DIPLOMA

PAPER TWO

SECTION A: MULTIPLE CHOICE QUESTIONS

1. The following are roles of an orthopaedic and trauma technician in an orthopaedic ward, which one is not:
2. Conducting ward rounds.
3. Application of casts.
4. Patient and staff education.
5. Application and removal of casts.
6. Which of the following are advantages of using plaster of Paris bandages?
7. Causes circulatory catastrophe.
8. It is inexpensive.
9. Easily moldable.
10. It is innocuous.
11. The following are factors affecting setting time of plaster of Paris casts.
12. Type of the plaster.
13. Thickness of the cast.
14. Alignment of the bone fragments.
15. Impurities.
16. The following are not indications of padding:
17. Bone prominences.
18. Where bivalving is needed.
19. Prevention of plaster burns.
20. Patient’s cosmesis.
21. The following are features of arterial obstruction in a casted limb:
22. Paresthesia of the limb.
23. Pallor of the skin.
24. Ability to flex and extend the limb.
25. Disturbed capillary return.
26. Reasons for flexing a knee joint at 150 are, except
27. To avoid breakage of the cast.
28. To facilitate walking.
29. To put the joint in functional position.
30. To prevent rotational movements of the knee joint.
31. Which of the following is not a reason for applying a cast?
32. To relief pain.
33. To immobilize the limb for healing.
34. For temporally measures.
35. To correct deformities.
36. Which of the following is not a characteristics of an ideal cast?
37. Light in weight.
38. Well fitting.
39. Untrimmed edges.
40. Functional.
41. Which of the following is a management of un-displaced fracture of clavicle?
42. Hanging cast.
43. Shoulder Spica cast.
44. Arm sling.
45. Above elbow cast.
46. The following are reasons for cast saw blade burns during cast removal, which one is not?
47. Blood stained casts.
48. Well-padded cast.
49. Presence of edema.
50. Resin based materials.
51. Which of the following is an indication of hip Spica?
52. Distal femur fractures in children.
53. Shaft femur fractures in adults.
54. Neck of femur fractures in adults.
55. Distal femur fractures in adults.
56. Sermianto cast is indicated for which of the following reasons?
57. Suitable for femoral fractures.
58. Applied for a uniting tibia/fibula fractures.
59. Suitable for fresh fractures.
60. Surgical method of fracture treatment.
61. The following are types of orthopaedic paddings used in casting, which one is not?
62. Synthetic pads.
63. Cotton wool.
64. Stockinette.
65. Crepe bandage.
66. Which of the following is not an indication for lower limb anterior slabs.
67. Burns on the posterior aspect of the lower limb.
68. Burns on the anterior aspect of the lower limb.
69. Contracture at the knee joint.
70. Posterior compound fractures.
71. The following factors decreases setting time of the cast, which one is not?
72. Resin.
73. Salt.
74. Hot water.
75. Number of cast layers.
76. Which of the following is not a consideration of setting up a cast room?
77. Space.
78. Staffing.
79. Hospital administrator
80. Patients’ population.
81. Which of the following is a physical property of plaster of Paris?
82. It is creamy.
83. It has exothermic reaction.
84. It innocuous to the skin.
85. It is a hemi-hydrated calcium sulphate.
86. Which of the following are not causes of cast sores:
87. Padded casts.
88. Loose casts.
89. Broken casts.
90. Sharp edged casts.
91. Using substandard p.o.P causes the following except?
92. Medico-legal costs
93. Serious health hazards
94. Exothermic reactions
95. Adequate immobilization
96. Among the following is not a benefit of using standard p.o.P
97. Easy creamy application
98. Flexible working time
99. Smooth finish
100. Costly to patients
101. The following are signs of pressure sores in a cast, which one is not?
102. Itchiness of the skin inside the cast
103. Increased warmth over a localized area of a cast
104. Looseness of a cast
105. Visible pus over the cast
106. Which one of the following is not a likely reason for plaster sore development?
107. Scratching beneath the cast
108. Padding done by use cotton wool
109. Local cast breakdown
110. Water contact with the cast
111. Plaster sores are graded according to the depth of involvement of the tissues. Which of the following is not matched correctly.
112. Grade one- involvement of subcutaneous tissue or cellulitis
113. Grade two- involvement of subcutaneous tissue or cellulitis
114. Grade three- involvement of muscles
115. Grade four- bone deep
116. Among the following is not a cause of nerve damage after application of p.o.P cast
117. Quality of p.o.P used
118. Compression by bone fragments
119. Indirect compression by the eodematous tissue
120. Reduced blood flow
121. Breaking of a cast may result due to the following reasons except?
122. Self-repair attempts by patients
123. Fall on the casted extremity
124. Persistent pressure on a particular area of the cast
125. Use of cold water during cast application
126. To avoid complications of a plaster cast, the following should be done except?
127. Patient should trim the edges of the p.o.P cast that he feels are not comfortable.
128. Patient should report on pain that is not relieved
129. P.o.P application by a skilled person in a proper manner.
130. Patient as a routine should be called for checkup the next day.
131. Which one of the following is not an expected complication after application of long arm cast
132. Mal-union
133. Pressure at the back of the thumb
134. Pressure in the cubital fossa
135. Flexion contractures of elbow and hand
136. Hip spica cast is used for the management of injuries to which of the following parts?
137. Fractures of the cervical and thoracic vertebrae
138. Fractures of femur in children
139. Fractures of the hip bone in children
140. Fractures of pelvis in children
141. The following are indications of a below knee cast, which one is not?
142. Fracture mid-1/3rd tibia/fibula
143. Fracture distal-1/3rd fibula
144. Fracture of tarsal bones
145. Reduced-dislocated ankle joint
146. Among the following is not an indication of a long leg cast
147. Fracture mid-1/3rd tibia/fibula
148. Fracture of tibial condyles
149. Reduced-dislocation of tarso-metatarsal joint
150. Fracture proximal 1/3rd tibia
151. When preparing to place a splint onto a patient, the following should be done EXCEPT?
152. Expose the injured extremity completely before splinting
153. Check for neurovascular compromise
154. Clean, dress and repair all open wounds before splinting
155. Ensure the splint is not locally made
156. Which one of the following is not a sign of a tight splint?
157. Free movement of fingers and toes after application
158. Patient feels pain, numbness and tingling sensation
159. The fingers become swollen
160. Fingers start turning to bluish in color
161. The following are the most common complications of a poorly applied splint, which one is not?
162. Pressure sores
163. Fractures occurrence
164. Fracture union
165. Secondary infections
166. In the follow up for a patient after p.o.P application, the following are usually checked EXCEPT?
167. Pulselessness
168. Paralysis
169. Pain
170. Muscle power
171. The following are features of a dynacast prelude synthetic splint system, which ONE is not?
172. Cannot be used throughout the rehabilitation process
173. It is all in one roll for ease of application
174. Sets within 3-5 minutes, weight bearing in 20 minutes
175. Naturally aids moisture transmission away from the skin to enhance patient’s comfort
176. Among the following, which one is not a rule in the application of p.o.P?
177. One joint above and one joint below the fracture site
178. Ensure reduction is done after immobilization
179. Mould with palm and not fingers
180. Uniform thickness of plaster is preferred
181. Which one among the following statement is not true about plaster casts?
182. A plaster cast is not from rolls or pieces of dry muslin cloth impregnated with calcium sulphate
183. Plaster cast are usually smooth and white
184. A person can feel the cast getting warm on the skin from the chemical reaction as it sets
185. They offer non-rigid immobilization in fractures of long bones
186. The following are indications for bi-valving, which ONE is not?
187. To facilitate daily dressing of a wound
188. To support foot and wrist in appropriate position
189. To ease swelling
190. Loose and non-fitting casts
191. The following are areas that call for extra strengthening in the application of a cast, which is not?
	1. Around the calf area
	2. Large joint areas
	3. At the fracture site
	4. At the sole of the foot
192. Which one of the following is not an equipment for use in removal of p.o.P
	1. Plaster shears
	2. Plaster spreader
	3. Electric plaster cutter
	4. Surgical blade

**SECTION B: SHORT ANSWER QUESTIONS**

1. List five disadvantages of fibre glass. (5 marks)
* Application requires speed and accuracy.
* May bind if tissues swell (rigid).
* High risk for irritation – tissue breakdown under the cast – extra rigidity.
* Expensive.
* Inner layer dries slowly.
* Risk for over physical mobility – light.
1. Differentiate between a cast and a splint. (5 marks)

**Cast-** A method of temporary immobilization that circumferentially incorporates a part or parts of a body.

**Splint-** A method of temporary immobilization that non-circumferentially incorporates a part or parts of a body.

1. Explain two methods of drying the casts. (5 marks) marks

**1. Natural method**

Most commonly accepted method to dry in the presence of circulating air.

Patient in bed should leave the cast uncovered.

If possible patients position to be changed after two to four hours to ensure each drying of both surfaces.

The outpatient should be advised to expose the cast to warm air.

**2. Artificial method**

The use of electrically heated bed cradles for drying cast is discouraged.

Patient can suffer from overheating and cast can dry too quickly, unevenly and become brittle.

The amount of heat used must be controlled accurately.

Example- routine is a half hourly of direct heat followed by half routine without heat.

Parts of the patient not enclosed in the plaster must be protected from scorching.

1. List five equipment for removal of plaster of Paris. (5 marks)
* Plaster Shears
* Plaster Spreader
* Plaster Saw
* Electric Plaster cutter
* Mackin tosh
1. List five indications of a tight cast. (5 marks)
* Pain
* Pulselessness
* Palor
* Paresthesia
* paralysis
1. List five indications of a short arm cast. (5 marks)
* Phalangeal fractures,
* unstable metacarpal fractures,
* Ligamentous injuries to phalangeal and metacacarpo-phalangeal joint.
* Scaphoid fractures
* Colle’s fractures
1. List five indications of long arm cast. (5 marks)
* Galeazzi fractures
* Monteggia fractures
* Fractures of one or both bones of the forearm.
* Stable injuries of the elbow joint.
* Stable fractures of the distal humerus.
1. List five indications of cylinder cast. (5 marks)
* Stable fractures of patella bone
* Osteoarthritis of the knee joint
* Ligamentous injury of the knee
* Knee joint dislocations
* Knee joint subluxations

**SECTION C: LONG ANSWER QUESTION**

1. Discuss in a step by step process of applying a below knee slab. (20 marks)
* Create rapport with the patient
* Record the patient’s vital signs
* Examine the patient’s limb clinically
* Send for X-ray of the limb in question also compare with the sound limb
* Interpret the X-ray
* Inform the patient on the procedure to be carried out
* Prepare the materials, tools and equipment to be used during the procedure
* Have enough assistants
* Expose the area to be splinted
* Measure the length required and the width of the p.o.P bandages.
* Measure the length and the width of the pad.
* Roll the slabs end to end.
* Immerse in water.
* Wait for the bubbles to seize
* Remove immediately.
* Smoothen carefully and quickly on a flat surface.
* Compress the layers together and exclude the bubbles.
* Position the limb appropriately with the help of assistants
* Operator can secure the slab using gauze roll/crepe bandage.
* Trim the edges well and blunt them
* Clean the patient
* Balance the inventory book
* Book for TCA the following day
* Clean the working area

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**KENYA MEDICAL TRAINING COLLEGE**

**FACULTY OF CLINICAL SCIENCES**

**DEPARTMENT OF ORTHOPAEDIC & TRAUMA MEDICINE**

**FINAL QUALIFYING EXAMINATION**

**FOR**

**DIPLOMA IN ORTHOPAEDIC & TRAUMA MEDICINE**

**PAPER: CASTING PAPER ONE**

**DATE: TIME: 3 HOURS (9:00AM – 12:00NOON)**

**INSTRUCTIONS**

1. This paper consists of:
* Section 1 (40 Multiple Choice Questions)
* Section 2 (8 Short Answer Questions)
* Section 3 (1 Long Answer Question)
1. Attempt **ALL** Questions
2. Write the EXAMINATION **NUMBER** given on all the answer sheets provided and on the question paper.
3. Ensure that all examination answer scripts are handed in at the end of the examination
4. Ensure you sign the examination register provided

EXAMINATION NUMBER ………………………………………………………………

**DIPLOMA**

**PAPER ONE**

**SECTION ONE: MULTIPLE CHOICE QUESTIONS**

1. **Which one is *NOT* a reason for flexing the knee at 150 when applying a long leg cast?**
2. To facilitate walking
3. To prevent movement of the knee joint
4. To avoid joint stiffness
5. To put joint in the functional position
6. **General application of plaster casts is likely to cause**
7. Swelling
8. Constipation
9. Mental lethargy
10. Hypostatic pneumonia
11. **Presence of a swelling with shiny skin of the limbs after cast application is an indication of which complication?**
12. Malunion
13. Reflex sympathetic syndrome
14. Hematoma
15. Hypostatic pneumonia
16. **Which of the following is NOT an effect of immobilizing wrong joints wrongly?**
17. Fracture displacement
18. Neurovascular injury
19. Loss of joint movement
20. Early fracture healing
21. **When doing plaster casting , the following statement is true**
22. Bonny prominences are covered with wool
23. Stockinet and wool must be always be used
24. One layer of wool is recommended
25. Circular cast is advisable in posterior slab where no swelling of the limb is anticipated
26. **Before opening a P.O.P bandage, you should NOT always check for:**
27. Date of manufacture.
28. The wrapper is air tight.
29. Expiry date.
30. Manufacturing company.
31. **Mono-valving is indicated for:**
32. Severe edema.
33. Minimal edema.
34. Wet cast.
35. Un-uniting fracture.
36. **Areas that should be well padded include:**
37. Pressure tolerant areas.
38. Pressure sensitive areas.
39. Unanticipated swelling regions.
40. Bulky muscle regions.
41. **Which factor does NOT increase the setting time of P.O.P. cast?**
42. Cold environment
43. Hot water
44. Inadequate air circulation
45. Cold water
46. **Which statement is not true about plaster sores?**
47. Patient should be advised to use foreign objects to scratch
48. There is precipitation of the heat
49. There is purulent discharge
50. Patient complains of pain
51. **When doing plaster casting , the following statement is true**
52. Bonny prominences are covered with wool
53. Stockinette and wool must be always be used
54. One layer of wool is recommended
55. Circular cast is advisable in posterior slab where no swelling of the limb is anticipated
56. **Which one is NOT a feature of arterial obstruction of to a casted limb?**
57. Paralysis of fingers or toes
58. Paresthesia of fingers and toes
59. Pallor of the skin with disturbed capillary return
60. Severe pain at the fracture site
61. **Which of the following is true for casting of below knee with a swelling**
62. Back-slab covers whole limb circumference
63. Partial cast is applied on the limb
64. Spica is always used
65. External fixator applied
66. **Which of the following is not an indication of bivalving a cast?**
67. To facilitate daily dressing of a wound in a cast.
68. When the swelling of the affected limb has subsided
69. Underlying edema.
70. Itchy cast.
71. **A lady presents with swelling of hands with shiny skin. She had a history of fracture of radius and kept on P.O.P cast for 4 weeks. The most likely diagnosis is?**
72. Malunion
73. Myositis ossificans progressiva
74. Reflex sympathetic syndrome
75. Rupture of extensor pollicis longus tendon
76. **Which of the following is not an advantage of fiber glass cast?**
77. Fiber glass cast will retain its structural integrity in water
78. Fiber glass cast is light weight yet strong
79. Fiber glass cast will not expand to accommodate any swelling
80. Fiber glass cast comes in many colours
81. **Which of the following is not an effect of immobilizing joints wrongly?**
82. Fracture displacement
83. Neurovascular injury
84. Loss of joint movement
85. Early healing of fracture
86. **Indications for above knee cast are as follows EXCEPT**
87. Proximal tibial fractures
88. Ankle dislocations
89. Serial casting deformities
90. Some distal femur fractures.
91. **Which of the following factors decreases the setting time:**
92. Cold weather.
93. Cold water.
94. Sugar.
95. Borax.
96. **During cast removal, the patient may get injuries from the cast saw blade due to the following reasons except**
97. Dragging the blade up and down motions
98. Blood stained casts
99. Due to edema
100. Resin based materials
101. **A cast is usually wedged to do which of the following:**
102. Relieve swelling
103. Properly align a reduced-displaced fractured bone
104. Reduce skin irritation
105. Permit suture removal
106. **Which of the following is not one of the signs and symptoms of cast sores?**
107. Local heat.
108. Loose cast.
109. Burning sensation.
110. Offensive smell.
111. **Sermianto cast is**
112. Suitable for fresh fractures
113. Suitable for femur fractures only
114. Surgical method for fracture management
115. Suitable for callous formed fracture of tibia fibula.
116. **Cylinder cast is indicated to the following conditions EXCEPT**
117. Malleoli fracture
118. Knee dislocations
119. Patella fractures
120. Knee sprains
121. **Casting spreader is used for**
122. Opening up cervical collar
123. Plaster application
124. Opening up casts
125. None of the above
126. **During physical examination of a patient before casting the following clinical methods are observed except**
127. Mode of injury
128. History
129. Radiographic examination
130. All the above
131. **Which of the following increases the setting time of plaster of paris?**
132. Cold water
133. Hot water
134. Salt
135. None of the above
136. **In a minimally displaced fracture of the proximal humerus with impacted fragments, the major treatment is:**
137. Immobilization in hanging arm cast
138. Immobilization in an elevated cast
139. Immobilization with a sling and swathe
140. Immobilization in a U-slab
141. **The Dennis Browne splint is used in the treatment of:**
142. Clubfeet
143. Torticollis
144. Springe’s deformity
145. Brachial palsy.
146. **Which of the following statement is correct about cast setting:**
147. Setting time: time taken to change from powder form to crystalline form.
148. Drying time: time taken to change from crystalline form to anhydrous form.
149. Average setting time: 3-9 minutes.
150. Average drying time: 24 – 72 days.
151. The following is not a physical property of plaster of Paris.
152. Creamy.
153. White in colour.
154. Easily moudable.
155. Comes in many colours.
156. **After how long will you remove a lower limb cast from an adult patient?**
157. 9 weeks.
158. 3- 4 months.
159. 12 weeks
160. 6 months,
161. **Which type of cast will you apply on a dislocated-reduced elbow joint?**
162. Hanging cast.
163. Above elbow posterior slab.
164. Above elbow cast.
165. U-slab
166. **What is the reason for applying P.O.P cast diagonally?**
167. To have a firm cast.
168. To prevent cast breakages.
169. To avoid tourniqueting the limb
170. To increase the strength of the cast.
171. Which are not the possible areas of applying reinforcement sticks on casts?
172. At knee joint of above the knee cast.
173. At the hip joint of hip spicas.
174. At the level of fracture site on the cast.
175. Along the shafts of the casts
176. **Which of the following is a reason for applying anti-rotational bars on casts?**
177. Above knee unilateral casts
178. Below knee casts
179. Above knee bi-lateral casts
180. One and a half hip spica
181. **Which of the following is an indication for creating a window at the heal side?**
182. Below knee slabs.
183. Above knee casts.
184. Lower limb casts on a cerebral palsy patients.
185. Lower casts in children.
186. **Which of the following is not a reason for serial casting:**
187. Fractures of tibia-fibula.
188. Congenital talipes equino varus.
189. Correction of joint contractures.
190. Repaired tendon Achilles.
191. **Hard cervical collars are not indicated for:**
192. Whiplash injuries.
193. Fractures of cervical region.
194. Injuries around the hip in women.
195. Prolapsed intervertebral discs of the neck.
196. **Which of the following is a possible indication for a white man P.O.P cast?**
197. Vertebral discs fractures.
198. Pelvic fractures.
199. Shoulder joint fractures.
200. Sternum fractures.

**SECTION B: SHORT ANSWER QUESTIONS**

* + - 1. Explain five causes of swelling of a limb in a cast 5marks
* Tight cast
* Un-elevated cast
* Early mobilization of the limb
* Not exercising the digits
* Post cast injuries
* Non-paddng of the limb before casting
	+ - 1. Outline five causes of nerve damage in a cast 5 marks
* Direct compression by bone ends
* Direct plaster pressure on superficial nerves
* Indirect compression of the nerve by oedematous tissue
* Tourniquet effect by the padding material
* Reduced blood flow.
	+ - 1. Explain the action taken in case of suspected plaster sore 5 marks
* Encourage the patient to pin point the area and then mark it.
* Patient to report at once.
* Window the part and inspect the underlying skin.
* Cut by electric plaster cutter, plaster saw.
* Clean and dress the sore.
* Give antibiotics and analgesics
	+ - 1. List five items carried on an average plaster trolley 5 marks
* Protective materials – stockinette, felt wool bandages of varying widths.
* Plaster bandages of varying widths.
* Slabs of various widths.
* Plaster Shears and Plaster spreaders
* Plaster scissors, plaster knife, marking pencil.
* Orthopaedic pad/soffban of varying length.
* Electric Plaster Cutter.
* Water buckets.
* Triangular bandages/arm sling/collar and cuff.
* Walking heels, boots/iron for lower limb.
* Steel basin
	+ - 1. Outline clinical features of impaired blood circulation in a cast. 5 marks
* Coldness to the extremities
* Blueness/cyanosis
* Swelling.
* Pain
* Ischemia of the digits
	+ - 1. Outline five records indicated on patient’s outpatient card during Cast application. 5 marks
* Name, address and age.
* Diagnosis and plaster type applied, an anesthetic given, manipulation, simple application.
* Instructions given.
* Supplementary appliances given, e.g crutches.
* Date of next return.
	+ - 1. List five indications of padding 5 marks
* Where swelling is expected/present i.e. in almost every acute conditions.
* Where the limb is thin and the bones are very superficial.
* When electric plaster cutter are used for removal.
* When wedging is needed.
* It is always wise to protect bony prominences e.g. around joints when any plaster is applied.
* It increases patient comfort.
* To help to absorb blood and serous fluid.
	+ - 1. List five advantages of fibre glass 5 marks
* Light weight – less bulky.
* Easy to apply.
* Moisture proof.
* Fast drying (15min).
* With different colors.
* Early weight bearing.
* Radiolucent (x-ray vision can past).
* Strength weight ration.
* Feels cooler in hot weather.
* No crumble.

**SECTION C: LONG ANSWER QUESTION**

* + - 1. Discuss five after care of cast application. 20 marks
* The “green “cast is protected from stress and supported as necessary with the pillows.
* The Plaster is kept uncovered to promote cast drying.
* The patient is instructed in the danger signals and advised how to care for the cast
* Upper extremity casts are placed in slings until maturity is reached. Lower extremities casts, weight bearing or not, are initially protected by crutches. Patient should be instructed not to bear weight on a walking cast for 24hrs to 48 hours after application.
* Keep clean. The cast should be kept clean, for this prevents cast breakdown and somewhat restricts the patient from undesirable activities.
* Avoid moisture. The cast must be kept dry. Water causes the mature plaster to crumble and become soft. The gypsum is washed out and only the gauze bandage remains.
* Exercise joints. The patient should be encouraged to move all the adjacent joints not immobilized by the cast.
* Above knee Plaster cast- patient should exercise the hip joints and toes.
* Above Elbow plaster cast- shoulder, thumb and fingers for exercise.
* Isometric exercises of the muscles immobilized by the cast may be important to maintain good muscular tone.
* Don’t scratch. Many patients develop a tremendous desire to scratch an itch beneath a plaster. Manipulating devices such as a cloth hanger, back scratcher, or pencil beneath a plaster is prohibited.
* Inserted foreign bodies- No foreign objects should be introduced under the cast. FB may cause localized pressure on the skin with the possibility of pressure sore. Toothbrushes, coins, good luck charms, and may other objects have been associated with skin and tissue necrosis.
* Do not remove padding- Padding aids in immobilization and alleviates much of the uncomfortable sensation of the cast saw.
* Eat well balanced diet rich in calcium, phosphorus and magnesium supplements
* Always elevate the lower limb above the level of the heart to enhance circulation

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**DEPARTMENT OF ORTHOPAEDIC & TRAUMA MEDICINE**

**FINAL QUALIFYING EXAMINATION**

**FOR**

**CERTIFICATE IN ORTHOPAEDIC PLASTER TECHNOLOGY**

**PAPER: CASTING PAPER THREE**

**DATE: TIME: 3 HOURS (9:00AM – 12:00NOON)**

**INSTRUCTIONS**

1. This paper consists of:
* Section 1 (40 Multiple Choice Questions)
* Section 2 (8 Short Answer Questions)
* Section 3 (1 Long Answer Question)
1. Attempt **ALL** Questions
2. Write the EXAMINATION **NUMBER** given on all the answer sheets provided and on the question paper.
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EXAMINATION NUMBER ………………………………………………………………

**CERTIFICATE**

**PAPER THREE**

**CASTING TECHNIQUES**

**SECTION A: MULTIPLE CHOICE QUESTIONS**

1. **The amount of heat produced during casting does NOT depend on:**
2. Amount of water used.
3. Temperature of the water used.
4. The number of layers applied.
5. Manufactures specifications.
6. **Besides fractures, what other types of finger injury is likely to require the use of ulna gutter or radial gutter splint**
	1. Blood clots
	2. Severe sprains
	3. Tendinitis
	4. Carpal tunnel syndrome
7. **A long arm posterior splint is applied to the underside of the arms and extends from the proximal palmer crease all the way to the axilla. What is axilla?**
8. Top of the deltoid muscle
9. Mid-point of the upper arm
10. Armpit
11. Lateral part of the clavicle
12. **Functions of the tabular gauze/stockinette include the following EXCEPT:**
13. It is skin tight cast.
14. It helps prevent the limb-hairs from becoming caught in the plaster.
15. It removes any roughness caused by the plaster casts edges.
16. It aids in the removal of the cast.
17. **Cork up splint is used to manage:**
18. Foot drop.
19. Shoulder dislocation.
20. Wrist drop.
21. Mal-union of fractures.
22. **Figure of 8 bandage can best be applied to manage which orthopedic condition?**
23. Ankle joint sprains.
24. Fracture olecranon process.
25. Skull fractures.
26. Fractures of the ribs.
27. **Long arm posterior splints and double-sugar tong splints are used with fractures to the olecranon process. Olecranon is a bony prominence located at the top of the\_\_\_\_**
28. Radius
29. Ulna
30. Humerus
31. Acromion
32. **Choose the proper foot position for applying a posterior ankle or stirrup splint.**
33. Foot pointed towards the floor
34. Foot pointed towards the ceiling
35. Foot approximately at 900 angle with the lower leg
36. Foot turned in slightly to stretch the outer ankle
37. **What is the purpose of using ice cold compressions in the management of STIs.**
38. To vaso-dilate the blood vessels.
39. To increase blood circulation.
40. To make the limb cold.
41. To vaso-constrict the blood vessels.
42. **The bulky Jones splint is a specific type of stirrup splint. What is the difference between a stirrup splint and a bulky Jones splint?**
43. A bulky Jones splint is longer
44. A bulky Jones splint is made of elastic bandages
45. A bulky Jones splint requires the lower leg to be wrapped in cotton padding
46. A bulky Jones splint is only used for children
47. **Which material is NOT typically used for posterior ankle or stirrup splints?**
48. Plastics
49. Wood
50. Fiberglass
51. Plaster
52. **What do you understand by the term ‘100-900’tricky?**
53. Reduce the elbow joint to 1000 then back to 900.
54. Reduce the elbow joint to 900 then 1000.
55. Reduce the knee joint to 1000 then back to 900.
56. Reduce the knee joint to 900 then 1000.
57. **When you mix P.O.P in water, there is production of bubbles, this is due to:**
58. Heat production.
59. Thermal expansion of P.O.P.
60. Formation of gypsum molecules.
61. Drying of the cast.
62. **What do you understand by the term ‘green period’ in casting?**
63. Grace period when modeling of the cast can be done.
64. Period when the fracture is fresh.
65. Period when the cast is producing bubbles.
66. Period when the cast cannot break.
67. **Windowing of a cast is done to:**
68. Correct deformities.
69. Inspection of the cast.
70. Allow dressing of the wound.
71. To make the cast cosmetic.
72. **When ulna gutter and radial gutter splints are applied, the fingers are usually placed in a\_\_\_\_\_ position**
73. Straight
74. Slightly extended
75. Flexed and rounded
76. Slightly pronated
77. **Which of the following is NOT a disadvantage of oscillating plaster machine?**
78. Not easy to cut dry casts
79. Produces scary noise
80. Can easily cause burns
81. Cannot be used without electricity
82. **What do you understand by the rule of two in casting:**
83. Two patients, two practitioners, two limbs.
84. Two X-rays, two joints, two practitioners.
85. Two applications, two X-rays, two patients.
86. Two days, two joints, two X-rays.
87. **Both the long arm posterior splint and the double sugar-tong splint are applied to the arm with the elbow bent at a\_\_\_ degree angle.**
88. 45
89. 60
90. 90
91. 125
92. **Single sugar-tong splints usually begin at the proximal palmer crease, extend down the forearm, wrap round and under the elbow, extend up the back of the fore arm and end at the\_\_\_\_\_**
93. Base of the wrist
94. Tip of the fingers
95. Base of the fingers
96. One inch below the wrist
97. **Mallet finger splints are used for avulsions of extensor tendon. Which of the following describes this type of injury?**
	1. Tendon detaches from the bone
	2. Tendon becomes weak
	3. Tendon becomes inflamed
	4. Tendon is stretched out
98. **Which of the following is an indication for creating a window at the heel side of a lower limb cast?**
99. Below knee slabs.
100. Above knee casts.
101. Lower limb casts on cerebral palsy patients.
102. Lower casts in children.
103. **Which of the following is NOT a reason for serial casting:**
104. Fractures of tibia-fibula.
105. Congenital talipes equino varus.
106. Correction of joint contractures.
107. Repaired tendon Achilles.
108. **Hard cervical collars are NOT indicated for:**
109. Whiplash injuries.
110. Fractures of cervical region.
111. Injuries around the hip in women.
112. Prolapsed intervertebral discs of the neck.
113. **Which of the following is a possible indication for a white man P.O.P cast?**
114. Vertebral discs fractures.
115. Pelvic fractures.
116. Shoulder joint fractures.
117. Sternum fractures.
118. **Which of the following is the COMMONEST cause of cast related compartmental syndrome?**
119. A firmly cast.
120. A tight cast.
121. An elevated limb in a cast.
122. Long leg cast.
123. **A patient on a lower limb cast with a callus forming fracture is advised to bear weight so as to:**
124. Reduce pain.
125. Prevent re-displacement of the fracture.
126. Increase calcification of the fracture.
127. Gain mobility.
128. **Which one the following is NOT a rule of splintage:**
129. Prolonged duration of casting.
130. Have uninterrupted casting procedure.
131. Have a rigid cast for adequate mobilization.
132. Extend the cast to accommodate two joints.
133. **Mono-valving is indicated for:**
134. Severe edema.
135. Minimal edema.
136. Wet cast.
137. Un-uniting fracture.
138. **Choose the proper foot position for applying a posterior ankle or stirrup splint.**
139. Foot pointed towards the floor
140. Foot pointed towards the ceiling
141. Foot approximately at 900 angle with the lower leg
142. Foot turned in slightly to stretch the outer ankle
143. **Rest as used in management of orthopaedic and trauma conditions simply means:**
144. Patient to sleep always.
145. Patient to sit on the chair.
146. Patient to have reduced activities after immobilization.
147. Patient not to walk
148. **Orthopaedic technologists are a family of orthopaedics that are specialists in:**
149. Exercising the patient.
150. Fine tune maneuvers to restore functions.
151. Fabrications of orthotics and prosthetics.
152. Surgery of orthopaedic patients.
153. **A patient on a lower limb cast with a callus forming fracture is advised to bear weight so as to:**
154. Reduce pain.
155. Prevent re-displacement of the fracture.
156. Increase calcification of the fracture.
157. Gain mobility.
158. **Areas that should be well padded include:**
159. Pressure tolerant areas.
160. Pressure sensitive areas.
161. Unanticipated swelling regions.
162. Bulky muscle regions.
163. **Patients with knee injuries will benefit from which of the following treatments?**
164. Rest, ice, compression, elevation
165. Hiking, ice, long term splint use, sunlight
166. Rest, traction, massage therapy, gait therapy
167. Heat, exercise, water therapy, pain medication
168. **The importance of applying Wool padding in plaster of Paris application is**
169. To protect the bony prominences and increase comfort to the patient
170. To protect the skin from sweating
171. To protect the skin when cutting with oscillating machine
172. To act as a reinforcement material
173. **Hanging cast is indicated for which fracture**

 a) Supracondylar humerus

 b) Clavicular

 c) Colles

 d) Mid shaft humerus

1. **Which of the following is Not a best advice to give the patient after cast application?**
2. Always elevate the limb to the level above the heart
3. Do not pour water onto the cast
4. Exercise the exposed digits
5. Patient must be reviewed after 24 hours
6. **What period of time do fractures of lower limb in children takes to unite**
7. 2 weeks
8. 3 months
9. 6 weeks
10. 4 weeks
11. **Which of the following is NOT true about removal of casts**
12. Do check X-ray after removal of the cast
13. Cut in coronal plane while removing cast on the lower limbs
14. Cut in sagittal plane while removing cast on the upper limbs
15. Refer the patient for rehabilitation services after removal of the cast

**SECTION B: SHORT ANSWER QUESTIONS**

* + - 1. Outline five purposes of casts 5mks
* Immobilize parts of the body.
* Hold bone fragments in reduced position (reduction is bringing the fractured on its anatomical position).
* Apply uniform compression incases of swelling
* Stabilize weak joints.
* Correct deformities.
* Support weakened limb.
* Permit early weight bearing on affected side.
	+ - 1. Highlight five indications for use of P.O.P 5marks
* Immobilization of fractures.
* Immobilization of diseased bones and joints.
* Correction of deformities e.g. club foot.
* Prevention of deformities.
* Emergency Splintage.
* Making of negative and positive casts.
* Immobilization in the treatment of burns and soft tissues injuries.
	+ - 1. Outline five advantages of P.O.P 5 marks
* Low allergic response.
* Offers rigid protection.
* Easy to apply.
* Inexpensive.
* Shape better than synthetic cast because of easy mouldability.
	+ - 1. List five benefits of using standard plaster of Paris 5marks
* Easy, creamy application.
* Excellent moulding properties.
* Low Plaster loss.
* Flexible working time.
* Strong.
* Smooth finish.
* Cost – effective.
* Versatile range.
* Easy removal.
* Customisable.
	+ - 1. Outline five rules of application of P.O.P Casts 5marks
* 8 inch for thigh, 6 inch for leg and 4 inch for forearm.
* One joint above and one joint below.
* Moulded with palm and not with fingers to avoid indentation.
* Joints should be immobilized in functional position.
* Not too tight or too loose i.e. adequate padding.
* Dip pop vertically in water till air bubble ceases to come.
* Uniform thickness of plaster is preferred.
	+ - 1. Outline five complications P.O.P Casts 5 marks
* Loss of position of fracture fragments.
* Plaster sores.
* Loss of muscle power
* Impaired circulation.
* Joint stiffness
* Disuse muscle dystrophy
* Disuse osteoporosis
	+ - 1. Outline five signs suggestive of plaster sores. 5 marks
* Heat and swelling of the digits.
* Increased warmth over a localized area of the cast
* Localized odour.
* Visible pus
* Staining of the cast.
	+ - 1. Outline five ways of managing swelling of a limb in a cast. 5marks
* Ensure the cast is not too tight
* Trim the edges well and blunt them
* If there is swelling-elevate the part affected.
* Ensure that digital exercise is done.
* If the problem persist and the patient experience a lot of discomforts, split the .PO.P and elevate the limb.
* Advice the patient not to use the limb at an early stage
* patient

**SECTION C: LONG ANSWER QUESTION**

* + - 1. Discuss five complications of P.O. P Casts. 20marks
* Loss of position of fracture fragments.
* Plaster sores.
* Loss of muscle power
* Impaired circulation.
* Stiffness of the joint due to inactivity. Free joints are to be kept mobile -. Encourage exercises.
* Muscle wasting- keep the muscles in tone e.g encouraging exercises.
* Venous thrombosis- common sites coronary and pulmonary infarction. Comes about due to blood flow cut off.

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**FINAL QUALIFYING EXAMINATION**

**FOR**

**CERTIFICATE IN ORTHOPAEDIC PLASTER TECHNOLOGY**

**PAPER: CASTING TECHNIQUES PAPER TWO**

**DATE: TIME: 3 HOURS (9:00AM – 12:00NOON)**

**INSTRUCTIONS**

1. This paper consists of:
* Section 1 (40 Multiple Choice Questions)
* Section 2 (8 Short Answer Questions)
* Section 3 (1 Long Answer Question)
1. Attempt **ALL** Questions
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EXAMINATION NUMBER ………………………………………………………………

**CASTING PAPER TWO**

**SECTION A: MULTIPLE CHOICE QUESTIONS**

1. **Which one of the following is NOT a Quality of a Soft ban:**
	1. Comfortable
	2. Hard to tear
	3. Allergic
	4. absorbent
2. **Evaluation of a patient before plaster application include:**
	1. Quality of the skin is checked
	2. History taking
	3. Complete neurovascular examination
	4. All the above
3. **Which one is NOT true about below elbow casts**
	1. Extends from above the elbow to the palm crease
	2. For wrist sprains and carpal fractures
	3. For Smith’s fracture
	4. For colle’s fracture
4. **Cylinder casts is used for:**
	1. Distal femoral fractures
	2. Malleoli fractures
	3. Ankle joint injuries.
	4. Patella fractures
5. **Which one of the following is NOT true about cast application:**
	1. Fibre glass takes 2-3 days to dry completely.
	2. Stockinette may be used as the first layer.
	3. Fibre glass is lighter than P.O.P
	4. We approach the skin diagonally.
6. **Which one of the following is NOT a physical property of P.O.P.**
	1. Sets in 2 – 3 minutes
	2. It is smooth when moulded.
	3. It is creamy
	4. Comes in single colour.
7. **Long arm casts usually begin at the middle of the humerus, extends down the arm, and ends at the\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
	1. Base of the wrist
	2. Base of fingers
	3. End of the fingers
	4. Mid-point of the forearm
8. **A fracture to which of the following fingers would most likely require an ulna gutter splint**
	1. Pinky fingers
	2. Middle fingers
	3. Pointer fingers
	4. Thumb
9. **Besides fractures, what other types of finger injury is likely to require the use of ulna gutter or radial gutter splint**
	1. Blood clots
	2. Severe sprains
	3. Tendinitis
	4. Carpal tunnel syndrome
10. **When doing plaster casting , the following statement is true**
	1. Bonny prominences are covered with wool
	2. Stockinette and wool must be always be used
	3. One layer of wool is recommended
	4. Circular cast is advisable in posterior slab where no swelling of the limb is anticipated
11. **Which one is NOT a feature of arterial obstruction of to a casted limb?**
	1. Paralysis of fingers or toes
	2. Paresthesia of fingers and toes
	3. Pallor of the skin with disturbed capillary return
	4. Severe pain at the fracture site
12. **Which of the following is true for casting of below knee with a swelling**
	1. Back-slab covers whole limb circumference
	2. Partial cast is applied on the limb
	3. Spica is always used
	4. External fixator applied
13. **The purpose of reducing the elbow joint using the ‘100-900’ tricky is to:**
	1. Reduce pain at the elbow joint.
	2. Avoid creasing of the cast at the elbow joint.
	3. To improve blood circulation.
	4. To enhance healing of the fracture.
14. **Mallet finger splints are used for avulsions of extensor tendon. Which of the following describes this type of injury?**
	1. Tendon detaches from the bone
	2. Tendon becomes weak
	3. Tendon becomes inflamed
	4. Tendon is stretched out
15. **A lady presents with swelling of hands with shiny skin. She had a history of fracture of radius and kept on P.O.P cast for 4 weeks. The most likely diagnosis is?**
	1. Malunion
	2. Myositis ossificans progressiva
	3. Reflex sympathetic syndrome
	4. Rupture of extensor pollicis longus tendon
16. **Which of the following is NOT an advantage of fiber glass cast?**
	1. Fiber glass cast will retain its structural integrity in water
	2. Fiber glass cast is light weight yet strong
	3. Fiber glass cast will not expand to accommodate any swelling
	4. Fiber glass cast comes in many colours
17. **Thumb spica splints are commonly used for injured thumbs and are usually worn until\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
	1. Swelling of injury goes away
	2. Injury is completely healed
	3. A person regains feeling in the thumb
	4. A person can move their thumb
18. **Which of the following types of finger splints is applied to only the tip of the finger**
	1. Buddy taping
	2. Finger spica splint
	3. Dorsal extension-block splint
	4. U-shaped splint
19. **During cast removal, the patient may get injuries from the cast saw blade due to the following reasons EXCEPT**
	1. Dragging the blade up and down motions
	2. Blood stained casts
	3. Due to edema
	4. Resin based materials
20. **A cast is usually wedged to do which of the following:**
	1. Relieve swelling
	2. Properly align a reduced-displaced fractured bone
	3. Reduce skin irritation
	4. Permit suture removal
21. **Which of the following is not one of the signs and symptoms of cast sores?**
	1. Local heat.
	2. Loose cast.
	3. Burning sensation.
	4. Offensive smell.
22. **Cylinder cast is indicated to the following conditions EXCEPT**
	1. Malleoli fracture
	2. Knee dislocations
	3. Patella fractures
	4. Knee sprains
23. **Both posterior ankle splints and bulky Jones splints are used for fractures of the malleolus. What is malleolus?**
	1. A bone in the middle of the foot
	2. The bone at the base of the big toe
	3. The round bone that sticks out from the sides of the ankle joint
	4. The bone that makes up the heel of the foot
24. **Which situation would a splint NOT be the best choice of treatment**
	1. A patient with finger dislocation
	2. A patient with non-displaced , closed fracture
	3. A patient with a sprained ankle joint
	4. A patient with tendonitis of the elbow.
25. **In a minimally displaced fracture of the proximal humerus with impacted fragments, the major treatment is:**
	1. Immobilization in hanging arm cast
	2. Immobilization in an elevated cast
	3. Immobilization with a sling and swathe
	4. Immobilization in a U-slab
26. **When long arm casts are applied, the elbow joint is usually bent at \_\_\_\_\_\_degrees.**
	1. 450
	2. 600
	3. 900
	4. 1200
27. **Which type of cast will you apply on a dislocated-reduced elbow joint?**
	1. Hanging cast.
	2. Above elbow posterior slab.
	3. Above elbow cast.
	4. U-slab
28. **What is the reason for applying P.O.P cast diagonally?**
	1. To have a firm cast.
	2. To prevent cast breakages.
	3. To avoid tourniqueting the limb
	4. To increase the strength of the cast.
29. **Which are NOT the possible areas of applying reinforcement sticks on casts?**
	1. At knee joint of above the knee cast.
	2. At the hip joint of hip spicas.
	3. At the level of fracture site on the cast.
	4. Along the shafts of the casts
30. **Short arm casts are frequently used for Colle’s fractures. Where do Colle’s fractures occur?**
	1. On the radius near the wrist
	2. On the radius near the elbow
	3. On the ulna near the elbow
	4. On the ulna near the wrist
31. **Which of the following is a benefit of treatment using a splint**
	1. Splints are water proof, so that one may continue with their daily swimming
	2. Splints permit swelling, thereby reducing the risk of neurovascular compromise
	3. Splints cannot be removed, providing a constant stable environment for healing
	4. Splints can be removed, so that the patient can put it on and off as much as they want
32. **Why is the bulky Jones splint called “ bulky”**
33. It is mostly used for injuries that result in the ankle being very swollen
34. The ankle is first wrapped with a thick cotton wrap before the splint is applied
35. Splint is made up of a very thick metal material
36. The person who created this type of splint was named Bulky Jones.
37. **When a volar/dorsal and single sugar-tong splints are applied, the wrist is usually in an\_\_\_\_\_position**
38. Extended
39. Flexed
40. Abducted
41. Adducted
42. **Which of the following people would mostly need to use a volar/dorsal splint**
43. Larry, who sprained wrist
44. Dan, who fractured his ulna
45. Bretty, who fractured his radius
46. Mike, who just had surgery to his wrist and hand
47. **Knee injuries can be classified according to sprains, fractures, inflammatory, and\_\_\_**
48. Lacerations
49. Strains
50. Abrasions
51. contractures
52. **A patient on a lower limb cast with a callus forming fracture is advised to bear weight so as to:**
53. Reduce pain.
54. Prevent re-displacement of the fracture.
55. Increase calcification of the fracture.
56. Gain mobility.
57. **Which of the following is NOT diseases of the cast:**
58. Joint stiffness.
59. Osteoporosis.
60. Plaster sores.
61. Callus formation.
62. **Which one of the following is an indication for aero-plane cast in children?**
63. Club foot.
64. Congenital dislocation of the hip.
65. Erb’s palsy.
66. Achondroplasia.
67. **After how long will you remove a lower limb cast from an adult patient?**
68. 6 weeks.
69. **3- 4 months.**
70. 8 weeks
71. 6 months,
72. **Which of the following is a reason for applying anti-rotational bars on casts?**
73. Above knee unilateral casts
74. Below knee casts
75. **Above knee bi-lateral casts**
76. One and a half hip spica

**SECTION B: SHORT ANSWER QUESTIONS**

* + - 1. Highlight five types of upper limbs splints/casts 5marks
* Figure of eight
* Sling and swathe
* Sugar tong-proximal and distal
* Long arm posterior splint
* Ulnar gutter
* Radial gutter
* Volar splint
* Thumb spica
* Finger splints
* Short arm casts
* Long arm casts
* Shoulder hood casts
* Shoulder spica casts
	+ - 1. Mention five indications of above elbow casts 5 marks
* Unstable ligamentous injuries of the wrist joint.
* Unstable fractures of the carpal bones.
* Fractures of one or both bones of the forearm.
* Stable injuries of the elbow joint.
* Stable fractures of the distal humerus.
* Monteggia ffractures
* Galeazzi fractures
	+ - 1. Mention five injuries that can be managed by a boot cast 5marks
* Fracture metatarsals
* Fracture phalanges
* Dislocations of tarso-metatarsal joints
* Fractures of the tarsal bones
* Dislocations of the metatarso-phalangeal joints
* Dislocations of the inter-phalangeal joints
	+ - 1. List five causes of injuries by saw blade. 5 marks
* Stained casts
* Swollen limbs
* Dragging the saw blade along the cast
* Synthetic casts
* Un-skilled personnel
	+ - 1. Highlight five advantages of fibre glass over P.O.P Cast 5marks
* Light weight – less bulky.
* Easy to apply.
* Moisture proof.
* Fast drying (15min).
* Different colors.
* Early weight bearing.
* Strength weight ratio, stronger than p.o.P
* Feels cooler in hot weather.
* Cannot crumble.
	+ - 1. List five items used during cast application 5marks
* Protective materials – stockinette, felt wool bandages of varying widths.
* Plaster bandages of varying widths.
* Slabs/p.o.P bandages of various widths.
* Plaster scissors, plaster knife, marking pencil.
* Orthopaedic pad/soffban of varying length.
* Electric Plaster Cutter.
* Water buckets.
* Triangular bandages/arm sling/collar and cuff.
* Walking heels, boots/iron for lower limb.
* Steel basin
* Crutches
	+ - 1. List five indications of a posterior splints 5 marks
* Buckle injuries and minor physeal injuries at the wrist.
* Fresh fractures where swelling is expected.
* Injuries around the joints, supracondylar fractures in children.
* Most elbow fractures. Complete casts are not necessary and are dangerous, even if split.
* Temporary support for many hand and foot injuries.
* Tibial fractures with significant swelling.
* Crush injuries and open fractures.
	+ - 1. Explain the rule of splintage. 5 marks
* Splint must be prolonged in duration of application
* It must be rigid enough to immobilize the injuries
* There should be disturbance during application
* Elongate the cast to include the joint below and above the fracture site
* The limb must always be elevated

**SECTION C: LONG ANSWER QUESTION**

Describe 5 types of slabs and their indications 20 Marks

• Sugar tong-proximal and distal- fore arm injuries

• Long arm posterior splint-injuries around the elbow and fore arm

• Ulnar gutter- injuries on the ulna aspect of the hand

* Radial gutter-injuries around the radial side of the hand
* Volar splint- injuries of the wrist, carpal bones and metacarpal bones

• Finger splints- injuries of the fingers

**Lower extremity splints**

• Knee splint- injuries of the knee

• Posterior leg splint- injuries of the tibia/fibula bone shafts

• Stirrup splint- injuries around the ankle joint

• Budding taping- injuries of the fingers and toes

Contraindications of each of the above slabs

* Swelling
* Bruises
* Lacerations
* Injuries occurring on thse opposite side

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**PAPER: CASTING TECHNIQUES PAPER ONE**

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**CASTING PAPER ONE**

**SECTION ONE: MULTIPLE CHOICE QUESTIONS**

1. **Which one is NOT a reason for flexing the knee at 150 when applying a long leg cast?**
2. To facilitate walking
3. To prevent movement of the knee joint
4. To avoid joint stiffness
5. To put joint in the functional position
6. **Which of the following is NOT a Principle for application of plaster of Paris?**
7. Joint below and above should not be included.
8. Joints should be mobilized in anatomical position.
9. Mould with the palm of the hands and fingers.
10. Dip plaster roll in water until the bubbles ceases**.**
11. **Which factor does NOT increase the setting time of P.O.P. cast?**
12. Cold environment
13. Hot water
14. Inadequate air circulation
15. Cold water
16. **One of the following is NOT an Indication for above knee cast**
17. Proximal tibial fractures
18. Ankle dislocations
19. Serial casting deformities
20. Some distal femur fractures
21. **Hip Spica is best applied to:**
22. Shaft femur fractures in children
23. Shaft femur fractures.
24. Fracture neck of femur in adults.
25. Distal femur fractures
26. **Padding during dynacast application is done due to the following EXCEPT:**
27. Protect bony prominences
28. Is applied where swelling is anticipated
29. Increases pain comfort.
30. Strengthens the fracture site.
31. **Which one of the following is NOT an Indication for a U - slab**
32. Fracture upper humerus
33. Fracture neck humerus
34. Fracture shaft radius
35. Fracture shaft humerus.
36. **The commonest complication of plaster of Paris in management of fractures is?**
37. Non-union
38. Mal-union
39. Joint stiffness
40. Deep venous thrombosis
41. **Which of the following is NOT the use of casts?**
42. Correct deformities
43. Support and mobilize joints.
44. Support fractured bones.
45. Make negative moulds of parts of the body.
46. **Indication for circumferential casting is:**
47. Severe swelling
48. Compartment syndrome
49. Closed fractures.
50. Insensate limbs.
51. **Skin injury from the cast saw is more UNLIKELY in:**
52. A wet cast.
53. Patients with fragile skin like babies and the elderly.
54. Burns from oscillator machine.
55. Badly applied cast**.**
56. **Sermiato cast is**
57. Suitable for fresh fractures.
58. Suitable for femur fractures only.
59. Suitable for walking cast.
60. Surgical method of fracture treatment.
61. **Which of the following is NOT a Cast removal equipment.**
62. Cast spreader
63. Plaster lorenz.
64. Plaster bender
65. Plaster knife
66. **Which one of the following is NOT a reason why Casts can be removed earlier than expected:**
67. To allow for wound dressings
68. To examine a painful area
69. To check fracture healing
70. To relieve pressure.
71. **An ideal cast should NOT be:**
72. Inflammable and non-toxic
73. Light in weight and well fitting
74. Very loose to prevent pressure sores.
75. Functional.
76. **Which of the following is the BEST management for un-displaced clavicle fractures?**
77. Co-arbitation cast
78. Hanging cast
79. Shoulder spica cast
80. Arm-sling
81. **Which one of the following is NOT a reason why patients get injuries from cast saw blade during cast removal?**
82. Dragging the blade up and down motions
83. Blood stained casts
84. Presence of edema or swelling
85. Resin based materials
86. **After skin care during cast removal include:**
87. Removing the scaly skin
88. Encourage the patient to expose the skin to the sun
89. Wash, dry and oil or cream the skin.
90. Re-apply cast.
91. **Which is NOT COMMONEST cause of pressure or cast sores.**
92. Foreign objects in the casts.
93. Edema.
94. Even bandaging techniques.
95. Fiberglass casts
96. **Which of the following is NOT a Clinical feature of cast sores?**
97. Local heat.
98. Loose cast.
99. Burning pain.
100. Offensive smell.
101. **Improper cast length can result in**
102. Unnecessary immobilization of the joints
103. Ulceration at the edge of the cast
104. Fracture just above or below the cast
105. All of the above
106. **Which statement is NOT true about plaster sores?**
107. Patient should be advised to use foreign objects to scratch
108. There is precipitation of the heat
109. There is purulent discharge
110. Patient complains of pain
111. **During casting:**
112. Bonny prominences are covered with wool
113. Stockinette and wool must be always be used
114. One layer of wool is recommended
115. Circular cast is advisable in posterior slab where no swelling of the limb is anticipated
116. **Which one is not a feature of arterial obstruction of to a casted limb?**
117. Paralysis of fingers or toes
118. Paresthesia of fingers and toes
119. Pallor of the skin with disturbed capillary return
120. **Severe pain at the fracture site**
121. **Which of the following is true for casting of below knee with a swelling**
122. Back-slab covers whole limb circumference
123. Partial cast is applied on the limb
124. Spica is always used
125. External fixator applied
126. **Which of the following is NOT an indication of bivalving a cast?**
127. To facilitate daily dressing of a wound in a cast.
128. When the swelling of the affected limb has subsided
129. Underlying edema.
130. Itchy cast.
131. **A lady presents with swelling of hands with shiny skin. She had a history of fracture of radius and kept on P.O.P cast for 4 weeks. The most likely diagnosis is?**
132. Malunion
133. Myositis ossificans progressiva
134. Reflex sympathetic syndrome
135. Rupture of extensor pollicis longus tendon
136. **Which of the following is NOT an advantage of fiber glass cast?**
137. Fiber glass cast will retain its structural integrity in water
138. Fiber glass cast is light weight yet strong
139. Fiber glass cast will not expand to accommodate any swelling
140. Fiber glass cast comes in many colours
141. **Which of the following is NOT an effect of immobilizing joints wrongly?**
142. Fracture displacement
143. Neurovascular injury
144. Loss of joint movement
145. Early healing of fracture
146. **Indications for above knee cast are as follows EXCEPT**
147. proximal tibial fractures
148. ankle dislocations
149. serial casting deformities
150. Some distal femur fractures.
151. **Which of the following factors decreases the setting time:**
152. Cold weather.
153. Cold water.
154. Sugar.
155. Borax.
156. **A cast is usually wedged to do which of the following:**
157. Relieve swelling
158. Properly align a reduced-displaced fractured bone
159. Reduce skin irritation
160. Permit suture removal
161. **Which of the following is NOT one of the signs and symptoms of cast sores?**
162. Local heat.
163. Loose cast.
164. Burning sensation.
165. Offensive smell.
166. **Cylinder cast is indicated to the following conditions EXCEPT**
167. Malleoli fracture
168. Knee dislocations
169. Patella fractures
170. Knee sprains
171. **Casting spreader is used for**
172. Opening up cervical collar
173. Plaster application
174. Opening up casts
175. None of the above
176. **During physical examination of a patient before casting the following clinical methods are observed except**
177. Abrasions
178. Scars
179. Sinuses
180. Pain
181. **In a minimally displaced fracture of the proximal humerus with impacted fragments, the major treatment is:**
182. Immobilization in hanging arm cast
183. Immobilization in an elevated cast
184. Immobilization with a sling and swathe
185. Immobilization in a U-slab
186. **The Dennis Browne splint is used in the treatment of:**
187. Clubfeet
188. Torticollis
189. Springe’s deformity
190. Brachial palsy.
191. **Which of the following statement is NOT correct about cast setting:**
192. Setting time: time taken to change from powder form to crystalline form.
193. Drying time: time taken to change from crystalline form to anhydrous form.
194. Average setting time: 3-9 minutes.
195. Average drying time: 24 – 72 days.
196. **The following is not a physical property of plaster of Paris.**
197. Creamy.
198. White in colour.
199. Easily moudable.
200. Comes in many colours.

**SECTION B: SHORT ANSWER QUESTIONS**

* + - 1. Outline five factors that affect setting time and drying time of plaster of Paris 5marks
* The dipping water should be kept clean
* The dipping water should be kept fresh.
* The temperature of the water should be tepid or slightly warm for plaster,
* The temperature of the water should be cool or room temperature for synthetic tape material.
* Manufactures desire
* Impurities in the dipping water
* Addition of salt products
* Weather effect of the day
	+ - 1. List five disadvantages of plaster of Paris 5marks
* Causes circulatory catastrophes’.
* Causes pressures sores
* Are heavy and inconvenient to the patient.
* Stiffness of joint
* Bones become osteoporotic.
* Uncertain immobilization.
* Not water proof.
* Loss of position of the fractures.
* Difficult to inspect the limb so it may conceal trouble e.g. wound breakdown.
* Long drying.
* May crumble and disintegrate at edges.
	+ - 1. List five most likely reasons for plaster sore development 5marks
* Poor technique with inadequate padding, or a ridge inside the cast, or failure to trim the ends of the cast correctly.
* Local cast breakdown with skin irritation due to poor care.
* Foreign bodies may easily slip between the cast and the skin. Children especially may insert small toys, coins or beads while hairgrips may fall inside the cast.
Patients should be warned of these damages and also to care for the plaster edges since wetting will cause plaster crumbs to be detached and fall inside the cast.
* Scratching at minor irritation beneath the cast with metal implements or knitting needles may cause trauma and infection. Such irritation should be reported and investigated early.
* Plaster soakage leading to skin damage and infection
* Cut edges of plaster following splinting or [bi-valving](http://boneandspine.com/what-is-bivalve-cast/)or window procedures may irritate the skin especially if swelling occurs around the edge.
	+ - 1. List five disadvantages of using synthetic casting tape 5 marks
* Application requires speed and accuracy.
* May bind if tissues swell (rigid).
* High risk for irritation – tissue breakdown under the cast – extra rigidity.
* Expensive.
* Inner layer dries slowly.
* Risk for over physical mobility – light.
	+ - 1. List five clinical features a patient is supposed to observe after P.O.P application. 5marks
* Change of color from pink-red to blue-black
* Swelling
* Paresthesia
* Skin breakages
* paralysis
	+ - 1. List Five indications of long arm cast. 5 marks.
* Unstable ligamentous injuries of the wrist joint.
* Unstable fractures of the carpal bones.
* Fractures of one or both bones of the forearm.
* Stable injuries of the elbow joint.
* Stable fractures of the distal humerus.
* Monteggia fractures
* Galeazzi fractures
	+ - 1. Calculate the chemical formulae of P.O.P 5Marks

2 (caso4-2H2O) changes (CaSo4).H2o + 3H20

Gypsum P.O.P water

* + - 1. Outline five characteristics of P.O.P 5 Marks
* It soaks rapidly.
* Smooth when moulding.
* It is creamy and
* Innocuous to the skin (Innocuous-harmless)
* It sets fast- can be moulded as desired.
* Light cast translucent to X-rays.
* It has a combined strength with durability.
* Low plaster loss properties depending with the brand, examples, gypsona.

**SECTION C: LONG ANSWER QUESTION**

Explain in a step by step process of applying a long leg cast. (20 marks)

* Create rapport with the patient
* Record the patient’s vital signs
* Examine the patient’s limb clinically
* Send for X-ray of the limb in question, also compare with the sound limb
* Interpret the X-ray
* Inform the patient on the procedure to be carried out
* Prepare the materials, tools and equipment to be used during the procedure
* Have enough assistants
* Expose the area to be casted
* Reduce the injury
* Maintain the reduced position undisturbed
* Apply the padding material diagonally, starting from the MP joints of the toes to the buttock crease overlapping half the width
* Open the p.o.P bandage vertically after checking the expiry date, and ensuring the wrapper is in situ
* Immerse in water vertically until all the bubbles seize
* Remove the bandage and hold in the air until the last drop
* Apply the bandage diagonally overlapping half the width up to 6 layers
* Prepare the sole and apply it
* Maintain the knee joint at 15 degrees and ankle joint at 90 degrees
* Smoothen carefully and quickly using the palm of the hand
* Position the limb appropriately with the help of assistants
* Operator can secure the slab using gauze roll/crepe bandage.

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**KENYA MEDICAL TRAINING COLLEGE**

**FACULTY OF CLINICAL SCIENCES**

**DEPARTMENT OF ORTHOPAEDIC & TRAUMA MEDICINE**

**FINAL QUALIFYING EXAMINATION**

**FOR**

**DIPLOMA IN ORTHOPAEDIC & TRAUMA MEDICINE**

**PAPER: CASTING PAPER THREE**

**DATE: TIME: 3 HOURS (9:00AM – 12:00NOON)**

**INSTRUCTIONS**

1. This paper consists of:
* Section 1 (40 Multiple Choice Questions)
* Section 2 (8 Short Answer Questions)
* Section 3 (1 Long Answer Question)
1. Attempt **ALL** Questions
2. Write the EXAMINATION **NUMBER** given on all the answer sheets provided and on the question paper.
3. Ensure that all examination answer scripts are handed in at the end of the examination
4. Ensure you sign the examination register provided

EXAMINATION NUMBER ………………………………………………………………

**FQE PAPER THREE**

**CASTING TECHNIQUES**

**SECTION ONE: MULTIPLE CHOICE QUESTIONS**

1. **Long arm casts usually begin at the middle of the humerus, extends down the arm, and ends at the\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
2. Base of the wrist
3. Base of fingers
4. End of the fingers
5. Mid-point of the forearm
6. **A fracture to which of the following fingers would most likely require an ulna gutter splint**
	1. Pinky fingers
	2. Middle fingers
	3. Pointer fingers
	4. Thumb
7. **Besides fractures, what other types of finger injury is likely to require the use of ulna gutter or radial gutter splint**
	1. Blood clots
	2. Severe sprains
	3. Tendinitis
	4. Carpal tunnel syndrome
8. **When doing plaster casting , the following statement is true**
	1. Bonny prominences are covered with wool
	2. Stockinette and wool must be always be used
	3. One layer of wool is recommended
	4. Circular cast is advisable in posterior slab where no swelling of the limb is anticipated
9. **Which one is not a feature of arterial obstruction to a casted limb?**
	1. Paralysis of fingers or toes
	2. Paresthesia of fingers and toes
	3. Pallor of the skin with disturbed capillary return
	4. Severe pain at the fracture site
10. **Which of the following is true for casting of below knee with a swelling**
	1. Back-slab covers whole limb circumference
	2. Partial cast is applied on the limb
	3. Spica is always used
	4. External fixator applied
11. **The purpose of reducing the elbow joint using the ‘100-900’ tricky is to:**
12. Reduce paint at the elbow joint.
13. Avoid creasing of the cast at the elbow joint.
14. To improve blood circulation.
15. To enhance healing of the fracture.
16. **Mallet finger splints are used for avulsions of extensor tendon. Which of the following describes this type of injury?**
	1. Tendon detaches from the bone
	2. Tendon becomes weak
	3. Tendon becomes inflamed
	4. Tendon is stretched out
17. **A lady presents with swelling of hands with shiny skin. She had a history of fracture of radius and kept on P.O.P cast for 4 weeks. The most likely diagnosis is?**
	1. Malunion
	2. Myositis ossificans progressiva
	3. Reflex sympathetic syndrome
	4. Rupture of extensor pollicis longus tendon
18. **Which of the following is not an advantage of fiber glass cast?**
	1. Fiber glass cast will retain its structural integrity in water
	2. Fiber glass cast is light weight yet strong
	3. Fiber glass cast will not expand to accommodate any swelling
	4. Fiber glass cast comes in many colours
19. **Thumb spica splints are commonly used for injured thumbs and are usually worn until\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
20. Swelling of injury goes away
21. Injury is completely healed
22. A person regains feeling in the thumb
23. A person can move their thumb
24. **Which of the following types of finger splint is applied to only the tip of the finger**
25. Buddy taping
26. Finger spica splint
27. Dorsal extension-block splint
28. U-shaped splint
29. **During cast removal, the patient may get injuries from the cast saw blade due to the following reasons EXCEPT**
30. Dragging the blade up and down motions
31. Blood stained casts
32. Due to edema
33. Resin based materials
34. **A cast is usually wedged to do which of the following:**
35. Relieve swelling
36. Properly align a reduced-displaced fractured bone
37. Reduce skin irritation
38. Permit suture removal
39. **Which of the following is NOT one of the signs and symptoms of cast sores?**
40. Local heat.
41. Loose cast.
42. Burning sensation.
43. Offensive smell.
44. **Patients with knee injuries will benefit from which of the following treatments?**
45. Rest, ice, compression, elevation
46. Hiking, ice, long term splint use, sunlight
47. Rest, traction, massage therapy, gait therapy
48. Heat, exercise, water therapy, pain medication
49. **Cylinder cast is indicated to the following conditions EXCEPT**
50. Malleoli fracture
51. Knee dislocations
52. Patella fractures
53. Knee sprains
54. **Both posterior ankle splints and bulky Jones splints are used for fractures of the malleolus. What is malleolus?**
55. A bone in the middle of the foot
56. The bone at the base of the big toe
57. The round bone that sticks out from the sides of the ankle joint
58. The bone that makes up the heel of the foot
59. **Which situation would a splint NOT be the best choice for treatment**
60. A patient with finger dislocation
61. A patient with non-displaced , closed fracture
62. A patient with a sprained ankle joint
63. A patient with tendonitis of the elbow.
64. **In a minimally displaced fracture of the proximal humerus with impacted fragments, the major treatment is:**
65. Immobilization in hanging arm cast
66. Immobilization in an elevated cast
67. Immobilization with a sling and swathe
68. Immobilization in a U-slab
69. **The Dennis Browne splint is used in the treatment of:**
70. Clubfeet
71. Torticollis
72. Springe’s deformity
73. Brachial palsy.
74. **In which situation would a cast be the treatment of choice on the day of injury**
75. A patient with a closed, non-displaced fracture
76. A patient with a displaced fracture requiring reduction
77. A patient with an open fracture
78. A patient with a compound fracture requiring surgery
79. **The following is not a physical property of plaster of Paris.**
80. Creamy.
81. White in colour.
82. Easily moudable.
83. Comes in many colours.
84. **When long arm casts are applied, the elbow joint is usually bent at \_\_\_\_\_\_degrees.**
85. 450
86. 600
87. 900
88. 1200
89. **Which type of cast will you apply on a dislocated-reduced elbow joint?**
90. Hanging cast.
91. Above elbow posterior slab.
92. Above elbow cast.
93. U-slab
94. **What is the reason for applying P.O.P cast diagonally?**
95. To have a firm cast.
96. To prevent cast breakages.
97. To avoid tourniqueting the limb
98. To increase the strength of the cast.
99. **Which are not the possible areas of applying reinforcement sticks on casts?**
100. At knee joint of above the knee cast.
101. At the hip joint of hip spicas.
102. At the level of fracture site on the cast.
103. Along the shafts of the bones.
104. **Short arm casts are frequently used for Colle’s fractures. Where do Colle’s fractures occur?**
105. On the radius near the wrist
106. On the radius near the elbow
107. On the ulna near the elbow
108. On the ulna near the wrist
109. **Which of the following is a benefit of treatment using a splint**
110. Splints are water proof, so that one may continue with their daily swimming
111. Splints permit swelling, thereby reducing the risk of neurovascular compromise
112. Splints cannot be removed, providing a constant stable environment for healing
113. Splints can be removed, so that the patient can put it on and off as much as they want
114. **Which of the following is NOT a feature of arterial obstruction of a limb in a cast?**
115. Palor of the skin with disturbed capillary return
116. Paralysis of the fingers or toes
117. Severe pain at the fracture site
118. Paresthesia of the fingers or toes
119. **The following are factors affecting setting time of P.O.P EXCEPT?**
120. Temperature of water
121. Thickness of the cast
122. Type of p.o.P
123. Alignment of the bone fragments
124. **Which among the following is not an indication of applying a P.O.P cast?**
125. Allow for swelling to subside
126. Relief pain
127. Prevent further trauma
128. Provide immobilization
129. **The following are disadvantages of using P.O.P EXCEPT**
130. It is cheap
131. Causes stiffness of joints
132. Causes circulatory catastrophes
133. Causes pressure sores
134. **As an orthopaedic and plaster technician in the orthopaedic ward, which among the following roles does NOT fall under your docket?**
135. Removal of traction
136. Application of casts
137. Conducting ward rounds
138. Education of patients and staffs
139. **A fracture must be reduced;**
140. During P.O.P removal
141. Before immobilization
142. After P.O.P application
143. During P.O.P application
144. **During history taking and specifically when examining the skin we check for the following, EXCEPT?**
145. Scars or sinuses
146. Cyanosis
147. Deformity
148. Color and texture of the skin
149. **Which of the following is the appropriate procedure of treating C.T.E.V non-operatively?**
150. Below knee P.O.P cast
151. Metal splints
152. Serial casting
153. Adhesive strapping
154. **There are four (4) major categories of casts, which of the following is NOT among?**
155. Spica casts
156. Upper extremities
157. Skull casts
158. Lower extremities
159. **Which of the following is not a chemical property of P.O.P?**
160. It reacts with water to form hydrated calcium sulphate
161. The reaction is exothermic
162. Porous
163. Gypsum crystals are needle shaped
164. **Below are physical properties of P.O.P EXCEPT?**
165. Comparatively light
166. Porous
167. Soaks rapidly
168. Bond by covalent interlocking bond
169. **There are several indications for the use of plaster of Paris, which of the following is not?**
170. Making of negative and positive casts
171. Prevention of deformities
172. Dressing of superficial burns
173. Correction of deformities
174. **When P.O.P is used**
175. Accuracy of alignment is secured and maintained
176. The patient can retain at least some mobility
177. ORIF cannot be indicated in case of mal-union
178. Check X-ray can be done with cast in situ.

**SECTION B: SHORT ANSWER QUESTIONS**

* + - 1. Explain the process of applying a heel pad on a cast 5 marks
* Inform the patient on the procedure to be carried out
* Heel pad is applied after application of a lower limb cast
* Prepare the materials, tools and equipment to be used during the procedure
* Measure the length required and the width of the p.o.P bandages.
* Measure the length and the width of the pad.
* Roll the slabs end to end.
* Immerse in water.
* Wait for the bubbles to seize
* Remove immediately.
* Smoothen carefully and quickly on a flat surface.
* Reinforce with a layer of a cast and smoothen
	+ - 1. List five things to check on a plaster bandage before using it 5 marks
* Date of manufacturing
* Date of expiry
* Company of manufacture
* Well sealed wrapper
* Size of the bandage
	+ - 1. List five supportive appliances for use by a patient to bear weight while on a cast 5 marks
* Arm slings
* Swing and swathe
* Triangular bandages
* Elbow crutches
* Axillary crutches
* Walking frame
	+ - 1. Draw a well labeled diagram of an above knee cast indicating joint angles. 5 marks
* Ankle joint- 90o
* Knee joint- 15o
* Distal end- Mp joints of the toes
* Proximal end- distal 1/3rd femur
* Drawing of the diagram
	+ - 1. Describe the neutral position of the following joints. 5 marks
* Hip joint- 180O
* Knee joint- 180o
* Elbow joint- 180o
* Wrist joint- 180o
* Ankle joint- 90o
	1. Differentiate between windowing and bivalving of a cast 5 marks

Windowing is the process of making a window on a dry cast using oscillating machine in order to manage an existing wound or a plaster sore. It is normally closed after healing of the wound

Bivalving is the process of splitting the dry cast into two halves using oscillating machine in order to relieve pressure caused by tight cast

* 1. List five types of external splintages 5 marks
* P.o.P cast
* Dynacast
* Metallic splints
* Wooden splints
* Hide and skin
	1. Explain the use of mouldable alluminium splints at the accident and emergency department. 5 marks
* They are used for emergency splintages to immobilize long bone fractures so as to move the patients from place to place
* They are used for definitive splintages in incomplete or minimally displaced fractures of small bones
* They are used for support of deep cut wounds
* They are used for management of deformities like joint contractures
* They are used for prevention of development of deformities like contractures arising fro burns

**SECTION C: LONG ANSWER QUESTIONS**

Discuss in a step by step process of applying full hip spica. 20 marks

* Create rapport with the patient
* Record the patient’s vital sign
* Indications are fractures of femur in children below 6 years
* Examine the patient’s limb clinically
* Send for X-ray of the limb in question, also compare with the sound limb
* Interpret the X-ray
* Inform the patient on the procedure to be carried out
* Prepare the materials, tools and equipment to be used during the procedure
* Have enough assistants
* Expose the area to be casted
* Reduce the injury
* Maintain the reduced position undisturbed
* Apply the padding material diagonally, starting from the MP joints of the toes the tummy on both limbs overlapping half the width
* Open the p.o.P bandage vertically after checking the expiry date, and ensuring the wrapper is in situ
* Immerse in water vertically until all the bubbles seize
* Remove the bandage and hold in the air until the last drop
* Apply the bandage diagonally overlapping half the width up to 6 layers
* Prepare the sole and apply it
* Maintain the knee joint at 15o flexion, ankle joint at 90o and hip joint at 15o  flexion
* Smoothen carefully and quickly using the palm of the hand
* Position the limb appropriately with the help of assistants
* Open the anterior and posterior pelvic area for relieving of the patients