures for Basic Tests

Unit 3 relates to Common Blood Tests and preparation of Peripheral Smear

Unit 4 focuses on Examination of Swelling, Lump, Joint etc.

Unit 5 deals with Eye and ENT Examination

Unit 6 relates to Screening and Management of Common Conditions

Unit 7 focuses on Suturing of Superficial Wound

Unit 8 deals with Drugs Dispensing and Injections

We hope the information given in this Block may help you in improving your knowledge and skills, so as to provide effective health care to the individuals, families and community living in their natural environment.

UNIT 1 UNIVERSAL PRECAUTIONS AND BIO-MEDICAL WASTE MANAGEMENT

Structure

1.0 INTRODUCTION

Universal precaution and biomedical waste management are vital components of the health and safety of the patients and health workers. The safe work practices need to be carried out every time and every day while dealing with patients or working in healthcare setting. Any ignorance or mistake could be disastrous to patient or health worker. For example, single needle prick poses a health worker substantial risk of infection. In view of emerging diseases such as Ebola, SARS, Bird flu, HIV, Hepatitis B & C health workers are also at risk of exposure. Similarly, they are also at risk of chemical and hazardous substances and chemical present in the healthcare setting. Skills to manage biomedical waste and developing habit of universal precautions are paramount important for every healthworker.

1.1 OBJECTIVES

After completing this unit, you shall be able to:

- learn about need of universal precautions;
- learn and apply the techniques of hand washing;
- identify and use of personal protective equipment; and
- carry out supervisory visit for biomedical waste management.

1.2 UNIVERSAL PRECAUTIONS

Universal Precautions, as defined by Centre for Disease Control (CDC) are set of precautions designed to prevent transmission of Human Immunodeficiency Virus (HIV), Hepatitis-B Virus (HBV), Hepatitis-C virus and other blood borne

pathogens when providing first aid or health care. They are intended to prevent exposure of Health workers to blood borne pathogens via parenteral, mucous membrane and through non-intact skin routes.

The purpose of Standard Precautions is to break the chain of infection showing in fig.1.1 focusing particularly but not exclusively on the mode of transmission, portal of entry and susceptible host sections of the chain.

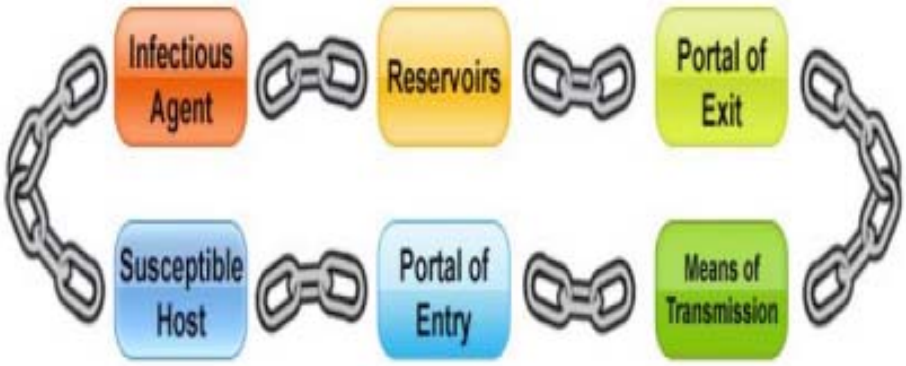

Fig. 1.1: Breaking chain of infection

Universal precautions are applied to the following:

a) Blood and body fluids

b) Semen, vaginal secretions

c) Tissues, pleural fluid, peritoneal fluid, CSF

d) Pericardial fluid

Components of Universal Precautions are:

1) Hand washing

2) Personal Protective Equipment (PPE)

   a) Hair cover

   b) Eyewear

   c) Face mask

   d) Gloves

   e) Gown

   f) Apron

   g) Shoe covers

3) Sharp Handling

4) Disinfection & Decontamination

5) Proper Biomedical Waste disposal

1.3 RESPIRATORY HYGIENE AND COUGH ETIQUETTE

Persons with respiratory symptoms should apply source control measures like cover their nose and mouth when coughing/sneezing with tissue or mask, dispose of used tissues and masks, and perform hand hygiene after contact with respiratory secretions.

Healthcare facilities should place acute febrile respiratory symptomatic patients at least 1 metre (3 feet) away from others in common waiting areas, if possible. Visual alerts should be posted at the entrance to healthcare facilities instructing persons with respiratory symptoms to practise respiratory hygiene/cough etiquette. Hand hygiene resources, tissues and masks should be made available in common areas.

1.4 HAND HYGIENE

It is single most effective measure for prevention of infection in hospital. Hand hygiene is recommended in following cases:

- Before and after each episode of patient contact
- Between individual patient contacts
- After contact with blood, body fluids, secretions or excretions, whether or not gloves are worn
- After handling soiled/contaminated equipment, materials or the environment
- Immediately after removing gloves or other protective clothing

Six steps of hand washing are shown in fig. 1.2.

- Step 1 : Palm to palm
- Step 2 : Back of both hand
- Step 3 : In between the finger
- Step 4 : Back of the fingers
- Step 5 : The thumbs
- Step 6 : Tip of the fingers

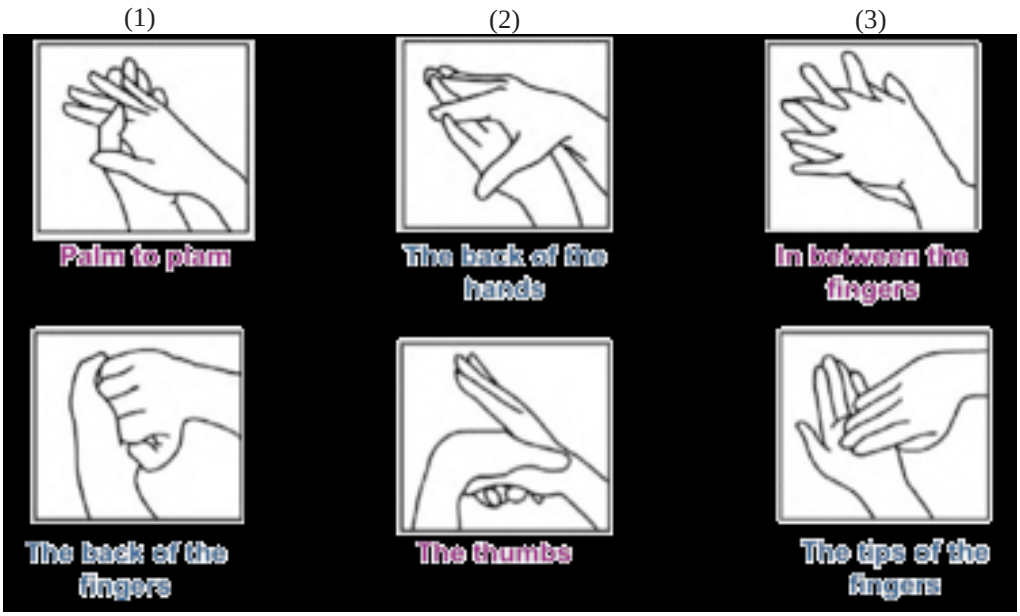

Fig. 1.2: steps of hand washing

Personal Protective Equipments (PPE)

a) Gloves

b) Gowns- To be worn outside clothing to protect against splashes. Second gown can be worn beneath one gown when heavy contamination is suspected.

c) Masks- To protect from airborne infections and splashes

d) Eye shield shown in Fig. 1.3

e) Shoe cover shown in Fig. 1.4

Fig. 1.3: Eye shield

Fig. 1.4: Shoe Cover

1.5 SHARP HANDLING

One should never recap needles after use. Single hand recapping technique should be used. Proper disposal of BMW as per categories is essential.

Fig. 1.5: Single Hand Re-cap

Single hand recap technique is shown in fig. 1.5.

1.5.1 Simple Measures to Prevent Sharp Injuries-

- Pass syringes and needles in the tray preferably cut it with the needle cutters
- Put needle and syringes in 2% hypochlorite solution if needle cutter is not available
- Remove the cap of needle near the site of use
- Pick up open needle from tray and/ drum with forceps

- Destroy syringes by burning their tips/ or if cutter not available
- Never pass syringes and needle on directly to next person
- Do not bent or break used needle with hands
- Never test the fineness of the needle's tip before use with bare or gloved hand
- Never pick up open needle by hand
- Never dispose it off by breaking it with hammer /stone

1.5.2 Prevention of Needle Stick and Sharp Injuries

- Be careful when using
- Never recap or bend needles
- Puncture-resistant container
- Container should be placed close to the site of use
- Container must have a lid that close
- Sent for disposal when 3/4th is full
- Use needle destroyer to prevent reuse
- Sharps must be appropriately decontaminated and/or destroyed after use.

1.5.3 Report all Exposures Immediately

Exposure to infectious waste including any time the worker is stabbed by a hypodermic needle or other sharp, or any time that blood or other body fluid in waste comes into contact with the open wound, or non intact skin, or mucous membrane (eyes, nose, or mouth) then report the exposure to the supervisor immediately, and try to make sure that the incident is recorded. Wash the exposed area thoroughly with soap and water, and apply a disinfectant such as alcohol or hydrogen peroxide.

1.5.4 Medical Care and Counselling after Exposure

Health worker after exposure should receive prompt and confidential medical attention. Health care facility should provide follow-up care and all necessary tests to the health care worker. Particularly in the case of a needle stick or exposure by another kind of sharp, vaccination for hepatitis B and/or a gamma globulin shot may be recommended, if the person has not already been immunised. Workers need counselling to take away fear of infection after exposure.

Observation Checklist

Monitoring and supervision of the infection control and biomedical waste management are very important aspect. However, person who is responsible for these activities must follow systematic approach. From the point of generation till its final disposal of waste there are various procedures which should be followed properly to reduce the risk of infection and improve quality of care in the healthcare setting. At the same time health workers are at ease for delivering the services. For example, for observation on biomedical waste management in the ward, following checklist can be used:

Check List for Hospital Waste Management

Ward/Work Station:	**Date _____Time:_____AM/PM**			
Black bags				
Located at right place	1. Yes,		2. No	
Placed on stand	1. Yes,		2. No	
Contain only non-infected waste	1. Yes,		2. No	
Is it torn?	1. Yes,		2. No	
Available sufficiently	1. Yes,		2. No	
Collected daily	1. Yes,		2. No	
Yellow bags				
Located at right place	1. Yes,		2. No	
Placed on stand	1. Yes,		2. No	
Contain only infected waste	1. Yes,		2. No	
Is it torn /leaking?	1. Yes,		2. No	
Available sufficiently	1. Yes,		2. No	
Collected daily	1. Yes,		2. No	
Bleaching solution				
Is it prepared today?	1. Yes,		2. No	
Separate bucket for needle/sharps and other Plastic materials	1. Yes,		2. No	
Does the bucket contain mesh?	1. Yes,		2. No	
Available in sufficient quantity?	1. Yes,		2. No	
Is it covered properly?	1. Yes,		2. No	
House keeping				
Floor Hygiene	1.Good	2.OK	3.Poor	4.Bad
Toilets cleanliness	1.Good	2.OK	3.Poor	4.Bad
Needle destroyers				
Present	1. Yes,		2. No	
Working	1. Yes,		2. No	
Location is appropriate	1. Yes,		2. No	
Any complain _____				
Syringes				
All syringes are in bucket for disinfection	1. Yes,		2. No	

Ward/Work Station:	**Date _____Time:_____AM/PM**	
Collected daily	1. Yes,	2. No
Gloves		
Disposed in bleaching solution	1. Yes,	2. No
Available in sufficient quantity	1. Yes,	2. No
Available of appropriate size	1. Yes,	2. No

Comments: _____

Signature: _____

1.6 LET US SUM UP

Universal Precautions are set of precautions designed to prevent transmission of Human Immunodeficiency Virus (HIV), Hepatitis-B Virus (HBV), Hepatitis-C virus and other blood borne pathogens. The purpose of universal precautions is to break the chain of infection focusing particularly but not exclusively on the mode of transmission, portal of entry and susceptible host sections of the chain. Universal precautions apply to blood and body fluids, **s**emen, vaginal secretions, **t**issues, pleural fluid, peritoneal fluid, CSF and pericardial fluid. Persons with respiratory symptoms should apply source control measures like cover their nose and mouth when coughing/sneezing with tissue or mask, dispose of used tissues and masks, and perform hand hygiene after contact with respiratory secretions. Hand hygiene is single most effective measure for prevention of infection in hospital. Hand hygiene is recommended in following cases - before and after each episode of patient contact, between individual patient contacts, after contact with blood, body fluids,, secretions or excretions, whether or not gloves are worn, after handling soiled/contaminated equipment, materials or the environment and immediately after removing gloves or other protective clothing. Protective equipment should be used always while handling patients.

1.7 ACTIVITY

1) Visit to a clinic or primary health centre and observe what are the biomedical wastes generated and how they are disposed off? Comment on the procedure at the health centre (e.g. Observation of a nurse while giving vaccination)

2) Visit to the waste disposal site and observe its management? (Visit to common Incineration plant or Autoclave plant). Note down the observation made in work book (log book).

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UNIT 2 PROCEDURES FOR BASIC TESTS

Structure

2.0 INTRODUCTION

As a mid level health care provider you have to supervise and at times directly get involved in collection of specimen for various tests and interpret the results.

While collecting any specimen for diagnostic purposes, you would have to take certain precautions to protect yourself and others from pathogens found in the blood and other body fluids. All blood samples and other body fluids must be considered as infectious irrespective of client status. Labeling of the sample is very important for proper treatment. So for quality care one need to collect samples cautiously to safe guard yourself as well as the clients.

2.1 OBJECTIVES

After completing this unit, you shall be able to:

- Collect urine, stool, sputum and blood sample correctly.

- Label the samples correctly and send them for investigation.
- Perform the procedure of urine testing for routine and pregnancy test and interpret the results.
- Collect stool sample and send to laboratory with correct labelling.
- Collect specimen for sputum examination.
- Collect and send sample for blood examination.

2.2 PRECAUTIONS/GUIDELINES IN COLLECTION OF SPECIMENS

While collecting any specimen you should take precautions keeping following guidelines in mind:

- Ensure that specimen to be collected before starting antibiotic therapy.
- Collect from the site where suspected organisms are most likely to be found (highly infected site).
- If possible provide additional information regarding the risk of infection (Hepatits B, HIV etc) associated with handling of the sample.
- All urine collection and / or transport containers should be clean and free of particles or interfering substances.
- The collection container should have a secure lid and be leak resistant container.
- Specimen container should not be reused.
- Proper labelling should be applied to the collection container or tubes.
- Use disposable needles and syringes to collect blood sample and discard them in puncture proof container.
- Always wear gloves while collecting the specimen.
- Wash your hand before and after the specimen collection.

2.3 METHOD OF URINE SAMPLE COLLECTION AND URINE TESTING

Let us now discuss collection of a random or clean catch mid stream urine specimen. It is collection of urine for an investigation to aid diagnosis and/ or treatment of medical condition.

Using the urine specimen in a community health setting can be beneficial in determining the albumin and sugar levels in urine.

2.3.1 Specimen Collection and Transportation Guidelines

- Explain the reason for procedure of specimen collection.
- Assist patient to bathroom if needed
- Provide specimen container
- Wash and dry hands.

- Clean perineum prior to voiding, using wipes or antiseptic soaked cotton
- Instruct to clean from center to periphery
- Initiate voiding and place the container in the stream of urine filling it about half. The first portion of the voiding is discarded and subsequent mid stream urine is collected.
- Complete voiding in the toilet.
- Cover container tightly without touching inside of cover
- Label the specimen and send to the lab as soon as possible
- After getting the lab report, record the findings
- Inform patient about the result of lab test.

Remember :
Mid stream urine is the most ideal specimen for diagnosis of UTI.

2.3.2 Types of Urine Examination

- Routine microscopic
- 24 hours urine
- Pregnancy test
- Urine for Albumin / Sugar

2.3.3 Points to Remember

- Ensure cleanliness of all articles.
- Take fresh urine sample in a wide mouthed clean bottle.
- Pay special attention to method and technique, as small variation can alter the result.
- Repeat test after few days if any abnormality is detected.
- Make second test when first is doubtful.
- Keep mouth of the test tube away from you while boiling urine for albumin test.
- To minimise contamination of urine-

  i) Ask the client to clean genital area with soap and water.

  ii) Take mid stream urine sample.

  iii) Don't take urine sample during menstruation.

  Record and report accurately at the end.

2.3.4 Articles Required

- Clean container for routine test/ sterile container for culture
- Disposable gloves
- Anti-septic solution
- Cotton balls

2.3.5 Procedure of Urine Test for Sugar/Albumin Using Dipstick

Urine test for sugar/albumin using dipstick is as follows:

- Remove one strip from bottle of dipstick and replace the cap.
- Dip regent area of the strip in urine and remove immediately to avoid dissolving the reagent. To remove excess urine-run the edge of the strip against bottle rim.
- For urine albumin – match colour against the bottle immediately.
- For urine sugar – read after 30 seconds, by comparing the colour of reagent area to the colour chart on the table of the bottle.

2.3.6 Procedure of Pregnancy Test Using Urine Sample

- Carefully read the instructions included in your test kit before collecting urine sample.
- Make sure the test's expiration date hasn't passed.
- Look for the manufacturer's toll-free number on the package, and call it if you have any questions about using the test.
- Remove the pregnancy test card from kit, and keep on flat surface.
- Use first morning urine one to two weeks after clients first missed period.
- Pour 2–3 drops of urine on the test kit
- Wait for 5 minutes
- Look for lines on the test kit

2.3.7 Result

- If one line appears it is negative for pregnancy and if two lines appear on the test kit it is indicative of positive for pregnancy.

2.4 METHOD OF STOOL SAMPLE COLLECTION

The stool sample is collected for analysis of faeces to help diagnose certain conditions affecting the digestive tract.

Stool sample is usually collected in a plastic or waxed container, once collected it should be transported immediately to the laboratory. If not possible to send immediately, or there is delay of more than 2–4 hours then you must use in a suitable transport medium

- Cary- blair transport medium
- Stuart's transport medium

If stool sample is not available then a rectal swab can be taken.

2.4.1 Points to Rremember

- specify whether the samples is a routine screening sample or an investigation for suspected intestinal infection.
- use the scoop attached to inside of the lid of the specimen container to place faecal material into the container.
- avoid mixing of stool with urine.

2.4.2 Articles Required

- Specimen container with lid/ wax container/ plastic container
- Wooden spatula
- gloves
- plastic bag

2.4.3 Procedure of Stool Specimen Collection

- Discuss procedure with patient about what specimen is required and reason
- Ask patient to pass urine so that preventing mixing of urine with stool.
- Give container to the patient / client.
- Instruct patient to collect sample. Lift up a portion of stool 15-30 ml from the centre of the mass and place it directly into container using wooden spatula.
- Close container tightly and put in plastic bag.
- Help patient with hygiene if required.
- Remove the gloves and wash hands.
- Label the container and send for lab investigation.
- After getting the lab report, record the findings.
- Inform patient about the result of lab test.

2.4.4 Normal Laboratory Value of Urine and stool

Urine Normal values are as follows:

- Colour – Yellow (light/pale to dark/deep amber)
- Clarity/turbidity – Clear or cloudy
- pH – 4.5–8
- Specific gravity – 1.005–1.025
- Glucose – ≤130 mg/d
- Ketones – None
- Nitrites – Negative
- Leukocyte esterase – Negative
- Bilirubin – Negative
- Urobilirubin – Small amount (0.5-1 mg/dl)
- Blood - ≤ 3 RBCs
- Protein - ≤ 150 mg/d
- RBCs - ≤ 2 RBCs/hpf
- WBCs - ≤ 2-5 WBCs/hpf
- Squamous epithelial cells - ≤ 15-20 squamous epithelial cells/hpf
- Casts – 0–5 hyaline casts/lpf
- Crystals – Occasionally
- Bacteria – None
- Yeast – None

2.4.5 Normal Laboratory Values: Stool

Test	Conventional Units	SI Units
Fat	< 5 g/day in patients on a 100-g fat diet	—
Nitrogen	< 2 g/day	—
Urobilinogen	40-280 mg/24 h	68, 473 mg/24 h
Weight	< 200 g/day	—

2.5 METHODS OF SPUTUM COLLECTION

It is collection of sputum specimen for analysis to determine the presence of micro-organism or abnormal cells.

2.5.1 Points to Remember

- Container for sample collection should be clean and wide mouth. Explain the patient to rinse mouth with plain water (without any antiseptic mouth wash), avoiding brushing of teeth and taking the food.
- Amount of the sample should be adequate.
- The best time for sputum collection is in the morning.

2.5.2 Articles Required

- Clean wide mouthed container with cover
- Gloves
- Facial tissue
- Toothbrush and/ or mouthwash
- Cup and water

2.5.3 Procedure

- Explain the procedure and purpose to the patient.
- Ask patient to clean mouth thoroughly rinse the mouth with water.
- Instruct patient to hold the specimen container without touching inside of the container or lid.
- Ask patient to cough deeply and expectorate in container, repeating until sufficient quantity of sputum is obtained. Specimen should contain lumps of mucoid sputum and little saliva by deep coughing.
- Secure the lid tightly before removing the gloves.
- In case of suspected tuberculosis, two specimen are collected.
- Label container and send to the laboratory as soon as possible.
- Wash hands properly. One on the spot and second early morning.
- After getting the lab report, record the findings.
- Inform patient about the result of lab test.

2.6 METHOD OF BLOOD SAMPLE COLLECTION

Let us now discuss the method of Blood Sample Collection:

2.6.1 Points to Remember

- Observe universal safety precautions.
- Needles and hub are single use and should be disposed off in appropriate sharp container as one unit.
- Needles are never recapped, removed, broken or bent after use.
- Contaminated surface should be cleaned with freshly prepared 10% bleach solution.

2.6.2 Articles Required

- Hand hygiene material such as soap and water / alcohol rub
- Well fitting gloves
- Single use disposable needle and syringe or launching device
- Tourniquet

2.6.3 Steps of Procedure

It is an amount of a person's blood taken from their body for use in medical tests.

Let us discuss steps of blood sample collection as given below:

- Explain the procedure and its purpose the patient.
- Place all the equipment needed in safe and easy reach.
- Check the laboratory form.
- Put on gloves
- Make patient comfortable in supine position.
- Place a clean towel under patient's arm.
- Extend the patients arm and inspect the anticubital fossa or forearm.
- Locate a vein of good size that is visible, straight and clear.
- Apply tourniquet abour 4–5 finger width above the venepuncture site and re-examine the vein.
- Clean the site with alcohal swab for 30 seconds and allow it to dry completely (30 seconds).
- Apply firm but gentle pressure.
- Do not touch the clean site.
- Ask patient to form a fist, so the veins are more prominent.
- Insert the needle swiftly at 30 degree angle or less and continue to insert the needle along the vein.
- Once sufficient blood has been collected release the tourniquet before withdrawing the needle.

- Withdraw the needle gently and apply gentle pressure to the site with clean gauze or dry cotton ball.
- Ask the patient to hold the gauze/cotton in place for sometime.
- Before dispatch invert the tubes containing additives for the required number of times.
- Cross check details of container with investigation form and send for testing.
- Discard the needle syringe and blood sampled device into puncture proof container.
- Remove and discard gloves.
- wash hands.

2.6.4 Normal Values: Complete Blood Count (CBC)

The following are normal complete blood count results for adults:

Red blood cell count	**Male:** 4.32-5.72 trillion cells/L*(4.32-5.72 million cells/mcL**) **Female:** 3.90-5.03 trillion cells/ L(3.90-5.03 million cells/mcl)
Haemoglobin	**Male:** 13.5-17.5 grams/dL***(135-175 grams/L) **Female:** 12.0-15.5 grams/dL(120-155 grams/L)
Haematocrit	**Male:** 38.8-50.0 percent **Female:** 34.9-44.5 percent
White blood cell count	3.5-10.5 billion cells/L(3,500 to 10,500 cells/mcL)
Platelet count	150-450 billion/L(150,000 to 450,000/mcL**)

* L = liter
** mcL = microlitre
*** dL = decilitre

2.7 LET US SUM UP

In this unit we have discussed basic tests, collection of samples and steps of doing the procedure such as urine test for pregnancy, urine test for sugar & protein. Stool sample collection, transportation, normal values for urine stools sample is usually collected for AFB (Acid Fast Bacilli) for diagnosing tuberculosis. Blood Sample Collection procedure and normal values are also been explained.

2.8 ACTIVITY

1) Identify patients with symptoms of illness such as:
   - Cough
   - Anaemia
   - Itching in perineal area
   - Lower backache

Collect suitable specimens and give reasons why you collected particular specimen.

2) Practice to select vein for blood collection and if required collect blood samples if prescribed by doctor.

3) Identify diabetic/pregnant woman and do urine test for albumin / sugar.

UNIT 3 COMMON BLOOD TESTS AND PREPARATION OF PERIPHERAL SMEAR

Structure

3.0 INTRODUCTION

Common blood tests are performed to diagnose diseases like typhoid, malaria, dengue and chikenguniya. Rapid blood tests provide results within minutes and enable the health workers to decide the treatment. Efficient and accurate diagnosis of dengue, malaria and typhoid is of primary importance for clinical care (i.e. early detection of severe cases, case confirmation and differential diagnosis with other infectious diseases), surveillance activities and outbreak control.

In this unit, we will discuss procedure for veinpuncture, rapid test for malaria, peripheral smear preparation, rapid test for typhoid.

3.1 OBJECTIVES

At completing this unit, you shall be able to:

- perform venipuncture to obtain blood samples;
- perform rapid test for malaria;
- develop skill to prepare peripheral smear; and
- perform rapid test for typhoid.

3.2 IMPORTANCE OF TESTS

Rapid diagnostic tests enable to diagnose early as well as screen for several diseases. Rapid diagnostic tests are done for faster results so that treatment can be started as soon as possible and are performed in place of microscopy.

3.3 VENIPUNCTURE PROCEDURE

The venipuncture procedure is complex, requiring both knowledge and skill to perform. You will have to generally establish a routine that is comfortable for you. Steps required for collection of procedure:

- Assess the patient's physical condition (i.e. diet, exercise, stress, basal state).
- Check the requisition form for requested tests, patient information, and any special requirements.

3.3.1 Articles Required for Collecting Blood

- Lab sample tubes for blood collection
- Blood sampling systems (needle and syringe system/vacuum extraction with holder)
- Tourniquet
- Skin antiseptic solution
- Gauze pads
- Adhesive bandage
- Tray for assembling blood collection tools
- Rack for holding blood tubes
- Durable marker for writing on laboratory sample

3.3.2 Steps of Doing the Procedure

- Wash hand by use of alcohol based rub or clean running water and soap
- Use personal protective equipment- one pair of gloves

Identify and prepare the patient

- Introduce yourself to the patient and explain about the blood sample
- Confirm the correct patient

Select a suitable site for venipuncture preferably at the bend of the elbow

- Palpate the area; locate a vein of good size that is visible, straight and clear
- The vein should be visible without applying a tourniquet

Prepare the patient and the puncture site.

- Apply a tourniquet around the arm approximately 4–5 finger width above the selected site
- Ask the patient to form a fist so that the veins are more prominent

Disinfect the area where you will put the needle.

- Use 70% isopropyl alcohol
- Wait 30 seconds for the alcohol to dry
- DO NOT touch the site once disinfected.

Perform the venipuncture.

Withdraw blood

- Prick the vein swiftly at a 30 degree angle.
- When blood starts to flow, ask patient to open his/her hand.
- Once sufficient blood has been collected release the tourniquet
- Collect the sample in the appropriate container.
- Recognise complications associated with the phlebotomy procedure.
- Assess the need for sample recollection and/or rejection.
- Label the collection tubes at the bedside or drawing area.
- Promptly send the specimens with the requisition to the laboratory.

3.4 RAPID DIAGNOSTIC TEST KIT FOR MALARIA

Malaria is a serious, sometimes fatal, parasitic disease characterised by fever, chills and anAemia and is caused by a parasite that is transmitted from one human to another by the bite of infected Anopheles mosquitoes. Rapid diagnostic tests (RDTs) most often use a dipstick and provide results in about 20 minutes. A blood specimen collected from the patient is applied to the sample pad on the test card along with certain reagents. Currently approved RDTs for malaria can detect 2 types of malaria antigens; one is specific for *P. falciparum* and the other is found in all 4 human species of malaria. After 15 to 20 minutes (depending on the test), the presence of specific bands in the test card window indicates whether the patient is infected with *P. falciparum* or one of the other 3 species of human malaria. At present malaria is diagnosed by looking for parasites in a drop of blood. Blood drop is put onto a microscope slide and stained so that the parasites will be visible under a microscope.

3.4.1 Articles Required

Rapid test for malaria contains following items:

- Test device individually foil pouched with a desiccant (a thgroscpic substance to induce dryness)
- Disposable sample applicator (5 µl)
- Instructions for use
- Active ingredients of main component
- 1 test strip
- Assay diluents: bovine serum albumin
- Precautions/ kit storage and stability

3.4.2 Steps of Soing Procedure

Let us now discuss the steps of doing procedure.

Test using a lancet by finger prick

- Clean the area to be pricked with an alcohol swab.
- Squeeze the end of the finger tip and pierce with a sterile lancet.
- Wipe away the first drop of blood with sterile gauze or cotton.
- Take a disposable specimen loop (5 µl) provided, dip the circular end of the loop into the blood specimen and carefully touch the circular end of the loop into the round sample well or using a capillary pipette (5 µl) while gently squeezing the tube, immerse the open end in the blood drop and then gently release pressure to draw blood into the capillary pipette upto black line.
- Bring all kit componenets and specimen to room temperature prior to testing
- Remove the test device from foil pouch, place it on a flat and dry surface
- Clean the finger tip and prick the finger with lancet
- With a 5µl disposable specimen loop provided, dip the circular end of a loop into the blood specimen and carefully place the circular end of the loop into the round sample well.
- Add 4 drops of assay diluents into the square assay diluents well
- Interpret test results within 20–30 min

Note: Caution: do not read test result after 30 minutes. Reading too late can give false results.

3.4.3 Interpretation of the Results

i) Negative: The presence of one colour band (“C” control line) within the result window indicates a negative result

ii) Positive: P falciparum positive – the presence of two colour bands (“P” test line and “C” control line) or three color bands (“P.a”, “Pan” test lines and “C” Control line) in the test result window, no matter which band appears first , indicates positive result as shown in Fig.3.1.

iii) Other plasmodium species (P.v, P.m, P.o) positive ; the presence of two colour bands (“Pan” test line and “C” Control line) within the result window, no matter which band appears first indicates other plasmodium species positive result.

iv) Mixed infection: P.f and P.v (or P.m, P.o); the presence of three colour bands (“P.f”, “Pan” test lines and “C” Control line) within the result window, may indicate mixed infection of P.f and P.v (P.m, P.o).

v) Invalid result if the control band (“C” control line) fails to appear within the result window, the result is considered invalid. The directions may not have been followed correctly.

Fig. 3.1: Blood Test using Kit

3.5 PERIPHERAL SMEAR PREPARATION

A small drop of blood is placed near the frosted end of a clean glass slide. A second slide is used as a spreader. The blood is streaked in a thin film over the slide. The slide is allowed to air-dry and is then stained.

Specimen

Anticoagulated blood EDTA vial is preferred. Blood smears can also be made from finger stick blood directly onto a slide.

Articles required:

1) Glass slides with frosted edge
2) Stopper piercer

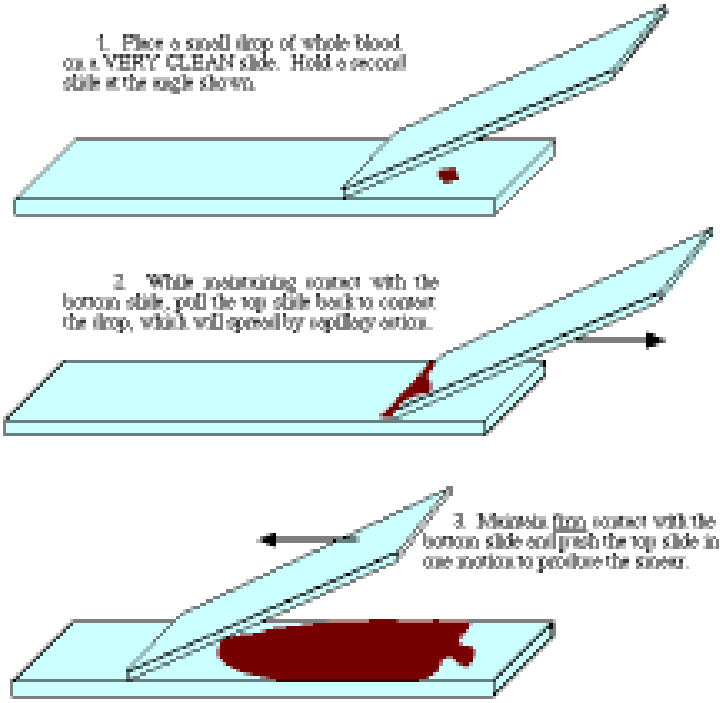


Fig. 3.2: Preparation of Blood Smear

Procedure shown in Fig. 3.2.

1) Using the stopper piercer, place a drop of blood about 2 mm in diameter approximately one inch from the frosted area of the slide.

2) Place the slide on a flat surface and hold the narrow side of the non frosted edge between your left thumb and forefinger.

3) With your right hand, place the smooth clean edge of a second slide on the specimen slide, just in front of the blood drop.

4) Hold the spreader slide at a 30º angle and draw it back against the drop of blood. Allow the blood to spread almost to the edges of the slide.

5) Push the spread forward with one light, smooth and fluid motion. A thin film of blood in the shape of a bullet with a feathered edge will remain on the slide

6) Label the frosted edge with patient name, ID and date as shown in Fig. 3.3.

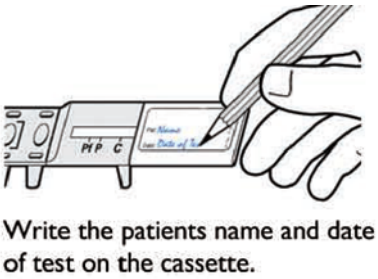


Fig. 3.3: Label the slide

7. Allow the blood film to air dry completely before staining. (Do not blow dry. The moisture from your breath will cause RBC artifact)

Important:

A good film preparation will be thick at the drop end and thin at the opposite end.

Smear should be made without delay as soon as the drop of blood is place on the glass slide.

Blood smear should occupy the central portion of the slide and should not touch the edges.

The thickness of the spread when pulling the smear is determined by the angle of the spreader slide (the greater the angle, the thicker and shorter the smear.

3.6 RAPID TEST KIT FOR TYPHOID

Let us now discuss in detail the procedure of doing rapid test for Typhoid. Fig. 3.3 shows the articles (rapid test kit) used for typhoid test.

Fig. 3.3: Rapid test kit for Typhoid

3.6.1 Steps of Ddoing the Procedure

Step 1. Add serum/plasma/whole blood to square well. For whole blood this is followed by addition of one drop buffer.

Step 2. Upto area A, add 3 drops buffer to oval well.

Step 3. Put clear plastic tab and add one drop buffer to square well

Fig. 3.4: Steps of doing procedure

3.6.2 Interpretation of Result

Interpret results using rapid typhoid kit in a patient with fever of unknown origin.

3.7 LET US SUM UP

In this unit, we have discussed important procedures for detection of malaria, typhoid using rapid test kit. Procedure for collecting blood specimen by venipuncture also discussed. More details would also be covered in Unit 8 of this Block.

3.8 ACTIVITY

Select three patient suffering with fever of :

- unknown origin and perform following tests – RDT for Malaria, Typhoid.
- Practice taking blood sample using vein puncture.

3.9 REFERENCES

Brown, Barbara, Hematology: Principles and Procedures, 5th edition, p 96-97.

UNIT 4 EXAMINATION OF SWELLING, LUMPS, JOINTS

Structure

4.0 INTRODUCTION

In the previous unit you have learnt about various tests which are carried out in case a patient is suffering with fever of unknown origin as well as how to collect sample through vein puncture. You will also come across other common problems at your health facility, such as swelling which is sometime visible and sometime not visible but patient would tell that she/he is feeling lumpiness on touching. Hence, this unit would enable you to identify most common lumps and their assessment so that early identification alert and alarm you to take appropriate measures.

4.1 OBJECTIVES

After completing this unit, you shall be able to :

- systematically examine common lumps and swellings;
- describe common lumps and swellings;
- recognise and early identify the following conditions: Lipoma, Hernia, Sebaceous Cyst and Abscess, Thyroid Lumps, Lymph Nodes, Breast Lumps, joint swellings; and

- Appropriately refer in the following conditions: Lipoma, Hernia, Sebaceous Cyst & Abscess, Thyroid Lumps, Lymph Nodes, Breast Lumps, joint swellings.

4.2 PREPARATION OF THE PATIENT FOR PHYSICAL EXAMINATION

Let us now discuss preparation of the patient for physical examination as given below:

Follow these steps:

- Ask the patient to indicate the position of the lump(s) and any previous lumps
- Explain the procedure to the patient
- Ensure that exposure is adequate
- Ensure patient's dignity
- Examination of a female patient should be done in the presence of a female attendant or a nurse
- Ask the patient if there is any tenderness
- Ask about any recent change in the lump

4.3 PROCEDURE OF PHYSICAL EXAMINATION

This is divided into various sections and these are: lump history, general examination, Look, Feel, Move (plane of attachment), Specific tests, and Regional Lymph nodes.

4.3.1 Lump History

Lump history - for taking history of swelling and give your findings in the remarks column.

Ask the following questions:

S.No.	Question	Remarks
1.	When was the lump first noticed? (Duration)	
2.	What made the patient notice the lump? (First symptom)	
3.	What are the symptoms related to the lump? (Other symptoms)	
4.	Has the lump changed in size, texture since it was first noticed? (Progression)	
5.	Does the lump ever disappear (persistence)? What makes the lump to reappear?	
6.	Has the patient ever had any other lumps? (Multiplicity)	

S.No.	Question	Remarks
7.	What does the patient think caused the lump? (Cause)	
8.	Is there loss of bodyweight?	
9.	Is there recurrence after operation?	

4.3.2 General Examination

Check for general well being, gait, pulse, temperature, pallor, order of limbs, eyelids, any enlarged lymph-nod.

4.3.3 Examination of Lump/Swelling

Let us now discuss about examination of Lump in details.

1) **Look (observation)**

- Location of lump/position:_____
- Contour: Regular/Irregular
- Pulsation: Check for Aneurism/High Blood Flow
- Number of lumps/swellings : _____
- Shape : Spherical/ Hemispheric/Pear or Kidney shape.
- Size of lump:
- Colour and texture of overlying skin: Check for smoother and shiny or thick and rough skin, scars, ulcers, discharging sinuses, peaud'orange)
- Check for Abnormal vessels
- Impulse on cough:

2) **Feel the lump/swelling (palpation)**

- Check temperature by touching and compare it with nearby / adjacent normal skin other than the lump swelling.
- **Tenderness:** Feeling pain on touch (Yes/No)
- **Surface:** Check for smoothness/regularity/nodularity.
- **Edge:** Check for well defined or indistinct edges.
- **Consistency:** Check for stony hard/ firm/ rubbery/spongy/soft consistency.
- **Cough impulse:** Reducible (Ask the patient to cough and see if the lump increase in size or not. If size increases by to reduce it by spreading the lump to see whether such as a bony prominence, joint etc.). It is reducable or not e.g. hernias – don't forget cough impulse.
- **Position** : Measured from a landmark.
- **Size:** Measure with a measuring tape.
- Thrill or pulsation: (Yes / No)

3) **Press:**

- **Pulsatility:** Check whether the lump is pulsatile or not. It should be expansile pulsation or transmitted pulsation).

- **Compressibility:** Disappear on pressure and reappear on release Emptying.
- **Reducibility:** Reappear only on application of another force e.g. cough.
- **Fluctuation:** It is checked by 2 fingers moved apart when middle area pressed.

4) **Percussion:**

Put three fingers (index, middle and ring) of left hand over the lump or swelling. Using middle finger of right hand tap gently over the middle finger of left hand over the lump and listen to the sound. It can be dull or resonant. Dull indicates solid nature. Resonance indicates presence of gas.

5) **Move (This is to check plane of attachment)**

Skin tethering (To see skin fixed with tissues lying beneath. Attempt to pick up a fold of skin over the swelling and compare with other side).

Deeper structures (attempt to move the swelling in different planes relative to surrounding tissues).

Muscles and tendons (palpate the swelling whilst asking the patient to use the relevant muscle).

6) **Listen:** (put a stethoscope over the lump and listen for bruit, bowel sounds etc. Bruit is the fine gurgling sound of blood flow in a blood vessel.

7) **Trans illumination:** Throw light from a bulb of the torch to the lump. If it is illuminated indicates presence of clear fluid.

8) **Regional Lymph Nodes**

You must be aware of the main routes of lymphatic drainage and the relevant regional lymph nodes. Palpate the lymphnodes and note their characteristics in terms of size, number, feel, tenderness, fixation to tissues etc.

9) **Examine surrounding tissue**

- Look and palpate draining group of lymph nodes
- Check sensation in surrounding area
- Check power of related muscle
- Distal effects (swelling, decreased size and loss of function etc.)

  Find state of local tissue: arteries pain and discoloration of skin to black indicates less blood supply or ischemia, nerves (nerve if affected leads to muscle wasting and change in sensation such as tingling numbness), lymphatic (blockage of lymphatic system leads to edema), bones and joints (if bones and joints are affected leads to erosion).

4.4 EXAMINATION OF NECK SWELLING (THYROID GLAND)

Let us now discuss the examination of swelling in the neck region as given below.

Follow these steps:

- Wash hands

- Introduce yourself
- Explain about examination to the patient
- Take consent
- Appropriately position and expose the neck by bending head backwards to some extent
- Perform general inspection
- Identify any scars on the neck – previous surgery *(e.g. thyroidectomy)*
- Observe for any obvious masses in the neck
- Ask for change in voice – weak or hoarness and its duration, whether it is increased over time or not.
- If a mid-line lump is present:
    - Ask the patient to swallow some water – *thyroid masses will rise / as will thyroglossal cysts*
    - Ask patient to protrude tongue –*thyroglossal cyst will rise / thyroid masses will not*

Thyroid gland

- Place the 3 middle fingers of each hand along the midline of the neck below the chin.
- Locate the upper edge of the thyroid cartilage ("Adam's apple")
- Move inferiorly until you reach the cricoid cartilage / ring
- The first 2 rings of the trachea are located below the cricoid cartilage and the thyroid isthmus overlies this area
- Palpate the thyroid isthmus using the pads of your fingers (not the tips)
- Palpate each lobe of the thyroid in turn by moving your fingers out laterally from the isthmus.
- Ask the patient to swallow some water, whilst you feel for symmetrical elevation of the thyroid lobes which rises during swallowing (asymmetrical elevation may suggest a unilateral thyroid mass).
- Ask the patient to protrude their tongue once more (if a mass is a thyroglossal cyst, it will rise during tongue protrusion).

Neck lumps:

- Most often caused by enlarged lymph nodes (consider sources in the head and neck, chest, abdomen, lymphoma).
- Thyroid disease.

4.5 CLINICAL – BREAST EXAM (CBE)

Let us now discuss the clinical breast examination (CBE).

Any lady who comes with a problem related to breast or any lady who is above 30 years of age and comes to you for any other problem you may perform CBE. Ask the patient to undress waist upwards and then examine the breasts.

Follow steps of Clinical Self-Exam (CBE).

Steps of a clinical breast exam are same as those of Breast-self examination. The steps are given below:

Step 1:

Ask the lady to stand in front of you with your shoulders straight and her arms on the hips and look at her breasts:

- To check size, shape, and colour of skin
- To find out that they are evenly shaped without visible distortion or swelling

Consult doctor if there is :

- Dimpling, puckering, or bulging of the skin over breast
- Changed position or an inverted nipple (pushed inward instead of sticking out)
- Redness, rash, or swelling of the breasts.

Step 2:

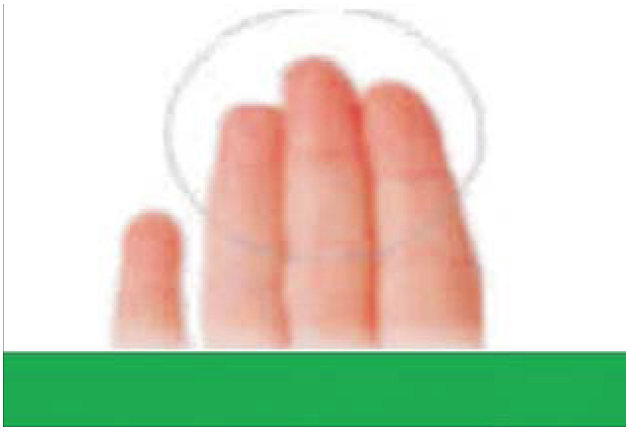
- Now, ask her to raise her arms and look for the same changes.
- Look for any dimpling of skin or in-drawing nipple.

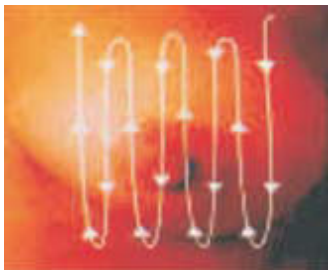
Step 3:

- gently squeeze each nipple between your finger and thumb
- Consult doctor if nipple discharge is milky or yellow fluid or blood.

Step 4:

- Ask the lady to lie down and then examine her breasts one by one.
- Use a firm, smooth touch with the first few fingers of your hand, keeping the fingers flat and together.
- Cover the entire breast from top to bottom, side to side—from collarbone to the top of the abdomen, and from the armpit to the cleavage.
- Be sure to feel all the breast tissue:
    - Follow a pattern to be sure that you cover the whole breast. Begin at the nipple, moving in larger and larger circles until you reach the outer edge of the breast. Also move your fingers up and down vertically, in rows. Begin examining each area just beneath your skin with a very soft touch, and then increase pressure so that you can feel the deeper tissue, down to your ribcage using fingers only.





- Breast lumps: These could be
    - Fibroadenomas (lumps are mobile, also known as 'the breast mouse'). These are benign breast tumours.
    - Simple cysts.
    - Fat necrosis.
    - Fibroadenosis (lumpy breasts with pain).
    - Breast abscesses.
    - Breast cancer.

4.6 ABDOMINAL LUMP

An abdominal lump is a swelling or bulge that emerges from any area of the abdomen. It most often feels soft, but it may be firm depending on its underlying cause.If a patient has a fever, vomiting, or pain around an abdominal lump, you may need emergency care.

Common Causes of Abdominal lump

A hernia causes the majority of lumps in the abdomen. Hernias often appear after you have strained your muscles by lifting something heavy, coughing for a long period, or being constipated.

There are several types of hernias. These are inguinal hernia, femoral hernia, umbilical hernia, incisional hernia, epigastric hernia and hiatal hernia.

i) Hernia swelling

A hernia is the exit of an organ, such as the bowel, through the wall of the abdominal cavity in which it normally resides. Hernias are of different types. Most commonly they involve the abdomen, specifically the groin. Groin hernias could be inguinal or femoral. Other hernias include hiatus, incisional, and umbilical hernias. This type of hernia causes pain or discomfort especially with coughing, exercise, or going to the toilet. Often it gets worse throughout the day and improves when lying down. The hernia swelling becomes larger while coughing or lifting heavy weight. ***The main concern is strangulation, where the blood supply to part of the bowel is blocked***. This usually produces severe pain and tenderness of the area. Hiatus or hiatal hernias often result in heartburn but may also cause chest pain or pain during eating.

Risk factors for the development of a hernia include:

- smoking
- chronic obstructive pulmonary disease
- obesity
- pregnancy
- peritoneal dialysis
- collagen vascular disease, and previous open appendectomy.

Hernias are partly genetic and occur more often in certain families. It is unclear if groin hernias are associated with heavy lifting. Hernias can often be diagnosed based on signs and symptoms. Occasionally medical imaging is used to confirm the diagnosis or rule out other possible causes. The diagnosis of hiatus hernias is often done by endoscopy.

The signs and symptoms of a hernia can range from noticing a painless lump to the severely painful, tender, swollen protrusion of tissue that you are unable to push back into the abdomen in case of strangulated hernia. Abdominal or pelvic pain can be part of the symptoms of many hernias.

Reducible hernia

- It may appear as a new lump in the groin or other abdominal area.
- It may cause pain but is not tender when touched.
- Sometimes pain precedes the discovery of the lump.
- The lump increases in size when standing or when abdominal pressure is increased (such as coughing).
- It may be reduced (pushed back into the abdomen) unless very large.

Irreducible hernia

- It may be an occasionally painful enlargement of a previously reducible hernia that cannot be returned into the abdominal cavity on its own or when you push it.
- Some may be chronic (occur over a long term) without pain.
- An irreducible hernia is also known as an incarcerated hernia.
- It can lead to strangulation (blood supply being cut off to tissue in the hernia).

- Signs and symptoms of bowel obstruction may occur, such as nausea and vomiting.

Strangulated hernia

- This is an irreducible hernia in which the blood supply to the trapped in intestine is cut off.
- Pain is always present, followed quickly by tenderness and sometimes symptoms of bowel obstruction such as nausea and vomiting.
- The affected person may appear ill with or without fever.
- This condition is a surgical emergency.

Hernia Examination: You need to examine hernia, in standing as well as lie down positions as given below:

Always start with the patient STANDING

i) **Inspect of abdomen while standing**

- Exposure is very important – ensure that you can see from umbilicus to knees at least
- Look in the groin for evidence of a swelling. If you can't see one, then ask the patient which side he has noticed a lump.
- Look for evidence of previous hernia surgery – oblique scar often hidden in pubic hair line.
- Any other obvious skin changes, swellings, lumps that may be relevant.
- Ask the patient to look over their shoulder and cough (so they don't cough into your face).
- As they cough, look at the lump to see if there is a cough impulse.

Palpate standing

- Palpate the swelling
- Find out if you can get above it (If not, it suggests of originating in scrotum/ spermatic cord e.g. hydrocoele)
- Feel to find out if it is soft, fluctuant, Pulsatile etc.
- Ask the patient again to cough and palpate for a cough impulse
- Ensure that you feel the opposite side, as bilateral hernias are very common, often one being much more prominent

Auscultate

- If possible auscultate the lump. If the hernia contains parts of intestine, you will hear gurgling sound intestine.

ii) **Lie the patient down**

Inspection

- Again, inspect the groin to ensure there is nothing missed from standing inspection.
- Offer to palpate the abdomen for any cause of raised intra-abdominal pressure such as ascites or mass, which can predispose to herniation.

Palpation

- Having identified a hernia, the next task is to assess if it is indirect or direct.
- Ask the patient if they can reduce the hernia.
- Palpate the groin to assess if the hernia has completely reduced.
- Tell the patient that you will palpate some bony points.
- Feel for the anterior superior iliac spine and the pubic tubercle, to identify the mid-inguinal point which earmarks inguinal ligament.
- Palpate the midpoint of the inguinal ligament (the surface landmark for the deep inguinal ring) and ask the patient to cough.
- If the hernia is CONTROLLED by pressure over the deep inguinal ring, it suggests that the hernia is indirect.
- In order to confirm that you were in fact controlling the hernia, ask the patient to cough without pressure to ensure that the hernia now appears.
- Offer to examine the scrotum, where you should palpate the testis and epididymis that completes the examination of the hernia, but offer to examine the abdomen for other masses etc. All newly discovered hernias or symptoms that suggest a hernia should prompt a visit to the doctor. Hernias, even those that ache, if they are not tender and easy to reduce (pushed back into the abdomen), are not necessarily surgical emergencies, but all have the potential to become serious. Referral to a surgeon should generally be made so that the need for surgery can be established and the procedure can be performed as an elective surgery. It will avoid the risk of emergency surgery when hernia become irreducible or strangulated.

Umbilical Hernia

An umbilical hernia is very similar to an inguinal hernia. However, it's more localised and occurs around the navel. This type of hernia is most common in babies and will often disappear later on as the their abdominal wall heals. The classic sign of an umbilical hernia in a baby is outward bulging of the belly near navel when they cry.

Surgery is required to fix an umbilical hernia if it doesn't heal on its own by the time a child is 3 years old. The possible complications are similar to those of an inguinal hernia as given below:

Incisional Hernia

An incisional hernia is one that appears due to a surgical cut that has weakened the abdominal wall. It requires corrective surgery to avoid complications.

ii) **Hematoma**

A hematoma is a collection of blood under the skin that results from broken blood vessels. Haematomas are typically caused by an injury. If a haematoma occurs over abdomen, a bulge and discoloured skin may appear. Haematomas typically resolve without needing treatment.

iii) **Lipoma**

A lipoma is a lump of fat that collects under the skin. It feels like a firm, rubbery bulge that moves slightly when pushed. Lipomas grow very slowly, can occur

anywhere on the body, and are almost always benign. They can be removed surgically if large, but in most cases, surgery isn't necessary.

iv) **Undescended Testicle**

During foetal development, the testicles form in the abdomen and then descend into the scrotum. In some cases, one or more of them may not fully descend. This may cause a small lump near the groin in newborn boys and can be corrected with hormone therapy or surgery to bring the testicle into position.

v) **Tumor**

Although very rare, a benign or cancerous tumor on an organ in the abdomen or in the skin or muscles can cause a noticeable lump. Whether it requires surgery or another type of treatment depends on the type of tumor and its location.

vi) **Ascites**

Ascites is the accumulation of fluid (usually serous fluid which is a pale yellow and clear fluid) that accumulates in the abdominal (peritoneal) cavity. The abdominal cavity is located below the chest cavity, separated from it by the diaphragm. Ascitic fluid can have many sources such as liver disease, cancers, congestive heart failure, or kidney failure.

The most common cause of ascites is advanced liver disease or cirrhosis. Although the exact mechanism of ascites development is not completely understood, most theories suggest portal hypertension (increased pressure in blood flow to the liver) as the main contributor. The basic principle is similar to the formation of oedema elsewhere in the body due to an imbalance of pressure between inside the circulation (high pressure system) and outside, in this case, the abdominal cavity (low pressure space). The increase in portal blood pressure and decrease in albumin (a protein that is carried in the blood) may be responsible in forming the pressure gradient and resulting in abdominal ascites. The most common cause of ascites is cirrhosis of the liver. Many of the risk factors for developing ascites and cirrhosis are similar. The most common risk factors include hepatitis B, hepatitis C, and long standing alcohol abuse. Other potential risk factors are related to the other underlying conditions, such as congestive heart failure, malignancy, and kidney disease.

There may be no symptoms associated with ascites especially if it is mild (usually less than about 100–400 ml in adults).

- As more fluid accumulates, increased abdominal girth and size are commonly seen.
- Abdominal pain, discomfort, and bloating are also frequently seen as ascites becomes larger.
- Shortness of breath can also happen with large ascites due to increased pressure on the diaphragm and the migration of the fluid across the diaphragm causing pleural effusions (fluid around the lungs).

Refer appropriatity if a patient with ascites need further investigations and should be seen by primary care physician and then depending on the suspected cause by the specialist concerned to higher health facility.

vii) **Hepatomegaly or splenomegaly (enlargement of liver and spleen)**

Enlarged liver and spleen has a variety of causes including infections, blood disorders, liver disease, and cancers.

Enlarged liver and spleen may be caused by infections including bacterial infections, infections caused by parasites such as malaria, kalaazar, acute hepatitis (liver inflammation, Cancer, Leukemia (cancer of the blood or bone marrow), Lymphoma, Sickle cell crisis and Congestive heart failure etc.

If on examination of the abdomen such a mass is suspected patient need to be refered to a primary care physician and then as pr the requirement to a specialist.

Lymph node enlargement

Lymph node is a small, round or bean-shaped cluster of cells covered by a capsule of connective tissue. The cells have an important role to play in fighting agaisnt bacteria or viruses and protect the body.

Lymph nodes are located in groups, and each group drains a specific area of the body. You may more likely notice swelling in certain areas, such as the lymph nodes in your neck, under your chin, in your armpits and in your groin. The site of the swollen lymph nodes may help in identifying the underlying cause. Lymph node swellings are common in children. Depending on which group of lymph nodes are enlarged i.e. cervical, axillary or inguinal it helps you localize the infection.

The most common cause of swollen lymph nodes is an infection, particularly a viral infection. However, there are other types of infections, including parasitic, bacterial, and other possible causes of swollen lymph nodes. They include:

Common infections

- Throat infections e.g. tonsillitis, pharyngitis etc.
- Measles
- Ear infections
- Infected tooth
- Skin or wound infections, such as cellulitis or erysipelas
- Human immunodeficiency virus (HIV) (the virus that causes AIDS)
- Infectious mononucleosis

Most of the swellings remain after the patient recovers from infection but if it is big in size, multiple, hard to touch or matted, in such a case further investigation is required such as Fine needle aspiration cytology (FNAC).

Abscess

An abscess is a tender mass generally surrounded by a coloured area from pink to deep red. Abscesses are often easy to feel by touching. The middle of an abscess is full of pus and debris. Cutaneous abscesses are most commonly caused by Staphylococci.

Painful and warm to touch, abscesses can show up any place on the body. The most common sites are armpits, areas around anus , around a tooth , breast, and the groin. Inflammation around a hair follicle can also lead to the formation of an abscess, which is called a boil (furuncle).

Unlike other infections, antibiotics alone will not usually cure an abscess. In general, an abscess must be opened and drained for treatment. Sometimes draining

occurs on its own, but generally it must be opened by a procedure called incision and drainage (I&D).

Abscesses are caused by obstruction of oil (sebaceous) glands or sweat glands, inflammation of hair follicles, minor breaks and punctures of the skin. Germs get under the skin or into these glands, which causes an inflammatory response as body's defences try to kill these germs.

The middle of the abscess liquefies and contains dead cells, bacteria, and other debris. This area begins to grow, creating tension under the skin and further inflammation of the surrounding tissues. Pressure and inflammation cause the pain.

People with weakened immune systems get certain abscesses more often. Those with any of the following are all at risk for having more severe abscesses. This is because the body has a decreased ability to fight against infections.

- Chronic steroid therapy
- Chemotherapy
- Diabetes
- Cancer
- AIDS
- Severe burns
- Severe trauma
- Alcoholism or IV drug abuse

Other risk factors for abscess include exposure to dirty environments, exposure to persons with certain types of skin infections, poor hygiene, and poor circulation.

Abscess Symptoms

Most often, an abscess becomes a painful, compressible mass that is red, warm to touch, and tender.

- As some abscesses progress, they may "point" and come to a head so that you can see the material inside and then spontaneously rupture.
- Most will continue to get worse without care. The infection can spread to the tissues under the skin and even spreads into the bloodstream.
- If the infection spreads into deeper tissue, fever can develop.

Abscess Treatment: Self-Care at Home

- If the abscess is small (less than 1 cm or less than a half-inch across), applying warm compresses to the area for about 30 minutes 4 times daily may help.
- Do not attempt to drain the abscess by squeezing or pressing on it. This can push the infected material into the deeper tissues.
- Do not stick a needle or other sharp instrument into the abscess center, because you may injure an underlying blood vessel or cause the infection to spread.

Incision and drainage may be performed by you as follows on an abscess:

The area around the abscess should be numbed with medication. It is often difficult

to completely numb the area, but local anaesthesia can make the procedure almost painless.

- You may give some type of sedative if the abscess is large.

  The area should be cleaned with an antiseptic solution and sterile towels placed around it.

  You should then cut open the abscess and totally drain pus and debris.

  Once the sore has been drained, insert packing sterile gauze into the remaining cavity to minimise any bleeding and keep it open for a day or two.
- Place a sterile bandage over the packing, and instruct the patient about home care.
- Most people feel better immediately after the abscess is drained.
- If the patient still experiences pain, the doctor may prescribe pain relieving pills for home use over the next 1–2 days.

Once treated, the abscess should heal

- Many people do not require antibiotics.
- The pain often improves immediately and subsides.
- Wound care instructions may include wound repacking, soaking, washing, or bandaging for about 7 to 10 days. This usually depends on the size and severity of the abscess.
- After the first 2 days, drainage from the abscess should be minimal to none. All sores should heal in 10–14 days.

4.7 GENERAL GUIDELINES FOR MANAGEMENT OF A LUMP

This will depend on a number of factors such as the site of the lump, the features of the lump and, ultimately, the diagnosis. Discussion with the patient will enable the patient to make choices about treatment. The following options may be considered:

- Reassurance and no treatment (for example, dermatofibroma, lipoma, some sebaceous cysts).
- Routine investigation to confirm a diagnosis (for example, hydroceles, goitre and other benign conditions).
- Routine excision biopsy (for example, sebaceous cysts, troublesome lipoma, persistent ganglia).

Urgent referral for investigation and/or treatment for the following conditions:

Any lump with features of malignancy:

- Hard, fixed and irregular lumps (often painless).
- Lumps with a history of rapid growth.
- Breast lumps.

- Testicular lumps.
- Abscesses (for incision and drainage).

The management of some lumps (particularly at some sites and based on clinical findings) may be discussed with consultant doctors. A typical example is lymphadenopathy in the neck. Benign pathology can present in an alarming fashion with hard, fixed and rapidly growing lumps which suggest malignancy. Urgent referral for further investigation is needed to make a diagnosis and, to allay anxiety.

Investigations

Diagnosis can be made clinically for some lumps and investigations are often not required. But when excision or radiological investigations are required, patient needs to be referred to appropriate higher facility where these investigations are available. You should have a list of referral centres for the important investigations at your centre.

- Excision biopsy may be all that is required, when it is not clinically contra-indicated.
- Total Blood Count, blood glucose and microbiological investigations may be appropriate for suspected infection.
- Aspiration followed by microscopy, culture and cytological examination may be indicated for some cystic swellings.
- Fine-needle aspiration for cytological examination may be used for some solid tumours.
- Ultrasound and Doppler studies may be used for suspected vascular lesions.
- CT and MRI scanning may be necessary to clarify the site or location and diagnosis of some lumps, particularly where deeper structures may be involved with or without organ involvement.

4.8 HISTORY TAKING AND MUSCULOSKELETAL EXAMINATION (JOINT SWELLING)

Swellings of the joints with pain especially that of knee in middle and old age is common.

Chief Complaint

You may ask a leading question “where is the pain”?

History of Present Illness

It is best to get the history in a chronological manner. If the patient chooses to start at present, let him continue. You can then prompt the patient to tell about the onset of their illness and tell their story moving towards the present.

Ask other aspects of diagnostic significance and related to pain that include:

- **Date of onset and type of onset:** Suddenly or slowly.
- **Location of pain:** Joints/ Muscles/Soft Tissues.
- **Presence of swelling:** Before and Now.
- **Subsequent course:** Progressive/Intermittent/Remittent.

- **Present status:** Better/ Same/Worse).
- **Impact on their lives.** There are four basic spheres of activity:
  - Activities of daily living (ADLs) - dressing, bathing, eating, transfers;
  - Household tasks- cooking, cleaning, washing, gardening, etc.;
  - Employment- physical or sedentary, clerical work, repetitive tasks;
  - Recreational/hobbies- gardening, walking, cycling, etc.

  Ask about historical clues when evaluating any joint related complaint such as:
  - What is the functional limitation?
  - Symptoms within a single joint or affecting multiple joints?
  - Acute or slowly progressive?
  - If injury, what was the nature of injury?
  - Any prior problems with the affected area?
  - Any other systemic symptoms?
- **Associated complaints:** These are patient's concerns. The subsequent review of system will systemically touch on broad issues that may shed light on their present illness-
- **Previous management and response:** Previous rheumatology care is particularly relevant.
- **Morning stiffness:** Generalised that last for > 30 minutes. This is considered to be an expression of inflammatory arthritis.

Past Medical History

Previous medical problems (e.g., hypothyroidism, diabetes mellitus) may be related to the present complaint or influence the rheumatologic management. Family History of Autoimmune diseases can cluster in a family (hypothyroidism, rheumatoid arthritis, Systemic Lupus Erythematosis (SLE). Gout, ankylosing spondylitis and psoriasis are examples of diseases which can be inherited.

Social history

Place the patient's illness in a social context. Management can vary depending on these factors (such as, family support, financial status, personal habits etc.).

Knee swelling: Such as the medical term for this condition is knee effusion. Water in the knee joint can result from an injury, chronic overuse, or disease.

Potential Causes of Knee Swelling

The most common causes of knee swelling are injuries, osteoarthritis, and bursitis, as well as less common causes are Baker's cysts and reactive arthritis.

Whether knee pain is mildly annoying or painfully debilitating, a person will want to identify the likely cause and treat the symptoms to help mitigate future problems. Chronic or long-standing swelling may lead to joint tissue damage, cartilage degradation, and bone softening. Therefore, treatment is usually recommended.

Knee pain: Pain is the most commonly reported symptom of knee osteoarthritis. The description of the pain will depend on the patient's condition and situation. For example, the pain may come and go or there may be a chronic low level of pain with intermittent flare-ups of more intense pain. The pain may be experienced as **dull and aching or as sharp and intense**, and it is usually worse with certain activities that place additional strain on the joint, such as when bending down or walking up stairs. Typically, the knee pain can be lessened with rest and an ice compress.

Knee stiffness: Bone friction and swelling in the knee joint makes the knee stiff and less flexible. The range of motion of the knee can become more limited. A person with moderate to advanced knee osteoarthritis may find it is difficult to straighten out his or her knee. Some people may only experience stiffness in the knee in the morning or after sitting for a long period. Stiffness may or may not be accompanied by swelling and **inactivity makes it worse**. Knees can become stiff after sleeping or sitting for a long period of time. People with knee osteoarthritis often find stiffness and pain are most noticeable when they try to get out of bed in the morning or out of a chair after a long period of sitting.

Knee swelling: When knee cartilage wears away with aging, the femur and tibia (and sometimes patella) bones can rub together, resulting in irritation and swelling of the knee (which can be due to fluid in the knee joint). A swollen knee may be accompanied by a sensation of warmth, which can range from warm to burning. The knee may even become red and warm to touch.

Knee popping or crunching: Feeling a crunching or hearing a popping sound when bending the knee, such as when bending down into a squat, are signs that cartilage has worn away and is not protecting the bones from friction. This symptom is known as crepitus.

4.9 COMMON CONDITIONS DUE TO KNEE SWELLING

Let us now discuss common conditions due to Knee Swelling.

4.9.1 Injury to the Knee

A trauma to the knee's bones, ligaments, tendons, bursae, meniscus, or articular cartilage can cause pain and swelling. Serious injury can cause blood to flood into the knee joint, leading to significant swelling, warmth, stiffness, and bruising.

This condition is called "haemarthrosis" and warrants urgent medical care. A patient should also seek medical attention if knee pain is severe, if the affected leg cannot bear weight, or if the patient suspects a bone may be broken.

4.9.2 Knee Osteoarthritis

Degeneration of the cartilage of the knee joint can result in an overproduction of joint fluid, causing the knee to swell. A swollen knee due to knee osteoarthritis is typically accompanied by pain.

4.10 NON-SURGICAL TREATMENTS FOR KNEE OSTEOARTHRITIS

i) **Physical therapy and exercise**

A graduated and targeted knee strengthening and stretching exercise program is an integral component of the treatment of knee osteoarthritis. Most often, an appropriately trained physical therapist or doctor will evaluate the biomechanical issues that may contribute to the individual's knee arthritis pain. Then, they will teach the patient specific exercises to stretch inflexible soft tissues, and others that build the muscles around the knee, thereby supporting the knee joint and making it less prone to further cartilage loss.

ii) **Activity modification**

While exercise is important to treating knee osteoarthritis, some types of activities and exercise will aggravate the knee joint pain. Certain high impact activities should be avoided and alternatives may be identified. For example, jogging may be replaced with cycling or swimming, both of which exert less force on the knee joint. While painful knee osteoarthritis may cause someone to be less active in general, less physical activity is not advisable. In fact, inactivity is harmful, and often leads to other health problems. The health care provider will work with the individual patient to find alternatives or adaptive strategies to perform daily activities that trigger pain.

iii) **Periodic rest**

A little discomfort is to be expected as stiff joints loosen up in the morning or at the beginning of exercise. However, when people feel terrible pain that limits their ability to function normally, they should generally not try to "work through the pain." Moderate to severe knee pain is a signal that the joint needs a rest. If there is no pain relief within 2 to 4 days of rest, then the individual should seek medical attention.

iv) **Warm or cold compress**

Using a warming pad or whirlpool for a few minutes can loosen a stiff knee joint making activity easier. Icing the knee joint for 15 or 20 minutes after activity can decrease swelling and provide some immediate pain relief. Heating or icing a joint is focused on improving symptoms temporarily, it does not alleviate the underlying causes of knee pain and will not improve long-term joint function by itself.

v) **Weight loss**

A diet to maintain normal weight as per height can pay big dividends for those suffering from knee osteoarthritis. For every extra pound (nearly 500 gms) on the body an extra three pounds of pressure is exerted on the weight-bearing knee joint. Gaining 10 pounds can mean 30 pounds more pressure on the knee with each step, as well as a significantly greater chance of developing osteoarthritis. For people who are overweight or obese, losing weight will significantly reduce pressure and strain on the knee joint, thereby alleviating symptoms and perhaps slowing progression of knee osteoarthritis.

Medications and Injections for Knee Osteoarthritis

The medications listed below can be used to alleviate the symptoms of knee osteoarthritis. Doctor and patient should discuss medication in the context of the patient's lifestyle, severity of pain and medical history. Potential side effects and interaction with other drugs and vitamins/supplements should also be considered.

vi) **Analgesics**. Pain relievers, such as acetaminophen (Tylenol) have relatively few side effects and relieve pain but do not reduce swelling.

Non-steroidal anti-inflammatory drugs (NSAIDs): Patients with moderate to severe pain may benefit from anti-inflammatory medications, such as aspirin, ibuprofen), naproxen or COX-2 inhibitors to reduce the swelling and inflammation that are a common cause of pain. These drugs carry significant side effects and should be used with caution in elderly persons, in particular in those with high blood pressure and heart problems.

Topical analgesics: These creams can be applied directly onto the knee. Some involve topical preparations of NSAIDs that are considered to have less risk of side effects.

4.11 LET US SUM UP

This unit deals with examination of swelling, lump and knee joint. The patient should be communicated about the procedure involved and get informed consent for examination. Basic steps involved in the examination after taking a brief history are: look (observe), feel (palpate), press, percuss, snore, listen, trans-illuminate, check regional lymph nodes and examine surrounding tissues. This unit also shows steps in examination of neck swelling, thyroid, clinical breast examination, abdominal lump (focuses on hernia ascites, tumor, liver and splenomegaly. It also discusses about identification of common lumps, management of abscess, knee joint swelling at home.

Remember the important steps involved in examination of a lump are Look (observation), Feel (palpation), Press, Percussion, Move (plane of attachment), Listen, Trans-illumination, Regional Lymph Nodes and Examine surrounding tissue

4.13 ACTIVITY

Select a patient with history of lump and examine for lumps, document the findings as per assessment in the workbook. Select an elderly patient with history of swelling joints.

Do examination and record the findings. Describe the methods used for assessment. Record the history in workbook.

4.12 REFERENCES

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UNIT 5 EYE AND ENT EXAMINATION

Structure

5.0 INTRODUCTION

In the previous units, you have read about the various procedure for basic tests, how to collect samples, labelling transportation and interpretation of results. Hemoglobin estimation test for malaria and blood sugar as well as pregnancy test. The Unit 4, dealt with identification of swellings, initial management and referral of unexplained lump. This practical would acquaint you to another important aspect of eye and ear, nose, throat related problems, assessment, investigation, primary care and management. Let us start with primary care for local infections of eye.

5.1 OBJECTIVES

After completing this unit, you shall be able to:

- identify danger signs related to common eye problems;
- give primary care and timely referral;
- do eye examination in common eye problems;
- counsel the patient in eye disorder;
- assess and manage foreign body in ear, nose, throat; and
- do hearing assessment.

5.2 PRIMARY CARE FOR LOCAL INFECTIONS OF EYE

Primary care in case of eye infections includes:

- Checking of visual acuity

- Relief of acute pain – analgesics, topical local anaesthetic.
- Cleaning of eyes with clean water.
- Cleaning of hands to prevent spread of infection.
- Dry hot compresses.
- Conjunctival swab for culture sensitivity.
- Contact lenses wearer to switch to glasses.
- Avoid unusual strain and stress to eyes.
- Specific management as per cause.

Primary care in case of redness of eye

- Visual acuity.
- Eye and hand hygiene to prevent spread.
- Investigations for underlying cause.
- Dark goggles.
- Specific management as per cause.
- Conjunctival swab for culture sensitivity.
- Do not bandage the eye without ascertaining the cause.
- Do not use steroids without ascertaining the cause.

To know danger signs and timely referral of patients

- Associated diminution of vision is there
- Symptoms not improving after conservative management as
- Any of the symptoms more pronounced
- In case of very severe pain
- Bulging of eyes is noted (proptosis).
- There is white in black of eye.

5.2.1 Conjunctivitis

Let us now discuss primary care in common eye conditions as given below:

Conjunctivitis is the common cause of redness of eye all the all the and primary care should as per red eye as described above.

5.2.2 Trachoma

As you have read about trachoma and other eye problem in details in theory Course 2 Block 1 Unit 5 like definition, causes, mode of spread, sign and symptoms, diagnosis, treatment and nursing care. Let us now discuss the primary care in trachoma.

- Visual acuity.
- Identification of stages of trachoma.
- To teach patient importance of hygiene and environment factors in prevention and containment of infection.

- Early institution of antibiotics ointments to the patient.
- Identification of advanced stages of trachoma as per WHO grading and referral of such patients.

5.2.3 Stye

- Visual acuity.
- Eye and hand hygiene to prevent spread.
- Explain the treatment to the patient.
- Explain the patient how to apply ointment and drops.
- If styes recur, the patient should be investigated for diabetes mellitus.
- Refraction error in case of recurrent stye.

5.3 INITIAL MANAGEMENT OF FOREIGN BODY IN THE EYE

Let us now discuss about initial assessment, emergency care and nursing care and management of foreign body in the eye.

a) **Assessment**

- Take proper history and note type of foreign body, duration of exposure, timing of exposure, whether unilateral or bilateral, if foreign body is any chemical (if its chemical then ascertain the chemical composition)
- What are symptoms after exposure.
  - a feeling of pressure or discomfort
  - a sensation that something is in your eye
  - eye pain
  - extreme tearing
  - pain when you look at light
  - excessive blinking
  - redness or a bloodshot eye
- Torch light examination to see if foreign body has pierced the eye or embedded in the eye.
- Foreign objects that penetrate the eye are called intraocular objects. Additional symptoms of an intraocular object include discharge of fluid or blood from the eye.

b) **Emergency care**

In case of foreign object in eye, prompt diagnosis and treatment will help prevent infection and potential loss of vision. This is especially important in extreme or intraocular cases.

Removing a foreign object by untrained person could cause serious eye damage. Get immediate emergency referral if foreign body :

a) has sharp or rough edges

b) is large enough to interfere with closing your eye

c) contains chemicals

d) was propelled into the eye at a high rate of speed

e) is embedded in the eye

f) is causing bleeding in the eye

g) Cornea has cloudy spot

c) **Nursing Care**

Depending upon the situations which may vary from patient to patient, while taking care remember the following points:

- Eye wash may be done with normal saline/ringer lactate if penetration can be ruled out. Clean water can be used if fluids are not available.
- Do not remove contact lenses unless there is sudden swelling or in case of a chemical injury.
- In case of chemical injury eye wash to be done with lots of fluids (Normal saline/ Ringer lactate/ B.S.S/ Clean water)
- In case of penetrating injury or abrasion to cornea restrict eye movement.
    - Bandage the eye using a clean cloth or gauze.
    - If the object is too large to allow for a bandage, cover the eye with a paper cap.
    - Cover the uninjured eye. This will help prevent eye movement in the affected eye.
    - Do not rub or put pressure on the eye.
    - Do not use any utensils or implements, such as tweezers or cotton swabs, on the surface of the eye.
- Referral of patient to Ophthalmologist to be done in the following eye problems:-
- Associated diminution of vision.
- All penetrating injury
- Corneal abrasions
- Symptoms does not improves or worsen

5.4 EYE EXAMINATION

The comprehensive adult eye and vision examination may include,

a) **Patient History:** The patient history is the initial component of the examination. The objective is to obtain specific information about the patient's perception of his/her eye and vision status and important background information on related medical issues. It helps to identify and assess problem areas, and it provides the doctor of optometry an opportunity to become acquainted with the patient, establishing a relationship of confidence and trust.

The collection of demographic data generally precedes the taking of the patient history. Major components of the patient history include:–

- Nature of the presenting problem, including chief complaint
- Visual and ocular history
- General health history, which may include a social history and review of systems
- Medication usage, including prescription and non-prescription drugs; use of mineral, herbal, and vitamin supplements; documentation of medication allergies; and utilisation of other complementary and alternative medicines
- Family eye and medical histories

b) General observation of the patient (e.g., overall patient appearance, mobility, demeanor)

- Observation of external ocular and facial areas

c) **Visual Acuity**

Visual acuity, measured with and without the patient's most recent spectacle or contact lens correction, includes:

- Distance visual acuity (DVA)
- Near visual acuity (NVA)

d) **Systematic approach to examine the eye –** It includes the following parts of the eye as given below:

1) **Lids and lashes –** assess lids and lashes for:

Position: Ptosis (Drooping of eyelid)

Margins: Ectropion (outward turning of lid) and entropion (inturning of the lid)

lagophthalmos: unable to close eyes completely

Blepharophimosis: inability to open eyelids

Abnormal Lesions – such as

- Crusting
- Redness
- Swelling / bruising
- Lacerations

2) Conjuction Covers the inside of eyelids and the sclera – does not pass over the cornea; is vascular.

Normal: translucent, flat, sclera visible beneath

Abnormal: findings are:

- Redness.
- Chemosis (oedema)
- Discharge
- Subconjunctival haemorrhage.

- Lacerations.
- Lesions

3) **Cornea :** Avascular circular 'window' of the eye
   - Normal:: clear, bright, smooth surface
   - Abnormal
     - Cloudy – iris may be difficult to see
     - Scarring - milky line, localised opacity
     - Foreign body
     - Rust ring
     - Ulcer
     - Laceration

4) **Anterior chamber:** Space between posterior cornea and iris filled with aqueous fluid

   Normal: clear, bright & deep

   Abnormal

   - flat, shallow**,** deep
   - hyphaema **(**blood in A.C**).**
   - hypopyon **(**Pus in A.C**).**
   - Anterior chamber Intraocular Lens (IOL)

5) **Iris**:

   Colour: Normal colour vary from black, brown, green and blue:

   Note for any abnormal structure in the iris.

6) **Pupil**:

   Size: 2 mm to 4 mm

   Shape: Normally round

   Surface : normally smooth

   Position: normally it is central

   Reaction to light: Direct reaction:

   Consensual reaction

7) **Lens :** Lies behind iris – seen through the pupil

   Normal: Bright, even red reflex (like the red eye seen in photos)

   Abnormal

   - Dull or absent red reflex.
   - White pupil.
   - Shadows in red reflex

8) Posterior chamber assessment including retina to be done by ophthalmologist with ophthalmoscope

5.5 COUNSELLING OF PATIENTS IN EYE DISORDERS

Patient counselling is an important part of health care management. Due to lack of proper and adequate knowledge or information, patients are unable to take proper decision. Every patient should know about the nature of the disease and the benefits of the treatment suggested by the doctor. Counselling is a process of passing these information to the patient. One aspect of patient counselling is also to help patients who have apprehensions on aspects of treatment, surgery, adapting to hospitalisation, resource mobilisation. Patient Counselling helps such people in understanding about the treatment, length of stay, cost, prognosis, and plan for their rehabilitation.

5.5.1 Benefit of counselling

The objective of counselling department is to guide, help and provide alternatives to a patient according to their need by considering their constraint. They should not be forced to do anything beyond their limit. Patient counselling is a simple process of educating beneficiaries about the need and importance of eye care. It builds confidence among potential patients. Counsellors assist patients in decision-making by giving detailed information about the operation, pre-operative care, post-operative

5.5.2 Points to be Taken Care of Exclusively in Eye Care by a Coun Sellor:

- In case of cataract surgery illustrate about the different type of lenses and their features like their material (hydrophilic, hydrophobic,) their design (Aspheric, unifocal, multifocal, toric, single piece, multipiece) etc..
- Vision prognosis should be explained mildly but clearly in cases where the prognosis is guarded like in trauma, retinal surgery and advance glaucoma stage.
- Special counseling is required for the patients with low vision or diseases which cause gradual loss of vision.
- When the patient comes to know about the condition which can lead to permanent blindness patient feel nervous and very helpless. So they must be handled carefully and these counseling can take more time to console the patient and help them to get rid of that trauma.
- Proper counselling is very essential in eye camps as the patients return to their own place after surgery and most of them are illiterate.
- So every information should be carefully explained in their language like how to maintain hygine, how to use medicines and what to do and not to do?

5.6 ASSESSMENT OF REFRACTIVE ERRORS

After assessment of common eye problems, let us now discuss diagnosis of refractive errors and nursing care.

Assessment:

- Initial assessment involves checking visual acuity of the patient both for distance and near. Snellens chart is most commonly used.
- Distance vision is assessed at 6 meters.
- For illiterates C chart and E chart are also available.
- Vision with pin hole is important as it gives clue to visual potential of eye.
- Refraction of eye can be determined under full cycloplegia with automated refractometer or retinoscopy (objective refraction).
- Patient is then called for Post Mydriatic test for prescription of final glasses after cycloplegic affect of the drug is over. (subjective refraction).
- Refraction and prescription of glasses can be done by optometrist, trained ophthalmic nurse or ophthalmologist.

Nursing care:

- It is very important to identify and diagnose refractive error early.
- Visual acuity testing is most important screening method for the same.
- Specially in children early diagnosis and correction is important as uncorrected refraction can leads to development of Amblyopia. (state of permanent diminution of vision)
- After screening patient may be referred to designated centers for further diagnosis and prescription of glasses.

5.7 INITIAL MANAGEMENT OF FOREIGN BODY IN EAR, NOSE, THROAT

In the previous sections, you have read in details about eye problems and primary care, appropriate referrals for various common eye conditions, this section would deal with the ENT problems.

Let us now discuss Ear problems before reading the foreign body in these structures:

a) **Ear**

- First look at external appearance of ear-shape form is it normal?
- Note any scar/opening in front of or behind ear
- Now gently press tragus and press bony prominence behind ear is it painful?

- Lastly shine a torch light into ear canal after gently pulling ear backwards and outwards. Check if you can see any pus discharge/blood/eardrum perforation (hole in eardrum)
- **Tuning fork Tests:** This test to be done with 512 Hz tuning fork to assess the hearing loss. Tuning fork as shown in fig. 5.1 has got parts such as prongs, stem and foot piece.
- **Conductive hearing loss:** Any lesion in the external ear, middle ear and ear ossicles.
- **Sensorineural hearing loss:** Any lesion in the cochlea and the central auditory pathway.

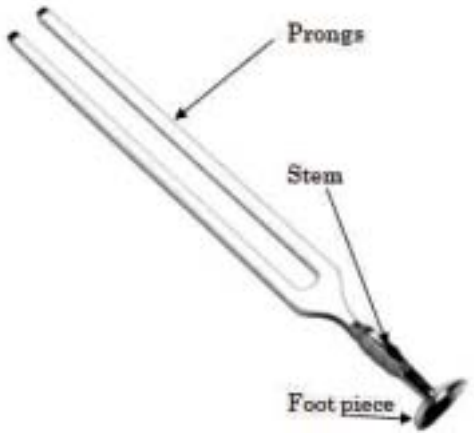


Fig. 5.1 : Tuning Fork

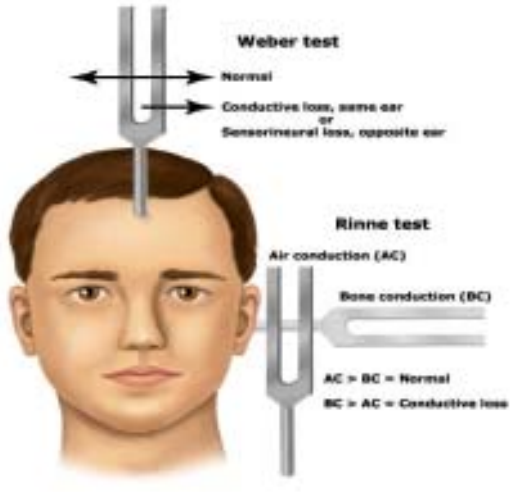


Fig. 5.2 : Placement of Tuning Fork

After going through the assessment for ear problem, let us now discuss the nose and throat related assessment as given below in detail:

b) **Nose**

- First look at external appearance of nose is it normal? Note any scar/swelling
- Gently press nose is it painful/any swelling
- Now gently lift tip of nose and examine with a torch light- note if any boil/ bleeding/discharge/foreign body is present.

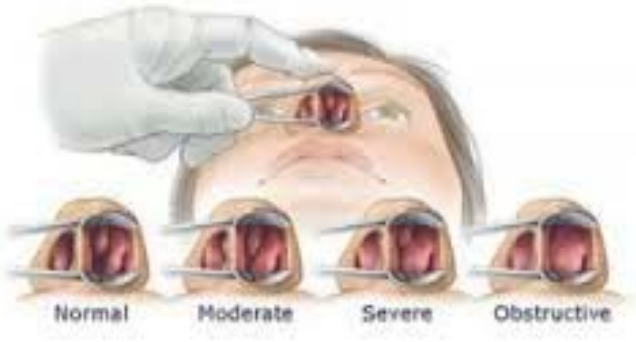


Fig. 5.3 : Nose examination

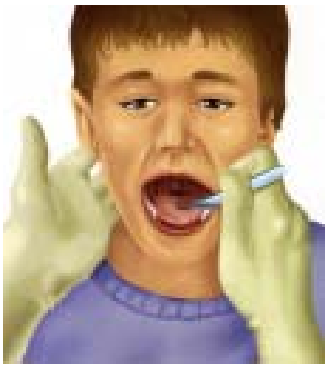


Fig. 5.4 : Throat examination

b) Throat

- Ask patient to open mouth wide and shine a torch light-examine tongue, teeth

- Now use a tongue depressor/handle of spoon to push down tongue gently. Examine the tonsils and back of throat.
- Lastly ask patient to put out his tongue- check for any swelling/ulcer.

Foreign Body in Ear:

1) Take history, that is, ask patient about nature of foreign body inserted and duration
2) Make a note whether the foreign body is organic (seeds/insects) or inorganic (paper/beads etc.)
3) Examination: Inspect ear canal with a torch light and describe foreign body if visible.
4) In case of a live insect pour any kind of oil into ear to kill insect. No intervention to be done in case of other foreign bodies.
5) Give analgesics if required and refer immediately to nearest tertiary centre for removal by ENT surgeon.

Foreign Body in Nose:

1) Step 1 to 3 as above
2) Refer immediately to nearest tertiary centre for removal by ENT surgeon

Foreign Body in Throat

1) History: Ask nature of foreign body (FB) i.e. organic (seeds etc.) or inorganic (coins/batteries/jewelry/clips)
2) Ask if the said foreign body was eaten or inhaled (i.e. whether in oesophagus or in airway)
3) Examination:
   - Foreign Body ingested: Drooling, vomiting, inability to eat.
   - Foreign Body inhaled: Noisy breathing, fast breathing, bluish skin discolouration (present in late stages)
4) Get Chest X ray done, both AP and lateral views must be done.
5) If respiratory distress is present- nebulise patient
6) Advise to remain nil orally
7) Urgent referral to tertiary centre for removal by ENT surgeon

5.8 LET US SUM UP

In this unit, we have discussed in detail about the common problems in eyes, primary care for eye conditions, refractive errors and counselling of patient in eye disorders. The problems of eyes like conjunctivitis, trachoma, stye and foreign body in eye, assessment and nursing care are also highlighted. The section has dealt with ear, nose and throat problems, foreign body which are common to be managed as primary care approach, hearing assessment etc;

5.9 ACTIVITY

- Assessment of foreign body in Eye & ENT.
- Select elderly person for counselling in case of having diminished vision.

UNIT 6 SCREENING AND MANAGEMENT OF COMMON DENTAL CONDITIONS

Structure

6.0 INTRODUCTION

Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity. One can't be healthy if one is not Orally Healthy. Oral health is very essential to general health and quality of life. It is a state of being free from periodontal (gum) disease, tooth decay, tooth loss, mouth and facial pain, oral and throat cancer, oral infection and sores, and other diseases and disorders that limit an individual's capacity in biting, chewing, smiling, speaking, and psychosocial well-being.

The burden of oral and dental diseases worldwide is very high, inspite of the fact that most of these diseases are non-communicable and preventable with simple measures.

This is proven by the following World Health Organisation (WHO) world data:

- 60–90% of school children have dental cavities.
- 15–20% of middle-aged (35–44 years) adults suffer from severe periodontal (gum) disease, causing loss of tooth
- About 30% of people aged 65–74 have no natural teeth.

Most established oral diseases are irreversible, will last for a lifetime and have impact on quality of life and general health. The target population for these diseases mainly includes children and elderly, especially in the poor and disadvantaged population groups. One fifth of the world's population is adolescent (10 and 19 years of age), hence preventive strategies, if applied at the initial years of life,

can tremendously help reduce this burden of increasing dental and oral health problems. Also, since oral diseases are usually progressive and cumulative, a large number of elderly suffer from its effects. The process of ageing itself may directly or indirectly increase the risk of oral disease, compounded by various co-morbidities (like diabetes, cardiovascular disease, and hypertension etc.) and the various medications for these conditions.

Here we will discuss the common dental and oral diseases, their identification in a community, the risk factors associated with their development and progression and the strategies for their early identification and management.

6.1 OBJECTIVES

After completing this unit, you shall be able to:

- enumerate most common dental and oral diseases/conditions;
- list screening methods for common dental & oral diseases/conditions;
- discuss preventive strategies for common dental & oral diseases/conditions;
- formulate strategies to educate the general population about causes of oral cancer and other oral conditions; and
- prevent and manage common oral and dental diseases.

6.2 ANATOMY AND PHYSIOLOGY OF ORAL CAVITY

The oral cavity represents the first part of the digestive system. It houses various hard and soft tissue structures, the primary function of which, is to serve as the entrance of the alimentary tract and to initiate the digestive process by salivation and propulsion of food downwards. The hard tissues are the teeth and the jaw bones (maxillae and mandible). The soft tissues include mainly the gums around the teeth (gingiva), the lips, the cheek, the hard and soft palate and the tongue containing various teeth buds (see Fig.6.1).

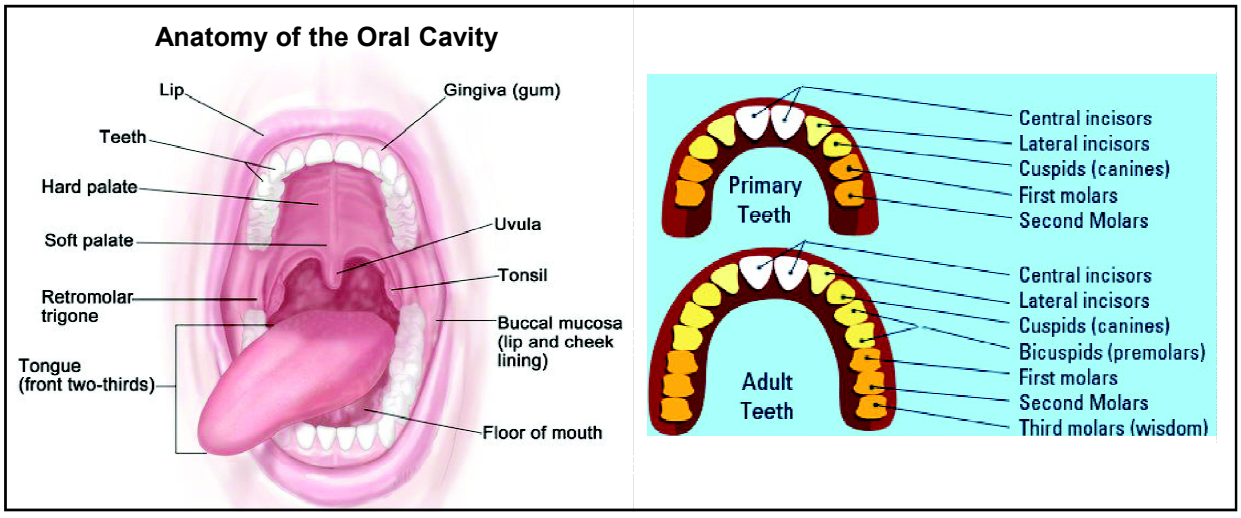


Fig. 6.1 : Anatomy of Oral Cavity

Development of teeth begins during the early second trimester of pregnancy. There are two sets of teeth in humans. The deciduous teeth (primary or temporary teeth) are the first to emerge in the oral cavity and are progressively replaced by

the permanent (or adult) dentition. There are 20 deciduous teeth, comprising 8 molars, 4 canines (or cuspids), and 8 incisors. The permanent dentition consists of 32 teeth: 12 molars (including 4 so-called wisdom teeth or third molars), 8 premolars (or bicuspids), 4 canines, and 8 incisors.

The 20 primary teeth start appearing in the mouth by 6 months of age, are in place by age 3 and remain until around 6 years of age when they begin to fall out to make way for the permanent set of teeth. Adult teeth start to grow in between 6 and 12 years of age. A tooth is divided into two basic parts: the crown, which is the visible, white part of the tooth, and the root, which extends below the gum line and anchors the tooth into the bone (see Fig.6.2). Each tooth has the following 4 parts:

1) **Enamel.** The visible substance that covers the tooth crown. Harder than bone, enamel protects the tooth from decay. Enamel is made up of phosphorous and calcium.
2) **Dentin.** Underneath the enamel is the dentin, which is calcified and looks similar to bone. Dentin is not quite as hard as enamel, so it is at greater risk for decay should the enamel wear away.
3) **Cementum.** It covers the tooth root and helps anchor it (cement it) into the bone.
4) **Pulp.** It is found at the centre of your tooth and contains the blood vessels, nerves, and other soft tissues that deliver nutrients and signals to your teeth.

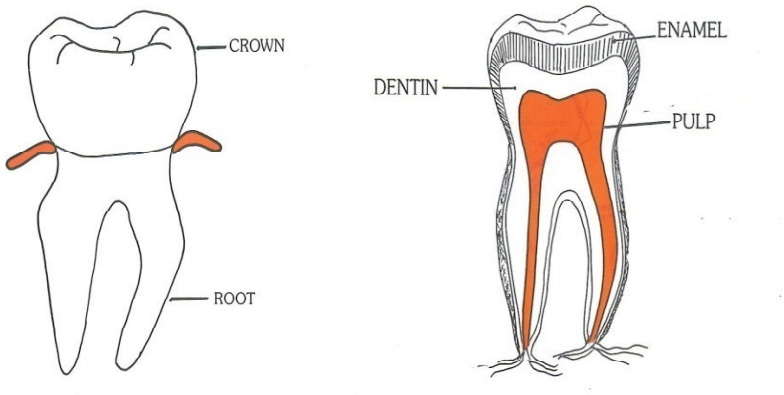


Fig. 6.2 : Parts of human tooth

Similarly, the various soft tissues around the teeth help in the functions of mastication, deglutition, speech etc. Surrounding major and minor salivary glands produce and secrete saliva into the oral cavity that helps in digestion, swallowing, speech, cleansing of oral cavity and protection from various diseases. Hence, even minor disruptions in the function of the oral cavity can seriously jeopardise an individual's quality of life.

6.2.1 High Risk Factors of Dental and Oral Diseases/Conditions

High risk factors for oral diseases include:

- **Tobacco:** In any form (smoke, smokeless, snuff) is one of the most significant risk factors associated with the development of gum diseases and oral cancer. Additionally, use of tobacco can lower the chances for successful treatment.

- **Poor oral hygiene:**

  An unhealthy oral cavity is the source of all systemic infections.

- **Unhealthy diet:** both, excessively sugary and malnourished diets and in-between meals are detrimental to dental and oral tissues.

- **Hormonal changes in girls/women and adolescents:** These changes can make gums more sensitive and make it easier for gingivitis to develop.

- **Diabetes and other immunocompromising systemic conditions:** People with diabetes are at higher risk for developing infections, and poor healing. Diseases such as AIDS, leukemia etc. have similar effects.

- **Medications:** There are hundreds of prescription and over the counter medications that can reduce the flow of saliva, which has a protective effect on the dental and oral tissues. Without enough saliva, the mouth is vulnerable to infections such as gum disease. And some medicines can cause abnormal overgrowth of the gum tissue; this can make it difficult to keep teeth and gums clean.

- **Genetic susceptibility.** Some people are more prone to severe gum disease than others.

These are also risk factors for the four leading non-communicable chronic diseases – diabetes, cardiovascular diseases, cancer, and chronic respiratory diseases – and hence, oral diseases are often linked to these chronic diseases. Social determinants in oral health are also very strong. Healthy oral practices and health seeking behaviour is lacking in people from uneducated and lower socio-economic populations, that also contributes mainly to increased oral disease prevalence and severity.

6.2.2 Common Dental Conditions and their Signs and Symptoms

Now we present a list of most common dental diseases/ conditions:

1) Dental Caries and Early Childhood Caries
2) Periodontal Diseases
3) Dental Erosion
4) Dental Attrition
5) Dental Abrasion
6) Malocclusion
7) Oral Cancer and Potentially Malignant Disorders
8) Wisdom tooth related problems
9) Dental Fluorosis
10) Oro-dental Trauma
11) Congenital Defects
12) Oral Manifestations of Systemic Diseases

Now, let us discuss these conditions:

1) Dental Caries

Tooth decay (dental caries or cavity) occurs when the bacteria in plaque is given the chance to settle on teeth. It produces an acid that slowly eats away at the tooth enamel and forms holes. These bacteria are particularly prevalent after eating sugars and starches. When the root of a tooth becomes infected and fills up with bacteria, it damages the nerves and the pulp tissue inside the tooth itself. The most severe root infections cause patients to develop painful abscesses. These appear in the form of painful facial swellings.

Causes: Bacteria in presence of food particles stuck to the teeth and a moist environment will produce acid, which ultimately decalcifies the tooth.

Signs and symptoms

- Sensitivity to cold/hot/sweet/acidic foods
- Pain while chewing
- Spontaneous pain in advanced stage (irreversible cases)
- Loss of tooth structure (catch the tip of a dental probe in soft caries, cavity in advanced cases)
- Halitosis (foul smell in mouth) from food lodgment and decay

Early Childhood Caries (ECC): Early Childhood Caries is defined as the presence of one or more decayed (non-cavitated or cavitated lesions), missing (due to caries) or filled tooth surfaces in any primary tooth in a preschool-age child between birth and 71 months of age. The term "Severe Early Childhood Caries" refers to "atypical" or "progressive" or "acute" or "rampant" patterns of dental caries (see Fig.6.3 and Fig.6.4).

Fig. 6.3 : Early Childhood Caries (ECC)

Fig. 6.4 Dental Caries

2) Periodontal Diseases

Plaque is the soft, sticky bacterial deposit that readily forms on exposed surfaces of teeth. It is easily removed by brushing and flossing. It calcifies over time, forming tartar (calculus) which can only be removed by a Dental Surgeon or Dental Hygienist using special instruments. Plaque results in a local inflammatory reaction known as gingivitis.

Gingivitis is the mildest form of a spectrum disease and can progress to periodontal disease (see Fig. 6.5).

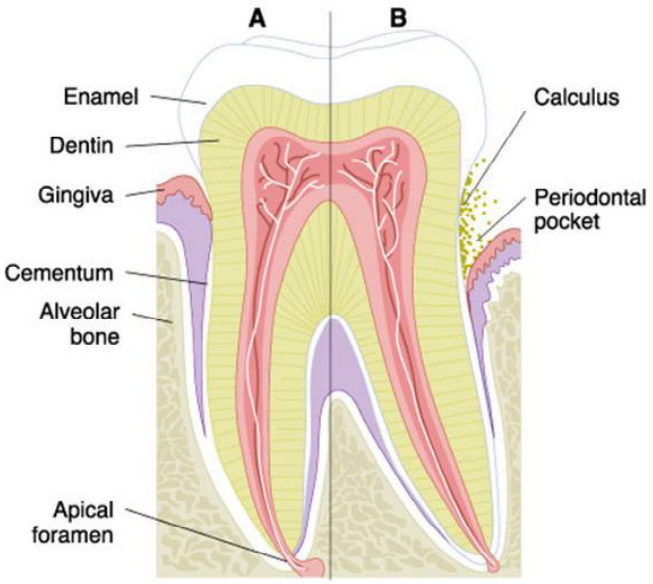


Fig. 6.5 : Periodontal disease

Causes: Local causes- The most at risk individuals are those with poor dental hygiene, lapsed brushing and flossing techniques.

Systemic causes- Pregnancy and adolescence stages with hormonal variations, diabetes mellitus and other immunocompromised states, cigarette smoking and other less common causes like platelet disorders, Vitamin C deficiency, Vascular conditions, Leukaemia and HIV infection.

Direct	Indirect	Distant
• Poor oral hygiene resulting in accumulation of dental plaque and calculus • Traumatic occlusion	• Food impaction • Chewing and smoking of tobacco • Malnutrition—deficiency of vitamins A and C • Endocrine disturbances —physiological (puberty, pregnancy and the menopause) —pathological (hyperthyroidism, hyperparathyroidism and diabetes mellitus) • Decreased immunity—HIV infection, persons on immunosuppressive drugs • Blood disorders—anaemia, leukaemia • Idiopathic—gingival fibromatosis • Drug induced—phenytoin sodium, nifedipine, etc.	• Socioeconomic status • Literacy level • Access to oral health care facility • Oral health knowledge and awareness • Health insurance

Signs and symptoms

- Red or swollen gums
- Tender or bleeding gums (on brushing or simple probing)
- Food lodgement in between teeth (pockets) causing itchy sensation, difficulty and pain in chewing
- Loose teeth
- Sensitive teeth - sensitivity to cold/hot/sweet foods
- Receding gums or longer appearing teeth
- Calculus (tartar), plaque and stain deposits on teeth
- Bone loss on dental x-rays (Fig.6.7)

Fig. 6.6 : Probing the proximal area of Tooth

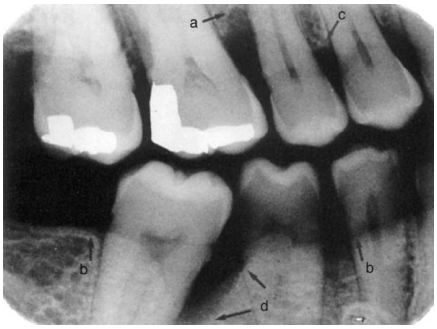


Fig. 6.7 : Bone Loss in the IOPA X-ray

Fig. 6.8 : Marginal Gingivitis

Fig. 6.9 : Calculus deposits

3) Dental Erosion

Dental erosion is the loss of dental hard tissue, associated with extrinsic and/or intrinsic acid that is not produced by bacteria (Fig.6.10).

Causes: Dental erosion is caused by sustained direct contact between tooth surfaces and acidic substances. It has long been recognised that demineralisation of dental enamel will occur once the oral environmental pH reaches the critical threshold of 5.5. Acids in the mouth originate from three main sources: produced in situ by acidogenic bacteria, ingested extrinsic acids as dietary components and dislocated intrinsic acids through the backflow of gastric contents. Acids of bacterial origin cause caries, while extrinsic and intrinsic acids cause dental erosion.

Fig. 6.10 : Dental erosion

Signs and Symptoms

- Discolouration
- Rounded Teeth/ Dents in teeth
- Severe Tooth Sensitivity

4. Dental Attrition

A type of tooth wear caused by tooth-to-tooth contact, resulting in loss of tooth tissue, usually starting at the incisal or occlusal surfaces. Tooth wear is normally a physiological process and is commonly seen as a normal part of aging.

Causes

1) Physiological – aging process
2) Pathological - caused by bruxism, which is clenching and grinding of the teeth

Signs and Symptoms

- Loss of tooth anatomy
- Sensitivity or pain
- Tooth discoloration
- Altered occlusion due to decreasing vertical height, or occlusal vertical dimension.

5) Dental Abrasion

Abrasion is the loss of tooth structure by mechanical forces from a foreign element. If this force begins at the cementoenamel junction, then progression of tooth loss can be rapid since enamel is very thin in this region of the tooth. Once past the enamel, abrasion quickly destroys the softer dentin and cementum structures.

Causes includes toothbrushes, toothpicks, floss, and any dental appliance frequently set in and removed from the mouth.

Fig. 6.12 : Dental Abrasion

Signs and Symptoms

- Loss of tooth anatomy
- Sensitivity or pain
- Tooth discoloration

6) Malocclusion

A malocclusion is a misalignment or incorrect relation between the teeth of the two dental arches when they approach each other as the jaws close.

Causes

- Dental arch discrepancy
- Craniofacial anomalies

Signs and Symptoms

- Crowding / mal-alignment of the teeth
- Skeletal disharmony

Fig. 6.13: Dental malocclusion

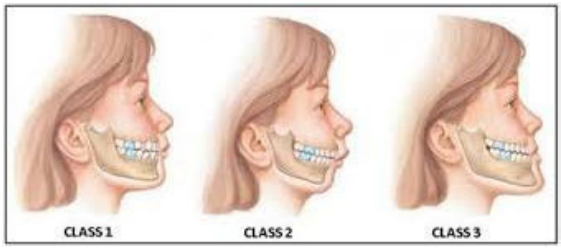


Fig. 6.14: Skeletal malocclusion

7) Oral Cancer and Potentially Malignant Disorders

Oral cancer can affect any area of the oropharyngeal cavity including the lips, gum tissue, check lining, tongue, jaw the hard or soft palate and throat. It often starts as a tiny, unnoticed white or red spot or sore or swelling anywhere in the mouth or throat. The incidence of oral cancer ranges from one to 10 cases per 100 000 people in most countries. The prevalence of oral cancer is relatively higher in men, in older people, and among people of low education and low income.

Causes:

Direct	Indirect	Distant
• Tobacco smoking/chewing • *Paan masala/gutka* chewing • Infections—HPV, HSV, AIDS, syphilis, candidiasis • Chronic irritation—faulty prosthesis, sharp teeth • Exposure to radiation	• Industrial pollution—asbestos, lead, leather and textile industries • Compromised immune status • Nutritional deficiencies (vitamins A and B complex, and zinc)	• Low socioeconomic and literacy level • Poor access to oral health care facilities for prevention and early detection • Poor oral health awareness

Signs and symptoms

- Sores (ulcers) that bleed easily or do not heal
- a thick or hard spot or lump
- a roughened or crusted area
- numbness, pain or tenderness
- a change in the way your teeth fit together when you bite down.
- Neck lymph nodes – enlarged, fixed

Fig. 6.15 : Showing Pre-cancerous Lesions in Oral Cavity

8) **Wisdom Tooth related problems**

3rd permanent molars are 4 in no. (2 upper & 2 lower). They are also called vestigial organs, as our ancestors required heavy masticatory forces to chew on uncooked food. These days it is common to have these teeth fully erupted/partially erupted/ missing or unerupted. With time our upper and lower jaws /arches size is reduced. Impacted wisdom teeth (partially erupted or unerupted) should not be removed unless they have associated significant dental or other oral disease. It is also common to have some pathology associated with the wisdom tooth eg. Dentigerous Cyst, Ameloblastoma etc.

Causes

- Physiological
- Pathological

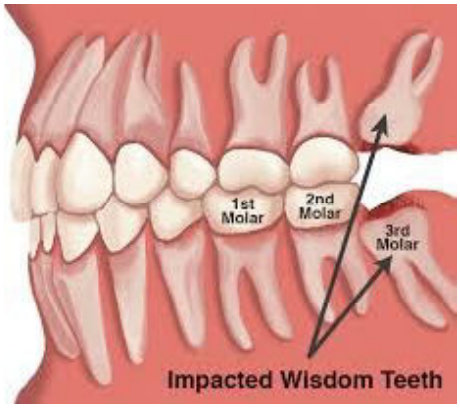


Fig. 6.16 : Impacted wisdom teeth

Signs and Symptoms

- Pain
- Swelling
- Inability to open mouth

9) **Dental Fluorosis:**

This is the intrinsic staining of teeth due to presence of excessive fluoride in diet (specially drinking water) during the formative stages of teeth (see Fig.6.17).

Fig. 6.17 : Dental Fluorosis

Causes:

Direct	Indirect	Distant
• Exposure to high levels of fluorides: >1 ppm of fluoride in drinking water • Airborne fluoride from industrial pollution (aluminium factories, phosphate fertilizers, glass-manufacturing industries, ceramic and brick products) • Fluoride-rich dietary intake—sea food, poultry, grain and cereal products (especially sorghum), tea, rock salt, green leafy vegetables, etc.	• Tropical climate—excess ingestion of water and beverages with a high fluoride content • Presence of kidney diseases affecting the excretion of fluoride • Thyroid and thyrotrophic hormones have a synergistic effect on fluoride toxicity	• Poor nutritional status—deficiency of vitamin D, calcium and phosphates • Decreased bone phosphatase activity is linked to fluoride toxicity

Signs and symptoms

- Mild cases show mottling of enamel (white patches, loss of enamel translucency)
- Advance cases show brown spots on teeth
- Advanced cases show skeletal changes due to excessive fluoride

10) **Oro-Dental Trauma**

Across the world, 16–40% of children in the age range 6 to12 years old are affected by dental trauma. Any Facial trauma in children and adults would result in

- **Soft tissue injuries** - cuts, abrasion, laceration loss of tissue etc.
- **Hard tissue injuries** - fracture of tooth or jaw bones.

Causes

- unsafe playgrounds
- unsafe schools

- road traffic accidents
- violence

Fig. 6.18 : Tooth fracture

Fig. 6.19 : Facial Fracture

Signs and Symptoms

- Severe pain
- Inability to bite properly (teeth not meeting properly)
- Inability to open/ close mouth
- Oral/ nasal/ ear bleeding
- Deformity of face

11) **Congenital Defects**

Various congenital and birth related defects are seen in teeth and oro-facial region. The common ones are cleft lip and palate, Hemifacial microsomia and dental defects like abnormal shape and number of teeth. Not much can be done for their prevention and genetics has a major role to play in the development of these conditions.

Causes

- Genetic
- Nutritional deficiency
- Environmental

Fig. 6.20 : Congenital defect of teeth (abnormal shape)

Signs and Symptoms:

- Cleft lip
- Cleft palate
- Dental- Ectodermal Dysplasia, Cleidocranial Dysplasia, Dentinogenesis Imperfecta.
- Hemifacial microstomia

12) **Oral Manifestations of Systemic Diseases**

Oral cavity/ Mouth is the mirror of systemic health. Almost half (40–50%) of people who are HIV-positive have oral fungal, bacterial or viral infections. These often occur early in the course of HIV infection.

Fig. 6.21: Oral fungal infection

Signs and Symptoms

Certain systemic conditions are manifested by prodromal signs in the oral cavity:-

- Measles- Koplik spot
- Diabetes- Severe Periodontal diseases
- Pregnancy- Gingivitis, Pregnancy tumor
- CVS- Periodontal disease
- HIV, – Hairy leucoplakia
- Coeliac disease, Dental erosion

6.2.3 Role of Health Worker in Prevention and Management of Oral/ Dental Diseases?

Dental Caries: prevention can be discussed as follows:

Medical interventions	Non-medical interventions	Other interventions
• Use of systemic and topical fluorides • Use of pit and fissure sealants • Preventive restorations • Different types of restorations and endodontic treatment • Regular dental check-up	• Oral health education • Nutrition and diet • Proper methods of maintaining oral hygiene —use of fluoride tooth-paste and brush —use of dental floss and interdental brushes, etc. —antiseptic mouth washes (under prescription)	• Make oral health care more accessible and affordable • Improve the socioeconomic and literacy level of the population • Include oral health care in general health insurance

The burden of dental and oral diseases and other non communicable chronic diseases can be decreased simultaneously by addressing the common risk factors. Moreover, control of oral disease depends on availability and accessibility of oral health systems but reduction of risks to disease is only possible if services are oriented towards primary health care and prevention. These include:

- Well balanced nutritious diet
- Avoid Tobacco and Alcohol
- Exercise regularly and lead a healthy lifestyle
- Ensure proper oral hygiene
- Use of protective sports gear and wearing helmet and seatbelts while driving to reduce the risk of facial injuries.

Dental cavities can be prevented by maintaining a constant low level of fluoride in the oral cavity. Fluoride can be obtained from fluoridated drinking water, salt, milk and toothpaste, as well as from professionally- applied fluoride or mouth rinse. Long-term exposure to an optimal level of fluoride results in fewer dental cavities in both children and adults.

- High relative risk of oral and dental diseases relates to socio-cultural determinants such as poor living conditions; low education; lack of traditions, beliefs and culture in support of oral health. Education and creating awareness regarding these diseases should be given prime importance.

Periodontal Diseases: Preventive measure as shown below:

Medical interventions	Non-medical interventions	Other interventions
• Scaling and polishing of teeth • Oral and systemic antibiotics • Use of mouth washes • Gingival and periodontal surgery —gingivoplasty, gingivectomy, flap surgery, mucogingival surgeries, guided tissue regeneration, synthetic bone grafts, etc.	• Oral health education • Nutrition and diet • Proper methods of oral hygiene maintenance —use of toothpaste and tooth brush —use of inter-proximal cleaning devices such as interdental brushes, dental floss and water pik, etc. • Regular dental check-up	• Make oral health care more accessible and affordable • Improve the socioeconomic and literacy level of the population • Include oral health care in general health insurance

Oral Cancer / Pre Cancer: Prevention and treatment measures include the followings:

Medical interventions	Non-medical interventions	Other interventions
• Biopsy of pre-malignant lesions • Surgery • Radiotherapy • Chemotherapy • Combination treatment	• Stop all oral abusive habits such as tobacco smoking and chewing • Improve oral hygiene • Remove all irritants from the mouth • Improve the nutritional status • Undergo regular oral check-up	• Self-examination of the oral cavity • Prevent initiation of harmful habits • Industrial safety legislation and protection of the health of workers

- Potentially malignant conditions should be diagnosed in the early and initial phase for a better 5 year survival. This can only be achieved by oral screening the high risk groups of age 30–60 years every 5 years, and also teaching and creating awareness regarding self oral examination. Tobacco Cessation counselling should also be carried out among the high risk groups regularly and repeatedly.

- The ***GOLD STANDARD*** in regard to diagnosis of Oral cancer is Biopsy. It can be

- Incisonal
- Excisional
- Punch

Management

Prevention is better than cure. Five year survival rate is higher in patients diagnosed early. However, 3 modalities of treatment or in combination are available. These are

- Radiotherapy
- Surgery
- Chemotherapy

Fluorosis: Prevention can be done by the following measures:

Primary prevention	Secondary prevention	Tertiary prevention
• Specific guidelines on the use and appropriate dose levels of fluoride supplements, and use of fluoride toothpaste for young children • In high fluoride areas —provide an alternate supply of drinking water —employ defluoridation techniques at the community or individual level	• Improve the nutritional status, especially of expecting mothers, newborns and children up to the age of 12 years. • Treat other causes of fluoride toxicity such as kidney and thyroid diseases, etc.	Treat the discoloured/disfigured dentition by appropriate aesthetic treatment such as bleaching, micro-abrasion, laminate veneers, etc.

Gingivitis can be prevented by good personal oral hygiene practices, including brushing and flossing which are important also to control advanced periodontal lesions. Community water fluoridation is effective in preventing dental caries in both children and adults. Water fluoridation benefits all residents served by community water supplies regardless of their social or economic status. Salt and milk fluoridation schemes are shown to have similar effects when used in community preventive programmes. Professional and individual measures, including the use of fluoride mouthrinses, gels, toothpastes and the application of dental sealants are additional means of preventing dental caries.

Lifestyle behaviour that affects general health such as tobacco use, excessive alcohol consumption and poor dietary choices affect oral and craniofacial health as well. These individual behaviours are associated with increased risk of craniofacial birth defects, oral and pharyngeal cancers, periodontal disease, dental caries, oral candidiasis and other oral conditions. Oral health care providers can also play a role in promoting healthy lifestyles by incorporating tobacco cessation programmes and nutritional counselling into their practices.

Nutrition:

Today the world faces two kinds of malnutrition, one associated with hunger or nutritional deficiency and the other with dietary excess. Diet and nutrition affects oral health in many ways. Nutrition, for example, influences cranio-facial development, oral cancer and oral infectious diseases. Dental diseases related to diet include dental caries, developmental defects of enamel, dental erosion and periodontal disease. The major challenges are: to implement nutritional counselling, covering not only the general health aspects of having good nutritional

behaviour but also emphasising the aspects directly linked with oral health. The posteruptive effect of diet in terms of sugar consumption is one of the aetiological factors for dental caries.

Awareness-raising activities to promote breastfeeding are to be facilitated. Among other important health benefits, breast milk prevents the occurrence of rampant early childhood caries. Early childhood caries is caused by frequent and prolonged exposure of the teeth to sugar and is often the result of a child going to bed with a bottle of a sweetened drink or drinking at will from a bottle during the day. Advise in regard to decreasing the consumption of sugary soft drinks, a major risk factor in dental caries, should be taken seriously. Also, dental erosion seems to be a growing problem and in some countries an increase in erosion of teeth is associated with an increase in consumption of beverages containing acids. We should promote a rational and healthy diet among people living in deprived and more remote areas by encouraging the use of natural products with good nutritional values instead of refined, industrialised food. We should advocate a healthy diet which can also help prevent oral cancer viz. fresh yellow-green fruits and vegetables including salads since these have been identified as beneficial and also Vitamin A, C and E supplements. Excessive consumption of alcohol is an important risk factor in the aetiology of oral precancerous and neoplastic lesions and such habits should be discouraged.

Prevention of other tooth problems

The following measures need to be adopted :

- Prevention of malocclusion (especially crowding of the teeth) by referral to a dental surgeon.
- Prevention of premature loss of deciduous teeth by regular dental checkups.
- Restoration of missing permanent teeth by prostheses (dentures) by referral to a dental surgeon.
- Making sugar-free chewing gum freely available and affordable in the country.
- Using sugar substitutes such as saccharine, xylitol, mannitol, aspartame, etc. in paediatric medicinal syrups, bakery products, jams, marmalade, etc.
- Making toothbrushes and fluoridated toothpaste available to the masses at low cost. Regular use of fluoridated toothpaste is proven to reduce the incidence of dental caries by 30%.

6.2.4 Taking Aappropriate Decision and Referral

Most oral diseases and conditions require professional dental care, however, due to limited availability or inaccessibility, the use of oral health services is markedly low among young, older people, under privileged, people living in rural areas, and people with low socio-economic status. Traditional curative dental care is a significant economic burden for many high-income countries, where 5–10% of public health expenditure relates to oral health. In low and middle-income countries, public oral health programmes are rare. The high cost of dental treatment can be avoided by effective prevention and health promotion measures. However, once these dental diseases are established, they should be managed by trained doctors and specialists of the particular disease. It is recommended that one should see a Dental Surgeon every 6 months so that any oral and dental disease can be diagnosed and referred at any early stage.

As most of the dental/ oral diseases are not life threatening, it is not a priority both for the Government as well as the Community. However, as these diseases result in loss of productivity and loss of man days, oral health care is being integrated into the health care delivery system in PHC and CHC level. Creating awareness and providing facilities with regard to manpower (Dental Surgeon) and infrastructure (machinery and materials) at the PHC and CHC level has done wonders in decreasing the burden of dental and oral diseases as well as diagnosing and referring the potentially malignant conditions to higher centres.

6.2.5 Care of Patients Who are Already Suffering from Dental Problems

The following general measures should be followed:

- Creating awareness in regard to diet and nutrition
- Stop Tobacco and Tobacco Cessation counselling
- Regular exercise and life style changes
- Proper oral hygiene instructions – tooth brushing twice a day after meals using junior tooth brush and a pea size of toothpaste, or brushing with Datun or Neem, but **NOT** chewing. Professional cleaning of Teeth (Scaling) to be carried out once in 3–5 years by a dental professional.

Dental Caries: Treatment comprises removal of decay by operative procedures and restoration with appropriate materials such as silver fillings, gold inlays, composite resin, glass ionomer cement, full metal or porcelain crowns, etc. In advanced cases, where the pulp of the tooth is involved, endodontic treatment may be required. Where there is extensive destruction of the tooth structure or when endodontic treatment is not feasible, extraction of the tooth and replacement by an artificial prosthesis may be required.

Postsurgical complications

A post-extraction bleeding tooth socket should be treated by using a wad of wet gauze placed over the socket and the patient should be advised to bite down (for 30 min.) and arrest the haemorrhage through pressure; any medications that promote bleeding should be temporarily discontinuation and the patient should seek dental advice if the symptoms do not settle, as suturing may be necessary.

6.3 SCREENING FOR GINGIVITIS, DENTAL CARIES AND ORAL CANCERS

Screening as a method for diagnosing diseases and conditions is of prime importance in regard to oral diseases and conditions. This not only helps in diagnosing diseases and conditions in the early stage but also helps in diagnosing the progress of potentially malignant conditions to oral cancer thus increasing the 5 year survival rate in regard to Oral cancer.

6.3.1 What to do When you Encounter Suspected Case of Oral Cancer?

Diagnose the condition with the help of Biopsy, and start Tobacco Cessation

including healthy lifestyle counseling immediately. Referral of diagnosed Oral cancer cases to specialist higher centres.

6.3.2 Care of Diagnosed Case of Dental /Oral Condition

Institute the therapy to manage these conditions as soon as possible, and at the same time provide oral health prevention and promotion strategies.

6.3.3 Importance of Counseling in Dental Conditions

It is pertinent to point out that when a patient sits in a Dental Chair and is asked to open his mouth, the Dental Surgeon while carrying out a screening of the oral cavity can use his skills in counselling the patient who has no option but to listen.

6.4 MANAGEMENT AND TREATMENT FOR VARIOUS DENTAL CONDITIONS

WHO recommends for public health that every effort must be made to develop affordable fluoridated toothpastes for use in developing countries. Water fluoridation, where technically feasible and culturally acceptable, has substantial advantages in public health; alternatively, fluoridation of salt and milk fluoridation schemes may be considered for prevention of dental caries.

Thus PREVENTION and PROMTION is better than CURE in regard to dental and oral conditions.

6.5 LET US SUM UP

Most of the common dental diseases are from preventable causes. Early identification of these diseases, preventive strategies and patient education are the key factors that can help control the morbidity from them. Hence, all steps should be taken to intercept these diseases in the initial stages, by identifying the high-risk population and risk modification by life-style changes. Once these diseases set-in, proper treatment should be undertaken from specialists, without delay.

6.6 ACTIVITY

Visit any of the places mentioned below during your community posting and identify dental problems,

- School
- Old Age Home
- Dental OPD
- Working place of your choice

Plan health education programme on Oral/ Dental Health Promotion and document in the log book provided to you.

6.7 REFERENCES

- Oral health for adults in care homes; NICE Guidelines (July 2016).
- Oral health promotion: general dental practice; NICE Guidance (December 2015).
- Guidelines for oral health care for people with a physical disability; British Society for Disability and Oral Health (2000).
- Clinical Guidelines and Integrated Care Pathways for the Oral Health Care of People with Learning Disabilities; British Society for Disability and Oral Health (2012).

UNIT 7 SUTURING OF SUPERFICIAL WOUNDS

Structure

7.0 INTRODUCTION

We have either suffered or seen a close relative suffer a lacerated wound that required suturing and management. Improperly sutured wounds can lead to wound breakdown, infection and poor healing. Hence it is important to learn proper wound management and repair. In this practicum, we will learn wound toilet, proper wound care, including indications and contraindications of primary wound closure, delayed primary closure and where secondary healing or grafting is required.

7.1 OBJECTIVES

At the end of this unit, you should be able to:

- clean wounds properly;
- stitch and Dress of Minor wounds. The Do's and Don't's during suturing;
- provide/Supervise home care, and Follow up; and
- identify danger signs, refer and follow up.

7.2 THE IMMEDIATE WOUND CARE

All wounds need some kind of cleansing. The simplest toilet (applicable, say, to eyelid wounds) is dabbing on antiseptic after ordinary washing and exploring to remove obvious dirt. Most wounds need more than this, some very much more. The more the dead tissue, the more thorough must be your toilet (dressing). Dressing is a protective covering applied to a wound with purposes, such as:

- Present infection
- Absorb discharge
- Control bleeding
- Avoid further injury

Contraindications

Conditions which does not allow dressing toilet are signs of wound are:

- foul discharge
- lymphangitis
- lymphadenitis
- fever.

7.2.1 Types of Dressing

a) **Adhesive dressing (Band-aid):** These are sterile dressing of different kinds and consists of a pad of absorbent gauze. To apply this surround skin must be dry before application and all the edges of the dressing pressed firmed down.

b) **Non-adhesive dressing:** This is readymade sterile dressing consists of layers of gauze covered by a pad of cotton wool with an attached roller bandage to hold it in position. These are enclosed and sealed in protective covering and supplied in various sizes.

c) **Gauze dressing :** This is sued for large wounds as it is having absorbent, soft and pliable. It is liable to adhere to wound.

d) **Improvised:** This can be prepared with any clean soft absorbent material such as clean handkerchief, a piece of linen, a clean paper etc.

7.2.2 Points to be Kept in Mind While Doing Dressing

An efficient dressing should be sterile:

- Wash hands thoroughly before dressing.
- Avoid touching of wound with fingers, wear gloves and use asceptive technique.
- Do not talk or cough over wound.
- If dressing stick to the wound do not try to pull it but remove gently by wetting the wound with sterile saline solution.

7.2.3 Articles Required

- Kidney tray and Paper bag.

- Savlon / Dettol
- Thumb forceps/Artery forceps depending on wound size
- Syringe
- Scissors
- Medication (ointment to apply on wound) i.e. soframycin, betadine
- Spirit (to clean outside of wound).
- Gloves

7.3 PROCEDURE FOR DRESSING OF WOUND

Let us learn wound dressing which can be done by two methods depending upon the examination.

7.3.1 The Social Cleansing of a Wound (Procedure)

Do this in two stages before you drape a patient, first the surrounding skin, then the wound.

(1) Pack the patient's wound with a sterile swab to keep it dry while you clean the skin around it with tap water, ordinary soap, and a nail brush. Pour on more tap water, until the patient's skin is very clean as shown in Fig. 7.1.

(2) Now remove the swab and clean the wound itself. If the dirt is ingrained, use a fresh soft boiled nail brush and gloved or scrubbed hands. You can use a nail brush in a wound. Push it into the dirty tissues of the wound with gentle rotating movements. Don't use vigorous side to side scrubbing movements. Put a basin under the wound, so that you can pour clean water over it continuously.

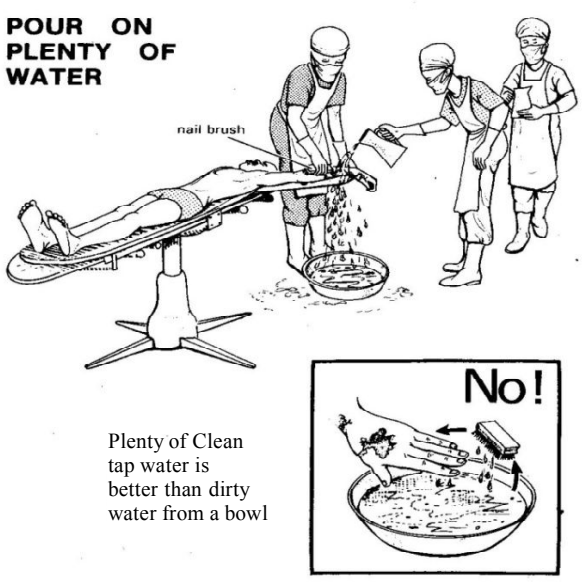


Fig. 7.1: Pour on plenty of clean water

7.3.2 The Surgical Cleansing of a Wound

Paint the skin around the wound with cetrimide or chlorhexidine. Don't use iodine, because this will damage more tissue. Drape it or cover with clean cotton cloth exposing the wound.

Points to be keep in mind while cleaning the wound

- Treat the tissues kindly.
- Don't grab them with large artery forceps, or swab them violently; this injures them, and makes them less able to resist infection.

- Use a pair of forceps to wash away all dirt and ingrained mud etc.
- Flush smaller foreign bodies out of the wound with sterile Normal saline or sterile water in a 50 ml syringe, or an ear syringe.
- You may find pieces of wood, metal, gravel or clothing.
- Explore the patient's wound; probing for foreign material is not enough. If necessary, open it widely to look into its depths.
- If for any reason, you have to leave a foreign body, such as deeply embedded bullet, tell the patient so.
- Remove all clots and join up all cavities so that they drain easily.

7.3.3 Injured Tissues in a Wound

This you can assess the condition of the wound, patient may be referred to higher health facility.

- **Injured skin**. Except on the patient's face, cut away 3mm of the skin margin round the wound. Don't undermine the skin edges.
- **Injured fat** readily necroses, so cut it back freely until you reach healthy yellow fat which is not bruised.
- **Injured muscle and fascia.** (A) Cut away all torn fascia and open up fascial planes (B). Put retractors in the wound so that you can see inside it. Cut away all dead muscle (C) Dead muscle looks darker and bluish, it does not bleed or ooze when you cut it, and it does not contract when you pinch it with forceps. Snip it away until you reach healthy muscle which contracts and oozes where you cut it. Be radical; dead muscle is an ideal culture medium for clostridia. If you are in doubt as to whether muscle is alive or dead, cut it out!
- **If there are loose pieces of bone which are not attached to periosteum of muscle,** they are ischemic and will die anyway. Remove them. Leave bone pieces which are still attached to periosteum. Don't scrape live muscle or periosteum from the surface of a bone, because the bone under it may die.

If bone is exposed in the wound, you can cover it with moist (sterile saline) gauze.

Special Structures: If clinical examination shows that a nerve has been injured, or a tendon or artery has been injured, refer him for proper exploration and repair to a higher centre. Similarly, if he has a compound fracture or a joint that is exposed, DO NOT Suture the wound but clean it thoroughly as above and refer him after applying splint.

7.3.4 Relieving Tension in the Wound

If a patient's tissues show any tendency to burst out of his wound, open up his deep fascia longitudinally down the whole length of the muscle compartment involved. This will prevent the compartment syndrome and is especially important in the forearm and the lower leg; it may even hasten the union of a fracture.

7.3.5 Controlling Bleeding from a Wound

If you are using a tourniquet, if bleeding is very severe, be prepared to reapply the tourniquet, even as you try to grasp the bleeding vessels with artery forceps.

If you are not using a tourniquet, bleeding or oozing should start as you cut away dead tissue. If it does not, you have not yet reached viable tissues, so you are not cutting away enough. If the wound is extensive, pack one part of it while you clean another.

Most of the bleeding will probably have stopped by the time you have finished toileting the wound. If larger arteries spurt at you, tie them with silk or linen thread. If necessary, control oozing with packs, leave them on for 10 or 20 minutes, and apply more if necessary.

7.3.6 Sutures and Dressing

If you have had to do an extensive wound toilet, the wound will not be suitable for immediate primary suture. So pack it with gauze, aiming for dryness. Loosely bandage the gauze in place, making sure the bandages do not restrict the circulation.

If the wound is in a limb, raise it.

Prevent Gas Gangrene, if a patient has a severe muscle wound of his buttock, thigh, calf, axilla, or retroperitoneal tissues, give him penicillin 1.5 megaunits every 4 hours starting immediately after the injury. Or, give him tetracycline.

Splints to immobilise the Limb, if he has a severe wound of a limb, immobilise it and then elevate it.

A Second Surgical Toilet, if you see more dead tissue at the time of the delayed closure, toilet his wound again.

7.4 PRIMARY SUTURES

Let us now discuss the Primary Sutures its immediate care, indications and contraindications in detail as given below.

7.4.1 Immediate Primary Suture

This is the suture of a wound within six hours of the injury, but it is only safe if the wound is clean and if it contains no dead tissue. All other wounds are best packed with gauze and left open to see what happens, 3 day later.

When you suture any wound, aim to: (1) close it at all points and in all planes. Suture it so as to obliterate dead spaces in which blood and exudate can collect. Be gentle in handling tissues to prevent further trauma.

You have just toileted the wound, and have now to decide if it is suitable for immediate or delayed primary suture.

7.4.2 Indications

(1) In most parts of the body, primary suture is only indicated if a wound

- is clean cut, as by a knife or broken glass
- is less than 6 hours old
- contains no doubtfully viable tissue, and
- can be sutured without undue tension

2) Most wounds of the head, face, and neck, and small clean wounds on the hands, arms, and scalp, are suitable for immediate primary closure for up to 24 hours because their blood supply is good.

3) Close all wounds of the dura, and the pleural and peritoneal cavities, by immediate primary suture. If necessary, you can leave the tissues over them for delayed suture.

If all the other conditions apply, except that you cannot bring the skin edges together, you may be able to close the wound by primary skin grafting. Keeping this information would help the patient in relieving his/her worries, so you must explain to the patient.

7.4.3 Contraindications

These are (1) wounds more than 6 hours old, or with dirty or damaged tissue, (2) severe wounds, crush injuries, gunshot wounds and bites - either human or animal, (3) any wound in which immediate or delayed primary split skin grafting might be a better way of providing skin cover, for example degloving injuries, (4) wounds in severely shocked patients whose wound repair poorly, (5) all open fractures (6) Most open joint wounds.

7.5 TECHNIQUE OF SUTURING SKIN

You must know about sutures available for use as per site of the wound in the body.

After cleaning and preparing the wound for suturing under local anaesthesia, the correct suture material and needle are chosen for use. If using atraumatic sutures with needle, use 3–0 or 2–0 nylon or silk on a cutting needle to suture the skin at most places. However, close to the eye, on the face, and on the hand it may be better to use finer suture such as 4–0 or even 5–0. Enter the skin at right angles to the skin surface and exit from the other end beyond the breach at an equal distance from the edge. Include deeper tissue in the bites. Apply simple sutures and tie the knot without making it too tight. The margins of the wound should just approximate. Sometimes, mattress sutures may be required to get good apposition. If there is dead space, or there are tissues in the depth that require approximation, apply atraumatic chromic catgut (2–0 or 3–0) to get them close. This will reduce or obliterate the dead space.

Clean the sutured wound once again with normal saline, apply dressing with povidone iodine ointment and surgical tape or bandage to hold it. Inspect the wound after 48 hours and leave exposed if there is no significant discharge.

Most wounds can be managed by removing sutures at one week. Those on the face can be removed even a day or two earlier, while on the lower limbs and back 10 days to two weeks may be better. Healing is slower in old age and hence sutures may be left longer in them.

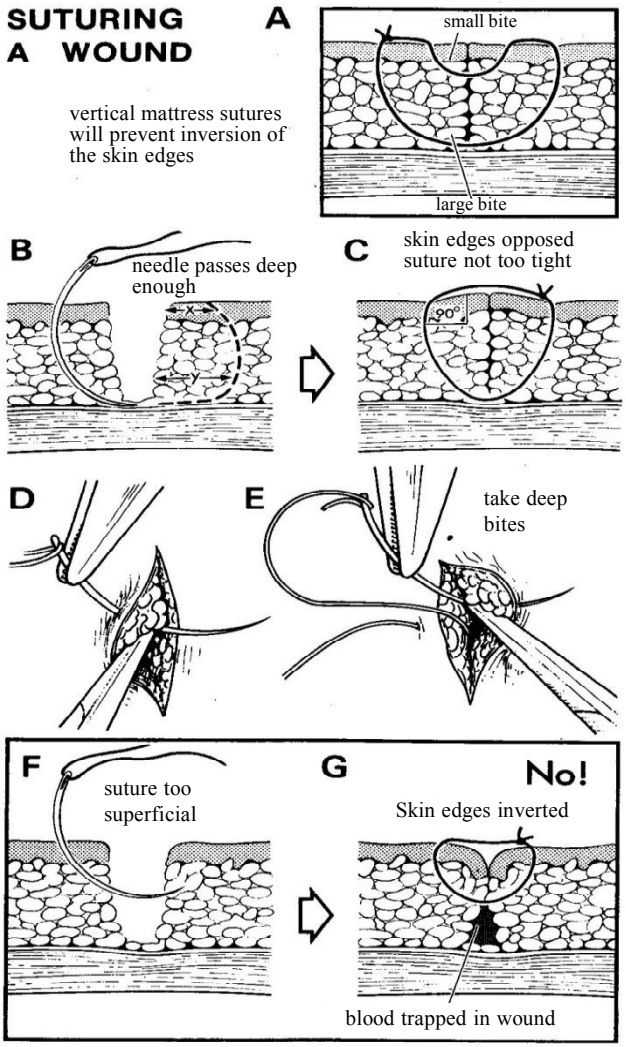


Fig. 7.2: Suturing of a wound

7.6 LET US SUM UP

The key messages of this unit are wound toilet is very important before one embarks on suturing a wound, consider primary wound closure only in clean cut wounds, especially those on the face and scalp, where there is good vascularity, give good analgesia for wound toilet and suturing, give inj. tetanus toxoid booster after any lacerated wound, if the booster has not been given in the previous one year, never suture deep wounds extending to the muscle, primarily. On the contrary, lay them open, join all cavities and do a fasciotomy, if required in such cases and square the knots as you fasten them, to ensure that they do not slip. Do not fasten them too tight, just enough to approximate cut edges.

7.7 ACTIVITY

Select 3–5 persons with wounds.

Identify different types of wounds and take care of these wounds appropriately. Describe the procedure followed is each wound and maintain record in workbook.

UNIT 8 DRUGS DISPENSING AND INJECTIONS

Structure

8.0 INTRODUCTION

In the previous units you have learnt about the practical skills on Sample collection, common blood tests, screening and management of dental conditions and suturing of Superficial Wounds. In Block 6 of Theory Course 2, you have also learnt about essential drugs.

With this background you are ready to move a step further and get acquainted with the common procedures of 'Drugs Dispensing and Injections'. Many of you might already be actively involved in this activity. The unit will mainly deal with the prescribing/ dispensing and administering designated drugs / medication and explaining side effects to the patients or their care providers. In this unit you will be learning how to Insert intravenous cannula, administer intramuscular injection and provide intravenous medication/ fluids in emergency.

8.1 OBJECTIVES

After the completion of this unit, you will be able to:

- Describe the principles of prescribing/ dispensing and administering drugs;
- List the various routes of drug administration;
- Administer intramuscular, intradermal and subcutaneous injections;
- Insert intravenous cannula; and
- Provide intravenous medication/ fluids in emergency.

8.2 DRUG PRESCRIPTION

What is meant by prescribing, dispensing and administering of drugs?

Prescribing: When the doctor or another designated person writes a prescription for a medication for the patient.

Dispensing: Wwhen the pharmacist sometimes a nurse)fills the doctor's prescription and hands the medication to the customer.

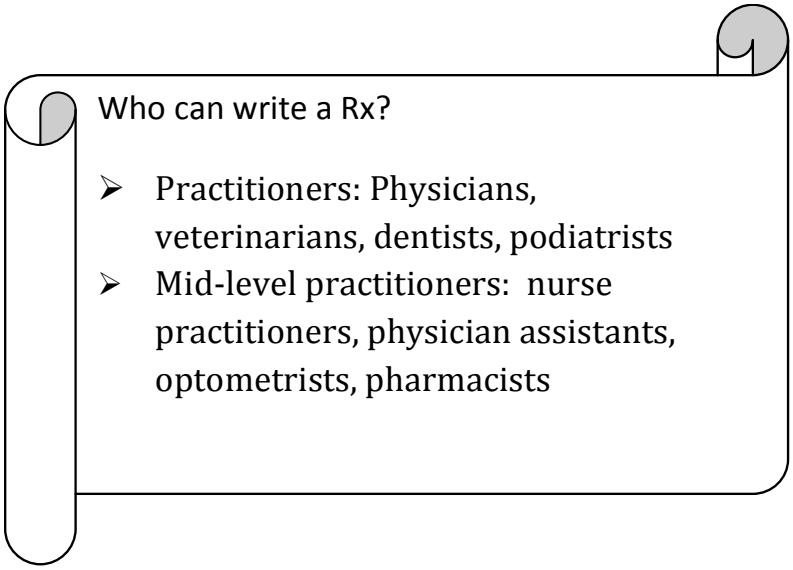
Administering: when the patient ingests the actual medicine or is injected the medicine (or a nurse gives the medicine to the patient).

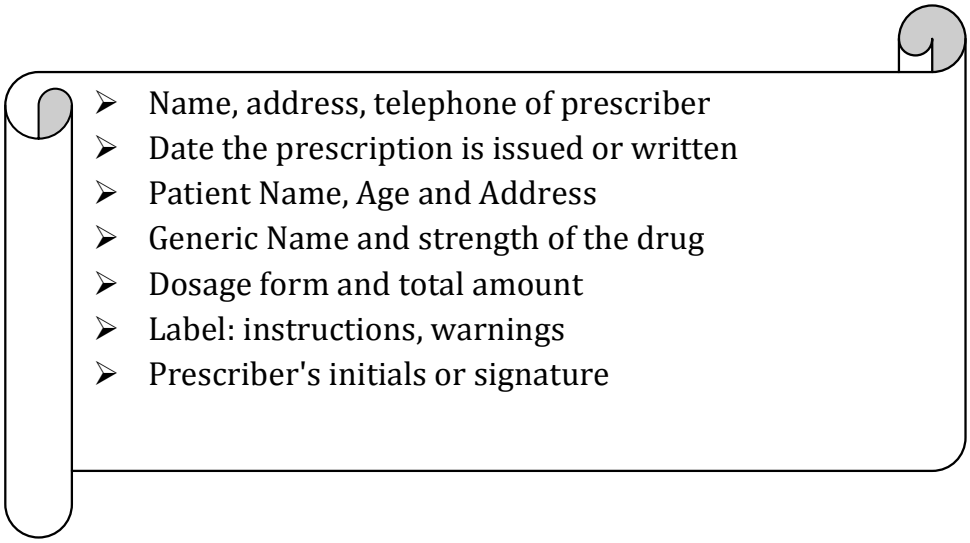
8.2.1 What is a Prescription?

A prescription is a written, verbal, or electronic order from a practitioner or designated agent to a pharmacist or nurse for a particular medication for a specific patient. Although you will not prescribe medications, but get acquainted to the principles of drug prescription as follows.

8.2.2 Writing Prescriptions and its content

You should be aware with the content while writing any prescription so that, you cross check that right medication is ordered to right patient. Hence, check for the following:





8.2.3 Principles for Drug Prescription

- Select the drug, considering:
  - Medication Allergies
  - Suitability
  - Safety
  - Availability
  - Cost
- Determine if controlled drug or non-controlled drug
- Determine preference for brand or generic product
- Name of the drug:
  - Use with caution- look alike or sound alike drugs
  - Avoid abbreviations
- Must give clear information, instructions and warnings
- Multiple drugs per prescription can add to confusion
- KEEP IT SIMPLE

Give Information, Instructions and Warnings

The six points listed below summarise the minimum information that should be given to the patient.

1) Effects of the drug

   Which symptoms will disappear; and when; how important is it to take the drug; what happens if it is not taken;

2) Side effects

   Which side effects may occur; how to recognise them; how long will they remain; how serious they are; what to do if they occur;

3) Instructions

When to take; how to take; how to store; how long to continue the treatment; what to do in case of problems;

4) Warnings

What not to do (driving, machinery); maximum dose (toxic drugs); need to continue treatment (antibiotics);

5) Future consultations

When to come back (or not); when to come earlier; what to do with left-over drugs; what information will be needed;

6) Everything clear?

Everything understood; repeat the information; any more questions.

8.3 DRUG DISPENSING

In the settings where a pharmacist is not available, nurses have authority to dispense certain medications. Nurses are accountable for providing safe, competent and ethical care to their clients.

8.3.1 What is Drug Dispensing

Dispensing includes the preparation, packaging, labelling, record keeping, and transfer of a prescription drug to a patient or an intermediary, who is responsible for administration of the drug.

Dispensing occurs when the nurse gives medication to a client or their delegate for administration at a later time e.g. when the client is leaving the health centre and needs medication while away/ at home.

Nurses may dispense with or without the involvement of a pharmacist.

Remember:

If you dispense the medication without the involvement of a pharmacist, you must

- Ensure the pharmaceutical and therapeutic suitability of the medication for the client, as well as its proper use.
- Have policies or standing instructions from your employers regarding dispensing by nurses.

8.3.2 Principles of Drug Dispensing

In order to dispense medications, you should meet the following expectations:

1) Dispense medications when it is in the best interest of the client.
2) Dispense medications only to clients under your care.
3) Take steps to ensure pharmaceutical and therapeutic suitability,
    - Review the order for completeness and appropriateness (e.g., drug, dosage, route and frequency of administration)

- Review the client's medication history and other personal health information
- Consider potential drug interactions, contraindications, allergies, therapeutic duplications and any other potential problems (e.g., adverse side effects)
- Use current, evidence-based resources to support your decision-making (e.g., online clinical databases, decision support tools)
- Consider the client's ability to follow the medication regimen.

4) To ensure proper use, you should
   - Label the medication legibly with: Client's name; Medication name, dosage, route, and (where appropriate) strength; Directions for use; Quantity dispensed; Date dispensed; Initials of the nurse dispensing the medication and the name, address, and telephone number of the agency from which the medication is dispensed; and Any other information that is appropriate/specific to the medication.
   - Package the medication in a way that is most appropriate for client needs.· Hand the medication directly to the client or their delegate.
   - Provide education based on an assessment of the client's abilities and level of understanding regarding the medication, including: Purpose of medication; Dosage regime, expected benefits, potential side effects, storage requirements and instructions required to achieve a therapeutic response; and Written information about the medication.
5) Record dispensing information on an individual medication profile and/or client record each time a medication is dispensed.

Client profile/record includes

- Client name, address, phone number, date of birth, gender and, when available, allergies and adverse reactions
- Date dispensed
- Name, strength, dosage of medication and quantity dispensed
- Duration of therapy
- Directions to client
- Signature and title of the person dispensing the medication.

8.4 ADMINISTRATION OF MEDICATIONS

The **administration** stage (administering the prescription) includes administering the right medication to the right patient, in the right manner and administering the medication only when indicated.

8.4.1 Basic Principles of Administering Medication

Before administration

- Check that you are taking the correct medication chart for the correct patient
- Interpret the order carefully before preparing drug for administration

- Check that the pharmacist/you has/have reviewed a new drug order before administering
- Check for any drug allergy or ambiguous order
- Do not hesitate to contact the prescriber, if not you, for any illegible or ambiguous order
- Accept verbal order only in emergency by writing down and repeating back the order, spelling the drug name and doses
- Check that you are preparing the correct drug for the correct patient
- Always get a double-check for correct drug, dose, route and time of administration before administering the drug
- Make sure to counter-check the drug prepared against the order before administering
- Label all infusion sets and lines
- Be familiar with all the different administration sets and devices available in the inventory

During administration

- Check that you are administering the correct drug to the correct patient
- Advise patients on the possible adverse drug reactions
- Encourage patient to express any discomfort or problems experienced during drug administration

After administration

- Document promptly on the medication chart the time that the drug is administered

Rights of Medication Administration: Rights of drug administration are not rights, as in privileges, but things that must be correct.

1) Right patient

   Check the name on the order and the patient; use 2 identifiers; ask patient to identify himself/herself; when available, use technology (for example, bar-code system).

2) Right medication

   Check the medication label; check the order.

3) Right dose

   Check the order; confirm appropriateness of the dose using a current drug reference. If necessary, calculate the dose and have another nurse calculate the dose as well.

4) Right route

   Again, check the order and appropriateness of the route ordered. Confirm that the patient can take or receive the medication by the ordered route.

5) Right time

   Check the frequency of the ordered medication; double-check that you are

giving the ordered dose at the correct time; confirm when the last dose was given.

6) Right documentation

   Document administration AFTER giving the ordered medication. Chart the time, route, and any other specific information as necessary.

7) Right reason

   Confirm the rationale for the ordered medication. What is the patient's history? Why is he/she taking this medication? Revisit the reasons for long-term medication use.

8) Right response

   Make sure that the drug led to the desired effect. If an antihypertensive was given, has his/her blood pressure improved? Be sure to document your monitoring of the patient and any other nursing interventions that are applicable.

8.4.2 Basic Principles of Monitoring Medication Use

- Be familiar with the drug use protocols
- Be familiar with the possible adverse drug reactions following drug administration
- Be vigilant when monitoring patient by adhering strictly to established protocols
- Alert prescriber promptly should patient develop unexpected signs and symptoms or is not
- responding as expected
- Document patient's response on the medication chart in a timely manner
- Do not use dangerous abbreviations when documenting administration details
- Keep up-to-date references easily accessible for quick checks

8.5 ORAL DRUG ADMINISTRATION

You have learnt in your basic nursing training about the various routes of drug administration such as: oral, parentral (Injections), rectal, inhalations, local applications etc. In the next section we shall review drug administration via oral and parentral (Injections) routes.

8.5.1 Oral Aadministration of Medicines

Let us go through oral medications procedure as given below:

Giving medicines in the form of tablets, capsule or syrup by mouth

Purposes

To prevent diseases e.g. OPV, Vitamin supplements

To diagnose disease condition

To treat disease condition

Articles required

A clean tray containing

1) Medicine container (tab, syrup etc.)
2) Bowl of water for rinsing spoon
3) Hand towel-1
4) Medication card
5) Minim glass/ ounce glass
6) Glass of water, feeding cup/ spoon/ dropper etc.
7) Grinding mortar and pistle
8) Small towel to clean the mouth of the bottle, kidney tray and paper bag

Procedure

1) Check medication card with the treatment book/ prescription record and counter checked by another person
2) Wash hands
3) Recall safety measures, record, locate the drug, read the label on exact bottle/ container and see that it is the right medicine, shake the bottle (If liquid), read label the second time
4) Collect medicine into the container with minimal handling of the drug
5) Measure liquid accurately with a minim glass and read the lower level of the meniscus
6) Pour liquid from the side opposite to the label, wipe the mouth of the bottle, recap the bottle and read the label before replacing
7) If the drug is a tablet or capsule form, take it in a spoon or medicine cup
8) Keep medication card at hand
9) Identify the patient by his/her name, explain the procedure and place the patient's towel under the chin if needed
10) Position the patient comfortably in an upright sitting position
11) Administer each drug separately followed by water
12) Remain with the patient till the medicine is swallowed
13) Record the drug given: details of the dose, route, date, time, signature and omissions etc.
14) Clean and replace the articles, dispose waste safely, and wash hands

Note:

- If patient is unable to swallow, powder the tablet by crushing it in the mortar with pristle.
- Give water before and after putting the powder in patient's mouth or dissolving it in water.
- Syrup, cough mixtures and sedative lozenges should be given without water and not followed by food or water.

- Tonic to stimulate appetite is given before meals
- Laxatives are given at night e.g. paraffin, Dulcolax
- Drugs that irritate the lining of the stomach may be givenby diluting with water / or after food and with plenty of water e.g. iron, aspirin
- The nurse must know the pharmacological action, uses, dosage and the effect of each drug given
- Never use content of the unlabelled container, the label must be clear and legible
- If in doubt about anything regarding medication orders like the dosage or patient, consult a senior person before giving the medication
- Any error in administration of medication must be reported to the higher authority immediately
- All medication should be recorded only after administration.

8.6 INJECTIONS: GENERAL PRACTICAL ASPECTS OF INJECTING

Apart from the specific technique of injecting, there are a few general rules that you should keep in mind.

l) Expiry dates

Check the expiry dates of each item including the drug. If you make housecalls, check the drugs in your medical bag regularly to make sure that they have not passed the expiry date.

2) Drug

Make sure that the vial or ampoule contains the right drug in the right strength.

3) Sterility

During the whole preparation procedure, material should be kept sterile. Wash your hands before starting to prepare the injection. Disinfect the skin over the injection site.

4) No bubbles

Make sure that there are no air bubbles left in the syringe. This is more important in intravenous injections.

5) Prudence

Once the protective cover of the needle is removed extra care is needed. Do not touch anything with the unprotected needle. Once the injection has been given take care not to prick yourself or somebody else.

6) Waste

Make sure that contaminated waste is disposed of safely (Refer Section 8.7).

Withdrawal/Preparation of injections

Checklist 1: Aspirating from ampoules (glass, plastic)

Materials needed

Syringe of appropriate size, needle of required size, ampoule with required drug or solution, gauze.

Technique

1) Wash your hands.
2) Put the needle on the syringe.
3) Remove the liquid from the neck of the ampoule by flicking it or swinging it fast in a downward spiralling movement.
4) File around the neck of the ampoule.
5. Protect your fingers with gauze if ampoule is made of glass.
6) Carefully break off the top of the ampoule (for a plastic ampoule twist the top).
7) Aspirate the fluid from the ampoule.
8) Remove any air from the syringe.
9) Clean up; dispose of working needle safely; wash your hands.

Checklist 2: Aspirating from a vial

Materials needed

Vial with required drug or solution, syringe of the appropriate size, needle of right size (im, sc, or iv) on syringe, disinfectant, gauze.

Technique

1) Wash your hands.
2) Disinfect the top of the vial.
3) Use a syringe with a volume of twice the required amount of drug or solution and add the needle.
4) Suck up as much air as the amount of solution needed to aspirate.
5) Insert needle into (top of) vial and turn upside-down.
6) Pump air into vial (creating pressure).
7) Aspirate the required amount of solution and 0.1 ml extra. Make sure the tip of the needle is below the fluid surface.
8) Pull the needle out of the vial.
9) Remove possible air from the syringe.
10) Clean up; dispose of waste safely; wash your hands.

Checklist 3: Dissolving dry medicine

Materials needed

Vial with dry medicine to be dissolved, syringe with the right amount of solvent, needle of right size (iv, sc or iv) on syringe, disinfectant, injection needle, gauze.

Technique

1) Wash hands.
2) Disinfect the rubber cap (top) of the vial containing the dry medicine.
3) Insert the needle into the vial, hold the whole upright.
4) Suck up as much air as the amount of solvent already in the syringe.

5) Inject only the fluid into the vial, not the air!
6) Shake.
7) Turn the vial upside-down.
8) Inject the air into the vial (creating pressure).
9) Aspirate the total amount of solution (no air).
10) Remove any air from the syringe.
11) Clean up; dispose of waste safely; wash hands.

Drug Dose Calculations

$$\frac{\text{Desired Dose} \times \text{Volume in Hand}}{\text{Concentration}} = \text{\_\_\_ml to be given}$$

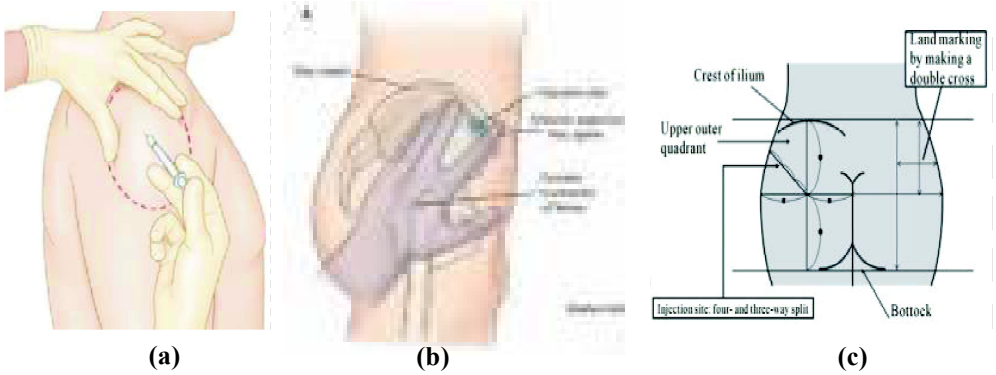
Common routes and methods of giving Injections

You have learnt in your basic nursing training that injections can be delivered through different methods or routes. Though injections can be given through a wide variety of routes, the most common are. intradermal (ID), subcutaneous (SC), intramuscular (IM) and intravenous (IV). The injection sites vary according to the type of injection.

8.6.1 Intramuscular Injection

An intramuscular (IM) injection is a shot of medicine given into a muscle. Injections given using intramuscular route include Diclofenac, DPT, TT.

The following are safe areas to give an IM injection:



(a) (b) (c)

Fig. 8.1 : Deltoid Injection

Vastus Lateralis and Rectus Femoris Muscle (Thigh): anterolateral aspect of middle one third or the mid thigh. This is the preferred site in children.

Ventrogluteal Muscle (Hip): Fig. 8.1 (c) Have the person getting the injection lie on his or her side. The hip is a good place for an injection for adults and children older than 7 months.

Deltoid Muscle (Upper arm muscle): Completely expose the upper arm. You will give the injection in the center of an upside down triangle, 1 to 2 inches below the acromion process. This site should not be used if the person is very thin or the muscle is very small. Shown in Fig. 8.1 (a)

Dorso gluteal Muscle (buttocks): Shown in Fig. 8.1 (c) Expose one side of the buttocks. (outer upper quadrant of the gluteus maximus muscle). Do not use this site for infants or children younger than 3 years old. Even in adult patients, this site is best avoided as the extra layer of fat tissue reduces the absorption of the medication.

Materials needed

Syringe with the drug to be administered (without air), needle (Gauss 22, long and medium thickness; on syringe), liquid disinfectant (alcohol/ spirit), cotton wool/swab.

Technique

1) Assemble equipment.
2) Reassure the patient and explain the procedure.
3) Wash hands and use disposable gloves.
4) If necessary, withdraw medication from the ampoule or vial.
5) Use an alcohol swab to clean the skin where you will give the shot
6) Hold the muscle firmly and insert the needle into the muscle with a quick firm motion.
7) After you insert the needle swiftly at an angle of 90 degrees, release the muscle grasp.
8) Gently pull back on the plunger of the syringe to check for blood. (If blood appears when you pull back on the plunger, withdraw the needle and syringe and gently press the alcohol swab on the injection site. Start over with a fresh needle.)
9) If no blood appears, inject all the solution by gently and steadily pushing down the plunger.
10) Withdraw the needle and syringe and press an alcohol swab gently on the spot where the shot was given.
11) Check the patient's reaction and give additional reassurance, if necessary.
12) Clean up; dispose of waste safely; wash your hands.

8.6.2 Intradermal Injection

A shallow injection given between the layers of the skin, creating a "wheal" on the skin.

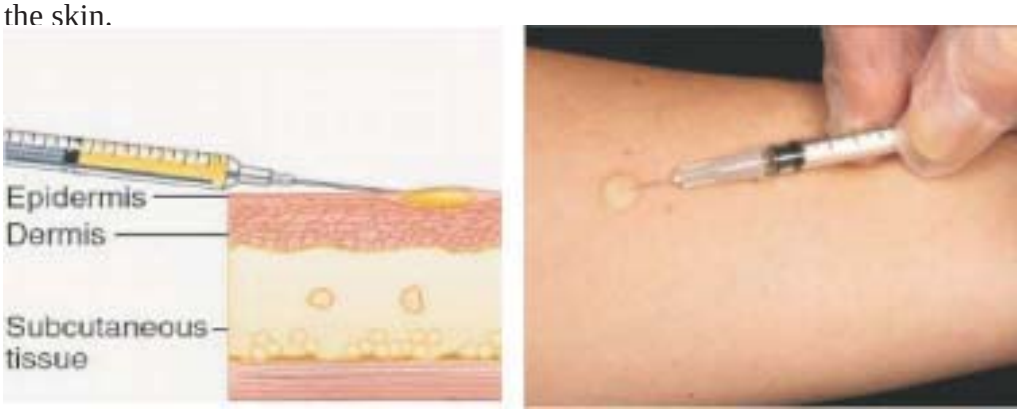


Fig. 8.2 : Intradermal Injection

Materials needed

Syringe (tuberculin or 1ml suringe)with the drug to be administered (without air), needle (Gauss 26–27, short and thin; on syringe), liquid disinfectant (alcohol/ spirit), cotton wool/swab.

Technique

1) Follow steps 1 to 5 as given for intramuscular injection
2) Select an area on the inner aspect of the forearm that is not heavily pigmented or covered with hair. Shown in Fig. 8.2 The upper chest or upper back beneath the scapulae are also sites for intradermal injections.
3) Cleanse the area with an alcohol swab by wiping with a firm circular motion and moving outward from the injection site. Allow skin to dry.
4) Use your non-dominant hand to pull skin taut over the injection site.
5) Remove needle cap with non-dominant hand by pulling it straight off.
6) Place the needle almost flat against the patient's skin, bevel side up (at an angle of 10-15^{o})
7) Insert the needle so that the point of the needle can be seen through the skin—only about 1/8 of an inch.
8) Slowly inject the desired dose of medication while watching for a small wheal or blister to appear. If none appears, withdraw the needle slightly.
9) Withdraw the needle at the same angle it was inserted.
10) Do not massage the area or apply spirit swab after removing the needle.
11) Assist the patient into a position of comfort.
12) Clean up; dispose of waste safely; wash your hands.
13) Chart the administration of medication, as well as the site of the administration. Some agencies recommend circling the injection site with ink.
14) Observe the area for signs of reaction at frequent intervals.

8.6.3 Subcutaneous Injection

A subcutaneous (SC) injection is a shot of medicine given into the fatty tissue beneath the skin. Since there is little blood flow to the fatty tissue, this route is used for a slow, sustained absorption of medicine.

In addition to all the sites mentioned for IM injections SC injections are also given frequently over abdomen. (about 5cm around the navel).

Materials needed

Syringe with the drug to be administered (without air), needle (Gauss 25- 26, short and thin; on syringe), liquid disinfectant (alcohol/ spirit), cotton wool/swab.

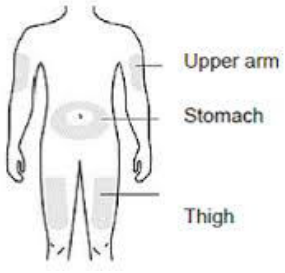


Fig. 8.3 : Subcutaneous Injection

Technique

1) Follow steps 1 to 5 as given for intramuscular injection
2) Select an appropriate area and cleanse it with an alcohol swab by wiping with a firm circular motion and moving outward from the injection site. Allow skin to dry.
3) Take the cover off the needle.
4) Hold the syringe like a pencil in one hand.
5) With the other hand, pinch the skin between the thumb and index finger in order to separate it from the underlying muscle tissue.
6) Thrust the needle into the raised fold of skin at an angle of 90^{o} if using a 26G needle. However for small children and persons with thin skin, the needle should be inserted at an angle of 45^{o} when using a larger needle. The aim is not to accidentally inject into the underlying muscle.
7) Release the skin fold after the needle is inserted completely.
8) Use the free hand to hold the syringe near its base to stabilise it.
9) Inject the medication slowly taking 5–10 seconds for injecting the entire amount.
10) Withdraw the needle, press the site with the spirit/ boiled swab and press gently for about a minute.
11) Do Not RUB the injection site. Do Not recap the used needle.
12) Clean up; dispose off waste safely; wash hands
13) Chart the administration of medication, as well as the site of the administration.

8.6.4 Venepuncture for Giving Intravenous (IV) Injection

Intravenous injection is an injection given into a vein.

Venepuncture is a frequently done procedure for giving intravenous injection or drawing blood for various investigations. One should be extremely careful while performing a venepuncture since using an unsafe needle may transmit infections into the blood stream directly and this can have serious consequences. While the process for venepuncture remains essentially the same as that for an IM injection in terms of cleaning the skin, drawing the medication and handling of the syringe/ needle the following points must be observed while performing a venepuncture:

Materials needed

Syringe with the drug to be administered (without air), needle (Gauss 20–24, long and medium thickness; on syringe), liquid disinfectant (alcohol/ spirit), cotton wool/swab, tourniquet.

Technique

1) Select the right site and right vein: brachial vein and the veins in the back of the hand are commonly used.
2) Always wear a sterile glove before performing a venipuncture.

3) Apply the tourniquet 2–3 inches above the intended venipuncture site to increase pressure in the vein and make it more prominent. When tourniquet is in place, the patient should be asked to open and close his fist several times to encourage venous distension. The vein should be palpated gently to see if it feels soft and bouncy.

4) Cleaning the site: since the contamination of the blood stream poses a serious threat to the health of the patient, the skin should be cleaned meticulously over the site of the venipuncture (usually the brachial vein in the elbow region) using a spirit swab.

5) Hold the syringe at an angle of 10–15^0.

6) Ensure that the bevel of the needle is facing up.

7) Push the needle gently but firmly into the vein as shown in Fig. 8.4.

8) Be careful not to push more than 1cm inside the vein.

9) Draw the syringe plunger to see if the needle is inside the vein. If the blood flows easily into the syringe, it indicates that the needle is inside the vein. If it does not come, try again.

10) Release the tourniquet and then inject the medication into the vein.

11) Withdraw the syringe and needle gently.

12) Presss the site of puncture firmly with a spirit swab.

13) Do Not Rub the site of puncture. Keep the swab pressed till the bleeding stops oozing out. This usually takes about 1 to 2 minutes.

14) Check the patient's [illegible] ssurance, if necessary.

15) [illegible]

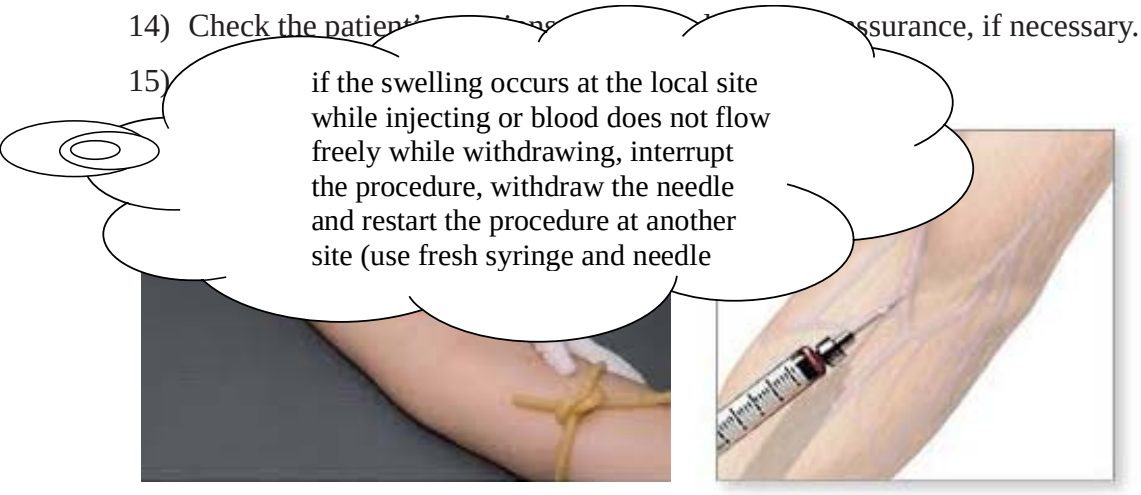


Fig. 8.4 : Intravenous Injection

Remember:

8.6.5 Intravenous (IV) Cannulation

IV cannulation is an intravenous infusion (via a catheter placed in peripheral veins of upper l imb) and is one of the commonest invasive procedures performed in acute care hospitals. The main indications of IV cannulation are:

- Fluid and/ or electrolyte replacement
- Route for drug administration
- Nutritional support
- Transfusion of blood and blood products
- Venous access for diagnostic blood draws

Fig. 8.5 : 5: g/v Catheter

Material required

- Tourniquet
- Gauze squares
- Adhesive tape
- Clear permeable dressing
- IV sets
- IV bottles
- IV catheters
- Sterile gloves
- Sterile drapes
- Surgical scissors
- Antiseptics
- Spirit swabs
- Site label (to record time of insertion)

Technique

- Wash hands
- Introduce yourself
- Confirm patient details – *name / DOB*
- Explain procedure and Check understanding & gain consent
- Select the right vein: consider
  - Patient medical history, age, body size, weight, general condition, and level of physical activity.
  - Condition of patient's vein, type of IV fluid or medication, expected duration of IV therapy.

Caution - Avoid cannulation in an area of:

Localised oedema, Dermatitis, Cellulitis,

Arteriovenous Fistula,

Wounds, Skin grafts, Fractures, Planned limb surgery, previous cannulation site

- Select the right site: from distal to proximal, Fig. 8.6
- Select the right size of IV catheter

Fig. 8.6 Site for I/V Connulotion

- 26–24 gauge for infants and children
- 24–22 gauge for children and elderly patients
- 24–20 gauge for medical and post operative surgical patients
- 18 gauge for surgical patients and for rapid blood transfusion
- 16 gauge for trauma patients and those requiring large volumes of fluid rapidly transfusion

- Prepare the site, insert the catheter and use right technique for its fixation:

  If the site is excessively hairy, clip the hair (Do Not shave). Clean a visibly dirty skin with soap and water. Then use antimicrobial solution (chlorhexidinegluconate or 10% povidone iodine, or 2% tincture iodine or 70% isopropyl alcohol). Chlorhexidinegluconate takes 30 seconds while povidone iodine requires at least 2 minutes to kill all the micro-organisms. Do not use 70% isopropyl alcohol after povidone iodine because it may irritate the skin and interfere with its germicidal action. If patient is allergic to iodine, use Chlorhexidinegluconate or 70% isopropyl alcohol to prepare the site.

Steps of inserting the cannula/ catheter

- Apply a tourniquet 2–3 inches above the intended puncture site.
- Palpate a vein: Go for a vein you can feel – *it's best if they feel "springy"*
- It should ideally be straight
- Tapping the vein and asking the patient to pump their fist can make it easier to see and feel veins
- Avoid areas where two veins are joining *(valves present)*
- **Weer gloves**
- **Insert the cannula: before venipuncture, stretch and immobilise the vein:**
- Grasp the cannula or cannula's wings with right hand and proceed with venipuncture.
- Insert the cannula at 10 to 30^{o} angle depending on the vein depth.
- Observe for the blood backflow in the cannula tubing or hub, it shows that the cannula is in the vein lumen.
- If backflow present, lower the cannula almost parallel to the skin. Push the catheter off the stellate and advance completely into the lumen of the vein.
- Remove the needle and dispose off into the sharps bin.
- Release the tourniquet and apply digital pressure beyond the cannula tip and stabilise the hub.
- Secure and dress the cannula: Place a 1-2 inch wide tape across the cannula hub: it should not cover the puncture site. Then place a 1–2 inch wide tape under the cannula hub, adhesive side facing up. Fold the tape around the hub. If catheter hub with wings being used, the tape strip is folded across the wings rather than the hub. Cover the venipuncture site and catheter hub with the dressing; the hub tubing junction is not covered. Place a gauge pad folded and covered with tape under the hub- tubing junction to prevent the skin breakdown.

- Flushing the IV cannula: Regular flushing with 5ml of sodium as shown in Fig. 8.7 chloride 0.9% is sufficient, 2 ml before and 3 ml after administering the drug. Alternatively safer solutions include prefilled single use saline flush syringes. Close the cannula port.

Fig. 8.7 : Fluding of IIV Cannula

- **Care of the catheter after insertion**
- Document in patient records: date and time of cannulation and reason for cannulation, type of cannula used, date the cannula should be removed, your name and designation.

Remember

- Solution for flushing should go in smoothly with little resistance
- Stop immediately if
  - You see signs of swelling around the site (phlebitis)
  - Patient complains of pain
- If you fail in first attempt, Don't panic! *(this is relatively common*
- Try again (Get some new equipment, Try another vein)
- If you fail again, REFER the patient immediately to PHC/CHC/DH

8.6.6 Administration of IV Fluids in Emergency

Purposes

1) To administer medicines for immediate action
2) To substitute and supplement fluid and nutrition
3) To help in maintaining blood volume

General instructions

1) Use strict aseptic technique
2) Do not permit air entry into the vein maintain strict intake output record
3) Have complete apparatus that should be in proper working order
4) Ensure there is no cloudiness, sediments, discolouration or leakage of the medication or IV fluid

Material required

- IV stand
- Mackintosh with cover

- Bottle/ bag of IV solution to be infused
- Sterile IV infusion set
- All other articles as required for IV cannulation (Refer section on IV Cannulation)

Technique

1) Wash hands
2) Collect all articles and take to patient side
3) Explain the procedure and reassure patient
4) Carefully remove the IV administration set from its packing to avoid contamination
5) Connect the set to the bottle/bag by inserting the piercer with a twisting movement
6) Hang the bottle/bag safely from the IV stand and prime the set by releasing the air vent and opening the flow clamp
7) Expel all air by running the fluid through
8) Protect the other end of the tube with the plastic cap
9) Position patient and place mackintosh to protect the bed clothes
10) Establish IV access (if not already done) using cannulation as described above (Refer section on IV Cannulation) apply splint to the limb if necessary and make the patient comfortable
11) Record time, type of solution used and rate of flow etc.
12) Clean and replace all articles
13) Observe the general condition of the patient, watch for any reaction, swelling, pain, leaking or inflammation
14) Maintain the desired rate of flow and ensure that the bottle/bag does not empty completely
15) As the level of the fluid in the bottle/bag reaches the piercer tip, clamp the tube, remove the piercer and needle carefully so as not to contaminate it and insert in the next bottle (if required) and restart.

(Note: If indicated, refer the patient to the PHC/CHC/ DH with the IV fluid infusion on, IV site well immobilised using a splint.)

To discontinue the IV infusion:

1) Close the flow control clamp, remove the splint
2) Place a spirit swab on the site and withdraw the cannula from the vein, maintaining pressure while doing so
3) Press the site till the bleeding stops
4) Clean up; dispose of waste i.e. IV set and cannula etc. safely; wash your hands.

Fluids

- Choice of resuscitation fluid depends on the cause of the deficit. At the level of Health and Wellness centre (HWC), isotonic crystalloid solutions (eg,

0.9% saline or Ringer's lactate [RL]) are typically given for intravascular repletion during shock and hypovolemia (both haemorrhagic and non hemorrhagic)

- Colloid solutions are generally not used. Patients with dehydration and adequate circulatory volume typically have a free water deficit, and hypotonic solutions (eg, 5% D/W 0.45% saline) are used.

Route and Rate of Fluid Administration

- Standard, large (eg, 14– to 16–gauge) peripheral IV catheters are adequate for most fluid resuscitation. (An IV infusion pump can be used where available).
- Patients in shock typically require and tolerate infusion at the maximum rate. Adults are given 1 l of crystalloid (eg, 0.9% saline or Ringer's lactate [RL]), (20 ml/kg in children) or, in haemorrhagic shock, 5 to 10 ml/kg of colloid or packed RBCs, and the patient is reassessed. An exception is a patient with cardiogenic shock who typically does not require large volume infusion.
- Patients with intravascular volume depletion without shock can receive infusion at a controlled rate, typically 500 ml/h.

a) **Fluid calculation formula for adults**

Calculating Flow Rate in Drops per Minute

$$\text{drops/ min} = \frac{\text{volume (ml)} \times \text{drop factor (drops/ ml)}}{\text{time (min)}}$$

$$\text{drops/ min} = \frac{\text{amount of solution to be used in (ml)} \times \text{no. of drops/ ml}}{\text{No. of hours over which to be given} \times 60}$$

b) **Fluid calculation formula for children**

Body Weight Method

1) Daily maintenance fluid requirement formula:

0-10 kg	100 ml/kg/day (100 × kg)
11-20 kg	1000 ml (for first 10 kg) + 50 mL/kg/day for each additional kg between 10- 20 kg
over 20 kg	1500 ml (for first 20 kg) + 20 ml/kg/day for each additional kg over 20 kg

Basic Intravenous Medication Safety

Nursing responsibilities for the safe and effective administration of intravenous (IV) medications begin with the standards of practice common to all routes:

- Know and perform the six rights of medication administration – right patient, right drug, right dose, right route, right time, and right documentation.
- Assess that the medication prescribed is the correct medication.
- Check the medication at least three times against the medication administration record (MAR) prior to administration – as you remove the

drug from the storage area, as you prepare the drug, and at the patient's bedside just before you administer the drug.

- Only administer medications that have been labelled appropriately.
- Perform accurate dosage calculations; and know the volume of the medication to administer, the characteristics and viscosity of the medication, and the location of anatomical structures underlying injection sites.
- Administer medications correctly, and closely monitor their effects.
- Select an injection site in relation to anatomical landmarks.
- Maintain stability of the needle and syringe unit.
- Aspirate the syringe before injecting an IM medication, the medication may accidentally be injected directly into an artery or vein.
- Use strict aseptic technique.
- Don't inject a large amount into a site that is not appropriate.
- Educate Patient and family about adverse effects.
- Apply the nursing process to medication administration.

Remember

that, once you have administered an IV medication, it enters the bloodstream immediately and begins to affect target tissues and organs. Be careful to avoid errors in dosage calculations, preparation, and administration.

8.7 HANDLING AND DISPOSAL OF INJECTION RELATED WASTE

(also refer unit 1 of Block 2 on Universal Precautions and Bio-medical waste management)

Handling Injection Waste: Steps for handling injection waste after giving injection

1) Keep translucent puncture proof containers for collecting needle, syringe and broken glass ampoules within an arm's reach at the place where injections are given. Keeping these containers out of reach leads to keeping infectious and dangerous sharps on places like the table where they are liable to cause injury.
2) Immediately after giving an injection, the syringe hub should be cut using the hub cutter. Fig. 8.8 Hub Cutter Avoid keeping the used syringe on the table/ tray. THE HUB SHOULD BE CUT AFTER EVERY SINGLE INJECTION.
3) The container attached to the hub cutter is to be emptied periodically (as explained later) into the white translucent puncture proof container.
4) Do not accumulate used syringes for hub cutting at one-go. Piled up used syringes with intact needles may be reused. This also exposes the health worker, clients and waste handlers to injury. Current guidelines recommend breaking the syringe hub Immediately after giving an injection at all locations (including in outreach immunization sessions).

5) After cutting the hub, collect the syringe plungers in a blue or red plastic bag. The bag should not be filled more than 3/4th. Afterwards tie the bag and send for terminal disposal.

6) Likewise the translucent puncture proof container should not be filled more than3/4th. It must be sealed and sent for terminal disposal.

7) As waste can't be stored for more than 48 hours, even if the container/ bag is not filled upto 3/4th, tie/seal/these and send for terminal disposal.

8) Used glass ampoules and broken multidose vials made of glass should be put in the sharps container.

9) The various categories of waste like paper, plastics, swabs and sharps should be put in separate color coded bags/containers as per BMW disposal guidelines of Central Pollution Control Board and Ministry of Health and Family Welfare.

Fig. 8.8 : Hub Cutter

8.8 LET US SUM UP

In unit you have studied about administering/prescribing designated drugs / medication and explaining side effects to the patients or their care providers; and how to Insert intravenous cannula, administer intramuscular injection and provide intravenous medication/ fluids in emergency. The prescription/dispensing and administration of drugs is a specialised skill. The effectiveness of the prescribed drugs is influenced by your approach to the individual patient. It is important to follow the principles of drug prescription/dispensing and administration for avoiding errors and better outcome. It is equally important to listen to what the patient has to say and then also educate the patient.

This was the last unit of the block 'General Skills and Laboratory Skills'. In the next block you will be learning about the 'Skills for Management of Common Conditions and Emergencies'.

8.9 KEY WORDS

- **Bio Medical Waste:** any waste which is generated during the diagnosis, treatment or immunization of human beings or animals or in research activities pertaining thereto or in the production or testing of biological or any

solid waste or liquid, which may present a threat of infections to humans

- **Sharps**: include needles, syringes, scalpel blades, glass etc. that may cause puncture and cuts. This includes both used and unused sharps, which should be treated.
- **Venepuncture**: the puncture of a vein as part of a medical procedure, typically to withdraw a blood sample or for an intravenous injection.

BMW: Bio Medical Waste

CHC: Community Health Centre

DH: District Hospital

ID: Intra Dermal

IM: Intra Muscular

IV: Intra Venous

OPD: Out Patient Department

PHC: Primary Health Centre

SC: Sub Cutaneous

8.10 ACTIVITY

1) On your visit to the health centre, a 30 year old male presents to you with severe dehydration, unable to tolerate oral fluids. He is conscious and having cold and clammy peripheries. You decide to refer this case to PHC after starting IV infusion. How will you proceed?

- **Guidelines**
  - Decide on the type and volume of IV fluid to be given.

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    .....
  - Calculate the rate of flow of IV fluid.

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    .....
  - Prepare the articles for IV Cannulation and IV infusion **.**

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    .....
  - Perform IV cannulation and start the IV infusion.

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    .....

- Dispose off the IV cannulation and IV infusion related waste safely.

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  .....

- Refer the patient to the PHC

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2) A case of pulmonary tuberculosis (Relapse) is due for Inj. Sterptomycin. Follow precautions before injecting dose to the patient.
   - Ensure 7' R
   - Decide route of drug injection
   - Prepare articles
   - Plan health education pertaining to his condition
   - Disposing Needle and Syringe after injection.
   - Making patient comfortable before and after the procedure.

8.11 REFERENCES

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Certificate in Community Health for Nurses (BPCCHN)
Practical Course

BNS-043 : Public Health and Primary Health Care Skills (10 Credits)

Block – 1 : Public Health Skills

Unit 1 : Community Need Assessment and Identification of Common Health Problems
Unit 2 : Nutritional Assessment
Unit 3 : Investigation of an Outbreak
Unit 4 : Organizing and Conducting Special Clinics
Unit 5 : Social Mobilisation Skills
Unit 6 : Health Education and Counseling
Unit 7 : Report Writing and IT Skills including Interpretation and Use of Data

Block- 2 : General Skills and Laboratory Skills

Unit 1 : Universal Precautions and Bio Medical Waste Management
Unit 2 : Procedures for Basic Tests
Unit 3 : Common Blood Tests and Preparation of Peripheral Smear
Unit 4 : Examination of Swelling, Lumps and Joints
Unit 5 : Eye and ENT Examination
Unit 6 : Screening and Management of Common Dental Conditions
Unit 7 : Suturing of Superficial Wounds
Unit 8 : Drugs Dispensing and Injections

Block – 3 : Skills for Management of Common Conditions and Emergencies

Unit 1 : Basic Life Support (BLS)
Unit 2 : Assessment and Management of Fevers
Unit 3 : Management of Common Aches and Pains
Unit 4 : First Aid Techniques and Stabilization Care in Common Emergencies – 1
Unit 5 : First Aid Techniques and Stabilization Care in Common Emergencies – 2
Unit 6 : Geriatric and Palliative Care

Block – 4 : Maternal Health Skills

Unit 1 : Assessment of Health Status of Women
Unit 2 : Ante Natal, Intra Natal, Post Natal Examination and Care
Unit 3 : Organising Labor Room
Unit 4 : Conducting Normal Delivery and Partograph
Unit 5 : Identification, Care and Referral of Complications during Labour
Unit 6 : Post Natal Examinations and Care
Unit 7 : Emergency and Injectable Contraceptives and Follow-up Care

Block 5 : Reproductive and Adolescent Health Skills

Unit 1 : Assessment and Management of STIs and RTIs
Unit 2 : Insertion and Removal of IUCDs
Unit 3 : Management of Abortion and Counselling
Unit 4 : Adolescent Counselling

Block 6 : Newborn and Child Health Skills

Unit 1 : Newborn Resuscitation
Unit 2 : Assessment of Newborn
Unit 3 : Kangaroo Mother Care
Unit 4 : Infant and Young Child Feeding and Counseling
Unit 5 : Promoting and Monitoring Growth and Development and Plotting of Growth Chart
Unit 6 : Immunisation and Safe Injection Practices
Unit 7 : Use of Equipments