

The Manual of Fracture Casting & Bracing

Exam 80% Passing

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Multiple Choice circle the correct answer

1. The purpose of immobilizing a limb is to:
 - a. provide comfort to an injury
 - b. keep the patient from using the limb
 - c. protect the limb from external trauma
 - d. remind the patient that they have a fracture

2. A joint can be immobilized by:
 - a. a splint
 - b. a cast
 - c. an orthosis
 - d. all of the above

3. Fractures can be mechanically stabilized by:
 - a. an intramedullary implant
 - b. internal plates and screws
 - c. external fixation devices
 - d. all of the above

4. Open reduction and internal fixation of fractures:
 - a. is always the treatment of choice for all fractures
 - b. is indicated only in rare occasions
 - c. is indicated for the treatment of many fractures
 - d. none of the above

5. Immobilization of a fractured bone fragments is:
 - a. necessary to get the fracture to heal
 - b. is unphysiologic, and retards the normal healing process
 - c. can only be accomplished by open reduction and internal fixation
 - d. is impossible by any currently available means

6. Allowing movement of adjacent joints to a diaphyseal fracture:
 - a. is dangerous to the fracture when it is healing
 - b. is strictly forbidden for all fractures during the treatment process
 - c. promotes healing of the adjacent fracture
 - d. is not possible during non-operative treatments

7. The current day indications for casting and bracing:
- are limited to fractures of the distal radius, the humeral shaft, the isolated ulna, and the tibial diaphysis.
 - include many musculoskeletal conditions
 - are limited to fractures about joints
 - are the same in all countries
8. The Colles fracture of the distal radius:
- was named after the Colles dogs which caused a fracture in the Dr. that first described the fracture
 - was named after Dr. Colles who first described the fracture
 - is caused by punching a hard object
 - never enters the wrist joint
9. Closed reduction and casting is indicated in distal radius fractures:
- that have a dislocation of the distal radio-ulnar joint
 - in a very few, select cases
 - in most injuries
 - in cases that can't be surgically fixed
10. When treating a Colles fracture, the forearm should be placed in a position of:
- relaxed supination
 - relaxed pronation
 - what ever position is most comfortable for the patient
 - rotation described as the "Cotton-loader" position
11. The only muscle capable of recreating the typical Colles' deformity -radial shortening and dorsal angulation is:
- the pronator teres
 - the wrist dorsiflexors
 - the brachioradialis
 - the wrist volarflexors
12. The brachioradialis creates its maximum force on the distal radius when the forearm is:
- pronated
 - supinated
 - in neutral position
 - flexed 90° to the upper arm

13. When applying a cast to the arm that has an acute Colles fracture, the elbow, wrist and forearm should be placed in the following, respective positions:
- 30° flexion, 20° dorsiflexion and radial deviation, and relaxed supination
 - 90° flexion, 20° dorsiflexion and ulnar deviation, and relaxed supination
 - 90° flexion, slight volarflexion and radial deviation, and relaxed supination
 - 90° flexion, slight volarflexion and ulnar deviation, and relaxed supination
14. The below-the-elbow cast is:
- never indicated for any type of distal radius fracture
 - controls prono-supination
 - can be applied to simple, transverse distal radius fractures that do not require reduction
 - can be used for both bone forearm fractures
15. The reduction of the Colles' fracture is accomplished by manipulation of the fragments prior to positioning the forearm for the cast application. The manipulation is carried out:
- with the forearm in the same position as used when the cast is applied
 - with the forearm in pronation
 - with the forearm in supination
 - with the forearm in neutral rotation
16. In preparation for reducing the Colles' fracture, the arm is:
- placed in traction with the elbow in 90° of flexion, the wrist in ulnar deviation
 - placed in traction with the elbow in 90° of flexion, the wrist in radial deviation
 - placed in traction with the forearm in neutral rotation
 - relaxed and elevated to minimize swelling before the reduction
- .
17. The Munster cast for the Colles' fracture is applied with the forearm:
- in pronation and the wrist in radial deviation.
 - in supination and the wrist in radial deviation
 - in supination and the wrist in ulnar deviation
 - in pronation and the wrist in ulnar deviation
- .
18. The first roll of casting tape for the Munster cast is applied over padding
- from the base of the metacarpals to just below the elbow
 - from the base of the metacarpals to about 10 cm above the elbow
 - from the base of the proximal phalanges to just below the elbow
 - from the carpal row to just below the elbow
19. The second roll of casting tape for the Munster cast is applied
- long after the first roll has cured
 - from the mid forearm to above the elbow
 - from the palmer crease to the elbow
 - around the thumb

20. The proximal portion of the Munster cast is molded above the elbow with the elbow:
- in 90° of flexion
 - in 45° of flexion
 - in 60° of flexion
 - in 30° of flexion
21. Two types of casts are applied to the patient with a Colles' fracture.
- first a long arm cast, followed by a short arm cast
 - first a cast in supination, followed by a cast in pronation
 - first a plaster cast that can be bivalved, followed by a fiberglass cast
 - first a well padded cast until acute symptoms subside, followed by a functional cast over minimal padding
22. The Munster cast permits
- near full pronation, supination, flexion and extension of the elbow and wrist
 - near full flexion of the elbow and supination of the forearm
 - near full flexion of the wrist and elbow
 - near full extension of the elbow and wrist
23. The Munster cast limits
- pronation and supination of the forearm
 - flexion and extension of the elbow
 - pronation of the forearm and extension of the elbow and wrist
 - pronation of the forearm and flexion of the elbow and wrist
24. A fracture brace may be made for the Colles' fracture by creating a Munster-like configuration with low temperature thermoforming materials. The principles of application are different from those of casting materials,
- but the principles of function are the same as the Munster cast
 - and the positioning of the patient is much different from cast application
 - but the handling of the materials is the same as casting
 - but because the brace is removable, it does not need to fit as closely as a cast
25. In order to provide good cosmesis and function to the arm after a diaphyseal humerus fracture,
- perfect anatomic alignment is critical
 - a few degrees of angulation is acceptable, but shortening is not acceptable
 - a few millimeters of shortening is acceptable, but angulation is not acceptable
 - a few millimeters of shortening and a few degrees of angulation are acceptable
26. Acute management of the diaphyseal humerus fracture includes
- immobilization of the limb in a padded cast or splint with a sling
 - immobilization of the hand and wrist as well as the elbow and shoulder
 - immobilization of the forearm to prevent pronation-supination
 - a tight ace bandage to prevent swelling

27. The initial immobilization of the arm after diaphyseal humerus fracture should position the
- wrist in dorsiflexion but leave the fingers free to move
 - elbow at about 90° and the forearm in pronation
 - elbow at about 90° and the forearm in supination
 - elbow at about 90° and the forearm in neutral rotation
- .
28. It is very common for patients to shrug the shoulder when the sling is applied to the cast or splint. If the sling is applied in this position it will be too short and will tend to cause the humerus to
- shorten
 - drift into varus deformity
 - drift into valgus deformity
 - internally rotate the distal humeral fragment
- .
29. After application of the cast or splint for an acute diaphyseal humeral fracture, it is important for the patient to
- rest the arm and not move the shoulder or elbow joints
 - begin active abduction exercises
 - begin passive shoulder motion exercises
 - actively move the elbow without moving the shoulder
30. The humeral fracture brace is applied
- acutely, when the patient is first seen in the emergency room
 - after the fracture has healed, in the rehabilitation phase of treatment
 - within about 1 – 2 weeks post injury, when acute symptoms have subsided
 - at about 6 weeks to mobilize the joints and prevent joint stiffness
31. It is important to warn patients not to lean on the elbow while they are in a cast or brace for a humerus fracture, because
- it may cause the fracture to shorten
 - it may cause the fracture to internally rotate
 - it may cause the fracture to end up with delayed or non-union
 - it may cause the fracture to angulate into varus
32. The humeral fracture brace allows for full range of motion of all joints, where as the cast or splint limited the motion of the elbow But the most important difference between the cast and brace is
- the adjustability of the brace
 - the flexibility of the material
 - the positioning of the arm
 - the cosmetic appearance of the brace

33. The difference between a cast and a brace for the diaphyseal humeral fracture is
- the patient can remove the brace for hygiene
 - the brace can be adjusted to maintain soft tissue compression
 - the brace allows full motion of all joints
 - all of the above
34. The adjustability and frequent tightening of the humeral fracture brace is critical because it attains and maintains
- suspension of the brace on the arm
 - compression of the soft tissues for stability
 - compression of the soft tissues for comfort
 - all of the above
35. Casts and braces applied for the treatment of diaphyseal humeral fractures should
- extend over the shoulder to prevent the cast or brace from slipping distally
 - extend over the shoulder to prevent abduction of the shoulder
 - never extend over the shoulder and limit any motion of the shoulder
 - both a. and b.
36. The humeral fracture brace should be applied as soon as the acute symptoms subside, while the fracture is still “movable” because early function can correct any alignment problems at the fracture by
- extending the elbow, reducing the use of the sling and allowing gravity to align the limb
 - continuing pendulum exercises for passive shoulder movement
 - beginning limited active exercises as tolerated to promote corrective muscle forces
 - all of the above
37. The use of the brace can be discontinued once
- fracture union is confirmed by manipulation of the fracture
 - fracture union is confirmed by MRI evidence
 - fracture union is confirmed by clinical and radiological evidence
 - rehabilitation is complete
38. Isolated ulnar fractures which can be treated in casts and braces include
- diaphyseal fractures without disruption of the proximal or distal radio-ulnar joints
 - all fractures of the ulna when the radius is not fractured
 - metaphyseal fractures at the elbow
 - metaphyseal fractures at the wrist

39. Initial treatment of an isolated diaphyseal fracture of the ulna is
- immobilization of the wrist and fingers in a splint
 - immobilization of the elbow in a coaptation splint
 - immobilization of the elbow and wrist in a long arm cast with the forearm in relaxed supination
 - immobilization of the elbow and wrist in a long arm cast with the forearm in pronation
40. It is important in the acute management of an isolated fracture of the ulnar diaphysis, that
- the patient be encouraged to use their fingers to reduce pain and swelling rapidly
 - the patient be told to not move any joints until the doctor directs
 - the patient be encouraged to forcefully use the hand, even if it hurts
 - the patient be given anti-inflammatory medications to prevent pain
41. The initial long arm cast for isolated ulnar shaft fractures can be removed and replaced by a short, functional cast over minimal cast padding, or a functional brace over stockinette, usually
- within the first 3 days
 - at about 6 weeks
 - after there is evidence of fracture healing
 - after about one week
42. After placing the patient in a short, functional cast or a brace for an isolated ulnar fracture, patients are instructed to
- keep the arm in a sling and elevated as often as necessary
 - use the extremity to the maximum allowed by pain
 - go to the physical therapist 3 times a week
 - lift weights even if it hurts, no pain, no gain
43. Bilateral isolated ulnar fractures
- should never be braced
 - require surgery in order to return the patient to early function
 - can be treated in braces, the same as unilateral fractures
 - require much longer immobilization in a well padded long arm cast
44. A well molded short arm functional cast will allow
- full wrist, elbow and forearm rotation range of motion
 - full wrist and forearm rotation range of motion, but block elbow motion
 - full elbow and forearm rotation range of motion, but block wrist motion
 - full elbow range of motion, but block the last few degrees of pronation of the forearm and limited wrist motion

45. An isolated ulnar functional brace does not extend over the elbow or wrist and is shaped to compress the soft tissues into the interosseous space, thus it will allow

- full wrist, elbow and forearm rotation range of motion
- full wrist and forearm rotation range of motion, but block elbow motion
- full elbow and forearm rotation range of motion, but block wrist motion
- full wrist, elbow range of motion, but block the last few degrees of pronation of the forearm

46. Patients are allowed to bathe or swim in the isolated ulnar fracture brace. But they must be instructed that once the stockinette is wet they must

- remove the brace, dry the arm, put on dry stockinette and reapply the brace
- never remove the brace, but dry the stockinette with a hair dryer
- remove the brace, dry the arm and throw the stockinette and brace away
- remove the brace, apply a second layer of dry stockinette and reapply the brace

47. The amount of shortening at a tibial diaphyseal fracture site is:

- is related to the soft tissue damage at the time of injury
- usually increases with weight bearing activities
- can always be corrected in a functional cast or brace
- is related to the age of the patient

48. The amount of shortening at a tibial diaphyseal fracture site as a result of a closed fracture

- will not increase with graduated weight bearing
- will not increase with muscle function
- will not increase after removal of the long leg cast
- all of the above

49. Shortening of a tibial diaphyseal fracture is controlled by

- the long leg cast
- the functional cast
- the fracture brace
- the damage to the soft tissues at the time of injury

50. Functional casts and braces stabilize diaphyseal fractures of the tibia against

- shortening
- angulation
- movement of the fracture site
- weight bearing

51. The callus that forms with diaphyseal fracture healing is more abundant when

- there is motion at the fracture site
- the joints are immobilized above and below the fracture
- the cast is very tight fitting
- none of the above

52. Most closed, diaphyseal fractures of the tibia experience shortening at the time of injury of
- more than 2 cm
 - less than $\frac{3}{4}$ of a cm
 - less than what the final shortening will be with closed, functional treatment
 - which resolves with time
53. Shortening of $\frac{3}{4}$ of a cm in a diaphyseal tibial fracture will usually
- cause the patient to limp
 - cause low back pain
 - require a lift in the shoe
 - not cause the patient to limp
54. Mild angular deformities of the tibia after diaphyseal fracture usually
- can be corrected with cast or brace application
 - will progress with early weight bearing
 - require surgical correction
 - will cause arthritis of the adjacent joints
55. Closed diaphyseal tibial fractures resulting from low energy forces:
- do not usually require hospitalization
 - are usually very swollen and painful
 - always have a compartment syndrome
 - never have an associated fibular fracture
56. After confirmation of lack of injury to the neurologic and vascular systems, the next step for closed, functional treatment of a closed, diaphyseal fracture of the tibia is:
- apply a fracture brace
 - apply a functional, short leg cast
 - apply an Ace bandage to control swelling
 - apply a well padded long leg cast
57. Closed, axially unstable tibial and fibular diaphyseal fractures that are appropriate for closed, functional treatment in casts or braces:
- usually require manipulation to obtain good alignment
 - usually can be satisfactorily aligned by simply allowing the limb to hang freely over the side of the table while the cast or brace is applied
 - usually need to have traction applied to obtain good alignment while applying the cast or brace
 - require 2 assistants to control the limb while the cast or brace is applied
58. With segmental fractures of the tibial diaphysis, it is more critical to align:
- the foot to the hip, than the segment of bone
 - the segment of bone, than the knee and ankle
 - the knee and ankle joint parallel, than the segment of bone
 - the thigh to the leg, than the segment of bone

59. When applying the long leg cast for the initial treatment of a diaphyseal tibial fracture:
- the knee should be at 90° flexion and the ankle in neutral
 - the knee should be at $\leq 7^\circ$ flexion and the ankle at 90° flexion
 - the knee should be at 0° flexion and the ankle in equinus
 - the knee should be at 45° flexion and the ankle at 90° flexion
60. If the leg has significant swelling after an acute tibial fracture, one should:
- manipulate the leg to pump out the fluids
 - put the leg in traction to gradually reduce the swelling
 - put the leg in a well padded splint
 - immediately apply a tight, circumferential cast
61. Alignment of the tibial fracture during application of the cast or brace should be based upon
- the X-ray images
 - the contour of the opposite leg
 - the advice of the treating Dr.
 - a line drawn from the hip joint center to the mid portion of the ankle
62. When applying the long leg cast to a limb with an tibial fracture, the ankle should be positioned in:
- equinus
 - 90° of flexion
 - slight supination
 - 45° of plantar flexion
63. If the foot is placed so the ankle is in equinus in the long leg cast, when the patient weight bears in the short leg functional cast or brace, the tibial fracture will:
- angulate into varus
 - shorten
 - angulate into recurvatum
 - externally rotate
64. The long leg cast is applied in sections. The first, second and third segments are:
- 1) the ankle, 2) the knee and thigh and 3) the calf, respectively
 - 1) the calf, 2) the ankle and 3) the knee and thigh, respectively
 - 1) the ankle, 2) the calf and 3) the knee and thigh, respectively
 - 1) the foot, 2) the ankle and 3) the calf, respectively

65. After applying the long leg cast, the patient should be instructed to:
- elevate the limb and rest for about 24 hours
 - flex the muscles in the limb as tolerated
 - after the rest period, begin ambulation with crutches or a walker
 - all of the above

True or False

66. Application of the below-the-knee functional cast is never applied before 6 weeks post injury. T F
67. The below-the-knee, functional cast is applied to the patient when they are sitting with the hip, knee and ankle at 90°. T F
68. During the first stage of application of the below-the-knee, functional cast, it is not important to pay attention to the alignment of the tibial fracture alignment. T F
69. During the second stage of application of the below-the-knee, functional cast, it is not important to pay attention to the alignment of the tibial fracture alignment. T F
70. During the third stage of application of the below-the-knee, functional cast, the PTB portion of the cast is molded. T F
71. After the cast material is set, the proximal portion of the below-the-knee, functional cast, is trimmed to block knee motion. T F
72. After the application of the below-the-knee functional cast, a cast boot or rubber heel should be applied to encourage ambulation and protect the cast. T F
73. A below-the-knee functional brace can be made of casting materials, low temperature thermoplastics, or prefabricated parts off-the-shelf. T F
74. The patient should never be allowed to remove the below-the-knee, functional brace. T F
75. One can expect that a closed, diaphyseal fracture of the tibia will not shorten further than the initial shortening seen at the first X-ray when treated in a functional, below-the-knee brace or cast with early weight bearing. T F
76. Stockinet is a necessary part of every cast. T F
77. Never cut holes in the stockinet T F
78. 6 to 8 layers of padding is sufficient in the palm area. T F
79. Compressing the roll as you apply padding will give you a firm fitting cast. T F
80. The Gumby helps prevent the patient from picking padding from around the base of the thumb. T F

81. The finger helps keep the padding and stockinet from sneaking below the edges of the cast tape. T F
82. The Inter-osseous mold helps prevent rotation. T F
83. Ridges on the underside of a cast at the cuboid area are of no importance. T F
84. A comfortable short leg walking cast will always finish proximal to the sesimoid bones. T F
85. All casting tapes are about the same and require the same techniques in rolling. T F
86. Although not required by law, HEPA air filter systems are a good addition to the cast room. T F
87. Synthetic casting tape should be rotated to prevent pooling. T F
88. Pistoning inside the cast is good for the patient. T F
89. When applying a sling during a humeral fracture treatment, the patient should be asked to “shrug” their shoulder to help the sling fit better. T F
90. Eye and ear protection are not necessary in a modern cast room. T F

Matching

- | | |
|-------------------------------------|--|
| 91. Colles fracture ____ | a. Should always be applied in the initial treatment of a humeral fracture |
| 92. Dr. Sarmiento ____ | b. Can cause lateral and dorsal displacement of a distal radial fragment |
| 93. Discontinue brace usage ____ | c. Of the knee should be accomplished by properly trimming the PTB cast |
| 94. Transverse fractures ____ | d. Are necessary to properly mold the PTB cast |
| 95. Brachioradialis ____ | e. Prevents pronosupination in a Munster cast |
| 96. Lateral wings ____ | f. Will only shorten less than a millimeter after initial shortening |
| 97. Collar and cuff sling ____ | g. Only after clinical and radiological evidence of union is documented |
| 98. Angular deformity ____ | h. Can be prevented with a cast, splint or brace |
| 99. Full flexion and extension ____ | i. First introduced the PTB cast. |
| 100. Relaxed Quadriceps ____ | j. Usually the result of a fall on an outstretched hand |