



**SNS COLLEGE OF ALLIED HEALTH SCIENCES**  
SNS Kalvi Nagar, Coimbatore - 35  
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# DEPARTMENT OF CARDIOPULMONARY PERFUSION CARE TECHNOLOGY

**COURSE NAME : INTRODUCTION TO SURGERY AND CSSD**

**3<sup>RD</sup> YEAR**

**TOPIC : TOURNIQUETS**



# TOURNIQUET



# DEFINITION



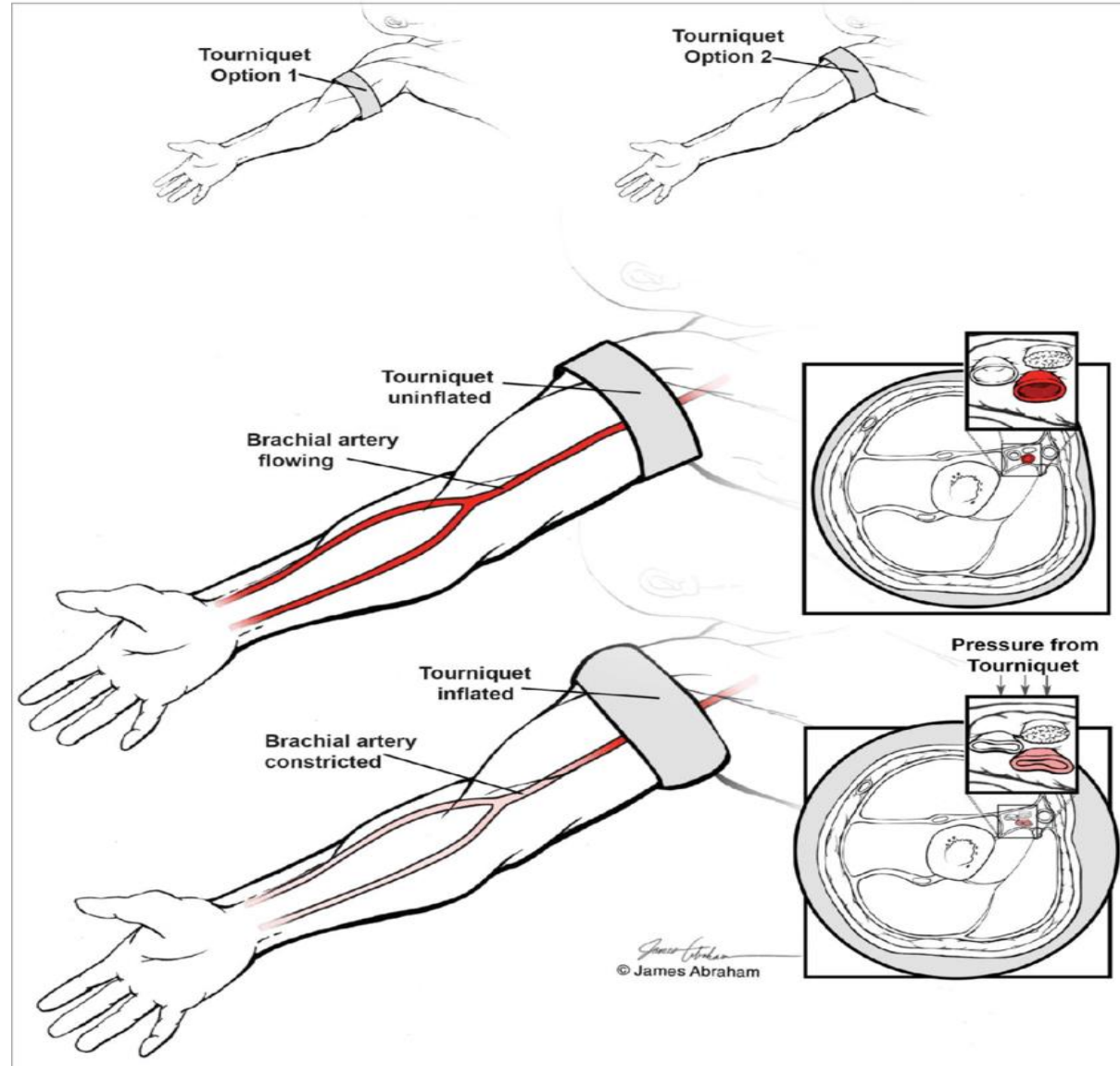
- A tourniquet is a constricting or compressing device used to control venous and arterial circulation to an extremity for a period of time.
- Pressure is applied circumferentially upon the skin and underlying tissues of a limb; this pressure is transferred to the walls of vessels, causing them to become temporarily occluded.
- Generally used in cannulation and to stop the flow of traumatic bleeding.



# Uses



- Tourniquets are to be used when major haemorrhage is present and standard control techniques will not be effective.
- Tourniquets must be placed proximal to the injury to control bleeding.
- Once a tourniquet have been placed, do not remove it. Even in the event of discomfort or pain to the patient, post placement.
- Apply constant pressure to the tourniquet until the bleeding slows or stops.
- Note the time in which tourniquet was placed.





# TYPES OF TOURNIQUET



- EMERGENCY TOURNIQUETS
- SURGICAL TOURNIQUETS

- **EMERGENCY TOURNIQUETS**; A tightly tied band applied around a limb (upper or lower) to prevent severe blood loss from limb trauma during emergency. It should be used as a last resort to control bleeding. Emergency tourniquets are widely used by the military to save combat.





- **SURGICAL TOURNIQUETS**; Surgical tourniquets enable the surgeons to work in a bloodless operative field by preventing blood flow to a limb and allow surgical procedures to be performed with improved accuracy, safety and speed. They have two basic designs :  
**Inflatable and Non - inflatable**



- **NONINFLATABLE (NONPNEUMATIC) TOURNIQUETS**

Noninflatable tourniquets are made of rubber or elastic cloth. Now a days their surgical use alone is limited because they have been replaced by modern torniquets system.



# PNEUMATIC TOURNIQUETS

- Pneumatic tourniquets are compressed gas to inflate a bladder or cuff to occlude or restrict blood flow.
- A regulating device on the tourniquet machine can control the amount of cuff pressure exerted on the limb.
- The pressure is provided by an electrically driven pump or by a central compressed air supply.





# Components of Pneumatic Tourniquets



The five basic components are:

- An inflatable cuff (bladder)
- A compressed gas source
- A pressure display
- A pressure regulator
- Connection tubing.



# COMPLICATIONS



Tourniquet related complications or side effects either **local** or **systemic**.

## LOCALIZED COMPLICATIONS

- **Nerve injuries**

The pathophysiologic cause of nerve injury following tourniquet is thought to be a combination of compression and ischemia. The prognosis of tourniquet induced nerve injuries is generally good-permanent deficits are rare, and most injuries will heal spontaneously within 6 months.



# MUSCLE INJURY



- Muscle injury following the application of the tourniquet is due to the combined effect of ischemia and mechanical deformation of the tissue.

# VASCULAR INJURY

- Direct vascular injury is uncommon complication of tourniquet use. it occurs most commonly in children, obese, elderly and patients with peripheral vascular disease



# SKIN INJURY



- Skin injuries are uncommon, but excessive tourniquet time or poorly placed tourniquets may result in cutaneous abrasions, blisters and even pressure necrosis. The highest risk of skin injury occurs in; Children, obese, elderly and patients with peripheral vascular disease.



# SYSTEMIC COMPLICATIONS



- **Cardiovascular effects**

Tourniquet deflation is a critical stage because it causes sudden drop in central venous pressure and mean arterial pressures. Cardiac arrests have been reported following cuff deflation.

- **Respiratory effects**

Respiratory changes are rare and mainly seen during the deflation of tourniquet



## Cerebral circulatory effects

- Patients with reduced intracranial compliance may be higher risk for adverse effects related to the increase in cerebral blood flow.
- Maintaining normocapnia can prevent this increase in cerebral blood flow during deflation.





## Hematological effects

- Tourniquet use induces changes in both coagulability and fibrinolysis.
- Tourniquet inflation during surgery is associated with a hypercoagulable state that is due to increased platelet aggregation and stimulation of coagulation factors caused by tissue damage and catecholamines released in response to pain from surgery and the tourniquet application



THANK YOU