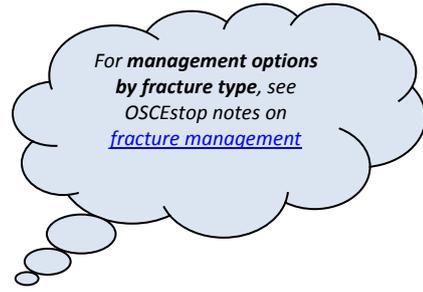


Application of a Backslab or Cast to a Limb

Introduction

- **W**ash hands, **I**ntroduce self, **P**atients name & DOB & wrist band, **E**xplain procedure and get consent
 - **Risks:** neurovascular compromise, joint stiffness after removal, infection, pressure sores, venous thromboembolism, failure of fracture union
 - **Backslabs vs casts:** for acute injuries, a 'backslab' (i.e. slab of plaster on one side of the limb) should be used to allow for swelling. This is then changed to a more secure full 'cast' (i.e. circumferential around limb) at ~1 week post injury.
- Check cast prescription



For management options by fracture type, see OSCEstop notes on [fracture management](#)

Preparation part

- Wash hands
- Apply an apron, and also gloves if using fibreglass
- Gather equipment
 - Large pads and plastic sheets
 - Plastic covered pillows
 - Webril cotton wool roll for under padding – *5-10cm width for upper limb, 10-15cm width for lower limb*
 - Plastic bowl filled with lukewarm water (the warmer the water the faster the cast will set)
 - Heavy duty scissors
 - For backslabs:
 - Plaster Of Paris sheets (usually come from a huge roll) – *15cm width for posterior backslabs, 10cm width for lateral/medial backslabs*
 - Broad gauze bandage roll (outer layer)
 - For casts:
 - Fabric stockinette (1st inner layer) – *5cm width for upper limb, 7.5cm width for lower limb*
 - 2x Fibreglass rolls (e.g. Benecast) or, less commonly, Plaster Of Paris rolls (small individually wrapped rolls) – *5cm width for upper limb casts, 10cm width for lower limb casts*

Patient part

Positioning and exposure

- Expose limb and remove any jewellery
- Examine the injured extremity
 - Look for wounds and treat prior to applying cast
 - Examine neurovascular status
 - Reduce the fracture or dislocation if required
- Position patient
 - Below elbow cast: patient sitting with elbow resting on hard surface and hand slightly elevated
 - Above elbow cast: patient lying supine with arm off side of bed and assistant holding the patient's hand to support the weight of the arm
 - Below knee cast: patient sit on edge of bed with lower legs dangling off side
 - Above knee cast: patient lying supine with leg rest/assistant holding leg in position
- Fully position limb in desired position – **SEE TABLE BELOW**
- Apply large pads and plastic sheets around patient and limb to collect spillage

Initial dressing

- Apply the fabric **stockinette** over the limb to cover the area below the plaster plus a couple of inches and cut to size – avoid wrinkles and cut hole for thumb if needed (omit this in acute injuries)
- Unroll the **webril** circumferentially around the limb to cover the area below the plaster plus a couple of inches (roll layers should overlap by 50%). Start with two initial rolls then progress distally/proximally. Use double thickness for both plaster ends and any bony prominences. Cut a hole/slit for the thumb if required. The end can be left loose.
- Apply extra squares of webril may be applied over any bony prominences to avoid pressure sores

Backslap application

- Using the correct width plaster sheet (unrolled), measure the length required longitudinally along the limb
- Fold the plaster sheet to the create required layers – *layers required vary by type of backslab – see table below (generally, 8 layer slab for upper limb; three 4 layer slabs for lower limb backslabs)*
- Cut plaster sheet to size
- Immerse the plaster into the lukewarm water and hold it under until the bubbles stop
- Drain the plaster until the drips stop (do not wring it out)
- Place the slab longitudinally in position over limb (fold any un-neat edges)

- Mould by rubbing it smooth
- Turn the ends of the webriil back over the ends of the plaster
- Unroll the **broad gauze bandage** circumferentially around the limb to secure the plaster and free ends of webriil (roll layers should overlap by 50%). Start distally and wrap proximally. To tie off the bandage, you can tape it or split the end down the middle, wrap around in opposite directions and tie off.
- Hold the limb in the correct position for approximately 5mins until the plaster hardens

Circumferential cast application

- Immerse the first roll of fibreglass/plaster (still rolled) into the lukewarm water and hold it under until the bubbles stop
- Drain until the drips stop (do not wring it out)
- Apply the **1st layer** by unrolling the fibreglass/plaster circumferentially around limb keeping the roll in contact with the arm at all times. Start distally and progress proximally (roll layers should overlap by 50%)
- Continue using the same roll to apply a **2nd layer** starting proximally and progressing distally
- 'Laminate' plaster by rubbing the plaster smooth with flats of both palms and fingers in a circular motion in the direction it was placed on to make sure all the fabric lines are out
- Turn the ends of the stockinette and webriil back over the ends of the plaster
- Now apply a **3rd layer** (using the second fibreglass/plaster roll which again needs to be soaked and drained), starting proximally and progressing distally like the 2nd to secure the turned-over ends of the stockinette and webriil and ensure even cast thickness
- 'Laminate' plaster further
- Hold the limb in the correct position for approximately 5mins until the plaster hardens

To Complete

- Thank patient and cover them
- Bin all waste and clean area
- For upper limb casts, give the patient a resting triangular or high-arm sling
- Review patient
 - Once the backslab/cast is set check:
 - No sharp edges
 - Correct positioning
 - Comfortable for patient
 - Distal neurovascular assessment and tendon function
 - Post-cast X-ray
 - 24 hours cast check
 - If problems arise e.g.
 - Pressure sores – a 'window' can be cut in the cast
 - Infection – smelling the cast is a good indicator
- Give the patient a leaflet and give plaster advice (including advising them to seek urgent medical help if limb is numb/painful/cold/discholoured, POP must be kept dry and that, for weight bearing-lower limb plaster casts, they must not weight bear for 2 days)
- Fully document in notes and sign cast prescription
- Book follow up appointment

Removing a Cast

- Use plaster-cutting shears or an oscillating power saw
- Shears: only oscillate the handle furthest from the plaster (keep the other one still and parallel to the plaster). You should only cut the plaster layer (i.e. place the blade between the plaster and the lining below)
 - Start distally and work proximally
- Oscillating power saw: use one hand to hold the saw handle nearest the blade, and rest the other hand around the cast with the thumb on the top of the saw to guide it. DO NOT slide the saw along the cast, use it by pressing it down in one position until it 'gives' then lift it off and do the same again slightly further down the cast and so on (don't worry, the saw does not cut skin!)
 - Start proximally and work distally
- Cuts should be over soft tissues and concavities (avoid bony prominences)

Where to cut upper limb casts

- Make **one cut** in a straight line along the anterior border of the forearm from the mid-antecubital fossa to the mid-palm
- Now use strength to split the cast to get it off

Where to cut lower limb casts

- Requires **two cuts**
- LATERAL CUT: from the little toe, along the lateral border of the foot, below and posterior to the lateral malleolus and up the lateral border of the lower leg
- MEDIAL CUT: along the corresponding line on the medial surface

Types of backslab/cast and additional specific details to application technique above

Type	Commonest indications	Position	Backslab (additional specific detail)	Cast (additional specific detail)
Upper limb				
Below elbow (short leg) backslab/cast	<ul style="list-style-type: none"> Isolated distal radius fracture Carpal fractures 	<ul style="list-style-type: none"> Extends from ~5cm below the olecranon to just proximal to the knuckles on the dorsum of the hand and the distal crease on the palmar aspect Wrist is normally neutral but can be flexed and ulnar deviated (Colles cast variation for Colles' fracture) or extended (for Smith's fracture) 	<ul style="list-style-type: none"> Cut a groove for the thumb before wetting the plaster Apply the plaster slab (15cm wide, 8 layers) to the dorsal aspect of the forearm and the dorsolateral aspect of the wrist Rub it smooth so distal radius is gently gripped 	<ul style="list-style-type: none"> After the stockinette, apply 2 wraps of webril padding around the wrist, partially tear the webril to go over the thumb, and then go proximally up arm to 2cm below the antecubital fossa For the first fibreglass/plaster layer, start by rolling the plaster around the wrist, then through the first webspace (cut a slit in the fibreglass/plaster to do this) and then work up the arm proximally
Above elbow (long arm) backslab/cast	<ul style="list-style-type: none"> All radius/ulna fractures (except isolated distal radius fracture) Distal humerus/humeral olecranon/epicondyle fracture 	<ul style="list-style-type: none"> Extends from middle of upper arm to just proximal to the knuckles on the dorsum of the hand and the distal crease on the palmar aspect Elbow at 90° Forearm usually mid prone but should be in supination for proximal third radius fractures, and in pronation for distal third radius fractures Wrist is usually neutral 	<ul style="list-style-type: none"> Apply extra layer of soft cotton wool around elbow Apply the plaster slab (15cm wide, 8 layers) along posterior aspect of arm, elbow and ulnar aspect of the forearm down to knuckles Make 5cm slits either side of the elbow crease and overlap cut edges and smooth them out Apply further plaster slabs (25cm long, 10cm wide, 4 layers) to the medial and lateral sides of the elbow and then smooth the edges 	<ul style="list-style-type: none"> When applying webril, ensure the sides do not dig into the elbow crease Apply 3 extra layers of webril over the elbow – one over the area above the elbow, one over the olecranon and one over the humeral condyles For the first fibreglass/plaster layer, start by rolling around the wrist, then through the first webspace (cut a slit in the fibreglass/plaster to do this) and then work up the arm proximally Make sure the edge does not dig into the elbow crease
Thumb spica splint/cast	<ul style="list-style-type: none"> Scaphoid fracture 	<ul style="list-style-type: none"> Similar to below elbow cast but with thumb also covered Forearm in neutral position Wrist in 20° extension Thumb in a straight line with forearm (slightly flexed) Thumb and distal fingers in line (like holding a can of coke) 	<ul style="list-style-type: none"> Apply 2 wraps of webril padding around the wrist continuing around the thumb twice. Wrap 2 layers over the hand, partially tearing the webril to go over the thumb, and then go proximally up arm Apply the plaster slab (10cm wide, 8 layers) around the radial aspect of forearm and around the thumb 	<ul style="list-style-type: none"> After the stockinette, apply 2 wraps of webril padding around the wrist continuing around the thumb twice. Wrap 2 layers over the hand, partially tearing the webril to go over the thumb, and then go proximally up arm Start wrapping the first layer of fibreglass/plaster around the wrist followed by 2 wraps around the thumb (leaving half of the distal phalynx free) Continue with several layers around wrist and base of thumb, 'pinching' or cutting a slit in the fibreglass/plaster to go through through the first webspace, then work up the arm proximally.
Volar/dorsal forearm slab	<ul style="list-style-type: none"> Carpal fractures (except scaphoid) Lunate dislocation 2nd-5th metacarpal fractures 	<ul style="list-style-type: none"> Extends along the volar/dorsal aspect of the forearm from the metacarpal heads to just proximal to radial head <u>Position of safe immobilisation (POSI) / 'Edinburgh position'</u> Wrist 30-50° extension MCPJs 80-90° flexion IPJs in full extension 	<ul style="list-style-type: none"> Apply 2 wraps of webril padding around the wrist, making a hole to hook it over the thumb, then progress proximally up the arm Apply the plaster slab (15cm wide, 8 layers) to the volar/dorsal aspect of the arm 	N/A
Radial gutter splint	<ul style="list-style-type: none"> 2nd/3rd metacarpal fracture 2nd/3rd proximal/middle phalynx fracture 	<ul style="list-style-type: none"> Extends from DIP index/middle finger joints to two thirds up the forearm Leaves thumb, ring and little fingers free Wrist in 20° extension MCP joints flexed to 50-70° IPJs in slight flexion 	<ul style="list-style-type: none"> Before applying webril, place a small piece of padding between the index and middle fingers Before wetting the plaster, cut a hole for the thumb Apply the plaster slab (10cm wide, 8 layers) around the radial aspect of arm – hook it over the thumb Include the index and middle fingers in the final layer of bandage 	N/A
Ulnar gutter splint	<ul style="list-style-type: none"> 4th/5th metacarpal fracture 4th/5th proximal/middle phalynx fracture 	<ul style="list-style-type: none"> Extends from tip of DIP of little finger joint to two thirds up the forearm Leaves thumb, index and middle fingers free Wrist in 20° extension MCP joints flexed to 50-70° IPJs in slight flexion 	<ul style="list-style-type: none"> Before applying webril, place a small piece of padding between little and ring fingers Apply the plaster slab (10cm wide, 8 layers) around the ulnar aspect of arm Include the little and ring fingers in the final layer of bandage 	N/A
Lower limb				
Below knee (short leg) backslab/cast	<ul style="list-style-type: none"> Calcaneus/talus fracture Fibula fracture Ankle fractures 	<ul style="list-style-type: none"> Extends from the tibial tubercle to the base of the toes Ankle neutral (90°) 	<ul style="list-style-type: none"> Apply the plaster slab (15cm wide, 4 layers) along posterior aspect of leg from 5cm below popliteal crease to the toes (fold over a corner of plaster to expose little toe and neatly fold excess plaster around ankles) Apply further plaster slabs (10cm shorter than main slab, 10cm wide, 4 layers) to the medial and lateral sides – they should both cover the heel Ensure fibular head is free (perineal nerve runs around this) 	<ul style="list-style-type: none"> Make a slit in the stockinette over the anterior ankle and overlap the layers Start webril distally (5-6 layers over heel, malleoli and head of fibula) Start first fibreglass/plaster layer at base of toes. Wrap around the ankle in figure 8s. Work proximally to 2cm below tibial tubercle. Then continue with other 2 layers.
Above knee (long leg) backslab/cast	<ul style="list-style-type: none"> Distal humerus/patella fracture Tibia and fibula fracture Tibia fracture 	<ul style="list-style-type: none"> Extends from the middle of the thigh to the base of the toes Knee in 5-20° flexion Ankle neutral Cylinder cast variation = ends before ankle 	<ul style="list-style-type: none"> Ensure fibular head is well padded with webril Apply the plaster slab (15cm wide, 4 layers) along posterior aspect of leg from middle of the thigh to the toes (fold over a corner of plaster to expose little toe and neatly fold excess plaster around ankles) Mould by rubbing and smoothing it Apply further plaster slabs (10cm shorter than main slab, 10cm wide, 4 layers) to the medial and lateral sides – they should both cover the heel 	<ul style="list-style-type: none"> Make a slit in the stockinette over the anterior ankle and overlap the layers Lower half (done first): start webril distally (5-6 layers over heel, malleoli and head of fibula). Start first fibreglass/plaster layer at base of toes and work proximally to tibial tubercle level. Then continue with other 2 layers. Upper half (done second): start webril distally (4-5 layers over upper thigh). Start applying plaster distally – overlap old fibreglass/plaster with width of a roll, then work proximally. Then continue with other 2 layers.