CHAPTER 10

Knowledge Review

Q1: List 10 general but crucial safety factors relating to the use of electrical therapy equipment.

A1:

Safety factors relating to the use of electrical therapy equipment include:

1. Always reading manufacturer's instructions prior to using electrical equipment.
2. Ensuring that the equipment has been checked and labeled safe for use by an authorized electrician.
3. Checking that all switches, leads and plugs on the equipment are secure and functional.
4. Not using equipment that is faulty.
5. If the equipment is mounted on a stand, ensuring that the base is secure, that leads can safely reach the mains socket and that it will not cause any obstruction.
6. Being aware of how the lead trails, making sure that it can not cause anyone to trip over it.
7. Not overloading mains sockets or extension leads.
8. Not working electrical equipment anywhere near water.
9. Making sure equipment is cleaned and applicator heads sterilized before use.
10. Checking that all attachments are clean and functional, and when used, securely attached.
11. Prior to application, the treatment is explained to the client.

12. Making sure the client has removed all jewellry prior to electrical treatments.
13. Never surprising the client with modalities or expecting that they know what is coming next.
14. Making sure all controls are set to zero before switching the equipment on.
15. Intensity controls should be turned on last, increased gradually, and switched off first.
16. Where appropriate, testing the equipment on yourself before using on client.
17. Encouraging client feedback.
18. Working with awareness of recommended treatment times.
19. Trying to gauge client's response to the treatment.
20. Adjusting the treatment time and intensity to suit the client.
21. Never leaving machines unattended when plugged in.
22. Cleaning equipment and storing it away safely after use.

Q2: What are the main advantages and disadvantages of using electro-massage machines?

A2:

Advantages to using electro-massage machines include:

1. Less tiring for the therapist
2. Produces quicker effects
3. Reduces treatment time
4. Useful in team situations

5. Useful in pre and post event situations
6. Adjustable intensities
7. Interchangeable attachments
8. Can provide deep and vigorous treatment
9. Can target specific tissues
10. Enhances manual massage treatments
11. Adds variety to treatment sessions
12. Some clients prefer electro-massage therapy

Disadvantages to using electro-massage machines include:

1. Can be expensive to buy
2. Requires regular servicing
3. Requires storage space
4. Requires specific skills to operate safely
5. Less personal treatment
6. Requires more careful monitoring of client's response to treatment
7. Less palpation during application
8. Can be heavy and cumbersome for some therapists
9. Can cause problems if used incorrectly
10. Some clients do not like electro-massage therapy

Q3: What are the main safety issues regarding the use of cryotherapy?

A3:

The main safety issues regarding the use of cryotherapy include:

1. Being aware of all contra-indications relating to body treatments

2. Not using cryotherapy where there is decreased or problematic circulation [eg. arterial disease; cardiac conditions; diabetes].
3. Not using cryotherapy where there is cold hypersensitivity or allergy [eg. Raynaud's disease, where vaso-spasm and pain can occur, especially in the extremities].
4. Not using cryotherapy where there are areas of reduced or absent skin sensation.
5. Avoiding use of cryotherapy over superficial nerves [eg. peroneal nerve at the lateral popliteal space or radial nerve at the posterior-lateral elbow], because it may cause a nerve conduction block, leading to distal numbness or tingling.
6. Reducing the intensity and application time of cryotherapy on areas with little body fat or muscle bulk.
7. Not over treating with cryotherapy, especially because prolonged treatments do not increase the effectiveness. Tissue death, nerve damage, unwanted vasodilation or frostbite are all possible results of excessive cooling.
8. Applying great care [lower intensity and duration] when using cryotherapy for children or the elderly, who are more likely to have a less than efficient temperature regulation system and a reduced ability to communicate their experiences so well].

Q4: Describe the sensations typically experienced during a cryotherapy treatment.

A4:

The usual subjective response to cryotherapy, during application, begins with the cold sensation and a short-duration dull pain, followed by a burning-like sensation, deep aching, and finally a numb sensation. An ice treatment should end as numbness occurs.

Q5: What are the main potential effects and benefits of thermal therapy?

A5:

The potential effects and benefits of thermal therapy include:

1. Increased vasodilation
2. Increased blood flow through a region
3. Reduced pain
4. Increased local metabolic rate
5. Relaxation of muscle tension and spasm
6. Increased soft-tissue extensibility and pliability
7. Reduced joint stiffness and increased range of movement
8. Increased healing rate of soft-tissue injuries
9. Improved neuromuscular response [sensory and motor]
10. Improved recovery from training
11. Can be used by the client at home to enhance their rehabilitation programme
12. Helps to bring about feelings of increased well-being

Q6: Describe how thermal sensation can be tested, and explain why it is an important procedure.

A6:

It is most important that the client is able to differentiate between heat and cold sensations, especially in the area that is to receive treatment. If the client is not able to report their thermal experience, there is a danger of tissue damage. A common method for the testing of thermal sensation is to half-fill two test tubes, one with cold water, and one with hot water. Before applying to the client's skin, the tubes should firstly be tested on yourself [so as to make sure that they are not too hot or cold to apply]. The client should have a tube lightly placed onto the area to be treated, and be able to report whether it is hot or cold. An alternative method is to simply use a warm spoon and a cold spoon.

Q7: List 10 methods of applying therapeutic heat treatment.

A7:

Common general and localized methods of applying therapeutic heat treatment include:

1. Sauna
2. Steam room
3. Steam bath
4. Jacuzzi
5. Hot bath
6. Hot shower
7. Gel hot pack
8. Wheat bag
9. Moist [hydrocollator] heat pack
10. Hot towels [alternating]

11. Paraffin wax bath
12. Infra-red lamp
13. Ultrasound
14. Heat spray
15. Heat rub

Q8: Describe how ultrasound therapy may be used to produce thermal or non-thermal effects, what its main indications for use are, and its main safety issues.

A8:

Pulsed ultrasound at low frequencies produces the non-thermal effects suitable for sub-acute treatments. Continuous ultrasound at higher intensities produces thermal effects, most useful in later stage therapy. In the treatment of acute injuries, non-thermal ultrasound has been shown to cause localized mechanical agitation and increased cellular permeability, which when combined with other beneficial effects such as increased histamine release, phagocyte responsiveness and protein synthesis by fibroblasts, a hastening of the resolution of the early phase of soft-tissue healing occurs. During this early stage of healing, ultrasound can also be used to drive topical anti-inflammatory or analgesic medication directly through the skin's pores into the affected tissues - a technique known as phonophoresis. Thermal ultrasound is normally employed once inflammation has subsided. Increased localized blood flow and tissue metabolism encourages an improved cellular proliferation and remodelling in injured tissue. Alongside improved supply of nutrients for repair, the heating effects of ultrasound can also help to create

an increase in collagen extensibility, making tissue mobilization [and normalization] easier to perform. Additionally, pain thresholds may be increased by ultrasound therapy.

There are a variety of indications for ultrasound, these include:

1. In acute situations ultrasound may enhance early healing and resolution of the inflammatory phase
2. It may help to reduce and control pain
3. It can be used where deep localized heating of tissues is required
4. It can improve local circulation, and therefore the nutrition to a site of injury
5. It can help reduce muscle spasm
6. It may help optimize scar tissue formation
7. It can help prepare shortened tissues for stretching techniques
8. It may improve the healing of chronic tendon injuries
9. It may improve the rate of healing of surgical skin incisions
10. It may improve the rate of healing of fractures
11. It combines well with other modalities and rehabilitation exercises

Specific safety issues relating to the use of ultrasound include:

1. Sports therapists must undergo thorough training in ultrasound therapy and obtain insurance to practice, before offering it to clients.
2. Being aware of all contra-indications relating to body treatments.
3. Not treating when unsure of the nature of the problem.

4. Not using ultrasound therapy where there is problematic circulation, cardiac insufficiency or a pacemaker.
5. Not using ultrasound therapy where there is impaired sensation.
6. Always testing for thermal sensation prior to application on local areas.
7. Not using ultrasound therapy where there are implanted metal pins or plates.
8. Not using ultrasound over bone growth [epiphyseal] plates.
9. Applying great care when using ultrasound therapy for pregnant women, particularly avoiding the abdomen and low back.
10. Avoiding high dose ultrasound in areas of inflammation, over fracture sites and breast implants.
11. Being careful to avoid CNS tissue and the eye region.
12. Always beginning with low intensities.
13. Always adjusting the intensity and duration of ultrasound therapy to suit the required objectives.
14. During treatment, always keeping the applicator [sound] head in motion [not using it in a stationary mode].
15. Being aware that burning of tissues can occur with inappropriate or excessive use of high dose ultrasound, particularly in tissues with impaired circulation.
16. Reducing intensities of ultrasound over areas with superficial bone.
17. Being aware that optimal outcomes are more likely if regular, appropriate dose treatments are employed.
18. Encouraging feedback from the client
19. Stopping treatment if any discomfort is experienced.

20. If during a course of treatment, progress is slow, reconsidering your approach and making a decision as to whether referral might be appropriate.

Q9: What are the main differences between EMS and TENS?

A9:

Electrical muscle stimulation [EMS] is used to passively tone and strengthen muscles or to create a gentle, repetitive massaging effect. There are a selection of machines able to provide these effects, some being large and expensive, others being small, inexpensive, battery operated and portable. The larger, modern clinical EMS machines offer a very comprehensive selection of computerized muscle stimulation programmes, a large number of paired pads, and enable more than one body region to be treated in one session. Small portable units offer a less expensive approach to muscle stimulation. Portable units are designed to be lightweight and easy to use. They typically only have a few controls and facility for two pairs of pads. The range of frequencies may not be as great as a clinical machine, nor such a wide range of programmes built in, but they can nevertheless be used easily by clients at home, and be very effective. There are a selection of currents used in EMS therapy. By employing a low-frequency interrupted direct current [traditionally around 50 hertz or cycles per second], through pads strapped onto specifically targeted muscles, a controlled passive workout can be initiated. There are three main variations to padding technique that have been developed, each providing slightly different benefits.

TENS [transcutaneous electronic nerve stimulators] units have some similarities to EMS units. They are typically small, hand-held, battery operated [portable] units, featuring intensity, frequency and mode controls, which send electrical signals [of a different frequency to EMS] to either one or two pairs of strategically positioned pads. The main difference between TENS and EMS is that TENS is mainly used to help control pain. The electronic signals produced by TENS machines are purported to “close the pain gate” and cause the release, within the CNS, of the body’s opiate-like pain-reducing chemicals [enkephalins and endorphins]. The electrode pads are typically placed over either side of the area of pain, the experience for the client should be a mild to moderate tingling sensation, and no muscle contraction should occur.