PLASTER TECHNIQUES

MATERIALS AVAILABLE FOR PLASTER CAST

1. Plaster of Paris
2. Plaster of Paris with melamine
3. Materials which undergo polymerisation

   a. Water activated :- These are materials which are coated onto fabric or glass cloth to form bandages. Contact with water initiates polymerisation so that the bandages set. [Baycast, scotchcast, crystona]

   b. Non water activated :- The material can be coated onto fabric and be activated by a chemical solvent or by the addition of a catalyst. U.V. light of a wavelength not harmful to eyes , is the activating agent for one photosensitive resin (Lightcast)

4. Low temperature thermoplastics :- These are inert plastics which become pliable when heated and harden when cooled. These are mouldable but there use restricted to modifying casts or splints rather than re-using the material for different patients.

Among these POP is the most commonly used material for plaster techniques in orthopaedics

Plaster Of Paris- POP

1. POP has been used since early egyptian times for decorating walls, but it is being used for orthopaedics since the 1800s.
2. The Term Plaster of Paris originated from an accident to a house built on a deposit of gypsum, near Paris. The house burnt down. When rain fell on baked mud of the floors it was noted that footprints in mud set rock hard.
3. Casting properties of POP first observed when a house in paris built on gypsum burnt down. It was found after rain fell, that the footprints in the mud were caked upon drying .
4. Pop bandages were first used in fracture by Antonius Matthysen,A Dutch army surgeon in 1852.

Physiochemical Properties of POP

- To make plaster of paris , Gypsum is heated to 120 Degree to drive off water

$$CaSO_4.2H_2O \longrightarrow 2\,(CaSO_4.\tfrac{1}{2}H_2O) + 3H_2O$$

Gypsum POP

- POP is CaSO4.1/2 H2O in its anhydrous form impregnated in gauge which has been pre strengthened with starch or dextrose.
- Hydration of POP converts it from powder form to crystalline form which gives rise to caste. This is the process of setting and is an Exothermic reaction.

- ✓Setting time :- time taken to change from powder form to crystalline form.
- ✓Drying time :- time taken to change from crystalline form to anhydrous form.
- ✓Average setting time :- 3-9 minutes
- ✓Average drying time :- 24-72 hours
- ✓Factors decreasing setting time :-
    1. Hot water 2. Salt 3. Borax 4. Resin
- ✓Factors increasing setting time :-
    1. Cold water
    2. Sugar

Classification

❑ ***A. Based on :- Pattern of application***

- **Slab**- POP Encloses Half Of Circumference
- **Caste**- Pop Encloses Full Circumference Of Limb
- **Spica** – Included Trunk And More Limb
- **Splintage-** Which Can Allow Movement At Adjacent Joint

❑ ***B. Based on interposition of material***

- ***Unpadded***

  . No material is interposed b/w POP and skin

  . Practiced by Bohler

  . **Sir Charnley** recommended its use in therapy of **colle' s fracture , scaphoid and bennet fracture**

- ***Padded:*** Interposed material may be stockinette & wool or wool alone, this is in current practice.


Bilateral long leg hip spica cast
One and one-half hip spica cast
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INDICATIONS

1. To support Fractured bones, controlling movement of the fragments and the damaged tissues
2. To stabilise & rest joints in ligamentous injury.
3. Reduced dislocations
4. To ensure rest of tissue in Musculoskeletal infections.
5. Deformity correction
6. Severe soft tissue injury especially across joints
7. Post tendon repair
8. To support & immobilise joints and limbs Post operatively to augment internal fixation until healing has occurred
9. Inflammatory condition

ADVANTAGE	DISADVANTAGE
❑ Slower setting ❑ Infinitely mouldable when wet ❑ Cheap/ cost effective ❑ Non allergic ❑ Early moulded to different forms	❑ Heavy ❑ Messy ❑ Significantly weakened if cast is wet ❑ Partially radio opaque ❑ Radio opaque so may occlude # lines ❑ Easily breaks when comes in contact with water

Patient Assessment

- The surgeon should examine the limb and fracture site, documenting any skin lesions and neurovascular status
- Radiographs should also be reviewed thoroughly to determine fracture pattern
- The motions required to adequately reduce the fracture should be rehearsed ahead of commencement of procedure

Rules for guiding pop use

POP should be applied by the surgeon

Procedure requires an assistant

As a guide to appropriate size:

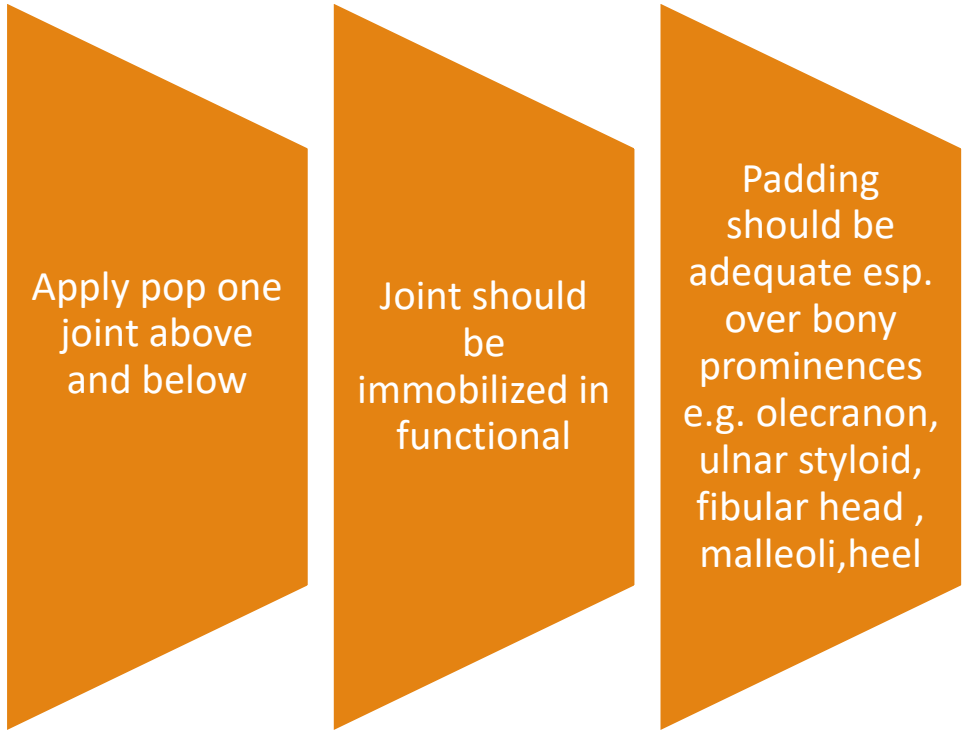
Arm and forearm : 6”

Wrist : 4”

Thumb and fingers: 3”

Thigh and leg: 8”

Ankle and foot: 6”



Rules for guiding POP use

- POP shouldn’t be too tight or too loose
- The plaster should be of uniform thickness through out
- Check neurovascular status after cast application
- Do check x-ray for acceptability of reduction

TECHNIQUE

PREPARE INJURED SITE

- Fracture is reduced and assistant holds limb in position of function, in a manner that it is unobtrusive to the application
- Stockinette is measured , extending 10 cm beyond determined limits of cast, and threaded over limb.

  Upper limbs: 2-3” ; lower limbs: 4”
- Wool padding is applied gently but snugly, starting from distal to proximal with 50% overlap b/w successive turns , extending 2-3 cm beyond edges of splint
- Padding is applied generally in two layers , but may be increased where are bony prominences or if significant swelling is anticipated
- Padding size: hand: 2” , Rest of upper limb : 3-4”, foot 3” , rest of lower limb: 4-6”

POP APPLICATION

- POP to be used is dipped completely with both hands into tepid or slightly warm water
- Prior to this , for slabs , the required length is measured and layered. On average 6-10 layers for upper limb and 12-16 layers for lower limb would suffice.
- It is then brought out and lightly squeezed to get rid of excess water.
- If a slab is to be created , the wet plaster is kept on a flat surface and the hand is run from one end to flat another to get rid of air bubbles which may cause slab to be brittle and the layers to separate when dry.

TECHNIQUE

- INDICATION MET
- MATERIALS
  - POP Bandage
  - Crepe bandage
  - Casting gloves
  - Basin of water
  - Padding
  - Sheets
  - Stockinette
  - Adhesive tape

Technique

- Above Elbow
  - An above elbow plaster cast or slab is applied from knuckles of hand (distal palmar crease anteriorly] and covers lower two thirds of arm
- Below Elbow
  - While distal extent is same as above, proximally the plaster ends below elbow crease.
- Above Knee
  - Distal extent is up to metatarsophalangeal joints and proximally it covers lower two thirds of thigh.
- Below Knee
  - Distal extent is same, proximal extent ends below knee.

POP Slabs and Cast

Attention:

1. Examine carefully to accurately diagnose injury and need for immobilization.
2. Decide whether to use slab or cast If limb very swollen or still swelling — use slab for support until swelling resolves/lessens, to prevent compartment syndrome.
3. Give pain relief if needed before positioning limb, putting on plaster.

Phase 1: examination and rehearsal

Phase 2: plastering

Phase 3: reduction and holding

Triple sequence in plaster application

Applying

1. Messy — protect person’s and your own clothes
2. Starts to set in 3–5 minutes.
3. Full strength in 24–48 hours, Helper holds limb in place for about 3 minutes, or until plaster cast/slab hard enough to support injury.
4. Warn person it will feel quite hot as it dries.
5. Handle plaster bandage with care, wet or dry, or it will be damaged and weak.
6. Use flat of your hands to shape and smooth plaster.
7. Do not use your fingers — you will make dents in plaster that press into person's flesh.
8. Never tip POP waste down drain. Line water container with plastic bag, drain off water after use, throw away waste

Water

Use wide bowls deep enough for plaster bandage to be fully submerged.

Water temperature will affect POP setting time.

Do not use hot water — plaster will set too fast, may cause thermal burns.

Do not use very cold water — plaster will set too slowly.

Use cool water — time to lay and mould plaster before it dries

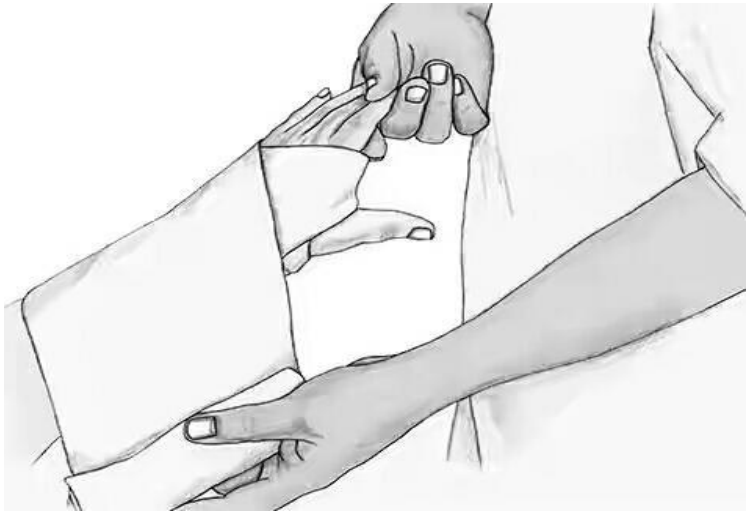
Protecting skin

Put on stockinette

- Do not use product containing elastic-it may Loosen or may cut in (constrict), cause swelling
- 3–5cm longer than area plaster will cover, to fold back over rough ends of plaster

Put on plaster wool:

- Lay gently around limb .
- Do not pull tight, make creases or ridges.
- Each layer should overlap previous by about half.
- Usually 2 layers for arm, 3–4 layers for leg
- Tear to shape around joints
- Use 2 extra layers to protect joints or prominent areas
- Bandage 5cm further than area plaster will cover, to fold back over rough ends.



Positioning limb: Make sure limb in right position before you start to plasterMoving limb after cast/slab is on makes creases in plaster that can damage skin, cause pressure areas

PLASTER OF PARIS SLABS

General principles:

1. Used to immobilize injured limb or suspected fracture during transport, while waiting for x-ray, until swelling lessens
2. Can be used as main support for soft tissue injuries
3. These procedures are just some of the basic methods

Application steps:

Stockinette and plaster wool

Slab

Crepe bandage

Attention:

Slabs need to be wide enough to fit around curve of limb like a shallow bowl, but not cover more than ⅔ of limb circumference

Before you wet Plaster Bandage :- Make sure

1. Right length — allow extra 10% as plaster bandage shrinks when wet
2. Shaped, e.g. fanned if needed
3. Person's limb is in correct position

Remember:

Use flat of your hands to shape and smooth plaster.

Do not use your fingers

Circulation and sensation — after putting on plaster check hands/fingers, feet/toes for color, warmth, sensation, movement, capillary refill, peripheral pulses.If any not normal — take off slab or cast.

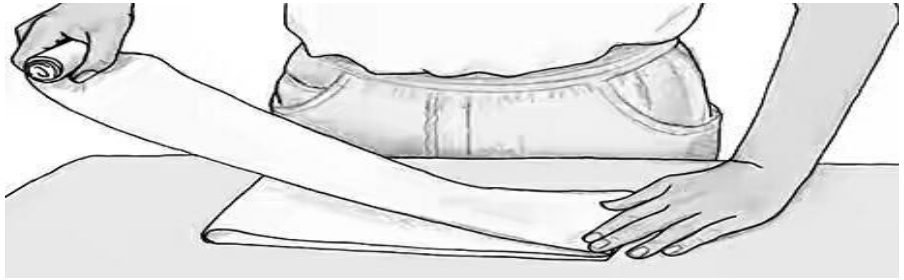
Measuring and cutting Slabs

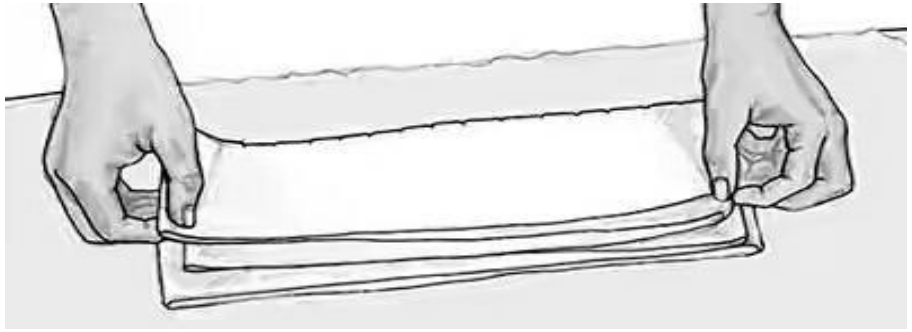
Measure length of slab with crepe bandage or tape measure

Use uninjured limb if injury very painful

Lay dry plaster bandage on flat surface to measured length, layer backwards and forwards until right number of layers

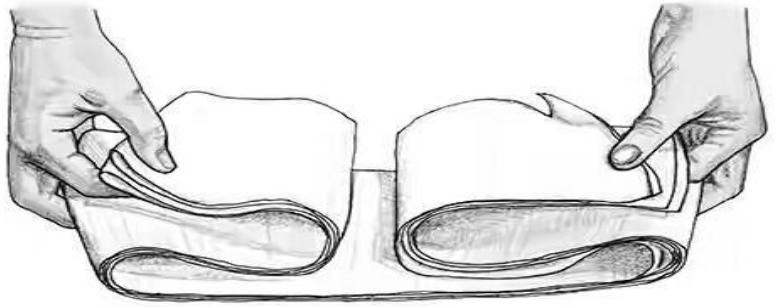
If plaster bandage not wide enough for limb — layers can be fanned out to widen slab, Weakens slab, so use extra layers

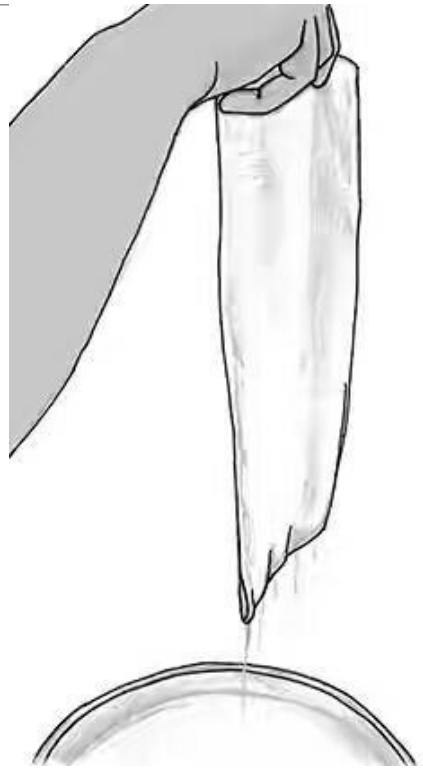




Wetting Slab

1. Lift slab by holding one looped end, lower into water until whole slab wet
2. Hold long slabs (eg full leg) in concertina shape so they fit in water bowl
3. Hold under water until bubbles stop
4. Lift slab out by holding upright
5. Run 2 fingers down length to squeeze out excess water





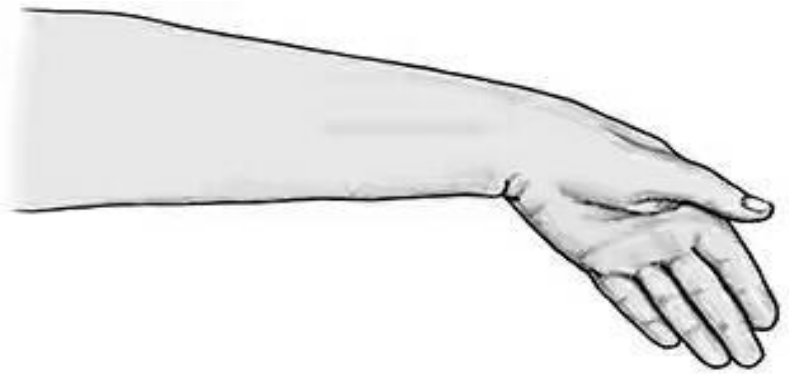
APPLYING

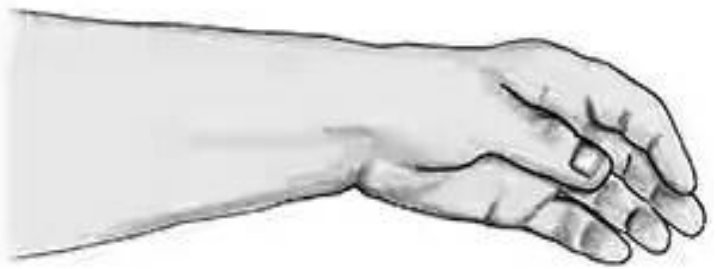
1. Check position of limb, fingers/toes.
2. Ask helper to hold, if needed Lay slab. Start at knuckles/wrist/toes (extremities) and go towards body
3. Use flat of your hands to shape around joints and smooth as you go. Smooth from fingers/hands or toes/feet towards body
4. Fold ends of stockinette and plaster wool back over ends of slab to protect skin
5. Bandage around slab and limb with damp crepe bandage to keep slab firmly in place. Bandage from end of limb/slab towards body
6. Hold limb in correct position for 3 minutes
7. Put arm in sling, keep leg lifted, e.g. on pillows
8. Clear away equipment
9. Check circulation and sensation
10. If slab being left in place as main treatment — tell person to undo bandage every day and rebandage firmly, or slab will get loose as swelling goes down
11. Organize specialist review

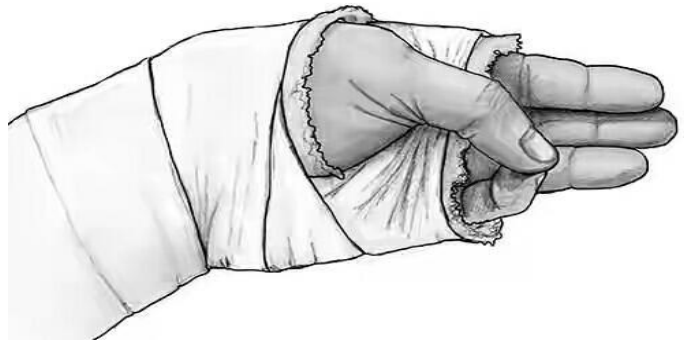
Lower arm slab — radial or universal Used for Colle's or distal forearm fractures.

Applying

1. Wet plaster, lay slab on upper forearm from base of knuckles to 3 finger widths below elbow crease
2. Displaced Colle's — ulna deviation and wrist flexion
3. Undisplaced Colle's — neutral position (10° wrist extension)
4. Use flat of your hands to shape and smooth as you go, over wrist and up arm.
5. Thumb joint moves freely — thumb and little finger can touch.
6. Metacarpophalangeal joints have full 90° flexion





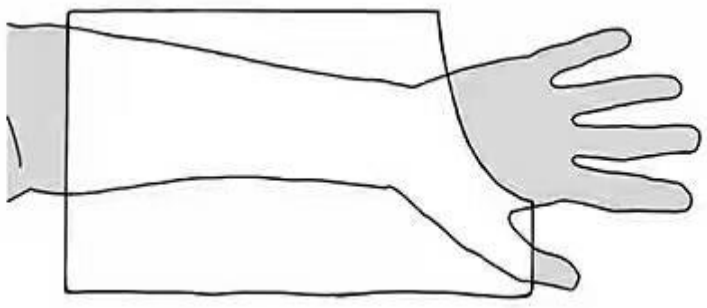


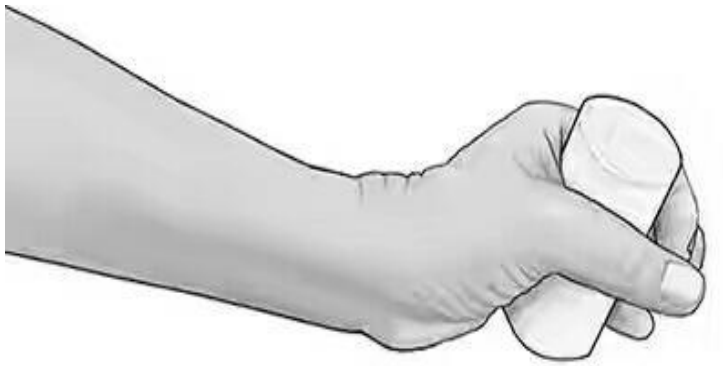
Lower arm Slab- Scaphoid

Used for fracture of scaphoid bone or first metacarpal that hasn't moved out of alignment (not displaced).Used for soft tissue injury to/around thumb.

What you do? Preparation :-

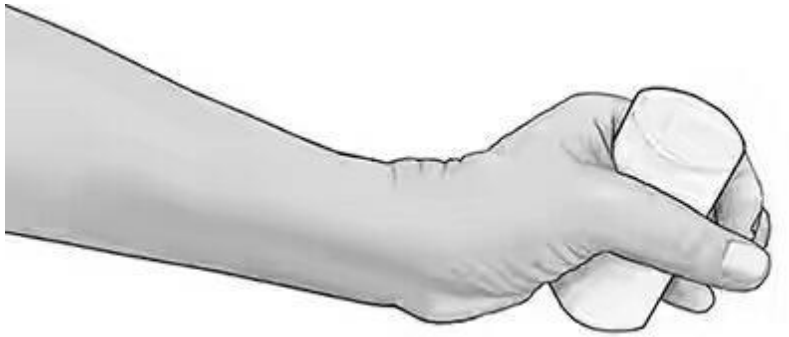
1. Person sits in comfortable chair or lies on examination couch, with arm as straight as possible
2. Put on stockinette and plaster wool — around thumb, across palm to middle of elbow
3. Put 2 extra layers of wool around thumb
4. Measure inside of arm from center of palm to 3 finger widths below crease of elbow — elbow joint must move freely
5. Make slab and cut to fit around thumb and clear knuckles — echidna template —Put arm and hand/fingers in line

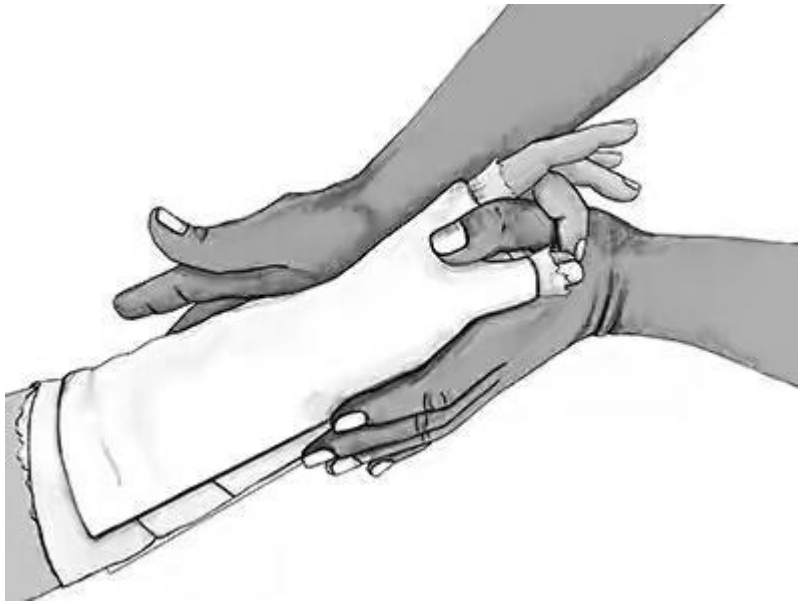




Applying :

1. Wet plaster, lay slab along thumb (radial) side of arm from just below middle joint of thumb and Centre of back of hand to 3 finger widths below elbow crease
2. Slight radial deviation, 20° wrist extension, thumb forward— **Glass holding position**.
3. Use flat of your hands to shape and smooth as you go, around thumb and up arm
4. Joint at base of thumb shouldn't move, but middle joint is free
5. Thumb and middle finger should just meet. Like holding a pen





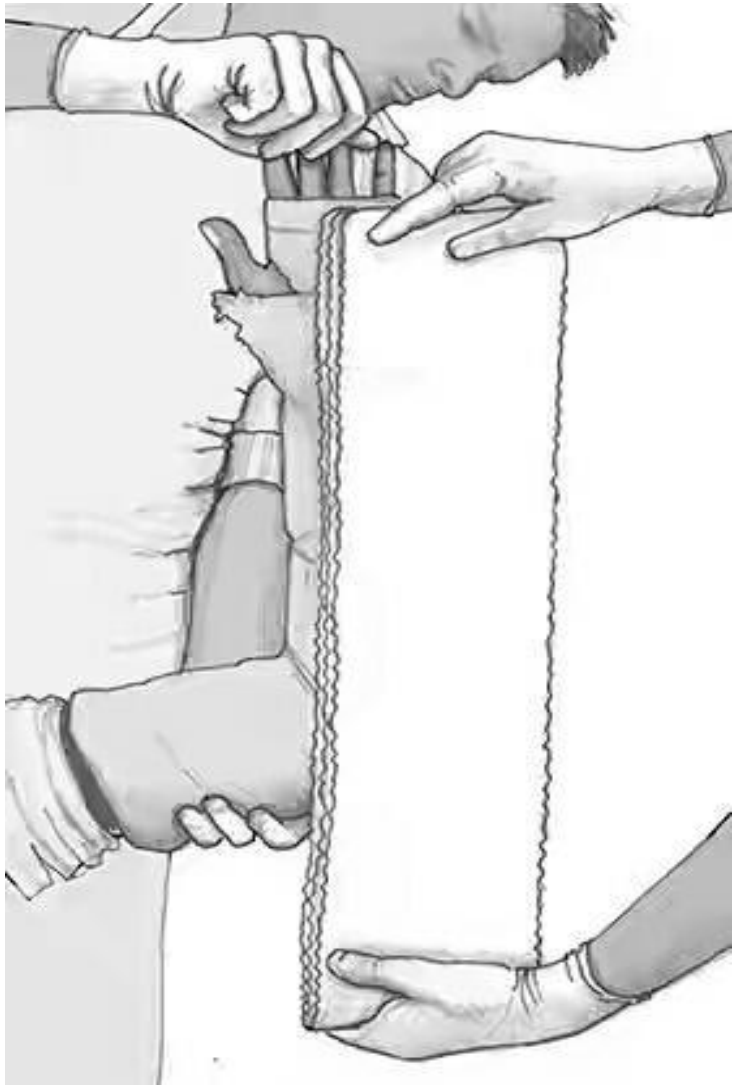
Full Arm Slab

Used for fracture of middle and proximal thirds of radius or ulnar or lower humerus that hasn't moved out of alignment (not displaced).

What you do ? Preparation:-

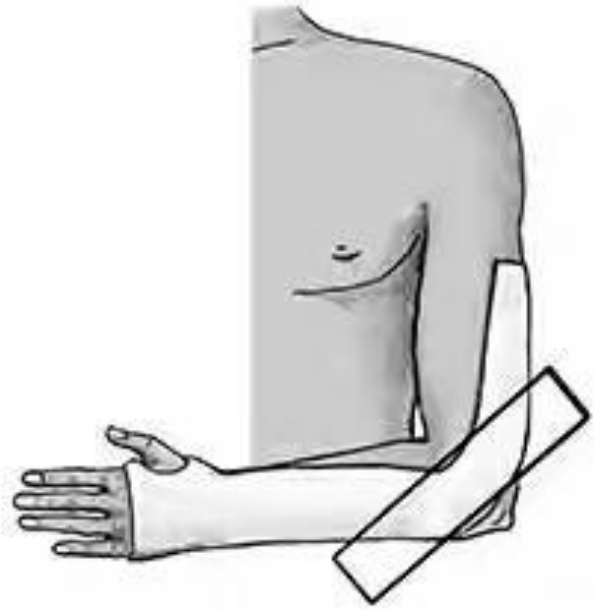
1. Person sits in comfortable chair.
2. Get helper to hold person’s elbow at 90°, fingers in air, in ‘nose thumbing’ position.
3. Put on stockinette and plaster wool — from fingers to 3 finger widths below armpit, and another layer of wool from tips of fingers to elbow
4. Put extra layer of wool around elbow
5. Put 2 extra layers of wool around wrist.
6. Measure from centre of palm, around outside of elbow, to 3 finger widths below armpit.

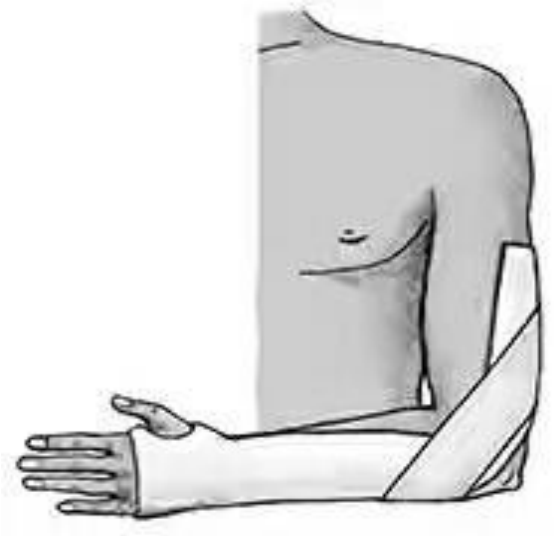
Make slab. Cut area for thumb, then cut longways slit half way up slab — elephant with 'legs' template



Applying

1. Wet slab, lay it starting at back of hand, opposite palmar crease
2. Shape end strips on either side of elbow. Make sure there is no plaster on elbow, ends don't meet
3. Use flat of your hands to shape and smooth as you go, over wrist and up towards armpit
4. Make reinforcing strip (5 layers thick) by measuring from mid forearm to mid upper arm. Apply as shown
5. Do not have plaster across elbow
6. Fold stockinette and plaster wool back over ends of plaster.
7. Bandage around slab with damp crepe bandage
8. Hold correct position for 3 minutes
9. Clear away equipment
10. Check circulation and sensation





LOWER LEG SLAB

Used for fracture of distal tibia, fibula, tarsus or proximal metatarsals that hasn't moved out of alignment (not displaced)

Used for soft tissue injuries to lower leg or foot.

What you do ?

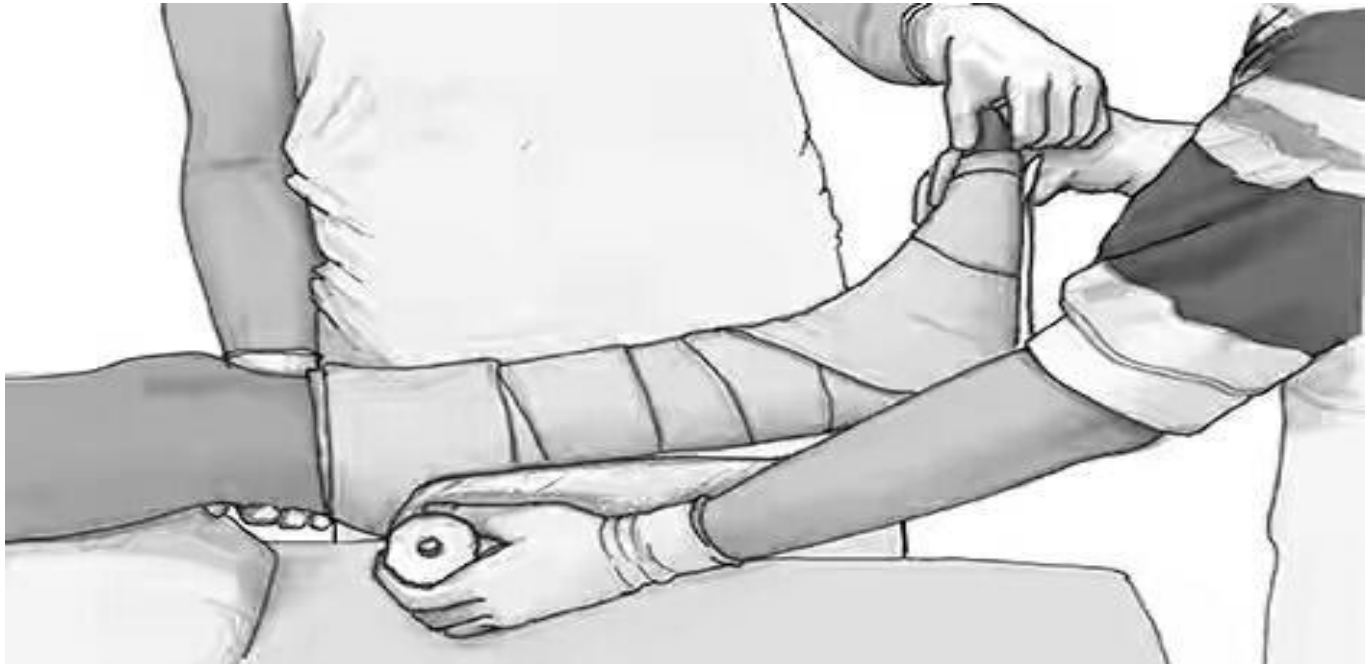
Preparation: Person lies on bed on stomach with knee and ankle flexed (bent) to 90°

OR

Person sits up or lies back with injured foot over edge of bed and ankle flexed to 90°.

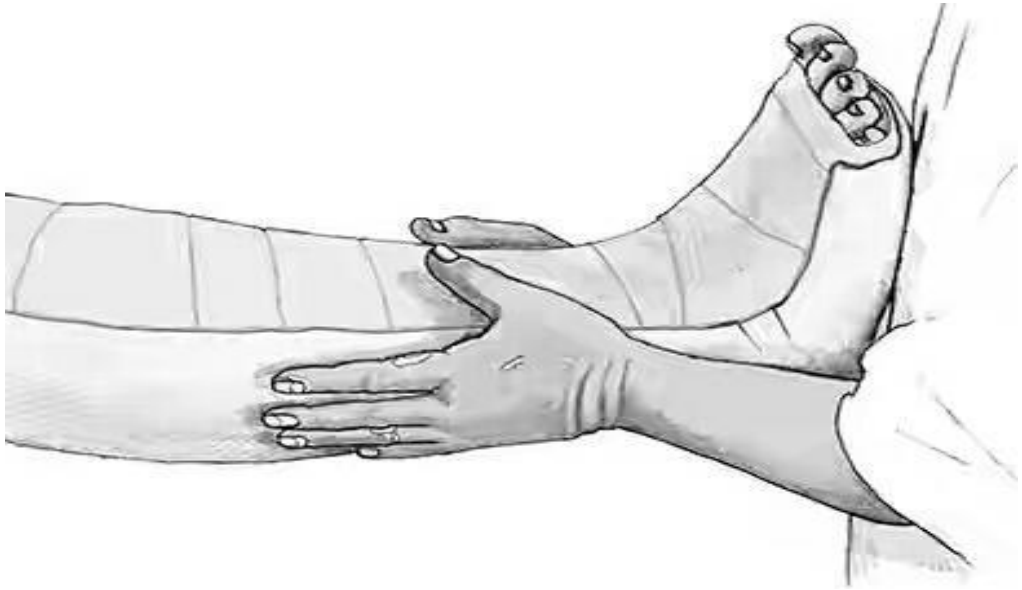
Use rolled towel to flex knee slightly (15–20°) on injured side

1. Put on stockinette and plaster wool — from tip of toes to middle of knee
2. Put 2 extra layers around ankle
3. Measure back of leg from base of toes to 3 finger widths below base of knee
4. Make slab. Fan plaster if legs large, or only narrow plaster rolls available
5. Check ankle at 90°



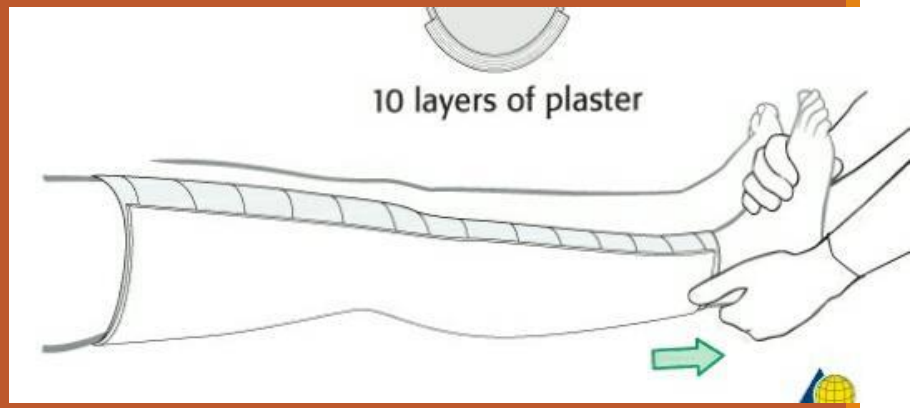
Applying

1. Wet plaster slab, lay on back of leg from bottom of toes to 3 finger widths below base of knee
2. Use flat of your hands to shape and smooth as you go, over ankle and up leg
3. Make sure slab isn't cutting into toe creases
4. Fold stockinette and plaster wool back over ends of plaster
5. Bandage around slab with damp crepe bandage
6. Hold in position for 3 minutes. Make sure ankle kept at 90°Clear away equipment
7. Check circulation and sensation
8. Organise crutches
9. Get advice from plaster technician on how to make walking heels or plaster shoes suitable for out bush



FULL LEG SLAB

Used for fractures of upper leg or knee



Attention

1. Leg must be set in alignment
2. Line up (align) from space between big and second toe, to middle of knee cap (patella), to hip bone (iliac crest)
3. Helper should watch to make sure this line is kept while you apply plaster

What you do ? Preparation:

1. Position person for lower leg slab first
2. Person lies on bed on stomach with knee and ankle bent to 90° (easier) OR Person sits or lies with injured foot over edge of bed, ankle flexed to 90°.
3. Use rolled towel to flex knee on injured side slightly (15–20°)
4. Helper needs to support ankle while lower leg slab applied, and leg while thigh slab applied
5. Put on stockinette and plaster wool — from tips of toes to groin
6. Put 2 extra layers around ankle, knee, head of fibula
7. Make slab in 2 halves

Lower leg slab —

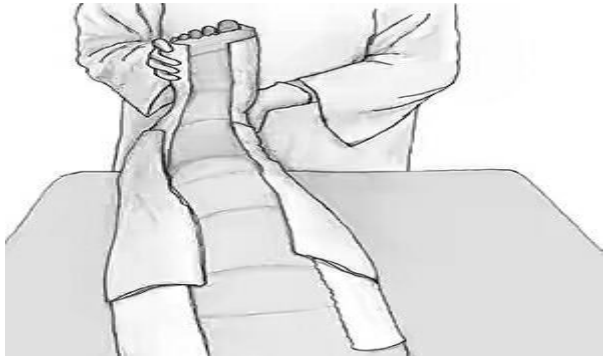
Trim end to match slope of toes

Thigh slab — overlap lower leg slab from mid calf, extend to buttock crease.

- ❑ Make sure it won’t cut into groin area
- ❑ Use 10 layers of plaster.
- ❑ Fan plaster if large leg, or using narrow plaster rolls

Applying

1. Check alignment of leg
2. Apply lower leg slabApply 10cm plaster as a stirrup across mid sole and up sides of slab to reinforce it against ankle flexion
3. Bandage around lower leg slab with single layer of crepe bandage, leave top half of calf bare to attach thigh slab
4. Have person on their back, knee bent slightly in 15–20° flexionWet thigh slab, apply to back of leg overlapping lower leg slab
5. Use flat of your hands to shape and smooth as you go, under knee and up towards body.
6. Make sure slab isn’t cutting into groin
7. To reinforce cast, apply 2 plaster strips (5 layers thick) to inside and outside of cast from mid-calf to mid-thigh
8. Fold stockinette and plaster wool back over ends of plaster
9. Bandage around both slabs with damp crepe bandages
10. Rest on pillows until plaster set — no pressure on heel (so plaster not indented), ankle at 90°, knee in 15–20° flexion



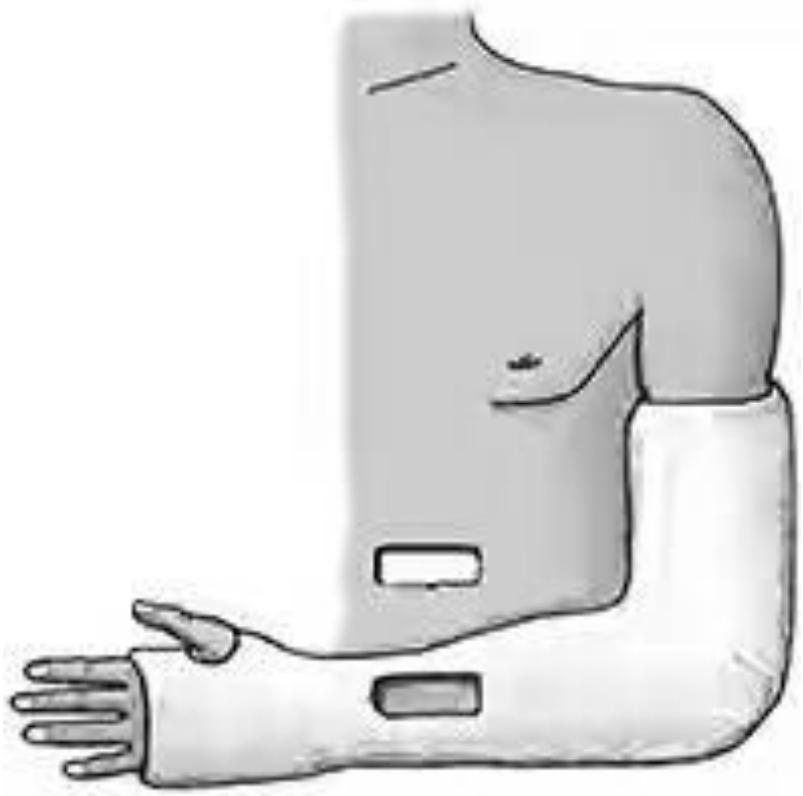
PLASTAR OF PARIS CASTE

General principles:- Used to hold broken bone still while it heals.

Do not put cast on until after broken bone seen on x-ray and checked by specialist, swelling has gone down.

Attention

1. Casts usually left on for 6–10 weeks.
2. Need to be strong and well made to last this long
3. Position limb carefully before putting on plaster
4. Helper must hold limb without pressing fingers into plaster
5. Work quickly so there is time to would plaster before critical setting period If wound under plaster cast that needs dressing — use plaster saw to cut window in plaster when it is dry.



5. Do not have extra plaster around fracture or middle of cast.
6. Avoid laying down layers of plaster bandage directly on top of each other
7. Reinforce casts where they cross joints by adding plaster strips length ways along outside

Circulation and sensation — after putting on plaster check hands/fingers, feet/toes for colour, warmth, sensation, movement, capillary refill, peripheral pulses — F 10.1. If any not normal — take off slab or cast.

What you need ?

1. Helper
2. Plastic apron
3. Blueys or plastic covers
4. Bucket/bowl lined with plastic bag and filled with cool water
5. Stockinette — big enough to fit loosely over limbPlaster wool — size and amount depends on limb

Main cast usually made using 6–8 layers of plaster

Short arm — 2 rolls of 7.5 or 10cm bandage

Long arm — 3 rolls of 7.5 or 10cm bandage

Below knee, non weight-bearing — 3 rolls of 10cm bandage

Below knee, weight-bearing — 4 rolls of 10cm and 1 roll of 7.5 cm bandage

Full leg — 6–8 rolls of 10cm bandag

Amounts vary depending on size of person’s limbs.

What you do ?

Preparation :-

1. Cover area around work site with blueys/plastic, put water nearby
2. Put stockinette loosely over whole area to be plastered and cut 3–5cm longer so it can be folded back over each end of cast
3. Put on plaster wool over stockinette
4. Get helper to hold and support limb
5. Dip plaster rolls in water on end — allows air to escape, allows complete soaking of plaster. Bandages ready when bubbling stops
6. Dip and remove all rolls of plaster from water at same time
7. Check position of limb

Applying

1. Start bandage from hand/foot, move up arm/leg towards body.
2. Bandage from inside to outside of limb with uniform thickness
3. Lay bandage down evenly by letting it roll onto limb
4. Do not pull or wrap tightly. Tight cast can cause swelling of fingers/toes and cut off blood/nerve supply
5. Overlap as you do in normal bandaging
6. Use flat of your hands to smooth and shape around joints, get a firm flat finish as you go.
7. Smooth each roll before starting a new one
8. Smooth from fingers/hand or toes/foot towards body
9. Do not crease POP. Creases can make cast too tight, cut off blood/nerve supply

- Put arm in sling, or tell person to keep leg lifted and resting on pillows when they get home
- Organise crutches if needed
- Record in file notes — type of cast, material used, modifications to cast, instructions given, if crutches given, date of next appointment

Always tell person:-

1. Come straight back to clinic if pain gets worse, swelling or blueness of fingers/ toes, plaster feels too tight or too loose.
2. Cast needs to be removed
3. Do not put any weight on cast for at least 48 hours, and then only very light pressure
4. Do not put things down cast to scratch
5. Do not pull out padding
6. Do not get cast wet, knock or damage it

Instructions to patient in a plaster cast

Important :-

1. Report back to the hospital immediately at any time of the day or night if
   - You get increased pain, or pins and needles in the plastered limb
   - Your finger or toes become blue, white, badly swollen or numb
   - You are unable to move your fingers or toes.
   - you loose any object, such as a coin or pencil, under the plaster
2. Do not rest the plaster cast on a firm surface.
3. Do not hang the splinted limb down unless the limb is in active use.
4. Use the splinted limb as much as possible :- move your fingers and toes, and all other joints not immobilized by the plaster cast, a number of times every hour
5. Keep the plaster cast dry.
6. Report back to the hospital if the plaster cast becomes loose, cracked or soft

LOWER ARM CAST

Used for Colles, scaphoid, distal forearm fractures

What you do ?

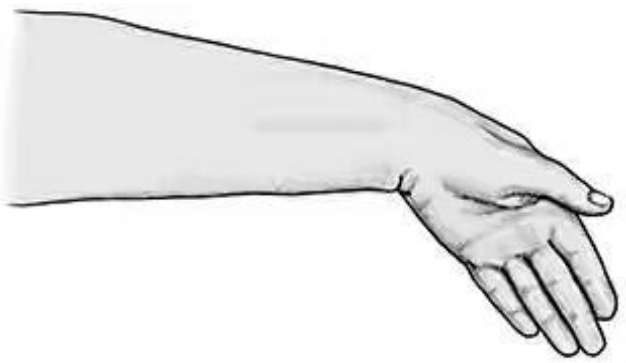
Preparation:-

1. Person sits in comfortable chair, arm supported in normal position
2. Put on loose stockinette from middle of fingers to elbow. Make hole for thumb
3. Put on plaster wool — from middle of palm to 3 finger widths below elbow crease.
4. Tear hole for thumb, or cover thumb for scaphoid fracture
5. Put 2 extra layers around wristCheck hand and limb position

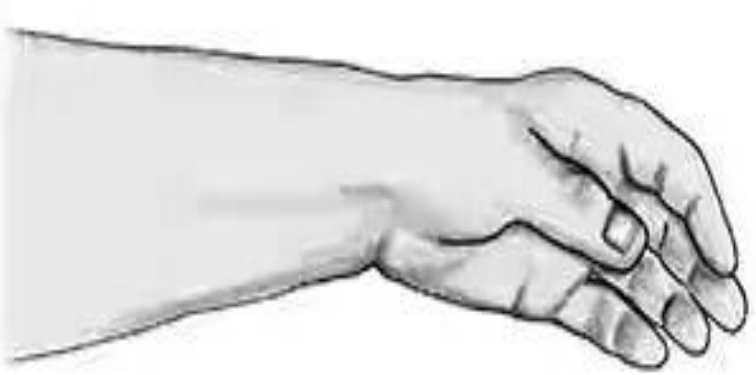
Applying :-

1. Wet 7.5cm plaster roll/s (1–2 rolls needed)
2. Start plastering at wrist, using bandaging a hand
3. To tidy thumb area, except for scaphoid fracture — bandage twice through space between thumb and finger, fold back stockinette, bandage twice more over the top of it
4. Keep plastering up arm to 3 finger widths below elbow crease
5. Use flat of your hands to shape and smooth as you go, over wrist and up arm
6. Thumb joint should move freely — except scaphoid fractureFor scaphoid fracture plaster thumb in placeShape hand into right position for fracture type

- **Colle's Displaced** — ulna deviation, wrist flexion

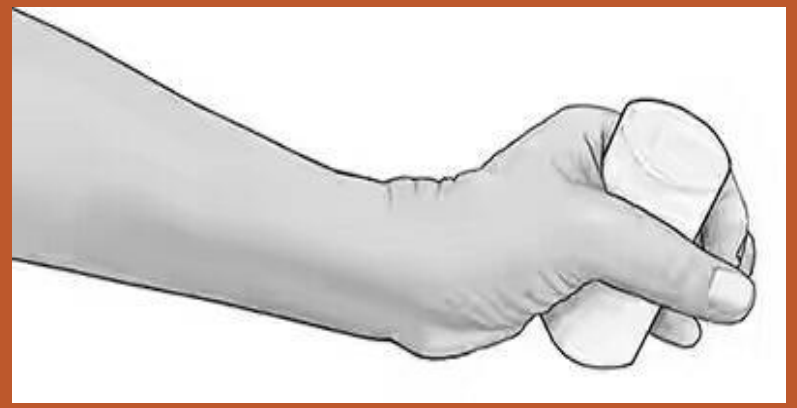


- **Colle's Undisplaced** — neutral position (10° wrist extension)



- Thumb joint should move freely — thumb and little finger can touch Metacarpophalangeal joints have full 90° flexion

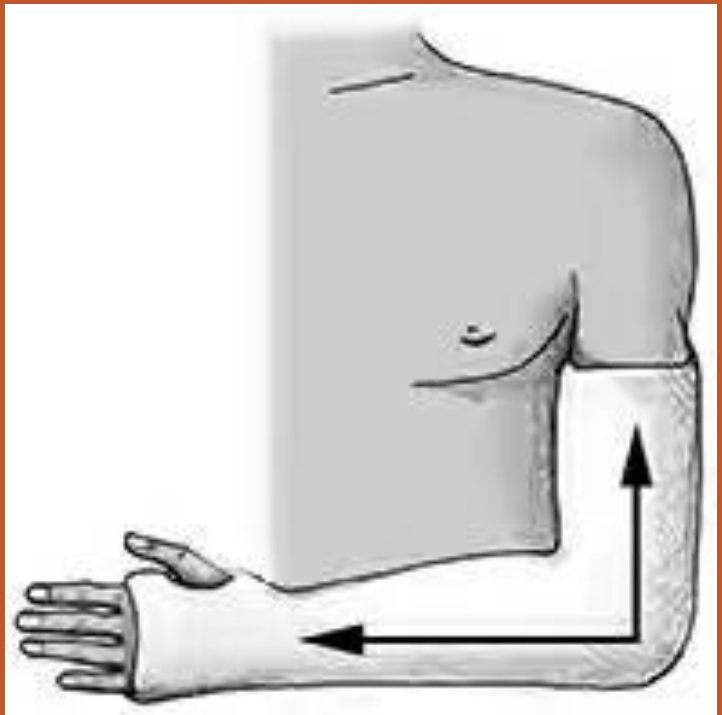
SCAPHOID



1. Slight radial deviation, 20° wrist extension, thumb forward.
2. Glass holding position
3. Joint at base of thumb shouldn't move, but middle joint is free
4. Thumb and middle finger should just meet. Like holding a pen
5. Fold stockinette and plaster wool back over ends of plaster
6. Hold in position for 3 minutes
7. Clear away equipment
8. Check circulation and sensation

Full Arm Cast

Used for fractures of proximal forearm or mid-forearm.



Attention:-

1. Make sure thumb joint can move around fully (rotate) when wrist is plastered
2. Apply cast as high as possible without digging into armpit
3. What you do

Preparation:-

1. Person sits in comfortable chair with elbow bent to 90°
2. If fracture close to elbow — palm facing upwards
3. If fracture in mid-forearm — palm facing body
4. Put on loose stockinette from tips of fingers to top of shoulder.
5. Make hole for thumb
6. Put on plaster wool — from base of fingers to armpit, tear hole for thumb
7. Put 2 extra layers around wrist and elbow
8. Check arm and hand in correct position

Applying:-

- Wet 7.5cm plaster rolls (3–5 rolls needed)
- Apply lower arm castCheck elbow bent to 90°, get helper to hold still
- Using 1–2 more 7.5cm plaster rolls, start plastering again from wrist, continue up to 7cm below top of arm, as high as comfortable
- Plaster around elbow using bandaging an elbow technique
- Use flat of your hands to shape and smooth as you go, over wrist and elbow, up arm
- To strengthen elbow area, make 10cm slab of plaster 5 layers thick and put it over cast already there
- Smooth down but be careful not to press or crease plaster
- Using 1 more 7.5cm plaster roll, bandage again from wrist over elbow slab and up to where plaster finishes
- Fold stockinette and plaster wool back over ends of plasterHold in position for 3–4 minutesClear away equipment
- Check circulation and sensation

Lower Leg Cast

Used for fractures of lower leg, ankle, foot

Attention:-

- Make all these casts ‘walkers’ as most people will try to walk with them
- Get advice from plaster technician on how to make walking heels or plaster shoes suitable for out bush10.86

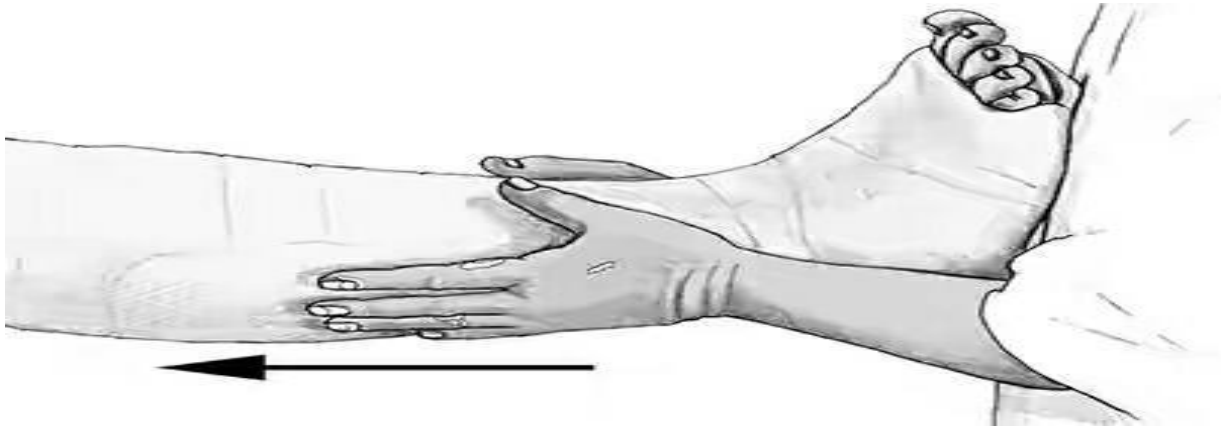
What you do?

Preparation

1. Person lies back on bed with pillow under knee on injured side
2. Ankle should be bent (flexed) to 90° and held by helper
3. Put on loose stockinette from tip of toes to middle of knee
4. Put on plaster wool over stockinette
5. Put 2 extra layers around ankle
6. Stand at end of bed and put person’s foot on your stomach to support it and keep 90° bend at ankle

Applying

1. Wet 10cm plaster rolls (2–3 rolls needed)
2. Plaster from bottom of toes to 3 finger widths below knee (tibial tuberosity)
3. Use figure of 8 bandaging around ankle
4. Knee joint should move freely
5. Make sure slab isn’t cutting into toe creases or covering little toe
6. Keep going until all rolls are used
7. Use flat of your hands to shape and smooth as you go, over ankle and up leg
8. Fold stockinette and plaster wool back over ends of plaster
9. Hold in position for 3 minutes

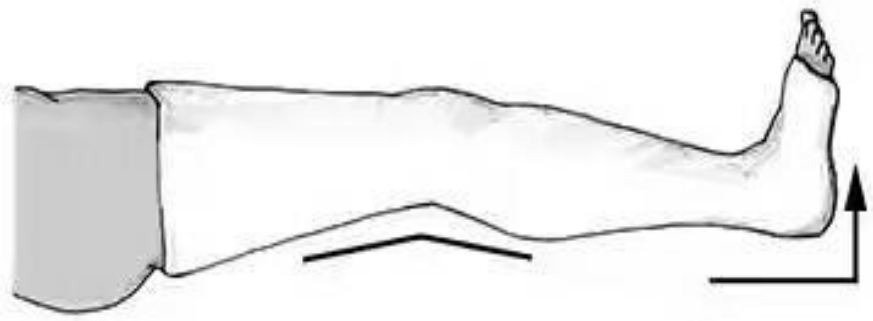


Below Knee Walking Cast

- Make slab from 10 layers of 10cm plaster bandage.
- Apply to cast along sole of foot from base of toes to just past heel
- Wrap 1 roll of 10cm plaster in figure of 8 fashion over this slab
- Clear away equipment
- Check circulation and sensation
- Organise crutches

FULL LEG CAST

Used for fractures of bones in upper leg and knee.



Attention:-

- Leg must be set in alignment
- Line up (align) from space between big and second toe, to middle of kneecap (patella), to hip bone (iliac crest)
- Helper watches to make sure this line is kept while you apply plaster
- Always plaster as high up leg as you can without digging into groin to stop any twisting (rotation) of limb
- Knee usually bent (flexed) at 20° but may vary with different injuries
- Helper should stand at side of person's injured leg to start with and then move to end of bed. Do not drop leg
- Rest cast on pillows for 48 hours to dry properly, or it will crack. No weight-bearing

What you do ?

Preparation:

1. Put person in correct position on bed
2. Put pillows behind their back, under buttock and thigh of good leg
3. Put pillows under knee and ankle of injured leg
4. Foot on injured side should hang about 5cm over end of bed
5. Helper should stand on injured side holding person's toes
6. Cut enough stockinette to cover whole leg plus 12cms
7. Take out ankle pillow and pull loose stockinette over leg as far as knee, leaving 8cm over toes for assistant to hold
8. While you support leg and foot, helper moves to end of bed to support person's foot.
9. Put foot on helper's chest so it can't drop, or knee straighten
10. Take away knee pillow and pull stockinette up to groinPut on plaster wool — from toes to groin
11. Put 2 extra layers around ankle and knee
12. Put knee pillow backHold knee bent (flexed) at 20° and ankle at 90° with helper supporting

APPLYING

1. Wet 10cm plaster rolls (4–6 rolls needed)
2. Plaster from bottom of toes to centre of calf
3. Use figure of 8 bandaging technique around ankle
4. Make sure cast isn’t cutting into toe creases or covering little toe,Use 2–3 rolls
5. Use flat of your hands to shape and smooth as you go, over ankle and up leg
6. Take away knee pillow
7. Bandage over first plaster, starting at ankle and working over knee to top of leg
8. Use technique for bandaging a knee over knee, Use 2–3 rolls
9. Use flat of your hands to shape and smooth as you go, over ankle and knee, up leg towards groin
10. Fold stockinette and plaster wool back over ends of plaster
11. Put knee and ankle pillows back and rest cast for 10 minutes
12. Clear away equipment, Check circulation and sensation.Organise crutches

Hip Spica cast

- A hip spica cast is a sort of orthopedic cast used to immobilize the hip or thigh. It is used to facilitate healing of injured hip joints or of fractured femurs.
- Hip spica includes the trunk of the body and one or both legs.
- A hip spica which covers only one leg to the ankle or foot may be referred to as a **single hip spica**, while one which covers both legs is called a **double hip spica**.
- A **one-and-a-half hip spica** encases one leg to the ankle or foot and the other to just above the knee.

Contraindications :- -

-unacceptable shortening or angulation;

-open fractures;
-thoracic or intra-abdominal trauma;
-large or obese children (inability for parents to care for child);

Position of Hip Spica

- Place affected thigh in 10 deg of abduction or in neutral position w/ opposite hip in moderate abduction to facilitate perineal hygiene;

- To decrease muscle forces & to minimize amount of shortening, place the lower extremity in the relaxed position;
  - w/ hip flexion, abduction, external rotation & knee flexion;
  - common mistake is to place the fractured thigh in marked abduction w/ resulting lateral bowing due to the pull of strong adductors;

- Consider placing the limb in the correct position before application of spica;
  - **proximal 1/3 frx:**
    - hip flexion : 45 deg
    - hip abduction: 30 deg
    - ext rotation: 20 deg
  - **mid shaft fractures:**
    - hip flexion: 30 deg
    - hip abduction: 20 deg
    - ext rotation: 15 deg
  - **distal 1/3 frx:**
    - hip flexion: 20 deg
    - hip abduction: 20 deg
    - ext rotation: 15 deg

Technique

- **Padding:**
  - Place a folded towel on the anterior thorax and abdomen and apply all padding and casting material over this towel
  - Following cast application the towel is removed;
  - This will create space between the cast and the thorax/abdomen and will avoid cast tightness and difficult w/ breathing;
  - Using this technique, it is not necessary to window the abdomen of the cast;
  - Its useful to place 2 layers of body stockinette over the patient's torso to ensure that the cast padding can be pulled up over the edges of the cast;
  - Soft roll is preferable to cotton roll (soft roll can be cleaned if it gets soiled);
  - Soft roll is placed, w/ care to evenly spread the cotton across the back and buttocks (including sacrum);
  - A thick belt of felt is taped across the chest, just below the nipple line
  - A second felt belt is fashioned to cover the sacrum, PSIS, and ASIS;

Reduction

- Prior to cast application, use flouro to help determine the optimal position for reduction;
- Distal femoral traction pin is inserted if fracture needs to be brought out to length;
- Apply the cast, but apply minimal cast material around the injured thigh;
- Once the cast is hard, bring in flouro and determine if the reduction is adequate;
- If the reduction is not adequate, then circumferentially cut the cast at the level of the frx;
- Then re-reduce the fracture under flouroscopic control;
- Once the reduction is adequate, have an assistant quickly apply more casting material while the thigh is held in the reduced position.

CAST RE-ENFORCEMENT:

- Apply a "broom stick" between the thighs and apply cast material over this, inorder to strengthen the cast and prevent cast breakdown at the hip joint;

CAST CARE:

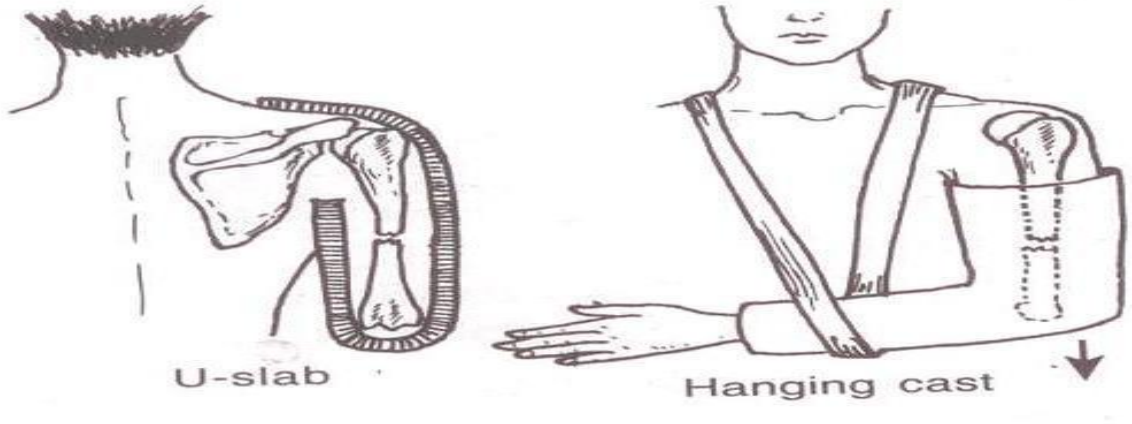
- Goretex liner allows the child and the cast to be washed;
- A panty shield napkin can be applied to the perineum to prevent soiling of the cast;
- Child is seen every 2 weeks for evidence of skin break down

Special slabs and cast

Upper limb :- u slab/cast, cylinder slab cast, hanging cast

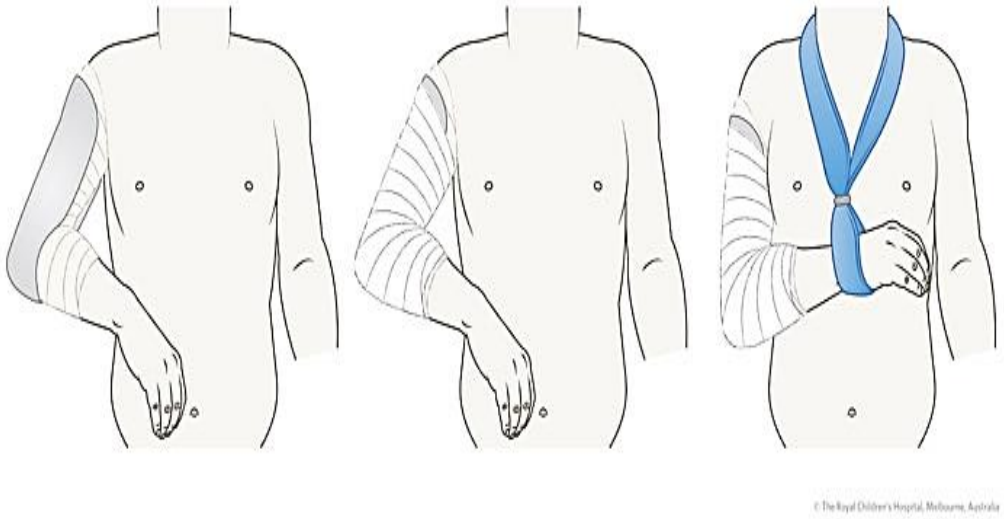
Lower limb :- PTB Weight bearing cast

Body cast :- to support/ immobilize the spine



‘U’ SLAB

- Middle third fractures of the humeral shaft are managed with a collar and cuff. Occasionally a hanging U-slab plaster of Paris (POP) is required. If a radial nerve injury is present, active manipulation is not recommended.
- Humeral shaft fractures should be referred to fracture clinic at 1 week.
- Healing generally takes 4-6 weeks depending on the age of the child, to reach a point when active mobilization will be commenced



HANGING CAST

Caldwell (1933)
-used for displace frx of the humeral shaft with shortening, and also for oblique and spiral fractures;

Indications

- Used for comminuted humeral frx
- Distal humeral shaft frx
- Cast must be light wt. And must extend from at least 1 inch proximal to the fracture site to wrist, w/ elbow at right angle & forearm in neutral rotation
- Arm must lie dependent to provide a traction force;
- Patient must sleep erect or semi-erect to avoid supporting elbow when seated;
- Erect position is maintained during the day as much as possible;
- There should be no support under the elbow, and nothing should compress the arm against the body (such as clothing);

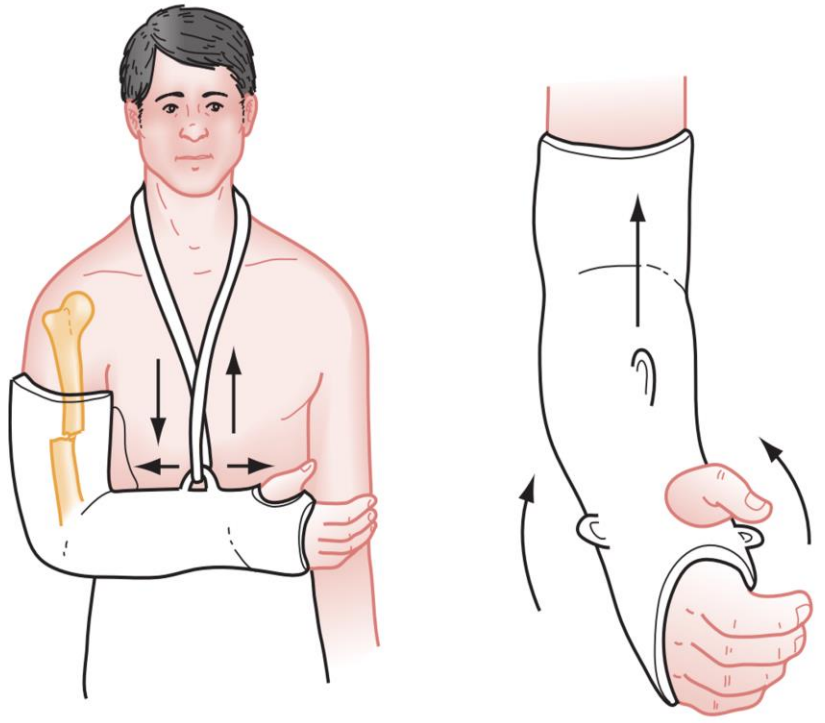


Figure 52-14. Hanging cast technique.

PATELLA TENDON BEARING CAST

- *A Sarmiento or patella tendon bearing cast (or PTB)* is usually applied as the last stage of treatment for tibia fractures.
- At 4-6 weeks post injury, the long leg cast is removed and a Sarmiento cast is applied.
- The PTB is not suitable for proximal tibial fractures, but is a good conservative method of treating stable tibial fractures from the middle third downwards.
- The principle of tibial PTB casting is the same as for the femoral cast brace. A well fitting below knee cast is applied and molded between the gastrocnemius heads. The actual weight is born on the patellar tendon region anteriorly. A rubber heel is applied and the patient is encouraged to weight-bear on the plaster.

Body cast

- It is used for a stable burst fracture of vertebrae.
- In general, a stable burst fracture is one in which there is no neurologic injury, in which the angulation of the spine is less than 20 degrees and in which the amount of **spinal canal compromise** is **less than 50 percent**. In these patients, treatment with a brace may lead to an excellent result.
- In general a **molded turtle shell type brace (TLSO)** or a **body cast** is required for the treatment of a burst fracture.
- This brace is usually worn for **eight to twelve weeks** in order to ensure adequate healing.

Body Cast

- This is just a larger form of a cylinder cast that encircles the trunk of the body instead of an extremity
- A body cast extends from the nipple line to the hips
- For pts with spinal problems, the body cast extends from the back of the head and chin area to the hips with modifications made for exposing the arms