

## **Chapter 2: Cold Therapy Modalities**

### **Multiple Choice**

1. The physiological effects of cryotherapy are primarily a result of which of the following?

- A. Stimulation of free nerve endings in the skin
- B. Release of vasodynamic hormones
- C. Increase in nerve conduction velocity
- D. Decrease in tissue temperature

**ANS: D**

2. Which of the following variables is least likely to affect the magnitude of temperature change in tissues under a cold pack?

- A. Temperature of the cold pack
- B. Water content of the tissues covered by the cold pack
- C. Ambient air temperature
- D. Body surface area covered by the cold pack

**ANS: C**

3. The greater the temperature gradient between the skin and the cryotherapy modality, which of the following will be greater?

- A. Tissue temperature change
- B. Duration of vasoconstriction
- C. Increase in modality temperature
- D. Tolerance for cold application

**ANS: A**

4. Why does the presence of thick adipose tissue under the skin tend to block decreases in tissue temperature when cryotherapy is applied to the skin?

- A. Adipose tissue has a low thermal conductivity.
- B. Resting membrane currents are higher.
- C. Adipose tissue has no thermal sensory receptors.
- D. More blood flows to the skin through capillaries in adipose tissue.

**ANS: A**

5. If you apply an ice pack to the skin overlying the calf muscles, which of the following will have the greatest decrease in temperature?

- A. Calf muscles
- B. Subcutaneous tissues
- C. Skin
- D. Fascia

**ANS: C**

6. Your patient has the following medical conditions. Which one is a contraindication for cold therapy?

- A. Hypotension
- B. Raynaud's phenomenon
- C. Osteoarthritis
- D. Acute inflammation

**ANS: B**

7. After a cold pack treatment your patient appears flushed and reports she is lightheaded. You notice a red patch on the skin underneath her cold pack. Which of the following problems is most likely?

- A. Reflex vasodilation
- B. Cold urticaria
- C. Cryoglobulinemia
- D. Raynaud's phenomenon

**ANS: B**

8. Which of the following patient examination procedures should not be performed following cryotherapy?

- A. Range of motion
- B. Posture assessment
- C. Joint play
- D. Manual muscle testing

**ANS: D**

9. Positive factors of immediate cold application following acute trauma include which of the following?

- A. Increased oxygen demand
- B. Alternating vasodilation/vasoconstriction
- C. Lowered metabolism
- D. Facilitation of leukocyte migration

**ANS: C**

10. Which of the following effects of cold on a peripheral nerve has been demonstrated by research studies?

- A. Decreased motor and sensory nerve conduction velocities
- B. Selective decrease of sensory nerve conduction velocities without affecting motor nerve conduction velocities
- C. Increased motor and sensory nerve conduction velocities
- D. Maintenance of normal nerve conduction and blockage of skin receptor function

**ANS: A**

11. What effect does cryotherapy have on patients with spasticity?

- A. No effect
- B. Increased
- C. Decreased
- D. Variable: may increase or decrease

**ANS: C**

12. Which of the following statements is true regarding vapocoolant sprays?

- A. They are effective in decreasing muscle temperature to allow stretching without pain.
- B. They can decrease skin temperature to about 15°C.
- C. Multiple clinical trials demonstrate their efficacy.
- D. They transfer heat from the body via convection.

**ANS: B**

13. The addition of compression to cold therapy can improve which of the following?

- A. Microcirculation and tissue oxygenation
- B. Vasoconstriction and histamine release
- C. Nerve conduction velocity and tissue hypoxia
- D. Analgesia and edema formation

**ANS: A**

14. Which of the following is an abnormal response to the application of cold?

- A. Reddening of the skin
- B. Raised, red, irregularly shaped areas on the skin
- C. Numbness of the skin
- D. Feelings of burning or aching of the skin

**ANS: B**

15. Your patient has a cast on his lower leg after fracturing his fibula when he fell off his bicycle. Today he is complaining of pain in the lower leg. Can cold therapy help reduce his pain?

- A. No, cold will not penetrate plaster casts.
- B. Yes, however, the cold modality must be applied under the cast.
- C. Yes, however, it will take longer to cool if he has a fiberglass cast.
- D. No, the strength of the cast will be weakened by application of cold.

**ANS: C**

16. Which of the following cold therapy modalities has the most research support for effectiveness in the treatment of myofascial pain syndrome?

- A. Ice massage
- B. Vapocoolant spray
- C. Cold compression unit
- D. Gel cold pack

**ANS: A**

17. Which of the following patient responses to cold therapy would lead you to avoid cold therapy in future treatments?

- A. Patient reports a burning feeling in the upper limb during ice water immersion.

- B. Skin appears red following 7-minute ice massage to the forearm.
- C. Light touch sensation is absent in the treatment area following cold pack application to the thigh.
- D. Patient's heart rate is increased following cold whirlpool treatment to the lower leg.

**ANS: D**

18. Which of the following cold therapy techniques has the greatest danger of causing a neurapraxia or axonotmesis?

- A. Ice bag around the elbow for more than 1 hour
- B. Cold water bath for a sprained ankle for 15 minutes
- C. Vapocoolant spraying of the hamstrings at their origin
- D. Ice massage for 5 minutes over the lateral epicondyle

**ANS: A**

19. Your patient is a 32-year-old female with a diagnosis of acute left knee sprain with suspicion of a torn anterior cruciate ligament. Which of the following cold therapy modalities would be the best choice to decrease her pain and swelling?

- A. Ice massage
- B. Controlled-cold compression unit
- C. Cold bath
- D. Gel cold pack

**ANS: B**

20. Which of the following correctly lists contraindications for cold therapy?

- A. Severe acute pain, joint effusion, muscle atrophy
- B. Postoperative swelling, paroxysmal cold hemoglobinuria, neurapraxia
- C. Open wound, cold urticaria, peripheral vascular disease
- D. Raynaud's phenomenon, upper motor neuron lesion, decreased joint range of motion

**ANS: C**

21. Which of the following is true regarding cold therapy application methods?

- A. A bag of frozen peas can be used for home cold pack application.
- B. Recommendations for temperature and duration of water baths are inversely related.
- C. The risk of frostbite is very high with ice massage, so treatments should not exceed 3 minutes.

D. Menthol gels or creams decrease subcutaneous tissue temperature as well as a cold pack.

**ANS: A**

22. Which of the following cold therapy applications best fits the given patient problem?

- A. Ice massage for acute exacerbation of metacarpophalangeal joint pain in patient with rheumatoid arthritis
- B. Cold whirlpool for patient with acute anterior thigh contusion
- C. Vapocoolant spray for limited knee flexion in patient who is 3 days post total knee surgery
- D. Cold pack for patient with shoulder pain 2 days following traumatic subluxation

**ANS: D**

23. Which of the following cold therapy applications is most appropriate for the given scenario?

- A. Cold whirlpool for left upper extremity pain in patient with hypertension
- B. Ice massage for right lateral epicondylitis in patient with history of cryoglobulinemia
- C. Controlled cold therapy unit for acute left ankle sprain in patient with medical history of diabetic neuropathy
- D. Cold pack to cervical spine following whiplash injury in patient with leukemia

**ANS: D**