3.0 Introduction

In the previous unit we discussed about checking temperature, pulse and respiration. In this unit, we will learn about Bandages, Slings, Splints and Binder and how and when to use them. We will also discuss safety and precautions to be taken care while using bandages, slings, splints and binders.

We usually come across injuries from minor scratch to big wounds and for speedy healing we put bandage on the injury. Sometimes someone mentions to use sling or a binder. In some situations splints are used. In this unit, we will discuss the use of these materials and how to use them while giving first aid care in emergency.

3.1 Objectives

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

- assess the requirement for Bandages/Splint/Slings and Binder;
- perform Bandaging;
- apply Slings; and
- demonstrate use of splints and binders.
3.2 RECOGNIZING BANDAGES/SLINGS/SPLINTS/BINDERS

In case of any injury, role of Bandages, Slings, Splints and Binder is very important. The injury may cause bleeding, fracture or dislocation (bone is displaced from its joint) and depending on the need and condition of the victim, you can assess and recognise what should be applied and where. In this section, we will discuss how to recognize bandages, slings, splints and binder.

Purposes

The main reason to recognize the types of bandages, slings, splints and binder is to be aware of these materials and make use of them when need arises. When you will be familiar to these items, you will use them effectively in emergency.

Articles required

You will require a First Aid Box or packets of Bandages, splint or sling and binder.

Procedure

Step 1  
First step is to recognize bandages. Bandages which are used are generally of two types: Roller Bandages which are long and rolled up (Fig. 3.1) or Triangular Bandages whose shape is a triangle (Fig. 3.2). Use of both of these should be known. You must also have an idea of improvising local supplies to act as Bandages in Emergencies. (Refer Unit 6 of this Block for Improvisation).

Skills: You must be able to recognize various bandages as you see them. Their use and application is discussed in later sections of this unit.

Fig. 3.1 : Roller Bandage  
Fig. 3.2: Triangular Bandage

Step 2  
To recognize slings, you need to understand that they are simply materials which help to provide support to the area of injury. They are available as per requirement either commercially (Fig. 3.3) or can be made from triangular bandage if and when required (Fig. 3.4).

Skills: You must be able to recognize slings or make the sling as per availability of articles.
Step 3  
Splints are wooden boards (Fig. 3.5). They can also be plastic/cardboard/metal. Commercial Splints are also present. Improvisation for use as splints can be done as per situation (Fig 3.6).

Step 4  
Binders or tourniquet are recognized as material which is elastic and can be fixed at an area. They are commercially available or can also be made from material available to you (Fig. 3.7).

Thus, in the above steps we learnt how to recognize bandages, slings, splints and binder. In the next section we will talk about use of these articles in emergencies. So, lets continue.

Note:

- Bandages are used for covering, stabilizing and protecting the wound/injury.
- Slings are used to provide support and restrict movement of the injured limb.
- Splints are used for immobilizing the broken bone(s).
- Binders are used for stopping blood circulation of the body part to stop bleeding.
3.3 ASSESSING THE VICTIM FOR BANDAGING/SLINGS/SPLINTS/BINDERS

You already know that in emergency you will observe and assess the scene. Then, call for help/assistance. Once it is safe, the next step is to assess the victim and provide first aid. If you find any injury/wound/fracture and so on you will have to bandage, apply sling, splint and binder as per your assessment of the victim and the situation. We will discuss how to do this in this section.

**Purposes**

The main reason to do this procedure is to assess the victim, provide first aid and find out which articles are to be required for use in emergency.

**Articles required**

When you have to learn how to do bandaging, use sling, splint and binder, you will need:

1. An adult volunteer to act as victim
2. Case scenario where the use of these articles is required e.g. wound or injury of hind arm with suspected fracture, heavy bleeding from upper leg.
3. The standard articles required are roller bandages of various sizes, triangular bandages, wooden or commercial splints, sticks, scissors, safety pins, adhesive tape etc.

In case of emergency the improvised articles/material or any clean material like towel, handkerchief, scarf, polyethylene sheet can be used as bandage/slings. Splints can be improvised by using any stick, shoe, box, roll of newspapers etc. Binders can be made with the help of rope, wire etc.

**Procedure**

**Step 1**  Ask the volunteer to act as victim. Ask him/her sit comfortably.

**Step 2**  Conduct assessment as per flow diagram given below
**Skills:** Perform Primary assessment and monitor any bleeding, injury, wound and check for fracture. Check to find out the requirement of the situation.

**Step 3** In case of injury, do dressing and use bandage to cover the dressing.

**Skills:** Bandaging has been discussed in detail in Section 3.4. Dressing has been discussed in detail in Unit 11 of this block.

**Step 4** If the victim complains of pain/sprain/strain and you want to immobilize the part, use sling.

**Skills:** Slings has been discussed in detail in Section 3.5.

**Step 5** If your assessment shows that fracture has occurred, you will splint the limb.

**Skills:** Splints has been discussed in detail in Section 3.6. Fracture had been discussed in Unit 3 of Block 3 of Theory Course.

**Step 6** If there is heavy bleeding, you can use binder.

**Skills:** Binder has been discussed in detail in Section 3.7.

**Step 7** Record and Report the findings.

**Skills:** Documentation form can be filled or verbal report can be given to medical personnel’s about what you did in the situation.

Therefore, when using bandage, slings, splints and binder, one must be aware where to use them. The procedures to apply bandage, sling, splint and binder are very important for the comfort and quick healing of the injured person. Now we will learn about each of these separately and in detail in upcoming sections.

### 3.4 BANDAGING

Every now and then we come across injuries and for quick healing we need to bandage the injured part. A proper bandaging can take away a lot of pain and keep the infection away for speedy healing. In this section we will learn about bandages and how to bandage.

#### 3.4.1 Concept and Purposes

**Definition**

Bandage is a piece of material (usually cotton) in various sizes and shapes with the purpose of covering the dressing, placed over injury or wound.

**Types of Bandages**

There are different types of bandages based on their shape and usage as enumerated below:
1. **Gauze or Roller Bandage**

It is a rolled strip of gauze or other material having width ranging from 1 inch to 6 inches. It is the most commonly used bandage (Fig. 3.8). The rolled portion is called head and unrolled portion is tail.

![Fig. 3.8: Roller Bandages](image)

2. **Triangular or Cravat Bandage**

It is a piece of 38 square inch cloth cut diagonally to make two bandages of triangle shape. It is right angled triangle in shape and used to make sling or used as bandage. It can cover big portion very quickly so it is very useful in first aid (Fig. 3.9). The pointed part is the apex or the point on the top and opposite to it is the base.

![Fig. 3.9: Triangular Bandage](image)

3. **Adhesive Bandage/Sterilized Bandage**

It is a bandage with attached dressing to be used on injuries. It has adhesive coated surface so it sticks to the skin and remains in place. It comes in different shapes and sizes. E.g. Band-aid (Fig. 3.10).

![Fig. 3.10: Adhesive Bandages](image)

4. **Constriction Bandage**

These bandages have elasticity in them so they are used to put pressure on the injured site for restricting joint movement, control bleeding, reducing swelling etc. e.g. Crepe Bandage for sprain/strains (Fig. 3.11).
5. **Improvised or Emergency Bandage**

In case of emergency and non-availability of actual bandage, any material which is clean can be used as a bandage e.g. handkerchief, scarf, shirt, ribbon, plastic film etc. (Fig. 3.12 a and b).

![Fig. 3.12 (a): Improvised Bandage made cloth, (b) Bandage made from T-shirt](image)

**Note:**
Triangular bandage can be used to cover small as well as very large part of the body in no time. This bandage is very important for first aid since with this covering/supporting any part of the body is very easy and quick.

**Methods of applying Bandage**

1. **Applying Roller Bandage:**

   Roller bandage is applied by 3 main methods depending on the location of the injury:

   **Circular/Spiral:** In this, roller bandage is applied in circular turns or spirally around injured part with each next turn covering 2/3 portion of the previous turn. It is used where injured part is of almost same thickness like finger, forearm, lower part of limb (Fig. 3.13).
**Reverse spiral:** In this roller bandage is started with spiral turn. Then it is reversed on itself with half twisting by placing thumb on upper edge of bandage. This is continued with next reverse turn which covers 2/3rd of the previous turn till the dressing or wound area gets covered. e.g. Calf of leg and thigh.

![Fig. 3.14: Reverse spiral method](image)

**Figure of Eight:** In this roller bandage have successive folds over and around each other like the numeric figure Eight. It is applied at the joints to avoid slipping and facilitate movement (Fig. 3.15).

![Fig. 3.15: Figure of Eight method](image)

**Special areas:** For eye, ear, jaw and head will be dealt in Unit 1 and Unit 2 of Practical Block 2.

2. **Applying Triangular Bandage:**

Triangular bandage is applied by these methods depending on the location of the injury:

**Open:** In the open form e.g. for sling to support an upper body injury (Fig. 3.16).

![Fig. 3.16: Applying sling](image)

**Broad-fold bandage:** As a broad-fold bandage with the apex folded down to the base twice (Fig. 3.17). Also called on-fold cravat.
Narrow-fold bandage: As a narrow-fold bandage with the broad-fold bandage folded in half (Fig. 3.17). Also called as two-fold cravat.

Pad: As a folded pad after the ends of the narrow-fold bandage. **Ring pad** is used on the wound when something is protruding out of the wound or has objects impaled in it, e.g. object like stick, screw driver, bone coming out and so on. After placing the ring pad on wound bandaging is done (Fig. 3.18).

**Fig. 3.17: Folds of Triangular Bandage**

**Fig. 3.18: Ring Pad made out of Triangular Bandage**

**Purposes**

- Fix medical device like dressing/splint in its place.
- Support the injured part of the body e.g. slings.
- Reduce the movement of the injured part e.g. constriction bandage/slings.
- Constrict the part to reduce the blood flow/swelling e.g. constriction bandage.

**3.4.2 Procedure**

When applying the bandage, you need to follow these steps:

**Articles Required**

The required articles are:

1. An adult volunteer to act as victim

2. Case scenario where the use of these articles is required e.g. injury of hind arm with suspected fracture, heavy bleeding from upper leg.

3. The standard articles required are roller bandages, triangular bandages, Adhesive/Sterilized bandages, scissors, safety pins, adhesive tape, Antiseptic lotion, cotton, disposable hand gloves, waste bag as required, etc.
Improvised articles can be used such as any clean material like scarf, handkerchief, towel, polythene bag, thread, rope, water etc.

**Steps of Procedure for applying Roller Bandage**

**Step 1**  
Wash the hands and put on gloves if required.

**Step 2**  
Assess the victim (as given in section 3.3 of this unit for requirement of bandage). Face the victim.

**Skills:** When bandage is applied stand facing the victim so that you can see the wound and apply bandage easily.

**Step 3**  
Hold the bandage in the hand opposite to the side injured or affected (Fig. 3.19).

**Skills:** When bandage is applied hold the head of bandage in right hand if the injury is on left leg and in left hand if the injury is in right side of the body as per proper body mechanics.

**Step 4**  
Hold the bandage in a way so that outer side is applied to the skin (Fig. 3.19).

**Fig. 3.19: Applying Roller Bandage**

**Step 5**  
Fix the bandage with two rounds before moving further (Fig. 3.20).

**Skills:** This will help secure the bandage when starting.

**Fig. 3.20: Secure with two initial rounds**

**Step 6**  
Continue by doing the pattern/method of bandaging as required.

**Step 7**  
For Circular/Spiral bandaging, continue to make series of circular/spiral turns. Each turn covers 2/3rd of previous turn. Refer Fig. 3.13.
Step 8  For Reverse Spiral Bandaging, place thumb on upper edge of bandage. Hold firmly. Now, turn the bandage downward over the thumb to lower edge of previous turn. Cover about \(2/3\)rd of the previous turn and continue. Refer Fig. 3.14.

Step 9  For Figure of eight, carry out spiral turns up and down to cover \(2/3\)rd of previous one (Fig. 3.21).

![Fig. 3.21: Figure of eight of ankle](image)

Step 10  Finish the bandaging by securing the end of the bandage with reef knot or adhesive tape, safety pins etc.

Step 11  Record and Report your procedure.

Skills: Finish by use of Reef Knot. In making reef knot, also called as square or surgeon knot, you have to wrap the left end of the bandage over and then under the right end to start the knot. Then, with the ends you get, wrap the right end over and under the left end to complete the knot. Pull the knot tightly from both sides to ensure that it will lie flat (Fig. 3.32).

![Fig. 3.22](image)

Steps of Procedure for applying Triangular Bandage

Step 1  Wash the hands and put on gloves if required.

Step 2  Assess the victim. Face the victim.

Step 3  Fold the bandage base to hide the uneven lining (Fig. 3.23).

Skills: This will help give a neat appearance to the bandage.

![Fig. 3.23: Fold the uneven part of bandage inside](image)
Step 4   Fold the bandage as desired viz. Open, broad, narrow or ring bandage or pad. Refer Fig. 3.17 and 3.18.

Skills: *The specific use of bandage as per body part involved is given in Unit 1 and Unit 2 of Block 2 of this Practical Course. Kindly refer the same.*

Step 5   Finish the bandaging by securing the end of the bandage with reef knot or adhesive tape, safety pins.

Step 6   Record and Report your procedure.

3.4.3 Safety and Precautions

Some of the precautions that you must take care while bandaging are as follows:

- Use bandage of suitable width and length. E.g for fingers and toes use narrow bandage while for trunk and shoulder use broad bandage. The measurements are given here for your reference.
  - Fingers and Toes : 1 inch (2.5 cm)
  - Hand : 2 inches (5 cm)
  - Head, foot and arm : 2 to 2.5 inches (5-6 cm)
  - Leg and thigh : 3 to 3.5 inches (7.5-9 cm)
  - Trunk, breast, shoulder : 4 to 6 inches (10-15 cm)

- Bandage firmly with use of adequate force but neither too tight (to disturb circulation) nor too loose (to come out easily).

- Keep your hands clean and wear gloves particularly while dealing with wounds.

- Always secure the ends with reef knot.

- Always apply bandage using method appropriate as per the limb or joint involved and item available.

- Hold the bandage in right hand if you have to bandage the left side and to bandage the right side, hold bandage in the left hand.

- Improvise as per need.

- Always use dressing/padding over the wound under the bandage.

- Always apply outer side of the bandage roll in contact with skin.

- Always move down to up and inward to outward of the body part.

- Keep a watch on bandages for circulation or bleeding by checking the toes/fingers for blue colour which means lack or reduction of blood supply.

- Don’t start or end over wound, bony prominence, joints or tender areas.

- Make the pattern you are making lie on the outer side and in a single line.

- Never open more than 4 inches of the bandage roll while applying.
Never put knot directly on the wound.

Try to do proper bandaging in the first go. If you have to untie the bandage and renew it, it can waste lot of your and the victims time.

Thus, in this section we learnt about the use and procedure of bandaging. In the next section we will discuss about use and application of slings.

**Check Your Progress 1**

1. Fill in the Blanks:
   a. The most common bandage to be used in emergency is ......................... bandage.
   b. The bandage to be used for sprains is ......................
   c. The ......................... is the method of applying roller bandage on knee.
   d. Triangular bandage helps to form a ......................
   e. ...................... pad is used to stabilize objects protruding from the wound site.

2. True or False:
   a. Always hold the head end of bandage in your hand opposite to the part of body where bandage is to be applied.
      True/False ............... 
   b. Tie the reef knot over the joint in figure of eight.
      True/False ............... 
   c. Four inches wide roller bandage should be used for leg.
      True/False ............... 
   d. First aid provider must be skilful in bandaging.
      True/False ............... 

3.5 SLINGS

In case of injury to the bones/joints/wounds, where there is an urgent need to give support and restrict the movement of the injured part, sling is a supportive bandage to the injured limb mainly upper limbs.

3.5.1 Concept and Purposes

**Definition**

Sling is the triangular bandage which is used to support and rest the effected limb especially arms, forearms and hand to prevent movement and pull that may occur due to injuries on the chest, shoulder or neck.

**Types of Slings**

The various types of slings are as follows:
1. **Arm or Big sling:** It is applied when upper or forearm is injured. It can also be used for injury/fracture to upper arm, forearm or wrist (Fig. 3.24).

![Fig. 3.24: Arm Sling](image1)

2. **St. John or Triangular sling:** It is used in case of collar bone fracture where you need to keep the hand raised high up for giving relief from pain (Fig. 3.25). It is also called high arm sling.

![Fig. 3.25: Triangular Sling](image2)

3. **Collar-and-Cuff sling:** It is used when forearm or palm or elbows have been injured and you want to immobilize it. These are also used if the limb is to be kept raised e.g. in case of bleeding (Fig. 3.26). This sling should not be used when wrist is injured for which arm/big sling can be used.

![Fig. 3.26: Collar and Cuff sling](image3)

**Purposes**

- Give support to the injured part.
- Restrict the movement of the injured part.
- Add to the comfort of the casualty.
- Inhibit further injury.

### 3.5.2 Procedure, Safety and Precautions

When applying slings, you need to follow these steps:

**Articles Required**

The required articles are:

1. An adult volunteer to act as victim.
2. Case scenario where the use of these articles is required e.g. injury of arm (for arm sling), collar bone fracture (for triangular sling) and elbow injury (for cuff and collar sling).

3. The Standard articles include customized slings and triangular bandages. Improvised articles include scarves, big cloth or even shirt/coat the victim is wearing can be used.

Steps of Procedure for applying Arm Sling

Step 1  Wash the hands and put on gloves if required.

Step 2  Assess the victim as per section 3.3 of this unit for requirement of sling. Face the victim.

Step 3  Support the injured forearm parallel to the ground with the wrist kept little higher than the elbow (Fig. 3.27).

**Skills:**  This will help to give support to injured/fractured limb and maintain its position.

Step 4  Apply dressing at the injured site. (This is dealt in Unit 11 of this Block)

Step 5  Place an open triangular bandage between the body and the arm, with its apex/tip towards the elbow and bottom corner over the shoulder (Fig. 3.37).

![Fig. 3.27: Supporting the arm and placing the triangular bandage](image)

Step 6  Extend the lower point of the bandage over the shoulder on the uninjured side (Fig. 3.28).

![Fig. 3.28: Extending the lower point to shoulder on uninjured side](image)
Step 7  Tie both the corners firmly with a reef knot on the collar bone/shoulder bone of the uninjured side.

**Skills:** This will help to reduce weight on the injured side and provide a firm elevation and support.

Step 8  Ensure the elbow is secured by folding the excess bandage over the elbow and securing with a safety pin (Fig. 3.29).

![Fig. 3.29: Secure elbow with safety pin](image)

**Skills:** This will provide neat appearance to the bandage.

Step 9  See to it that the finger tips must be visible out of the sling to observe blood circulation.

Step 10  Record and Report your procedure.

**Steps of Procedure for applying Triangular Sling**

Step 1  Wash the hands and put on gloves if required.

Step 2  Face the victim.

Step 3  Put a thick pad/dressing on the injured area. In case of fracture, place a thick padding between arm and chest.

**Skills:** This will help to provide comfort.

Step 4  Support the victims arm with the elbow beside the body and the hand extended towards the uninjured shoulder, palm on breast bone (sternum) (Fig. 3.30).

![Fig. 3.30 : Position of arm for triangular sling](image)

Step 5  Place an opened triangular bandage over the forearm and hand with the apex of bandage towards elbow (Fig. 3.30).

Step 6  Extend the upper point of the bandage over the uninjured shoulder (Fig. 3.30).
Step 7 Tuck the lower part of the bandage under the injured arm, bring it under the elbow and around the back and extend the lower point up to meet the upper point at the shoulder.

**Skills:** *This should be done with care and by supporting the elbow and the arm the whole time.*

Step 8 Tie firmly with a reef knot in collar bone pit of uninjured side. (Fig. 3.31)

**Fig. 3.31: Tying reef knot on uninjured side**

Step 9 Secure the elbow by folding the excess material and applying a safety pin, ensure that the sling is tucked under the arm giving firm support (Fig. 3.31).

Step 10 Record and Report your procedure.

**Steps of Procedure for applying Cuff and Collar Sling**

Step 1 Wash the hands and put on gloves if required.

Step 2 Face the victim.

Step 3 Allow the elbow to hang naturally at the side and place the hand extended towards the shoulder on the uninjured side. Refer Fig. 3.30 for position on the hand.

Step 4 Form a clove hitch with narrow triangular bandage and slide the clove hitch over the hand and gently pull it to secure the wrist.

**Skills:** *Clove hitch is made from narrow triangular bandage. To make this, two loops of the bandage are made and put on top of one another. The Front loop is laid behind the back loop without turning (Fig. 3.32). Pull both the loops after this.*

1. Hold the bandage
2. Make two loops
3. Place loops on one another without turning
4. Pulling loops

**Fig. 3.32: Tying Clove Hitch Knot**
**Step 5**  
Extend the points of the bandage to either side of the neck and tie firmly with a reef knot in the collar bone/shoulder bone of uninjured side (Fig. 3.33).

![Fig. 3.33: Reef knot on uninjured side](image)

**Step 6**  
Allow the arm to hang comfortably.

**Step 7**  
Record and Report your procedure.

**Safety and Precautions**

It is important to keep in mind the following things for safety:

- Make sure that sling is properly in place and neither too tight nor loose.
- Keep an eye on the blood circulation of the injured part.
- Make sure that the injured part is moved to the minimum.

Thus, in this section we discussed about slings. Now let us proceed for discussion about splints.

### 3.6 SPLINTS

Splint is a rigid device used to immobilize or support broken bone(s). It is wooden but now splints come in various materials and types. Let us discuss the use and importance of splints.

#### 3.6.1 Concept and Purposes

**Definition**

Splints are devices used for immobilization of the broken bone.

**Types of Splints**

The various types of Splints are:

1. **Wooden:** These are wooden plates/shapes of various sizes. They are most commonly used splints. It must be long enough to cover joint above and below the injured bone. To secure splint at its place it must be tied with bandages at the following locations – first above the fracture, second below the fracture, third at the joint above and fourth at the joint below the fracture. These bandages help to reduce movement of the joints and fractured bone. All the knots must be on splint not on the injured side. It should be sufficiently tight to stop any movement (Fig. 3.34).
2. **Vacuum:** It is a device like a small *vacuum mattress* that is used in emergency as a temporary *splint* (Fig. 3.35 a and b).

   When air is pushed into it, it expands and covers up around the injured body part just like the plaster. Advantages of the vacuum splint include the ability to provide support, relieve pressure at the injury site and taking the shape of any limb. The limb can also be *X-rayed* with this splint in place.

3. **Buddy wrapping or buddy taping:** It is bandaging a damaged (particularly a fractured) finger or toe together with a healthy one for support (Fig. 3.36). So this finger or toe acts as a splint.

   It can be used for limbs in emergency. The healthy part acts as a splint to keep the damaged one in a natural position for healing. This method is also used for *sprains, dislocations* and other injuries too.

**Purpose**

The purpose of splint is to immobilize and support the broken bone. It is used till the permanent casting or immobilization of the bone is done.

### 3.6.2 Procedure, Safety and Precautions

When applying splints, you need to follow these steps:

**Articles Required**

The required articles are:
1. An adult volunteer to act as victim.

2. Case scenario where the use of splints is required e.g. fracture of leg, fracture of arm.

3. Wooden splints, Vacuum splints (If available), Adhesive tapes, Bandages-Roller or triangular.

Also in the absence of standard splints any stick, shoe, box, roll of newspapers, umberala, cardboard etc. can be used. The improvised splint can be fixed with rope, cloth, wire etc. if bandage is not available.

**Steps of Procedure for applying Splint**

**Step 1** Wash the hands and put on gloves if required.

**Step 2** Assess the victim and his injury for requirement of splint (as given section 3.3 of this unit). Call the ambulance.

**Skills:** Check for bleeding, fracture, wound present.

**Step 3** In case the victim requires splinting, gather the necessary items for use.

**Skills:** All articles should be available. Also take help from the bystanders or other people who are willing to help or otherwise are present at the site.

**Step 4** Put the wooden splint on either side of fractured area or such that it fully supports they area (Fig. 3.37 a and b).

**Skills:** The splint should be of appropriate length according to body area involved. It should be such that it provides support. In case of upper limb, splint can be tied on lower side to provide support and immobilization.

**Fig. 3.37(a): Two Wooden Splints on either side**

**Fig. 3.37(b): Single splint supporting the hind arm**

**Step 5** Put padding or cotton between the limb and the splint.

**Skills:** Padding can be of cotton, cloth or gauze pads. It is important to reduce discomfort and friction between the extremity and the splint.

**Step 6** Tie a bandage over the splint (roller or triangular) above the injured site to hold the splint together or with the limb affected (Fig. 3.38).
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**Step 7** Tie another bandage below the injured site for holding splints together (Fig. 3.38).

**Step 8** Tie the third bandage on the joint above the injured site (Fig. 3.38).

**Step 9** Tie the fourth bandage on the joint below the injured site (Fig. 3.38).

**Skills:** This is important to immobilize the joints and the limb effected.

**Step 10** Tie more bandages if and as required for securing the splint.

**Step 11** Wash hands.

**Step 12** Record and Report this procedure.

**Safety and Precautions**

It is important to keep in mind the following things for safety:

- Splint must be rigid enough to keep the injured part straight and restrict movement.
- Splint must be long enough to cover joints above and below the injury.
- Splint must be padded to avoid bruising or hurting.
- Splint must be fixed by putting tape, braces or bandage as: one each above and below the injury, one at the joint above the injury and one at the joint below the injury. If bone is longer you can use extra bandage as and when required.
- Reef knot should be put on the splint. The knots should come on the splint or on the sides but not over the injured/fractured part.

Hence, in this section we have discussed the use and procedure for application of splint. We have discussed the use of splints in various fractures in Unit 1 and 2 of Practical Block 2 of this programme, which will help you to develop better understanding into use of splint in specific fractures. Now we will proceed to the last section of this practical on Binders i.e. Tourniquet.

### 3.7 Binder

Binder also called Tourniquet is a bandage which is used as a constricting or compressing device to control blood circulation for a period of time. Let us see this in detail.
3.7.1 Concept and Purposes

Definition
Binder or Tourniquet is a tool which helps to compress blood vessel and reduce or cut off circulation below the point where it is applied so that blood is not lost if an injury or cut has occurred which is bleeding heavily.

Reason for application
In case bleeding occurs, we need to apply pressure over the area. But when the bleeding does not stop even after applying the pressure, the tourniquet is applied as a last tool to cut off the blood and reduce loss of blood. The application of tourniquet has many legal implications, so one should be sure enough that it is required and safety precautions must be followed properly. So, use it when the matter is of life and death and the person may die if the bleeding is not controlled immediately due to shock. Moreover, apply it when the risk to life is more than the danger of losing a limb.

Placing the tourniquet
Place a tourniquet about two inches above the bleeding wound. Change the position if the old position is ineffective. Make sure the tourniquet is applied upstream; i.e. between the wound and the heart to cut off blood supply.

Application of tourniquet
Once applied, the binder must be released after every 12-15 minutes and reapplied after 1 minute, till bleeding stops. Loosen the tourniquet at least 1 hour (2 is better) after the bleeding is completely stopped by the tourniquet. If no more blood flow occurs, then start treating the wound and do not apply the tourniquet again. If the bleeding does not stop, put the tourniquet back on and do not remove it again.

Types
The types of tourniquets are as follows:

1. Surgical tourniquets
Surgical tourniquets prevent blood flow to a limb and help doctor in operations (Fig. 3.39).

Fig. 3.39: Surgical Tourniquet

2. Pneumatic Tourniquets
They have an inflatable cuff, a compressed gas source and an instrument to monitor and control pressure (Fig. 3.40).
3. Emergency or Primitive Binders

It is the emergency binder used to stop circulation of the blood beyond its point of application. It can be made with any available material.

4. Commercial Binder

This is available commercially and must be a part of first aid box (Fig. 3.41).

![Fig. 3.41: Tourniquet](image)

### Purposes

The purpose of splint is to stop blood circulation below its point of application. It is used in surgery or in extreme cases of severe bleeding where blood loss is high and can’t be controlled otherwise.

<table>
<thead>
<tr>
<th>Remember:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use Tourniquet only when the risk of losing life due to bleeding is higher than the risk of losing the limb. So, be careful in assessment and use of tourniquet.</td>
</tr>
</tbody>
</table>

### 3.7.2 Procedure, Safety and Precautions

When applying binders, you need to follow these steps:

#### Articles Required

1. An adult volunteer to act as victim
2. Case scenario where the use of binders is required e.g. heavy bleeding.
3. Tourniquets, Gloves.

In the absence of standard binders; constriction bandage, bandages, belts, cloth strip can be used and to tight/twist stick, pen etc. can be used.

#### Procedure

**Step 1** Wash the hands and put on gloves if required.

**Step 2** Assess the victim and his injury for requirement of binder (as per section 3.3 of this unit).
**Bandaging/Splints/Slings/Binder**

**Skills:** Check for bleeding. In case there is heavy bleeding apply dressing and bandage and if this does not help apply tourniquet.

**Step 3** In case the victim requires tourniquet, gather the necessary items for use.

**Skills:** All articles should be available. Also take help from the bystanders or other people who are willing to help or otherwise are present at the site.

**Step 4** Put the tourniquet in place at site just above the site of bleeding (Fig. 3.42). Apply at least 2 inches above the site of bleeding.

![Fig. 3.42: Apply tourniquet](image)

**Step 5** Keep observing.

**Step 6** Record the time on the tourniquet when it is applied.

**Step 7** Keep the record when tourniquet is loosened and re-applied.

**Safety and Precautions**

It is important to keep in mind the following things for safety:

- When trying to stop bleeding, use binder only when direct pressure does not reduce bleeding.

- Binders must be applied in life threatening condition only (severe bleeding).

- When applied correctly, they can be very painful.

- If loosely applied, the bleeding can increase.

- If opened too early, it can cause damage to the blood vessels and the bleeding can occur again.

- If they are left on for too long or applied tightly, it can damage the nerves, muscles, and blood vessels. Permanent damage can result if the tourniquet is left on for more than one to two hours.

- Always mark the time of binding if the victim is being shifted so that the binder may be released in time by the next caretaker.

- Do not apply binder on a joint.

- Do not apply it over clothing so it won’t slip. Apply directly over skin.

Tourniquets should be at least one to two inches wide (2.5-5 cm).
Smaller tourniquets should be used on the arm and thicker ones should be used on legs.

Tourniquets that are too narrow or thin can cut into the skin while very wide tourniquets need to be tied very tightly to be effective.

**Remember:**

Applying a tourniquet is risky and should only be done on an arm or a leg and when there is no other alternative to save a person’s life.

### Check Your Progress 2

1. **Fill in the Blanks:**
   a. ......................... Sling is used for forearm fracture.
   b. The use of one limb as a splint is called............... 
   c. Place a tourniquet about ...............inches above the wound.
   d. Loosen the tourniquet at least ...............after the bleeding has stopped.
   e. .................knot should be put on the splint.

2. **True and False:**
   a. Binder must be released after every 1 hour.  
      True/False ............
   b. Tourniquet is applied as a last tool to cut off the blood.  
      True/False ............
   c. Splint must be of one standard size.  
      True/False ............
   d. Reef knot of sling is to be tied on injured side.  
      True/False ............
   e. Tourniquet can be painful when applied correctly.  
      True/False ............

### 3.8 LET US SUM UP

Hence, it is clear that a first aid provider should have proper knowledge of handling injuries and for that one must have practical knowledge of bandages, dressings, splints and tourniquet. Injuries are inevitable and for protection, support, healing etc. bandages/dressings are very crucial. Similarly, sling, splint and binders are also useful in case of injuries, fractures and bleeding. Thus, in this unit we have learnt the procedure for bandaging, applying splint, sling and binder. In the next unit, we will discuss the procedure for moving and transporting the victim.
3.9 KEY WORDS

Scratch : Small area
Improvising : Make from what is available
Commercially : One which is available locally or commercially (in market)
Stabilizing : Becoming stable
Immobilizing : Reducing Movement
Healing : Process of making sound or healthy again
Diagonally : Oblique or cross-wise direction
Adhesive : Able to stick
Non availability : State of not being available
Previous : Last/existing or occurring before in time or order
Successive : Next/following something
Constrict : Make narrow
Folds : Wrap/Cover up
Knot : Fasten up
Supportive : Providing encouragement or emotional help
Parallel : Side by side/at 180 deg from each other
Visible : Able to be seen
Tuck : Fold or turn
Extended : Made larger
Rigid : Not flexible
Secure : Tight/Firm
Sufficiently : Enough or adequate
Sprain : Twist the ligaments
Dislocations : Abnormal separation in the joint
Compressing : Flatten by pressure
Operation : Surgery or procedure for removing defect or problem
Inflatable : Capable of being filled with air
Instrument : Device or tool to carry out a particular function
Early : Happening before the usual or expected time
Damage : Harm that effects or decreases normal function of something
Inevitable : Certain to happen which cannot be avoided

3.10 ANSWERS TO CHECK YOUR PROGRESS

Check Your Progress 1
1. a. Triangular  b. Crepe (constriction)  c. Figure of Eight  d. Sling  e. Ring
2. a. True  b. False  c. False  d. True

Check Your Progress 2
1. a. Collar and Cuff Sling  b. Buddy-wrapping  c. Two  d. 1 hour  e. Reef
2. a. False  b. True  c. False  d. False  e. True

3.11 ACTIVITIES

Activity 1
Select one of your friend. Imagine he/she has injury to fore-arm and knee. Perform roller bandaging. Practice all methods of bandaging learnt by you. Record in Log-Book.
(Supervised Activity)

Activity 2
Suppose one of your family member has a collar bone fracture. You know that for this fracture, you must use a sling. Demonstrate how you will make sling for this victim. Record in Log-Book
(Supervised Activity)

Activity 3
Practice splinting for a forearm fracture. Record in Log-Book.
(Supervised Activity)

Activity 4
One of your colleagues has severe bleeding after obtaining cut from a sharp instrument at work place. The blood is gushing out. What will you use to cut off the blood? Practice the use of this equipment. Record in Log-Book.
(Supervised Activity)

Activity 5
Practice bandanging in your self study group. Record in Log-Book.
(Self Activity)
3.12 REFERENCES

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