OBCE SPECIAL BOARD MEETING **PUBLIC SESSION**	**November 17, 2023 9:00 AM** **Zoom Conference:** https://teams.microsoft.com/dl/launcher/launcher.html?url=%2F_%23%2Fl%2Fmeetup-join%2F19%3Ameeting_MmIzMWRlZDQtZDA2My00YWJiLWJlM2QtODEzYTZiZWRjMGY0%40thread.v2%2F0%3Fcontext%3D%257b%2522Tid%2522%253a%2522aa3f6932-fa7c-47b4-a0ce-a598cad161cf%2522%252c%2522Oid%2522%253a%252218de3e80-5290-4185-bff6-3055919b6f1d%2522%257d%26anon%3Dtrue&type=meetup-join&deeplinkId=fe7a94de-4dd7-4f13-9425-98c60c255203&directDl=true&msLaunch=true&enableMobilePage=false&suppressPrompt=true **Meeting ID:** 212 878 479 480 **Passcode:** oSMe8n
Board President: Michelle Waggoner, DC Phone 503-378-5816 info@obce.oregon.gov	

November 17, 2023

9:00 AM Convene Public Session

The Board calls this Special Board Meeting in order to continue to review and revise the CA Study Guide.

1. **WORK SESSION** Action
    a. CA Study Guide

Preface

The main purpose of this manual is to act as a study guide for chiropractic assistants who are being examined and certified to assist with patient care in the chiropractor's office. It is intended to be a basic step-by-step guide, not a complete reference.

Original Printing March 1990
Revised August 2014
Revised January 2023

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1. Introduction

1.1 Licensing, Training, and Scope of Practice

Certified chiropractic assistant's (CAs) work under the license of a supervising chiropractic physician (DC). It is important that CAs review and understand the CA application process and all rules and regulations applicable to them. Every action taken by a CA should be done with their supervising DCs knowledge and approval. Acts of wrongdoing may result in disciplinary action against the CA and their supervising DC.

CAs are regulated by the statutes and administrative rules of the State of Oregon. These statutes and rules are enforced by the Oregon Board of Chiropractic Examiners (OBCE) for the protection of the public. The Oregon Administrative Rule (OAR) outlining conduct and expected behavior of CAs is OAR 811-010-0110 and OAR 811-035-0015.

CAs may assist with many procedures in the office, including but not limited to: recording a patient’s subjective complaints, taking vitals, performing physiotherapies, and performing soft tissue therapy.

CAs must not perform examinations and adjustments even if requested by a supervising chiropractic physician.

1.2 Chiropractic Assistant Certification Process

To become a CA, you must:

1. Be 18 years of age or older;
2. Complete a background check – and explain any criminal history that may show up;
3. 12 hours of training, including 8 hours of didactic, 4 hours of hands-on; and a
4. Passing grade on the Chiropractic Assistant Exam (open-book exam).

The background check will look for any charges or convictions on record for an applicant. It is important to note that having any charges or convictions, depending on their nature, does not mean an applicant cannot obtain a certificate. If the applicant has a criminal history that appears on a background check, they should be prepared to explain this, and obtain related court and police records. If an applicant is not certain if a conviction has been expunged or would not be reported, then they should mention this in the application process. Failure to do so will result in delays in the application and certification process.

The application and certification process may also be held up due to incomplete application submission. It is important to read the instructions and answer every question on the application.

Delays may occur due to the following:

- Failure to fill out or complete the application form.
- Failure to appropriately schedule the fingerprint/background check appointment.
- Failure to report and/or explain any criminal history.
- Failure to sign up and take the CA examination through NBCE.

The National Board of Chiropractic Examiners (NBCE) is the testing entity that hosts and grades the online CA examination. NBCE is not affiliated with the OBCE's application process, other than for the exam portion. Once an applicant has been approved to take the exam, the applicant will be notified by NBCE and must sign up through NBCE's site for the exam. While the exam is an open book test, no other resources may be used. This means applicants should not search for answers using a web browser, accept assistance from others, and share of exam answers. Applicants are required to take the exam themselves.

OBCE's website allows the public to search for a licensee and review any public documents associated with the license or certification. The Guide to Policy and Procedures (P&P) is also available through the OBCE's website. The P&P provides information about scope of practice and answers to commonly asked questions. The OBCE's website provides a link to the Secretary of State's website which hosts the OARs.

DCs are required to supervise CAs at all times. DC must be on the premises for a CA to be able to perform services. For example, if the DC leaves for lunch or early for the day, the CA cannot provide billable services, unless the CA is also licensed as a massage therapist (LMT) and is performing massage and billing under massage. CAs are required to report, to the OBCE, if the supervising DC is not present or supervising appropriately.

Typically, CAs assist with physiotherapies such as: putting on hot and cold packs, putting on and taking off electrotherapies, performing ultrasound therapies, and running patients through stretches and exercises. Some offices have CAs assist with massage and nutrition practices. It is important for the CA to be appropriately trained in the services they provide. Should a CA feel that they have not had enough training to be able to answer patient questions appropriately or safely provide care, the CA should notify their supervising DC or office manager and cease providing care until trained. CAs may not assist with manual muscle testing or adjusting of any kind.

1.3 Duty to Report

CAs are required to abide by the Duty to Report rule (OAR 811-010-0040). Given that the supervising DC has a position of power over the CA, it may be hard to confront the doctor directly. The OBCE is a resource for questions surrounding these issues. The OBCE receives and processes complaints when one has been submitted, although the OBCE does not investigate anonymous tips or complaints.

Health professionals, including CAs, have a duty to report child abuse and abuse against seniors and elders, and are mandatory reporters in or out of the office. A CA must report child abuse and neglect immediately. This requirement applies whether the CA observes or receives information about the abuse or neglect during work hours or personal time. Possible child abuse should be reported through Oregon's toll-free hotline: 1-855-503-SAFE (7233) or on the DHS website.

Mandatory reporting includes elder abuse. Possible elder abuse should be reported through Oregon's toll-free hotline: 1-855-503-SAFE (7233) or on the DHS website.

CAs should be prepared to leave contact information when reporting.

1.4 OBCE Complaint Process

The OBCE is a regulatory board that is complaint driven, meaning no action is taken until a complaint is received. Complainants (person submitting a complaint) should use the online complaint form via the OBCE's website to submit. The identity of the complainant is held confidential; however, the nature of the allegations may imply the identity of the complainant to the respondent during the investigation. The OBCE does not disclose the identity of the complainant.

The OBCE will review the complaint and assign an investigator. The complainant, witnesses, and respondent (the person being investigated) may be interviewed. The respondent will be informed by the OBCE of the allegations against them and be required to respond. When the investigation is complete, the OBCE board will make a determination as to any disciplinary action. The complainant will be notified after the OBCE board makes its determination.

Many CAs are afraid to file a complaint against their supervising DC because they are afraid of losing their job. Both CAs and DCs are required to follow all laws, rules, and policies relevant to chiropractic practice and healthcare settings. If CAs and DCs do not comply, there is a possible risk of patient harm. CAs may be included in a complaint against a DC or other CAs for failing to report the misconduct alleged.

The duty to report also applies to self-reporting arrests, criminal charges, civil cases, or investigations/board actions taken by other state licensing boards. For example, if a CA gets charged with Driving Under the Influence of Intoxicants (DUII), it must be reported to the Board. The duty to report also applies to possible unethical behavior or behavior that would be in violation of board rule or policy within the office. CAs may be asked to charge for services not provided if they are involved in billing. The CA may initially go along with the process during training but as they get a better sense of therapies and appropriate billing, they learn what is being done is wrong. This is an excellent time to self-report and provide detailed information to the OBCE. The duty to report does not apply to just inappropriate behavior of the DC, it applies to other CAs, and other licensed individuals such as LMTs, Nurse Practitioners, Acupuncturists, and Medical Doctors.

Occasionally, the OBCE receives complaints about being underpaid, lack of break time, or other employment issues that are not within the jurisdiction of the OBCE. The Oregon Bureau of Labor and Industries is the appropriate state agency to contact for those types of issues.

2. Boundaries

Power dynamics exist in all relationships, whether we acknowledge them or not. Employers have power over employees (they can make decisions that affect their employees' lives) and healthcare providers have unequal power with their patients (as patients come to them seeking resolution of pain or stress, looking to them for answers). It is important to know these differentials exist as they may lead to behavior that people (both healthcare providers and patients) would not normally engage in or tolerate.

The chiropractic profession involves a lot of hands-on application and treatment approaches. For chiropractic professionals, it might be a day-to-day procedure but for a patient who is new to chiropractic who may perceive touch as inappropriate. It is important to fully explain and define actions to patients and allow them to ask questions and provide informed consent. Informed consent is crucial to enable patients to more fully participate in their care and agree or disagree with treatment options. If a patient declines therapy for a particular day for

whatever reason, honor the patient's request and then tell the treating DC to allow changes in treatment to occur.

If a CA provides muscle work, it is very important to tell the patient what level of undress will be needed and what areas of skin will be exposed. Patients may hear or understand something different than described so be slow and thorough with gowning instructions. When doing full body massage with the patient mostly or fully disrobed on the table, proper draping and covering of the body is especially important. This is something that needs to be practiced in the office if the CA has never done it before. Poor draping techniques often cause patients to file complaints and not return for care.

Boundaries around conversations with patients are also important to establish and maintain. Patients want to know their healthcare providers and will ask personal questions. It is appropriate to share information about day-to-day life, but it is important to keep boundaries around talking about finances, personal relationships, or other such topics. It is important to understand and remember that CAs and DCs are patients' care providers, not their friends.

Each office should have its own policy about socializing with patients, whether it is via social media or engaging in person. Know what the policy is and abide by it.

The OBCE maintains strict rules around sexual misconduct and boundaries. CAs are not allowed to engage with a patient in a sexual manner. There are exceptions to this rule, particularly if the CA is in a personal relationship or married to the patient prior to them being a patient in the office. It is important for these issues to be communicated to the office manager and supervising DC in case the inappropriate behavior escalates and patient dismissal is needed.

If a CA does find they are becoming attracted to a patient, it is important to talk with the treating or supervising DC about this and see if there are other providers who can assist with care for this patient.

These rules apply to CAs and DC students who are working as CAs while completing their chiropractic study.

2.1 Language Barriers

Patients who do not speak English as a first language may have additional barriers around treatment. If they are not fluent in English, an interpreter other than a family member will be needed as it may not be appropriate to share personal details in front of family members or friends that they may otherwise share with their doctor. Interpreters are available over the phone as well as in person and are required by law if the office accepts federal or state funding (Medicare, Medicaid).

If there is any question whether the patient is fluent in English, especially with medical terminology, have an interpreter available. In Oregon, healthcare interpreters (HCIs) must be credentialed and registered through the Oregon Health Authority.

2.2 Other Boundaries

There are patients who identify differently than the gender or sex they were assigned at birth and may use pronouns appropriate for their identity. Make sure their charts reflect accurate pronouns, preferred names, or nicknames, as indicated by the patient. This simple act will help all patients feel acknowledged and welcome in the clinic.

The use of appropriate language will also help patients feel accepted for who they are. Instead of assuming their sexuality, ask about partners vs husbands or girlfriends etc. Every patient simply wants to be seen and heard for who they are regardless of their sexuality, religion, or race. We live in a society that does not automatically extend this respect to all types of people and we may have ingrained and implicit biases we are unaware of. Classes on cultural competency as part of the initial CA certification and subsequent renewal processes will assist in identifying these biases.

2.3 HIPAA - Health Insurance Portability and Accountability Act

The Health Insurance Portability and Accountability Act (HIPAA) is a federal law that ensures that patients are always entitled to the privacy of their records. When patients come into the office, they will need to sign a privacy statement or be made aware of the existence of these rules and what they mean. Patients do not need to give specific permission for their chart notes to be shared with their insurer, but permission is needed to send their charts to their attorney or another doctor's office.

If there are family members being treated in the same office, it might be tempting to share information but unless a release is on file, it is important not to share. Information about minors may be given to the consenting adult, but it is important to check with anyone being treated who they will share their information with. This may cause a little irritation to the patient if they need to sign a form for the office to be able to share information, but it is looking out for the patient's best interest and providing them protection.

Patient permission to disclose records is not necessary if the information sought is required by law or by subpoena for judicial or administrative proceedings. Offices are not allowed to release protected health information to employers, even in the case of a worker’s compensation claim. The employer is only allowed to know what the work restrictions are unless the patient wishes to share further information.

Patients do have the right, with worker’s compensation and motor vehicle accident claims, to limit the information these companies can see regarding prior care. Work with the patient to send only the records they want to have sent, for example, limiting disclosing any prior care to a specific date range or specific problem area.

2.4 Ways to Protect Information

Paper records

- Forms or charts that are on desktops may need to be face down until they are being actively worked on or addressed.
- No other patient charts should be in the treatment room other than the active patient in the room.
- Physical charts will need to be secure and locked up when not in the office and during break times.

Electronic records

- Keep computers physically in a place where patients cannot see other patient information.
- Use screen protectors which make it hard to see the screen from an angle, so only the person looking directly at the computer can see the information.
- Ensure that devices are locked/signed out of when not in use.

3. Sanitation and Safety

All offices must follow a standard for keeping the office clean and safe for patients. Depending on the type of clinic, there will be different rules to follow set by the federal agency, Occupational Safety and Health Administration (OSHA). Oregon OSHA also has different rules depending on the number of employees, if there is a lab in-house, or if there are other types of doctors other than chiropractors. CAs should check in with the office manager regarding abiding by OSHA and Oregon OSHA requirements.

General safety in a chiropractic office involves cleaning the tables and equipment between each and every patient. The material on the tables will have a specific type of cleaning spray vs other equipment to keep the table from cracking. If there are reusable pads for electric therapy, they will need to be cleaned between each patient. If there are multi-use disposable pads patients buy for their use on themselves, keep them labeled and safe so they are not accidentally used on other patients.

Any reusable sheets, gowns, shorts, or towels used on a patient will need to be laundered before being put back in the rotation. Some offices have a laundry service or in-house laundry. Follow the rules for that specific office but make sure to bring all soiled items to the laundry. Other offices may have single-use gowns, shorts, and table paper. Make sure these items are disposed of between patients.
When working directly on patients, use soap and water or hand sanitizer before touching the next patient. If there are items that patients reuse, such as pens, clipboards, etc. then make sure these items are briefly wiped down before the next use.

When patients are in the office feeling unwell, the office can make a policy to ask the patient to wear a mask or to reschedule. The provider may make that call and let the patient know what their treatment options are. During State of Emergencies, the Oregon Health Authority may have additional requirements for health care offices that will be in addition to other standard regulations.

3.1 Sanitization and Scents

Many patients have allergies or sensitivities to scents. To address this, many offices have policies around the personal use of scented lotions, soap, or shampoos to help keep the environment scent-free.

Patients may also be allergic to latex gloves, lotions, or even table cleaner and laundry detergent. Most electronic health records allow for alerts to flag providers to these sensitivities and allergies. Work to make sure this information is in the patient chart and will pop up immediately when they are in the office.

3.2 Other Safety Considerations

For other safety purposes, it is also important to make sure any prior surgical conditions such as artificial joints, unstable joints, or spinal surgeries should be flagged in the patient chart for the provider to remember. Some patients may even need safety in terms of being in a specific room based on the treatment table in there or request not to see a specific provider. All this information may be shared with you instead of the provider. Make sure to communicate these needs and put them in the patient chart for safety purposes. Providers may also flag a patient file if they do not want to treat specific patients as well. If you are a CA who helps with patient scheduling, make sure all these types of notes are readily available to you.

4. Documentation

Keeping accurate chart notes is an important piece of patient care. All records within the patient's file must have the patient's name, date, and the address of the office the patient is being treated out of on every page.

Many offices will utilize a CA to help take the patient subjective complaints in SOAP format, below.

> **S** – **Subjective** – what and where of the patient's complaint. This includes the type of pain the patient is experiencing and the progression of their pain, better, worse, or no change. It is also very helpful to obtain activities of daily living or limitations, such as the ability to care for themselves, work, or engage in physical activities.
>
> **O** – **Objective** – what the physician finds relating to the patient's complaints.
>
> **A** – **Assessment/Action** – the treating physician's assessment of how the patient is progressing and any care provided to the patient.
>
> **P** – **Plan** – any changes to the treatment plan and current plan. Any additional concerns the provider has, or additional referrals needed for the patient.

The CA will need to make detailed notes for the subjective portion of the record. CAs can help obtain height, weight, temperature, pulse, and blood pressure as part of the examination

findings. It is important to obtain this information when the patient presents as a new patient, for a new injury or condition, or for re-evaluations, when indicated.

When providing any type of physiotherapy, it is important to document the following:

1) What therapy is being provided – physiotherapies often need to include the settings such as wattage or intensity;
2) The reason for the therapy being provided;
3) The location of the therapy provided;
4) The time – either exact time on the clock or time in the number of minutes; and
5) Who provided the therapy?

Examples:
High-intensity IFC was provided to the upper back and the middle back to help promote pre-adjustment relaxation for a total time of 15 minutes. The therapy was provided by Sam Smith, CA license #55880
Pulsed ultrasound at 1.5 w/cm2 was delivered to the right anterior thigh to reduce pain and promote healing for 5 minutes from 3:45 pm to 3:50 pm. The therapy was provided by Sam Smith CA license #55880.

Exercise to the cervical region to help promote the range of motion and functionally improve the ability to look over shoulders was provided one on one to the patient for 10 minutes. The following exercises reviewed were: cervical towel rotation and extension exercises, cervical isometrics, and supine chin tucks.

Therapeutic myofascial work was provided to bilateral supraspinatus, infraspinatus, teres major and minor, and subscapularis from 11:00 AM- 11:25 AM to help decrease pain and improve the range of motion of the shoulder. Myofascial work was done with pin and stretch work along with instrument-assisted soft tissue therapy.

5. Billing

In some offices, CAs will be asked to chart therapies provided, who provided them, and to bill for the service provided. It is important to know ethical billing procedures, what codes might stack on each other, and what codes do not. Also, from a patient care standpoint, it is important to bill appropriately so they can receive the care they need.

When CAs provide therapies, it is important to recognize that some are timed, and some are not. Regardless of being timed or not, the time the therapy was provided is important to record. Some insurance companies are more specific and require the exact clock time to be notated and others simply need the total time the therapy was provided. The office should review these procedures with the CA as part of initial and ongoing training.

Billing time frames run in 15-minute increments and set up and tear down time is included in the billing. The minimum time to bill a 15-minute unit is to provide at least half of the time of the therapy, so 8 minutes minimum to be able to bill a 15-minute unit. To bill for the next 15-minute unit, half of the time of the next unit must also be provided, which means two units of care is 23 minutes (15 plus 8). Three units of care are 38 minutes minimum (30 plus 8), and 4 units of care are 53 minutes minimum (45 plus 8). Some insurance companies allow for billing for a reduced unit of care which is less than 8 minutes but typically not billable at 5 minutes or under.

Timed codes also stack on each other. For example, if massage and ultrasound are being provided at the same time, only one unit of a timed code may be billed. Typically, the office will be allowed to bill for the code that reimburses at the highest relative value unit (RVU), or highest paying rate.

Some therapies will not be covered by insurance. The insurance contract will also say if the patient can be billed for the non-covered services or not. There are new changes to federal rules that state the patient needs to be informed of all costs prior to engaging in care. Work with the office to ensure the patient has been appropriately informed of the billing and potential costs. Occasionally, insurance coverage does not go as expected and the patient will need to be informed of this as soon as possible.

6. Outcome Markers

There are common forms the patient can fill out to help track their progress. Some offices automatically do this on intake and every re-evaluation. Many insurances require these forms for pre-authorization of care. Common forms include:

Bournemouth Back Form – This form helps track the progress of lower back pain and is easier to fill out than the Oswestry form. Many insurance companies will not accept this one, but it is better for office use.

Disabilities of Arm, Shoulder, and Hand (DASH) – There is the full DASH form or the quick DASH form. This will also produce a disability score and help determine progress for the upper extremity.

Lower Extremity Functional Scale (LEFS) – This form asks 20 questions about the lower extremity.

Neck Disability Index (NDI) – This is a 10-question form with 6 choices for every question which produces a disability score. The higher the score, the higher the disability.

Oswestry Disability – This is the same form as the NDI but aimed at the lower back.

STarT Back Screening Tool – This form is required by certain insurance companies and has a more complex scoring, but they are simple questions for the patient.

If a patient is complaining of a new injury or problem, these forms are useful to help create and manage treatment plans for the treating provider. There are online scoring tools for the more complex forms but many of them are relatively easy to score. Become familiar with all office forms and when to use them.

7. Anatomy Terms

CAs will need to be familiar with common anatomy and terms used by both the patient and the doctor.

7.1 Bony Anatomy

There are seven regions of the body:

1) Head
2) Neck
3) Thorax (chest)
4) Abdomen
5) Pelvis
6) Upper Extremity – Shoulder to fingers
7) Lower Extremity – Hip to toes

The five regions of the spine that a chiropractor may adjust are listed below. Some doctors may adjust a problem-focused area and adjust 1-2 regions while others may adjust the full spine every time. For billing purposes, posterior ribs are included with the thoracic spine.

- Cervical (neck)
- Thoracic (upper and mid-back)
- Lumbar (lower back)
- Sacrum (tailbone)
- Pelvis

Extraspinal adjustments occur to the following:

- Jaw
- Anterior ribs (chest)
- Shoulder
- Elbow
- Wrist
- Hand
- Fingers
- Anatomical hips
- Knees

- Ankles
- Feet
- Toes

There are 12 pairs of ribs connected to the thoracic spine. Ten of the ribs attach to cartilage and to the chest bone (sternum) in the front. The last two sets, ribs 11 and 12, are floating ribs and do not have a cartilage attachment.

8. Terminology

8.1 Location Terminology

- Ipsilateral - Same side of the body
- Contralateral - Opposite side of the body
- Posterior – Referring to the back of an area
- Anterior – Referring to the front of an area
- Medial – Towards midline or the center of the body
- Lateral – Away from the midline of the body
- Superior – Above
- Inferior – Below
- Proximal – Closer to the center of the body
- Distal – Further from the center of the body

8.2 Movement Terminology

Spinal joints move in the following directions:

Movement	**Description**
Flexion	Bending forward
Extension	Bending backward
Right Lateral Flexion	Tilting to the right
Left Lateral Flexion	Tilting to the left
Right Rotation	Rotating or twisting to the right
Left Rotation	Rotating or twisting to the left

Extraspinal joints have additional movements:

Movement	**Description**
Flexion	Decreasing the angle between two structures
Extension	Increasing the angle between two structures
Plantarflexion	Flexion of the plantar (underside) part of the foot
Dorsiflexion	Flexion of the dorsum (top) part of the foot

Abduction	Moving away from the midline
Adduction	Moving towards the midline
Protrusion	Moving straight ahead or forward (tongue, mandible)
Retrusion	Moving backwards (tongue, mandible)
Protraction	Moving forward and laterally simultaneously
Retraction	Moving backward and medially simultaneously
Depression	Moving downward
Elevation	Moving upward
Medial (internal) rotation	Spiral movement towards the midline
Lateral (external) rotation	Spiral movement away from the midline
Pronation	Medial rotation of the radius, resulting in the palm of the hand facing posteriorly (if in anatomical position) or inferiorly (if elbow is flexed)
Supination	Lateral rotation of the radius, resulting in the palm of the hand facing anteriorly (if in anatomical position) or superiorly (if elbow is flexed)
Circumduction	Movement of a limb in a circular motion
Deviation	Movement of the wrist joint towards the radial or ulnar sides (radial deviation, ulnar deviation)
Opposition	Touching the pad of any one of your fingers with the thumb of the same hand
Reposition	Separating the pad of any of your fingers from the thumb of the same hand
Inversion	Plantar side of the foot is rotated towards the median plane
Eversion	Plantar side of the foot is rotated away from the median plane

8.3 Positional Terminology

Patients will lie on the table based on the doctor's instructions. Be sure to receive clear patient position and gowning instructions from the supervising chiropractic physician. Below are the basic definitions.

- Supine – Face up
- Prone – Face down
- Hook Lying – Face up with knees bent
- Side Lying – Lying on either side

9. Muscular Anatomy

Muscles are controlled by the brain and nerves which attach to those muscles. Some muscles are under voluntary control, such as skeletal muscle, and some are under involuntary control, such as cardiac muscle.

If a CA is going to do muscle work, further training by the supervising chiropractic physician is required.

9.1 Muscular Terminology

- **Joint** – where two bones meet
- **Ligament** – tissue that connects bones to each other
- **Tendon** – tissue that attaches muscle to bone

Muscles have tendons at each end which help attach the muscle to the bone. Without our muscles, we would not be able to move our joints.

All muscles have a normal, soft and supple, tone. When the tone changes, we name them in the following way:

Hypotonic – A lack of muscle tone
Hypertonic – An increase of muscle tone
Spasm – A sudden involuntary muscle contraction or convulsive movement

10. Common Injuries

10.1 Fractures

A fracture occurs when the bone breaks or cracks. Patients will often confuse the terms; a "break" and a "crack" are both fractures. There are multiple types of fractures. The supervising chiropractic physician may be the one to diagnose the types of fractures the patient has. The list below are common fractures that patients may refer to:

Avulsion Fracture – When a fragment is pulled off the bone by a tendon or ligament

Compression Fracture – When bones are collapsed

Burst Fracture – When bones spread out in all directions and may damage the spinal cord

Impacted Fracture – When the broken ends of the bone are driven together

Comminuted Fracture – When the bone shatters into three or more pieces

Displaced Fracture – When there is a gap between the broken ends of the bone

Greenstick Fracture – When the bone bends and breaks but does not separate into two separate pieces, like a tree branch

Open or Compound Fracture – When the skin may be pierced by the bone or by a blow that breaks the skin at the time of the fracture

Pathologic Fracture – When a fracture is caused by a preexistent pathological bone lesion

Segmental Fracture – When the same bone is fractured in two places, leaving a "floating" segment of bone between the two breaks

Spiral Fracture – When a fracture spirals around the bone

Stable, Simple, or Closed Fracture – When the bones line up, and the bone is barely out of place

Stress or Hairline Fracture – When a fracture looks like a crack and can be difficult to diagnose with regular X-rays.

Transverse Fracture – When a break occurs in a straight line across the bone

Oblique Fracture – When a break is diagonally across the bone

Some offices have in-house radiology to perform x-rays, and some refer out. It is not within CAs' scope of practice or duties to perform x-rays without additional training and certification through the Oregon Board of Medical Imaging.

10.2 Soft Tissue Injuries

There are multiple types of soft tissue injuries. The supervising chiropractic physician may be the one to diagnose the types of soft tissue injuries the patient has. The list below are common soft tissue injuries that patients may refer to:

Contusion – A bruise
Hematoma – A more severe contusion or a collection (or pooling) of blood outside the blood vessel
Strain – When the muscle or tendon in the body is torn (partially to completely)
Sprain – When the ligament around a joint is torn (partially to completely)

10.3 Stages of Repair

After an injury, tissues and bones will go through several stages of repair. It is important that appropriate physiotherapy modalities are used at each stage.

- **Acute Stage (0-6 weeks)** – An acute condition is usually a new injury that may be swollen, red, warm to the touch, and very painful.

- **Healing Stage (7-12 weeks)** – A sub-acute condition has progressed beyond the acute stage and has begun to repair. The area may still be swollen, red, warm to the touch, and painful.

- **Chronic Stage (over 12 weeks)** – An old injury or ongoing condition that is no longer swollen, red, or warm to the touch. The muscles may be tight and/or weak and scar tissue may have formed.

10.4 Commonly Treated Muscles

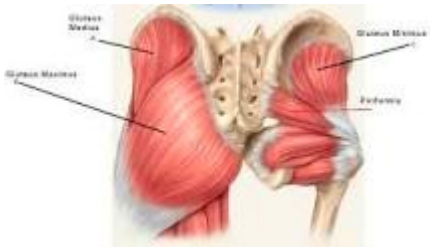
The CA's job may be to provide therapies to specific muscle groups.

Trapezius muscles – Divided into the upper, middle, and lower traps

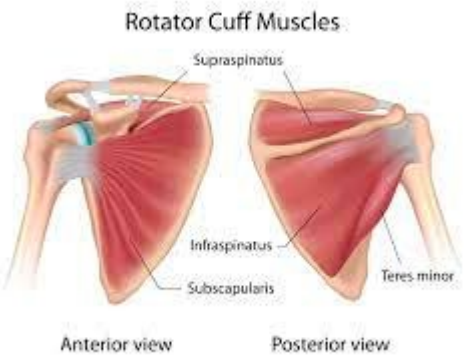
Spinal Erectors/ Paraspinals - The muscles on either side of the spine from the cervical region down to the sacrum

Quadratus Lumborum – The aggravated lower back muscles

Gluteal muscles - The muscles that attach to the sacrum and hips



Rotator cuff – The supraspinatus, infraspinatus, teres minor, and subscapularis muscles of the shoulder



10.5 Types of Pain or Sensation

Local pain – Pain located in the area of complaint

Radicular pain – Pain that travels to a different area of the spine or into an extremity

Paresthesia – An abnormal sensation such as numbness, tingling, or burning

When documenting a patient's subjective complaint – it is important to note where the pain is, whether it travels anywhere, and include a descriptor of the pain such as numb, sharp,

shooting, etc. Patients should be encouraged to use their own words to describe these sensations. The more detailed the subjective complaint is, the better the treatment plan the supervising chiropractic physician will be able to write.

11. Vitals

Obtaining a patient's blood pressure is part of the CA didactic training. Main points to remember:

1. Sit the patient in a comfortable chair with their back supported for at least 5 minutes before reading.
2. Have the patient put both feet flat on the ground and keep their legs uncrossed.
3. Rest their arm with the cuff on at chest height.
4. Make sure the blood pressure cuff is snug but not too tight.
5. Pump up the cuff until no pulse felt in the wrist.
6. Place the stethoscope under the cuff and listen for the pulse to start (systolic pressure).
7. Listen for the pulse to stop (diastolic pressure).
8. Record these findings in the chart.

If the patient has elevated blood pressure, notify the doctor so they can do a second reading or follow up.

Things that can make blood pressure artificially high:

1. Being in a physician's office (white coat syndrome);
2. Having to use the restroom;
3. Stress;
4. Caffeine (consumed up to 30 minutes prior);
5. Smoking/tobacco (if used 30 minutes prior); and
6. Alcohol (if consumed 30 minutes prior).

12. Physiotherapy

"Physiotherapy" is used to refer to those modalities (application of therapeutic agents) applied in office or instructed for home use.

Physiotherapy is used to increase the benefit of chiropractic adjustment and to aid the healing process. Different forms of physiotherapy may be used at different times to reduce pain, speed healing, reduce swelling, relax muscle spasms, or strengthen weak muscles.

Chiropractic physicians choose the physiotherapy modality or modalities that will best meet the needs of their patients. It is important that the CA follows the doctor's instructions carefully. Any changes in the patient's progress should be shared with the supervising physician. If the CA has any doubts or questions about the treatment being instructed to give, ask the supervising chiropractic physician directly.

12.1 Sanitation

Sanitation is important to help keep the patient safe and clean.

1. Sanitize the table after each patient.
2. Any equipment or modality that touches the patient's skin (exercise equipment, activator, cups, ultrasound head, etc.) should be thoroughly sanitized before it is used on another patient.
3. Anything disposable (pads, probes, face paper, paper gowns, etc.) should be thrown away after use.
4. Cloth gowns and towels should be laundered.
5. Sponge pads should be soaked in a germicide solution.

12.2 Positioning and Draping

It is important that the patient be comfortable, warm, and that the part being treated is positioned correctly. The supervising physician should instruct the CA in the best position for the treatment. Here are some guidelines:

1. Place patients in a comfortable position.

    a. Supine: place a large pillow or bolster under the knees and a small pillow under the head and neck. Some treatment tables allow the headpiece to lift. Not all patients will need a pillow under their knees. (Figure 3)

Figure 3 – Supine

    b. Side-lying: place pillows between the knees and under the head. A pillow supporting the top arm might also help, especially if the patient has shoulder or arm problems. (Figure 4)

Figure 4 – Side Lying

    c. Prone: place a small roll or bolster under the ankles, if desired. Some patients might also prefer a pillow supporting their chest or abdomen. (Figure 5)

Figure 5 – Prone

2. Be sure that all body parts are supported in a resting and comfortable position.
3. Drape the patient with blankets or sheets, exposing only the area to be treated. After the treatment has begun, this area can often be covered as well.
4. When giving gowning or clothing instructions, be very specific on what the patient needs to take off and what to leave on, and how to put the gown on.

5. Instruct patients to use appropriate body mechanics to get on and off the treatment table.

    a. When a patient is getting off the table from a supine position, have them roll to their side, then bring their feet off the table, and have them push up with their hands while keeping their torso straight. The patient should not lift their head up first. (Figure 1)

Figure 1 – supine position

    b. When a patient is getting off the table from a prone position, have them slide a leg off the table, bend their knees, and have them push up with their hands. (Figure 2)

Figure 2 – prone position

13. Heat Therapy

The general therapeutic effects of heat are warmth, pain relief, reduction of muscle spasm, relaxation, and preparing muscles for stretching and exercise. Heat modalities can be divided into two major categories: superficial and deep heat.

Caution must be used when applying heat to patients who have a decreased awareness of sensory stimulation or touch. This is common in elderly patients, patients with diabetes, medications, heart conditions, or for those who have had a compromise of their sensory abilities from a surgical procedure.

Some patients do not tolerate heat very well; they may become dizzy, nauseous, or faint. It is possible that some patients' pain levels will be increased with the application of heat. Be cautious by monitoring the patient closely during the initial treatment.

13.1 Superficial Heat Therapy

Superficial heat applications generally affect only those tissues close to the skin surface and do not penetrate to deeper structures.

When applying superficial heat to a patient, there will be an increase in blood flow to that area. Heat that feels only mildly warm to a CA's touch may be too much heat for the patient. This varies greatly from patient to patient and from area to area. Both the patient's level of sensitivity and their condition must be taken into consideration.

13.2 Indications for Superficial Heat

Condition	Effects

1. Chronic muscle spasm, nerve pain, injuries after 24-48 hours	Relieves pain, reduces muscle spasm
2. Chronic arthritis	Decreases joint stiffness
3. Chronic sprains and strains after 24 to 48 hours	Reduces pain, increases healing
4. Skin boils or superficial skin inflammation (cellulitis)	Increase blood flow

13.3 Contraindications for Superficial Heat

1. Insensitivity to heat, e.g., diabetes, nerve damage
2. Increased sensitivity to heat, e.g., multiple sclerosis, elderly, and pediatric patients
3. Poor circulation, e.g., heart conditions, arteriosclerosis, high blood pressure, diabetes
4. Tendency to bleed, e.g., hemophilia
5. Cancer
6. Pregnant people
7. Severe swelling of arms, legs, or abdomen
8. Tuberculosis
9. Medications (consult supervising chiropractic physician)

13.4 Application of Moist Heat

When utilizing or applying moist heat, be sure that the patient has a way of removing the heat or calling for assistance. Depending on the sensitivity of the patient to the heat, more layers or towels can be utilized. Instruct the patient to communicate if the heat is too intense. Hot packs are the most frequent cause of burns in patients who are receiving physiotherapy.

- **Hydrocollator** (Figure 6)
    - When heat packs are removed from the water, they should be placed in a commercial hot pack cover with an appropriate number of towels used as a barrier.
    - Place the heat pack on the patient.
    - Once treatment is complete, return heat pack to the hydrocollator.

Figure 6 – Hydrocollator

- **Moist Heating Pad** (Figure 7?)
  - Place the heating pad in an appropriate cover.
  - Turn on the heating pad. CAs should consult the supervising chiropractic physician regarding specific temperatures.
  - Place the heating pad on the patient.
  - Once treatment is complete, turn off the heating pad, and remove the cover to launder.

Figure 7 – Moist Heating Pad

13.8 Paraffin Baths

Paraffin baths are excellent for the treatment of hands, feet, or elbows and is particularly useful for arthritic pain in the extremities. (Figure 8)

- Before treating the patient, remove all jewelry from the extremity to be immersed.
- Wash the extremity with hand soap and towel dry.
  Examine the skin for open wounds, unhealed scars, or skin infections. If these conditions are present, paraffin baths should not be used.
- Immerse the extremity being treated in the paraffin bath and remove.
- Wait momentarily for the wax on the extremity to harden slightly and then immerse it again.
- Repeat this process until a thick coat of wax forms on the extremity.
- Immediately after the last immersion, wrap the area in wax paper or plastic wrap and cover with a dry towel or a mitt.
- The patient can be left in this wrap for up to 20-30 minutes.
- When the treatment is completed, unwrap the extremity and peel off the paraffin and return it to the paraffin bath where it can be melted and reused.

Dirt and debris will collect in the paraffin with use. The paraffin should be replaced whenever impurities are noted. This is done by allowing the paraffin to cool down so it can be removed and replaced with a new paraffin/mineral oil mixture. When not in use, keep the paraffin bath covered and protected from contamination.

Figure 8 – Paraffin Baths

13.9 Infrared Heat

Infrared heat is a dry superficial heat. There are two types of infrared heat lamps: bulb and coil. Some infrared heat lamps have movable reflectors that allow flexibility in directing the heat. (Figure 9)

- Preheat the infrared lamp for five minutes.
- Position and drape the patient to appropriately expose the treatment area.
- Inspect the treatment area and remove all metal.
- If directing the heat to the face, place wet cotton cloths over the patient's eyes to prevent burning of this sensitive tissue.
- Place the lamp 18-36" from the area to be treated.
- Inform the patient that they should feel a mild sense of warmth. If the patient feels too warm or their skin is too warm, move the lamp farther away.
- Treat the patient for 20-30 minutes.

Figure 9 – Infrared Heat Lamp on Leg

13.10 Deep Heat Therapy

Deep heat applications penetrate 3-5 centimeters below the skin. These modalities use sound waves to cause deep heat.

13.11 Indications for Deep Heat

1. Muscle strain
2. Ligament sprain
3. Tendonitis
4. Bursitis
5. Arthritis
6. Scar tissue and adhesions (ultrasound only)
7. Swelling (ultrasound only)
8. Radiculitis or nerve irritation (ultrasound only)
9. Wound healing (diathermy only)
10. Pneumonia (diathermy only)

13.12 Contraindications for Deep Heat

1. Cancer
2. Infections
3. Through the heart, brain, eyes, front of neck, reproductive organs, or across the spine
4. Pregnancy
5. Fracture or over the growth centers (the ends of the long bones) in a growing child
6. Tuberculosis

7. Hemophilia, blood clots, poor blood supply, hemorrhage, or other bleeding disorders
8. Pacemaker or over any metal implants such as total joint replacements, pins, staples, plates, screws, a diaphragm, or an IUD with metal
9. Within 20 feet of an operating interferential machine (diathermy only)
10. Severe osteoporosis (diathermy only)

13.13 Diathermy

These effects hold true for shortwave diathermy and microwave diathermy. There is a third type of diathermy, pulsed shortwave diathermy, which produces little or no heat. Pulsed shortwave diathermy can be used to help healing in conditions where heat is not desired.

Shortwave diathermy air spaced electrodes: (Figure 26)

Figure 26 – Shortwave diathermy airspace electrodes

Place the electrodes 1-3” from the body, keeping the space between the skin and the electrodes as even as possible. Do not allow any part of the electrodes to touch the skin. Both electrodes must be used. Electrodes may be placed on opposite sides of the body for a deep treatment.

Shortwave diathermy drum electrode: (Figure 27)

Place the electrode up against a towel that has been placed adjacent on to the skin.

27.5 Shortwave diathermy induction coil electrodes

Place the electrodes on a towel on the skin without touching it. One or both electrodes may be used. Placing the electrodes on opposite sides of the body will not make the treatment any deeper.

Place the pads against the towel on the skin. The farther apart the pads, the deeper the treatment. (Figure 25) Both pads must be used.

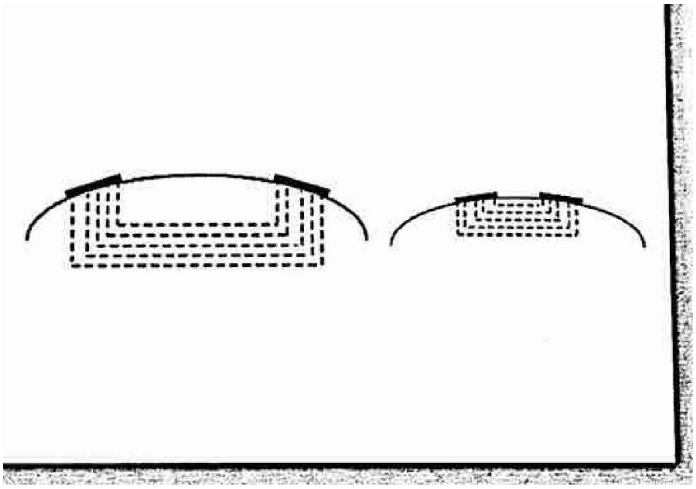


Figure 25 – Shortwave diathermy penetration

27.6 Microwave diathermy head

Place the head approximately 1-8” from the skin with the flat part of the head parallel with the skin. The farther the head is from the skin, the larger the treatment area will be (Figure 28) and the more intensity needed.

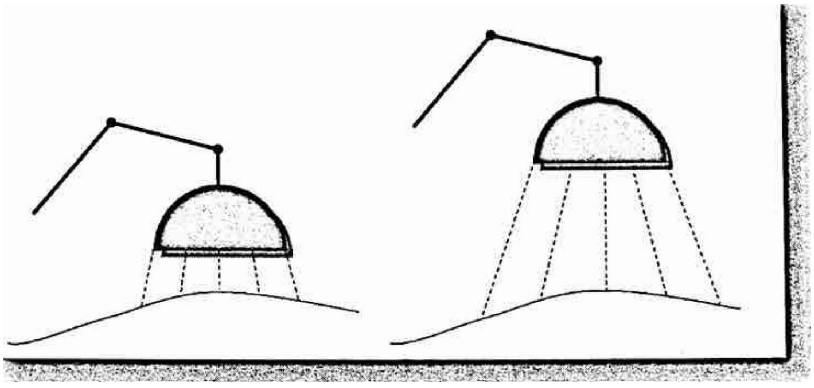


Figure 28 – Microwave diathermy distance

13.14 Ultrasound

Ultrasound can be pulsed or continuous. Pulsed ultrasound is useful for acute conditions or for small areas of treatment because it does not build up as much heat as continuous ultrasound.

The use of special conducting gel, lotion, or water is necessary because it does not travel well through air. If the ultrasound is turned on without the sound head being against gel, lotion, or water, the heat builds up inside the sound head and may burn out the crystal. It is important to keep the sound head against the patient's skin with gel or lotion or under water whenever the machine is turned on. (Figure 29)

- Position and drape the patient to appropriately expose the treatment area.
- Inspect the treatment area and remove all metal.
- Apply conductive gel or place extremity into water.
- Place sound head on gel or in water.
- Turn to desired intensity. Remember to keep the ultrasound head in continuous contact.
- Once treatment has begun, keep the ultrasound head moving continuously to avoid burning the patient.
- Once treatment ends, wipe off the gel or dry the area.

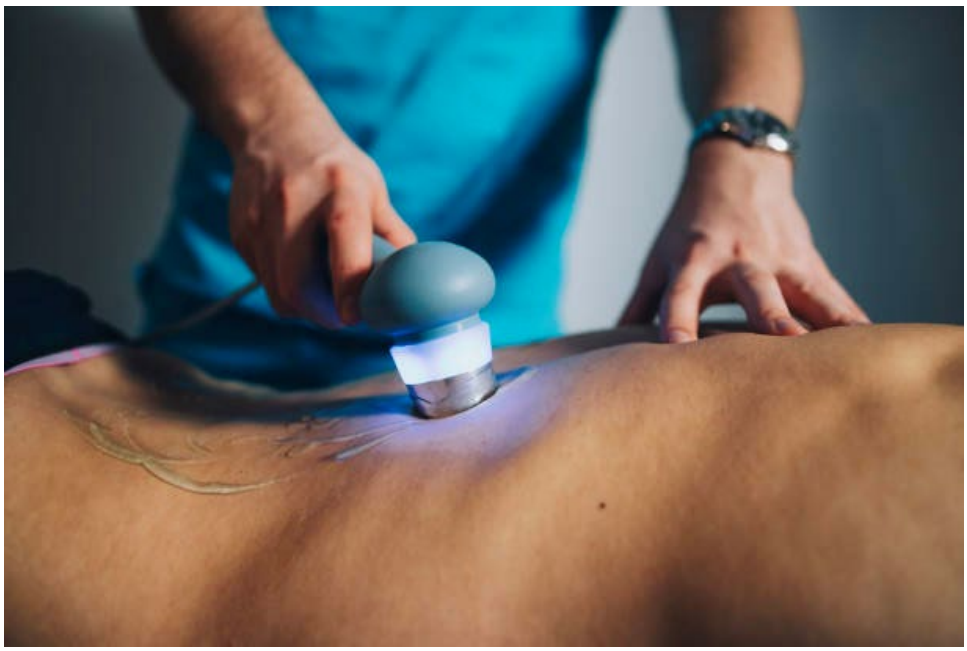


Figure 29 – Ultrasound head

14. Cold Therapy

The application of cold therapies is widely used both in and out of the doctor's office for a variety of conditions. Although a debate continues over the appropriate time frame in which one should apply

cold therapy or heat therapy, it is generally accepted that cold therapy should be used exclusively in the first 24-48 hours of an acute injury to decrease pain, swelling, spasm, and inflammation.

As one changes the treatment time of cold therapy, the treatment effects change also. If cold is applied for only a few minutes, you will get the opposite effect of applying heat. However, when one applies cold therapy for a greater time frame, cold can cause swelling like heat therapy. Most often, cold application is for 20-30 minutes.

Cold therapies can be applied safely in most circumstances, but occasionally patients may not tolerate cold either physically or psychologically. They may not tolerate the ache that accompanies cold application. They may exhibit a type of allergic reaction to the cold such as hives or itching. Should this occur, treatment should be discontinued immediately. Some patients find cold therapy irritating and will derive little benefit from it due to their resistance to its application. One should be cautious with all patients receiving cold therapy for extended periods of time; it is possible to cause frostbite or "cold burn" the patient.

15.1 Indications

Brief relief of pain (do not use longer than 5 minutes)

15.2 Contraindications

1. Sensitive patients (elderly, children, etc.)
2. Hypersensitive patients: may produce hives, itching, or chills
3. Circulatory problems
4. Patients who are already chilled

15.3 General Application

1. Avoid generalized body cooling
2. Keep the treatment room at a warm, comfortable temperature
3. Keep the patient warm with a blanket or heating pad on non-treated areas
4. If the patient is chilled, either before or after treatment, a warm drink may be supplied
5. A warm-up exercise before or after treatment may be employed to reduce chilling
6. Monitor your patient for chills, "goosebumps," bluish skin or hives during treatment. If found on the patient, discontinue treatment.

15.4 Types of Cold Therapies

The specific type of cold therapy will be determined by the area and shape of the body being treated. In turn, the specific modality will determine how much surface can be treated as well as how intense the cold will be.

15.5 Cold Packs of Ice Packs

There are many different ways to make cold packs, all of which are effective. A quick and easy method of making a cold pack is to fill a plastic bag with crushed ice and add a bit of water. Commercial gel packs are effective but lose their cooling capacity more quickly than ice. Instant cold packs use a chemical reaction to produce cold, but these products do not effectively cool the tissues. For home use, patients may use a frozen bag of peas. This makes an excellent pack for conforming to body contours and is very inexpensive.

Figure 10

15.6 Application

1. Inspect the treatment area.
2. Place a damp towel over the skin. Do not let the cold pack touch the skin.
3. Place the cold pack on the towel and stabilize it with a weight or strap.
4. The treatment time is usually 15-20 minutes and can be repeated several times a day as instructed by the doctor.

15.7 Ice Massage

This is an excellent method for cooling small areas of acute injury. Patients may be instructed on how to do this at home if the doctor ordersit. Ice massage is very effective for reducing pain and muscle spasms of chronic as well as an acute injury.

15.8 Application

1. Fill a paper cup with water to freeze it. You may place a tongue depressor or Popsicle stick into the cup of water before freezing to use as a handle later.
2. Position and drape the patient as instructed in the Introduction.
3. Have at least one dry towel available.
4. Peel away an ample portion of the paper cup from the ice block to expose the frozen contents (Figure 12) or remove the ice block entirely if you have used a tongue depressor or Popsicle stick.
5. Rub your hand over the exposed ice surface to smooth out any sharp edges.
6. Rub the ice slowly with slight pressure over the desired area for several seconds. Use the dry towel to pat off any water accumulation on the skin. Do not rub the towel on the patient; the skin will be quite sensitive from the treatment.
7. Advise the patient that there may be some discomfort that progresses from a sensation of cold to burning to aching, think of the initials CBAN to remember the order.
    a. Note: on occasion the stages of burning and aching may reverse in some patients.

8. When the patient reports numbness, discontinue treating in that area.
9. Treatment usually takes 5-10 minutes. If the patient is not numb within 1 minute, the treatment should be discontinued anyway to avoid any possibility of frostbite. Bony areas lack fatty insulation and should be avoided. If an area blanches (turns white) for more than 30 seconds, discontinue treating in that area. Ice massage is not recommended for large area cold therapy; an alternative method should be employed.

Figure 11 – Ice Massage

16. Cold Compresses

Cold compresses are primarily used for treating large body areas, but it is difficult to maintain a constant level of coldness. Alarge towel or other appropriate material like wool or flannel can be used.

16.1 Application

1. Immerse the towel in ice water for a couple of minutes and then wrong it of excess water.
2. Lay the towel over the treatment area.
3. Cover the cold compress with a thin layer of plastic.
4. Place a dry towel over the plastic.
5. Treatment time is usually 20-30 minutes several times a day.

17. Cold Baths

Very cold temperatures can be applied with cold baths. Usually, cold baths are reserved for treating extremity injuries such as ankles, wrists, or elbows. The bath is made with cold water, and ice is added accordingly to reach ever decreasing temperatures. Treatment temperatures can be greatly varied from cool to very cold, depending on what your doctor has prescribed. Because the temperatures are usually quite cold and a relatively large area is being exposed, the patient should be closely monitored. In order to maintain a sanitized bath, the same cleaning instructions given for hot baths apply for maintaining the apparatus used for cold baths.

18. Contrast Heat and Cold

Contrast heat and cold refers to the alternating use of a heat modality with a cold modality. Usually, contrast applications are done with hot and cold baths or hot and cold packs, but they can be equally effective with a combination of any superficial heat and cold modality. This treatment approach is most commonly used after an injury has progressed from an acute stage to a subacute or chronic stage. Since heat causes an increase in circulation and cold causes a decrease in circulation, the contrast between the two is thought to cause an intense pumping action of the circulation to the injured area. This will improve the healing of the injured tissues, relieve muscle stiffness, reduce swelling, and relieve pain.

18.1 Indications

Condition	Effect
1. Subacute sprain/strain	Decreases swelling, diminishes pain, increases healing
2. Bruises	Improves circulation and healing
3. Muscle spasm	Relaxes spasms, increases circulation
4. Swelling	Reduces swelling
5. Arthritis	Reduces pain, promotes healing

18.2 Contraindications

1. Patients sensitive to heat or cold
2. Patients unable to feel heat or cold
3. Advanced blood vessel disease

18.3 Application

1. The temperatures range from 104°F-107°F for heat and 50°F-60°F for cold.
2. Contrast applications should begin and end with heat.
3. Apply heat for 4 minutes and immediately apply cold for 2 minutes.
4. Apply heat followed immediately by cold and repeat this process until a total of five application have been given.
    a. Example:
        i. Heat 4 minutes; Cold 2 minutes
        ii. Heat 4 minutes; Cold 2 minutes
        iii. Heat 4 minutes
        iv. Total time – 16 minutes. Total applications = 5

19. Electrotherapy

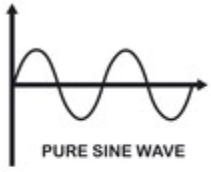
19.1 Introduction

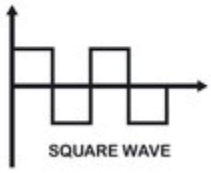
In general, electrotherapy modalities will decrease pain and swelling, relax muscles, and help tissues to heal. All electrotherapy modalities have electrical currents that fall into one of two categories. The first of the two types of electrical currents is called direct current (DC or Monophasic), which is also called galvanic current or galvanism. The second of the two types is called alternating current (AC or Biphasic), which includes sine waves, square waves, and faradic currents.

A direct current (DC or Monophasic) is a steady flow of electricity from one point to the other, always flowing in the same direction. An example of a direct current is a car battery. A battery has two posts (terminals); one is labeled negative, and one is labeled positive. If the two posts are connected with a wire, the electricity made in the battery will flow from the negative post to the positive post as long as they are connected. A circuit is created along which the electricity will flow. When a direct current is applied to a patient, it requires that one negative pad and one positive pad placed on the patient. In this situation, the patient's body completes the circuit; that is, their body acts as a connecting wire between the two pads.

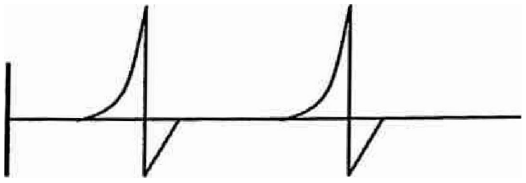
The second type of electrical current is the alternating current (AC or Biphasic). With this type of current, there is still a flow of electricity between two pads placed on the patient; however, there is a difference in that the electrotherapy machine causes the electricity to change the direction in which it flows. In an alternating current, the flow of electricity will go from the negative pad to the positive pad and then the machine will switch which pad is negative and which pad is positive so that the flow of electricity switches directions. An example of an alternating current is the electricity in your house.

Types of Alternating Currents (AC or Biphasic):



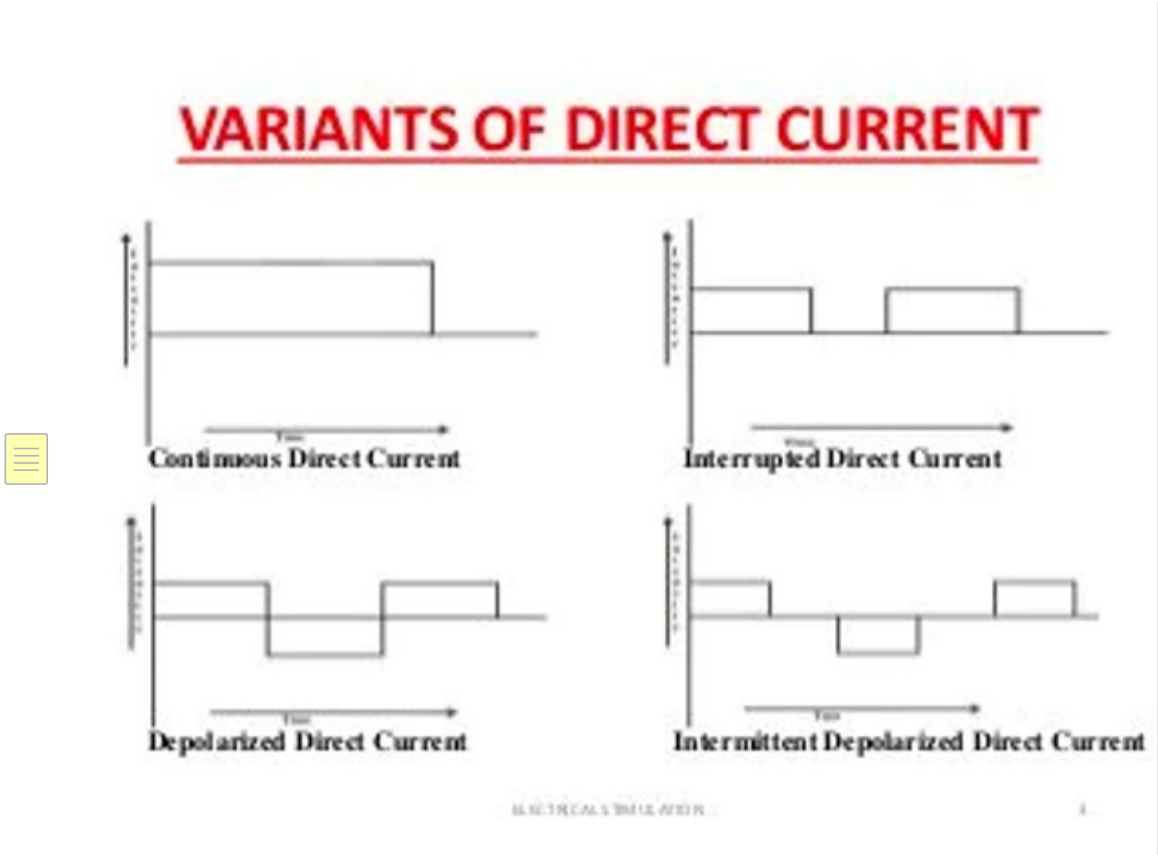


Faradic wave:



Faradic and Galvanic waveform

Types of Direct Currents (DC or Monophasic) Continuous direct current:



With any type of electrotherapy, there are certain requirements that must be met before therapeutic effects are obtained. First, a current or flow of electricity is required.

Second, a complete circuit for the electricity to flow is necessary. If a current is interrupted or “broken,” the electricity will stop flowing. In electrotherapy, we place electrode pads on the patient and the patient’s body completes the circuit. Each machine will have wires, called leads, that carry the electricity from the machine’s terminals to the electrode pads that are placed on the patient. The current must flow from the machine’s terminals through the leads to the pads placed on the patient. If any one of these steps is interrupted, the current will not flow, and the patient will not feel anything.

Once the electrodes are properly placed on the patient, control over how the electricity is applied is obtained. One can control the intensity, or how strong the current is, and control of the frequency, or how fast the current will be applied to the patient. The intensity is measured in microamps, milliamps (mA), microvolts, or volts (V). The frequency is measured in pulses per second (pps), cycles per second (cps), or hertz (Hz). How it is measured depends on the type of machine being used.

Intensity can be applied at two general levels. The first is called the sensory level. This occurs when the intensity dial is turned up and the patient feels a mild sensation of tingling, or pins and needles. The

second level is called the motor or muscle stimulation level. This level is reached when the intensity is increased beyond the sensory level of stimulation. At this level, muscle contraction or twitches result. Which one of the two levels used depends on what biological effects are desired. Some electrotherapy machines have other controls that allow the supervising physician to order different effects for the patient.

When applying any electrotherapy modality, it is important to keep the patient's comfort in mind. To prevent causing pain or discomfort, first check to make sure the machine is turned off and all controls are set to zero. Second, slowly turn up the intensity dial and ask the patient to report when they first feel something. The patient will report their first sensation (tingling). As the intensity is slowly turned up, ask the patient their comfort level. Continue to turn up the intensity until the desired effect or the patient reports that the therapy is uncomfortable, whichever comes first. If the patient reports discomfort, turn the intensity down to the patient's comfort level.

19.2 Terms

- Direct current (DC or Monophasic): a steady flow of electricity in one direction between the negative and positive terminal of an electrotherapy machine.
- Alternating current (AC or Biphasic): a flow of electricity that changes its direction of flow in a rhythmic fashion between the negative and positive terminals. Current: a flow of electricity.
- Conductor: any substance that allows the flow of electricity.
- Insulator: any substance that prevents the flow of electricity.
- Intensity: the strength of the current.
- Frequency: how fast the current flows in pulses per second.
- Circuit: a complete flow of electricity from one terminal to the other with an electrical conductor in-between.
- Electrode pads: metal, sponge or rubber pads placed on the patient to apply the electricity for treatment.
- Leads: flexible wires that connect the terminals of the machine to the electrode pads.

19.3 Precautions of Application

1. Safety precautions for electrical equipment:
    a. All electrical equipment should have a UL (Underwriters Laboratory) or CSA (Canadian Standards Association) sticker when it comes from the manufacturer. This indicates that the equipment was safe when it left the factory.
    b. All electrical equipment should have a 3-pronged plug and be plugged into a 3-pronged socket to be sure that the equipment is grounded. This will decrease the likelihood of an inadvertent shock.
    c. Any frayed or broken leads or wires should be replaced before that piece of equipment is used.
    d. Each piece of equipment should be safety checked once a year by a qualified individual.

As a safety consideration, always set all the controls on the machine to zero and make sure the machine is off before and after treatment is applied. Some machines have an on/off switch on the back of the machine and automatically re-set the controls to zero when each treatment is finished. Other machines are turned on with mechanical timers. With these machines, if the intensity control is left turned up and the timer is turned on, the patient is likely to get a sudden jolt. As a consideration to the next person using the machine, make sure all controls are set to zero when finished with treatments.

Sometimes a patient may not feel any sensation when the intensity is increased. If this occurs, there may be an interruption to the circuit, or themachine may be malfunctioning. In either case, set the intensity control to zero before moving the electrode pads or test the connections. This is a safety rule that will prevent the patient from receiving a sudden stimulation that results from jiggling wires or moving electrode pads while the intensity is on.

Sponge electrode pads require soaking in water to make sure there is a good connection with the skin of the patient. Some electrode pads require gel for the same reason. In either case, unless water or gel is used, the electricity will not flow. When applying any electrotherapy modality, remove any metal or jewelry from the treatment area. The electrical current will have a tendency to be conducted along the metal or jewelry and may cause a burn to the skin. All patients who have compromised mental faculties may not be able to accurately report if the electrotherapy is uncomfortable. In these situations, great care must be taken in applying and monitoring the electrotherapy treatments.

19.4 Contraindications

Certain medical conditions or areas of the body should not receive electrotherapy and are contraindicated. One should never use electrotherapy on a patient with a pacemaker and never have an electrotherapy on a patient with a pacemaker and never have an electrotherapy current pass through a patient's chest where the heart is located as it may cause the heart to beat abnormally. Other parts of the body that are sensitive to electrotherapy currents are the eyes and the brain. Electrotherapy is never applied so that the current passes from one pad through the brain to the other pad. Likewise, the front and sides of the neck are sensitive to electricity, therefore, electrode pads should never be placed over the throat area or the sides of the neck.

Another condition for which electrotherapy should not be used is if the patient is pregnant. There is an increased risk to the fetus if electrotherapy is used on the mid to lower back or the abdomen or pelvis of a pregnant patient. It is best to avoid electrotherapy altogether once the patient is pregnant. The supervising physician may choose another type of therapeutic modality to help instead of electrotherapy.

Electrotherapy should not be applied over any known cancerous tissues or infections as it causes circulation to increase. This may cause the cancer or infection to worsen or spread to other parts of the body. If an area of redness, swelling or pus is noticed on a patient, bring it to the attention of the supervising physician.

Some patients may have areas of decreased sensitivity or not able to feel pain or heat well. Diabetes or paraplegia may also cause patients' sensitivity to be decreased. All areas of decreased sensitivity, regardless of the cause, pose a risk for patients because they are no longer able to accurately report what they feel. It is possible to harm them without them knowing it. Great care must be taken when treating this kind of patient. If these patients are treated with electrotherapy, they should be monitored closely and frequently.

Additionally, patients who have compromised mental faculties may not be able to accurately report if the electrotherapy is uncomfortable. In these situations, great care must also be taken in applying and monitoring the electrotherapy treatments.

20. Low Volt Galvanism

Low volt galvanism (LVG or low volt direct current) occurs naturally in the form of lightening, electric eels, and electric torpedo fish. LVG has been used to treat many disorders including pain, weak muscles, and healing fractures. One must administer LVG cautiously as it has the ability to burn the patient's skin or cause tissue damage.

With LVG, the electricity flows from the negative pad to the positive pad. Each LVG machine will have a switch that allows one to decide which pad is positive and which pad is negative (the different pad polarities). This is important because there will be different biological effects under each pad. The positive pad causes decreased blood flow, hardening of the tissues, and is reasonably comfortable. The negative pad causes increased blood flow, softening of tissues, and is relatively less comfortable. The supervising physician will decide on the polarity of the pads.

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When applying LVG, usually two electrode pads of different sizes are used. The smaller of the two electrode pads is called the active pad. This means that there is more concentration of current under this pad and the biological effects are greater. Place the smaller active pad, whether positive or negative, over the area to be treated to get the best biological effects. The second electrode pad is called the dispersive pad because it dispersive pad because it disperses or spreads out the current, resulting in fewer biological effects. The dispersive pad must be at least twice the size of the active pad. It is the opposite polarity from the active pad and is placed away from the area of treatment.

Figure 13 – LVG

20.1 Terms

- Interrupted LVG: rather than flowing in a continuous stream, the current is stopped and then started again. This is useful in stimulating muscles when the nerves of those muscles have been damaged.
- Continuous LVG: a steady stream of LVG current.
- Medical Galvanism: using LVG to reduce pain or swelling in the patient. This approach may use either the positive or negative pad.
- Iontophoresis: using LVG to cause absorption of certain medicinal substances through the patient's skin for their therapeutic effects.
- Surgical Galvanism: using LVG to treat hemorrhoids. Also known as "Keesey" treatment.
- Polarity: the ability to switch the machine to positive or negative and to determine which pad will have a positive or negative effect.
- Active pad: the smaller of the two electrode pads used. This concentrates more electricity at this pad, and you will get more effects under this pad. The active pad is placed over the area of treatment. A probe may be used as a small active pad. (Figure 14)

- Dispersive pad: the larger of the two pads. It is usually at least twice as large as the active pad. This spreads the electricity, and you will get less effect under this pad. This dispersive pad is placed away from the area of treatment.

Figure 14 – LVG with **probe**

20.2 Indications

Condition	**Effects**
1. Stimulation of muscle that has lost its nerve supply (interrupted LVG)	Minimizes muscle weakness
2. Stimulation of weak muscles (interrupted LVG)	Maintains or improves muscle strength
3. When polarity effects are desired; strains, sprains, and scar tissue (continuous LVG)	Changes blood flow, reduces pain, softens or hardens tissues
4. When medicinals are topical (continuous LVG)	Will vary with medicinals; can treat fungus, bacteria, or pain.
5. Hemorrhoid (surgical galvanism)	Reduces hemorrhoids

20.3 Contraindications

1. Cancer
2. Hemorrhage
3. Infection
4. Through the heart
5. Through the brain
6. Through the eyes
7. Front of neck
8. Pregnancy
9. Pacemaker
10. Over superficial metallic implants
11. Over recent scar tissue
12. Areas of increased or decreased sensitivity
13. Sensitive skin
14. Poor patient tolerance

20.4 Application

1. Position and drape the patient as instructed in the introduction.
2. Remove all metal from the treatment area.
3. Set all controls to zero.
4. Soak pads thoroughly or place gel on them. (If performing iontophoresis, soak the pad in the desired solution.)
5. Set the polarity of the machine so that you know which pad is positive and which pad is negative.
6. Place the smaller active pad over the area to be treated. Place the larger dispersive pad on the same side of the body. Remember to keep the current from crossing through the patient's chest. You may hold the pads to the patient's body with straps, weights, hot or cold packs, or the patient's own body weight.
7. Set the mode:
    a. Continuous: for medical galvanism and iontophoresis
    b. Interrupted: for stimulation of muscle
8. Turn the intensity dial up slowly to patient tolerance (the maximum current is 1 milliamp on the meter for every square inch of active pad.)
    a. Treat for desired time
    b. For muscle stimulation, stimulate the muscle until it begins to fatigue.
9. For medical galvanism and iontophoresis, the first treatment should be no longer than three to four minutes. The next treatment can gradually be increased to a maximum of 10 minutes.
10. Always check for signs of burning on the patient's skin. Slight redness is normal if it goes away in 24 hours.
11. Turn the intensity dial to zero before removing pads.

21. High Voltage Pulsed Current

High voltage pulsed current (HVPC) has been in use in clinics since the 1970s. Originally, it was called "high volt galvanism" because it uses a type of direct current as does LVG. However, HVPC is very different from low volt galvanism in many respects. HVPC has a smoother, more comfortable feeling while LVG tends to be more intense and an almost "biting" feeling. Unlike LVG, HVPC does not produce strong polarity effects under each pad; therefore, it is incapable of burning the patient as easily. For these reasons, HVPC is now more commonly used in chiropractic offices.

HVPC is used to reduce pain, relax muscles, and decrease swelling. It is often used in treating patients with recent (acute) injuries as well as those that have old (chronic) injuries. HVPC can also be used to build strength in muscles that are weak and to promote wound healing. HVPC is typically used in chiropractic offices for relieving pain, muscle spasm, and swelling from injuries, sprains, and strains of arms and legs.

21.1 Indications

Condition	**Effects**
1. Chiropractic Joint Dysfunction	Relieves pain and relaxes muscles
2. Soft tissue injuries (acute & Chronic) such as strain and sprain	Relieves pain and relaxes muscles
3. Muscle Spasm	Relaxes muscles
4. Muscle weakness	Strengthens muscles
5. Swelling	Reduces swelling
6. Arthritis	Relieves pain and swelling
7. Discogenic Pain	Relieves pain and increases healing

8. Trigger points	Stimulates trigger points and decreases pain
9. Muscle and nerve pain	Reduces pain

21.2 Contraindications

1. Cancer
2. Hemorrhage
3. Infection
4. Through the heart
5. Through the brain
6. Through the eyes
7. Front of neck
8. Pregnancy
9. Pacemaker
10. Over superficial metallic implants
11. Over recent scar tissue
12. Areas of increased and decreased sensitivity
13. Sensitive skin
14. Poor patient tolerance

21.3 Application

1. HVPC machines of older design use two or more electrode pads of unequal size. The smaller are the active pad(s) and the larger is the dispersive pad. The dispersive pad should be at least twice as large as the active pad, but it is best to use as large a pad as possible. Newer HVPC machines use two pads of equal size because any polarity effects are minimal.
2. Position and drape the patient as instructed in the Introduction.
3. Inspect the area and remove medal from the treatment area.
4. Set all controls to zero.
5. Set the polarity switch. This controls which pad is positive or negative.
6. Set the pulse rate as directed by your doctor. A low pulse (less than 40 pps) will cause individual muscle twitches, while a higher pulse rate (more than 40 pps) will cause a continuous, sustained muscle contraction or tetany. The higher pulse rate may be more comfortable for the patient.
7. Choose continuous or reciprocal mode
    a. Continuous: all pads operate in a constant manner, best to reduce swelling or muscle spasm,
    b. Reciprocal: the current switches back and forth between two sets of active pads, best to exercise muscles.
8. Soak the pads in water or place gel on them.
9. Apply the pads to the treatment area. (Figure 15) Use straps, weights, weights, hot packs, cold packs, or the patient's body weight to hold the pads in place. Remember, do not cross the current through the chest. Sometimes instead of using electrode pads, you can substitute a very small pad on a handle called a "probe." (Figure 16) This will operate just like the flat pads, but you can hold it in your hand. It is useful for stimulating small areas such as trigger points, acupuncture points, or small muscles.
10. Turn the timer to the desired time of treatment, usually 15-20 minutes.
11. Gradually turn up the intensity control until you achieve the desired effect within the patient's comfort zone. For acute painful conditions, the intensity is kept low so that the patient reports just a buzzing or tingling sensation and no muscle contraction occurs. If you want to reduce muscle spasms in a chronic condition, it will be necessary to turn up the intensity until you see or feel a muscle contraction, provided the patient can tolerate the intensity.
12. When the treatment is over, turn all the controls to zero and remove the pads.

22. Low Voltage Alternating Current (Biphasic or Sinewave)

Low voltage alternating current (LVAC) has bene used to treat disease since the mid-1800s and is sometimes referred to as biphasic, sinewave, or faradic current. Although there are some technical differences among the terms, it is proper to think of them as belonging to the larger LVAC category.

LVAC is very effective in stimulating a muscle and causing it to contract strongly. This makes it an ideal modality for reducing the swelling of an injured area, reducing muscle spasms, relieving pain, and exercising muscles. LVAC does not require two different-sized electrode pads although they may still be chosen to be used. On occasion, it may be helpful to use a very small pad or a prod to treat small muscles or a specific treatment point. In these cases, the small pad will concentrate the current to the desired area for greater effectiveness.

LVAC machines will generally allow the user to choose how the current is delivered to the patient. There are three forms of available treatment: pulse, surge, or tetanize. With the machine set on pulse, the muscles will contract at a preset number of times or pulses per second, which is good for reducing swelling. In surge mode, the LVAC gradually increases and then gradually decreases. This effect can be controlled to occur from one to several times per minute. When this mode is being used, the patient's muscles can be seen gradually contract and then relax. This is an effective treatment mode to either exercise or fatigue a muscle. The tetanize mode allows the user to cause a smooth, continuous muscle contraction instead of muscle twitching as occurs with the pulse mode. The tetanize mode is good for releasing a chronic muscle spasm. The supervising doctor will determine the appropriate setting for each patient.

22.1 Terms

- Low Voltage Alternating Current (LVAC, biphasic, sinewave, faradic): a flow of electricity which changes directions in a rhythmic fashion between the positive and negative terminals or pads.
- Frequency: the number of times the LVAC changes direction each second. The frequency is measured in cycles or pulses per second.
- Pulse: a completed cycle of alternating current flowing from one terminal or pad to another and back again. One completed cycle is equal to one pulse.
- Surge: the gradual building up and dropping off of an alternating current so that a mucle under stimulation gradually tightens and then relaxes.
- Tetanize: that point which causes a smooth, continuous contraction. This contraction is referred to as tetany or tetanic contraction.

22.2 Indications

Condition	Effects
1. Chiropractic subluxations	Relieves pain, relaxes muscles
2. Soft tissue injuries (acute & chronic) such as muscle strain and ligament sprain	Relieves pain, relaxes muscles
3. Muscle spasms	Relaxes muscles
4. Muscle weakness	Strengthens muscles
5. Swelling	Reduces swelling
6. Arthritis	Relieves pain and swelling
7. Disc problems	Relieves pain and increases healing
8. Trigger points	Stimulates trigger points and decreases pain
9. Muscles and nerve pain	Reduces pain

22.3 Contraindications

1. Cancer
2. Hemorrhage
3. Infection
4. Through the heart
5. Through the brain
6. Through the eyes
7. Front of neck
8. Pregnancy
9. Pacemaker
10. Over superficial metallic implants
11. Over recent scar tissue
12. Areas of increased and decreased sensitivity
13. Sensitive skin
14. Poor patient tolerance
15. Over bony areas
16. Where muscle contraction is not desired, e.g., broken bones

22.4 Application

1. Position and drape the patient as previously instructed in the Introduction.
2. Remove all metal from the treatment area.
3. Set all controls to zero before turning machine on.
4. Soak the pads in water or use gel and place them on the treatment area. Two or four pads may be used. Each two pads constitute a separate circuit. (Figure 17)

Figure 17 – Low Voltage Alternating Current

5. Set the mode as indicated by the doctor: pulse, surge, or tetanize.
6. Turn the timer to the proper length of treatment (usually 15-20 minutes).
7. Increase the intensity gradually to the patient's tolerance or until the desired muscle contraction is achieved, whichever comes first.
8. After treatment, return all controls to zero and remove the pads.

23. Transcutaneous Electrical Nerve Stimulation

Transcutaneous electrical nerve stimulation (TENS) is a term that technically can be applied to any type of electrotherapy that electrically stimulates nerves by sending a current across the skin. However, TENS is usually used to describe the small portable electrical stimulators that can be carried in a patient's pocket or attached to a belt.

Since its development, TENS has proven to be useful is relieving acute and chronic pain. It is sometimes used to relieve the pain of those with terminal diseases such as cancer. Unlike other electrotherapies, TENS can be applied to for several hours at a time. Aside from the obvious benefit of having an electrotherapy modality that is compact, portable, and easily applied for considerable lengths of times, the TENS unit also have current delivery controls that can be operated by the patient. This allows the patient the flexibility of increasing or decreasing the intensity of the treatment, as needed.

There are many different types of TENS units on the market today. Each may vary it is wave form (type of current) the amount of current available. The control switches of the TENS units modify the intensity of the current, the frequency of the pulses, and the width of the pulses. The supervising physician will determine the initial treatment settings for each patient.

Achieving pain relief with a TENS unit can be difficult and may necessitate several trials of application to find the best settings and/or placement of the electrode pads. When using TENS, it is important to remember that this unit relieves pain but does not cure the patient's condition. The supervising physician will determine the appropriate time for the patients to normalize their work and social routines.

When TENS are sent home with patients, it is best to instruct them in the correct operation of the unit and have them verbally repeat, as well as re-enact the instructions prior to leaving with the unit. Operation instructions should be limited to changing the intensity only. Other changes should be determined by the doctor. Be sure to replace or change the batteries for the units before sending them to the patients. Some units carry nine-volts batteries while others use "AA" batteries.

23.1 Indications

Condition	Effects
1. Chronic pain, arthritis, and lower back pain	Relieve pain in 30-75% of cases
2. Acute pain, post-surgical pain, and post childbirth	Relieves pain in 30-80% of cases. May reduce the need for pain medications. May return the patient to normal activities sooner.
3. Intractable pain, i.e., cancer	Short-term relieve of pain in up to 65% of the cases.
4. Rehabilitation exercises	May reduce pain if used before and after exercise.

23.2 Contraindications

1. Pacemakers
2. Front of the neck
3. Pregnancy
4. In the presence of skin irritations

23.3 Application

- Control Settings
    - The controls of intensity, frequency, pulse, and modulations will be prescribed by the doctor according to the needs of the patient.
- Electrode Pad Attachment
    - Since the TENS application may last several hours, it is necessary to firmly attach the pads to the patient and ensure they remain moist and secure. Without this attention to placement, the conduction of stimulation may be considerably decreased.

To reduce the occurrence of skin irritation, suppliers have developed non-allergenic conductive pads that are self-adherent and eliminate the need for either conducting gels or adhesive tapes. These pads have the additional benefit of being reusable. They are hypoallergenic and can be worn for long periods of time.

It is also possible to apply conducting gel to small rubber electrodes and use standard medical tape to secure the pads. Because of the length of time the pads may be in contact with the patient's skin, care must be taken to avoid skin irritation. It is recommended that non-allergic tape be used for prolonged applications.

24. Electrode Pad Placement

Another consideration when using the TENS is the proper placement of the electrode pads. This remains an important consideration even though there is a lack of specific guidelines for pad placement for best results for any given condition. Some general suggestions for pad placement are:

1. Over the painful area
2. Over acupunture points
3. Over trigger points
4. Over a spinal nerve root
5. Over the path of a nerve

When applicable, it is best to use four electrode pads (two channels). (Figure 18)

Figure 18 – TENS

24.1 Length of Treatment

TENS units may be left in place on the patient for up to 24 hours, as determined by the supervising physician. Electrode pads should be removed daily to evaluate the condition of the skin and cleanse the area. If the skin shows signs of irritation, treatment at that particular site should be discontinued and the supervising physician notified.

25. Microcurrent Electrical Stimulation

Microcurrent Electrical Stimulation (MES) is another electric modality for use in chiropractic. It is p

25. Microcurrent Electrical Stimulation

Microcurrent Electrical Stimulation (MES) is another electric modality for use in chiropractic. It is popular for the treatment of sports injuries. Since the amount of current applied is so small, MES is presumably safer to use than many of the other modalities.

MES uses a very small micro-amperage current, in the range of 1/1000th the amperage of low volt galvanism, high voltage pulsed current, or low voltage alternating current. It operates on the theory that a sick or injured cell loses some of its energy and becomes weak. The micro-amperage current is similar to the natural currents of the body. When the current is applied to the sick cell, the cell is given a "quick charge," similar to charging aweak car battery. After the cell has been charged, it is able to work normally again, allowing pain to diminish and healing to take place.

25.1 Indications

Condition	**Effect**
Pain	Decreases Pain
Unhealthy tissue	Increases healing
Swelling	Decreases swelling

25.2 Contraindications

1. Demand-type pacemakers
2. Front of neck
3. Over the eye
4. Pregnancy

25.3 Application

There are many ways to use MES. Applications discussed here will be limited to those which can safely be done by the CA, at the order and instruction of the supervising chiropractic physician.

Before using MES, patients should be made aware that a very small amount of current will be used and thatthey should feel no electricity.

- Two or four pads: The pads should be placed around or over the problem areas. (Figure 19) Follow the manufacturer's instructions for applying the pads. Treatment time is usually 10-60 minutes.

Figure 19 - MES

- Gloves: The current is attached to the gloves as the provider moves their hands. The patient will not feel any discomfort. Treatment time is 10-60 minutes.

Figure 20 – MES with gloves

26. Interferential Therapy

Interferential therapy has become a very popular modality because it is one of a few modalities that can reach just about any place on the body, no matter how deep. Interferential therapy can be used on both acute and chronic conditions by changing the frequency and intensity of current used.

Interferential current needs four electrodes to work: two electrodes to make one circuit and two more electrodes to make a second circuit. The electrodes are put on the body so that the two circuits of current cross each other in an “X” pattern. In the middle of the “X,” where the two currents meet or “interfere,” a different current is produced. This new current comes out in the shape of a cloverleaf with the middle of the cloverleaf being at the middle of the “X.” (Figure 21)

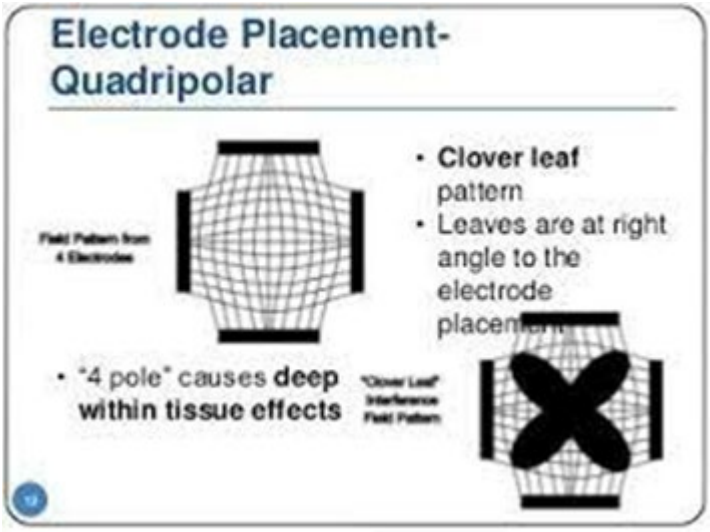

Figure 21 – Interferential Clover-leaf pattern

This cloverleaf of current generates useful effects on the body. By moving the electrodes around, the cloverleaf is moved, and different tissues are treated. For example, if all four electrodes are placed toward one side of the body, the currents will crisscross on that side of the body and the effects will take place at or near the skin on that side. (Figure 22) But if two electrodes are placed on one side of the body and two on the other side (making sure to crisscross the two circuits), the cloverleaf will be in the middle of the body and the effects will take place in the deep tissues. (Figure 23)

Figure 23 – Interferential Therapy Example

The effects that occur will depend on the frequency of the current used. The following are guidelines:

- 90-100 Hz. for pain relief
- 40-50 Hz. for muscle contraction
- 10-150 Hz. for reducing bruising and swelling

It is best to keep the frequency in the higher ranges (90-150 Hz.) and keep the intensity low to not cause a muscle contraction in an acute injury, .

26.1 Indications

Conditions	Effects
1. Soft tissue issues (acute & chronic) such as muscle strain, ligament sprain, nerve pain	Relieves pain and relaxes the muscles
2. Chiropractic subluxation	Relieves pain and relaxes muscles
3. Muscle spasm	Fatigues muscle causing it to relax
4. Weak muscles	Strengthens and teaches muscles to
5. Arthritis and other joint conditions	Relieves pain and swelling
6. Disc problems	Relieves pain and increases healing
7. Headache	Relieves pain and relaxes the muscles

26.2 Contraindications

1. Cancer
2. Hemorrhage
3. Infection
4. Through the heart
5. Through the brain
6. Through the eyes
7. Front of neck
8. Pregnancy
9. Pacemaker
10. Over superficial metallic implants
11. Over recent scar tissue
12. Areas of increased or decreased sensitivity
13. Sensitive skin
14. Poor patient tolerance
15. Within 20 feet of an operating diathermy (deep heat) machine

29. Ultraviolet

UV is seldom used in the chiropractor's office today but may occasionally be used for the treatment of psoriasis, wounds, or strep throat.

UV is a form of light that is given off by the sun at a higher frequency than our eyes can see.

UV can burn tissue easily, especially the eyes. Fortunately, ultraviolet is very easy to block out. Even plain glass blocks out much ultraviolet light. Most sunglasses are made with special tints to block out ultraviolet light.

There are four different types of ultraviolet lamps that can be used for their beneficial effects. Each lamp has a specific use depending on the particular type of ultraviolet used and the size and shape of the lamp:

- Hot quartz lamps (Figure 30) are good for producing erythema (sunburn) and for stimulating calcium and phosphorus use in the body. They are not as good for their germicidal (germ-killing) effects. They can treat large areas of the body. They are effective for treating psoriasis (a skin condition).

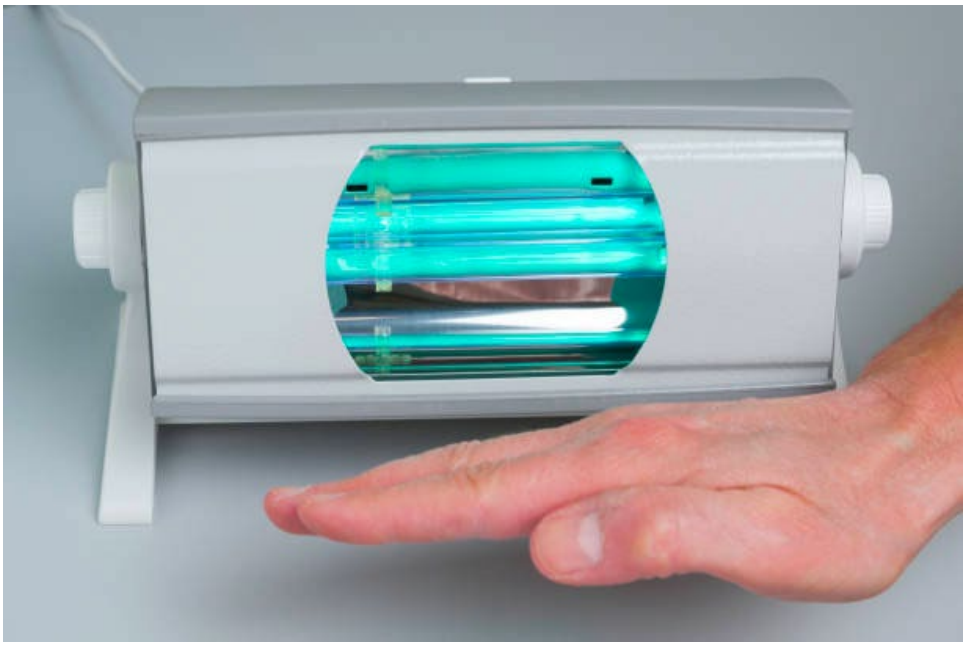

Figure 30 – Ultraviolet hot quartz lamp

Cold quartz lamps produce less erythema, and they are not good for stimulating calcium and phosphorus. They are good for their germicidal effect on large areas of the body. Large wounds and area of infected skin can be treated with a cold quartz lamp.

Cold quartz spot lamps are used for their germicidal effect on smaller wounds and ulcers. Cold quartz lamps are used for their germicidal effects inside openings of the body. They are effective for treating strep throat.

29.1 Indications

1. Psoriasis
2. Wounds and ulcers that are infected or are not healing
3. Rickets
4. Mild calcium and phosphorous deficiency in children
5. Strep throat

6. Osteomalacia (a condition causing softening or weakening of the bones) in pregnant or nursing women
7. Acne
8. Anemia

29.2 Contraindications

1. Active and progressive tuberculosis (lung disease)
2. Advanced heart disease
3. Advanced arteriosclerosis (artery disease)
4. Renal or hepatic insufficiency
5. Hyperthyroidism
6. Diabetes mellitus
7. Generalized dermatitis such as chicken pox or measles
8. Porphyria (blood protein disease)
9. Pellagra (vitamin B3 deficiency)
10. Lupus erythematous (autoimmune disease)
11. Sarcoidosis (disorder leading to inflammatory cells in the body)
12. Xeroderma pigmentosum (hereditary skin condition)
13. Skin cancers and precancerous areas

29.3 Precautions

1. Ultraviolet light is harmful to the eyes. Everyone in the area, the operator, and the patient, must wear protective goggles while the LTV is on.
2. You should not stay in the area of the lamp any longer than is necessary.
3. In most cases a mild erythema is desirable after each treatment. Your doctor will know the approximate treatment times to start. Your doctor may perform, or teach you to perform, a sleeve or patch test on the patient to determine the patient's sensitivity. (This test will not be explained here). Be sure not to overexpose the patient or double expose any area of the body. Exact draping and exposure times are essential.
4. The lamp-to-patient distance is critical. Moving the lamp twice as makes the lamp four times stronger. Exact measurements are essential. Be consistent with each treatment.

30. Low-Level Laser Therapy (Cold Laser)

Light Therapy Low-Level Laser Therapy (LLLT) is the use of light energy in the visible red and invisible infrared spectrum for tissue healing and pain reduction. It involves light energy produced by low-power lasers and super luminescent diodes (SLD's). Light is absorbed by the tissue where the light energy is transformed into biochemical energy that is available for cell activities.

Low power lasers used in rehabilitation are classified as group IIIb, which means they are relatively safe to use, but can cause damage to the eye if they shine directly into the eye.

(Figure 32) There are several types of lasers with different characteristics that are used in rehabilitation, but they all require protective eye goggles.

Figure 32 – Low level laser therapy

Laser light is very different from normal light in that laser light is all the same color (monochromatic), with all the light waves going in the same direction at the same time (coherent) and shines with a beam that is very narrow (collimated). As a result, laser light is very concentrated and delivers a lot of energy to the patient's tissues.

Another way of delivering light energy is with super luminescent diodes (SLDs). These are small light diodes that give off bright red or invisible infrared light like a laser, but are different than lasers. (Figure 33) SLDs are not as powerful or as concentrated as lasers. In order for them to work as well as lasers, more lights are needed, and they must be applied for a longer period of time.

Figure 33 – Light therapy super luminescent diodes

Lasers are used primarily for tissue healing and pain reduction although they can be useful in other areas.

30.1 Indications

1. Repetitive strain
2. Strains and Sprains
3. Skin ulcers and burns
4. Rheumatoid arthritis and osteoarthritis pain
5. Temporary increase in local blood circulation
6. Temporary relief of minor muscle and joint aches and pains
7. Stiffness and relaxation of muscles
8. Muscle spasms and minor pain and stiffness associated with arthritis
9. Adjunctive use for temporary relief of hand pain associated with carpal tunnel syndrome

Lasers are used primarily for tissue healing and pain reduction although they can be useful in other areas.

30.2 Contraindications

1. Direct exposure over the eye: Possible lesion of the retina. Use of protective goggles is mandatory for both patient and operator, regardless of the laser type, method, and technique used. The goggles should be designed to block the specific wavelength of the device being used.
2. Over the thyroid gland: Iodine in the thyroid may absorb high doses of laser energy.
3. Over suspicious lesions: May spread cancer
4. Over abdomen and pelvis area of pregnant women: May interfere with normal growth and development of the fetus
5. Patients receiving X-ray radiation for cancer
6. Over the areas of bleeding
7. Over skin areas that are sensitive to light
8. Over areas of recently injected steroids (72 hours)

9. When masking pain may be harmful

30.3 Not Contraindicated

1. Pacemakers
2. Implants: metal, plastic, joints
3. Over bony prominences
4. Peripheral vascular disease with decreased sensation
5. When heat is contraindicated (e.g. acute injury)

31. Other Physiotherapy Modalities

31.1 Spinal Traction

Spinal traction is a drawing or pulling force that is used to stretch muscles, ligaments, and discs, and to separate joint surfaces. It is generally applied along the length of the spine, either in the cervical or the lumbar spine.

The effects of traction include:

1. Decompression to the disc. The discs of the spine are connected to vertebrae above and below each disc. Traction on the spine decreases the compressive forces on the disc caused by body mass and gravity when in an upright position. As the compression on the disc decreases, the material inside the disc is pulled inwards, away from the outer barriers of the disc. For discs that are injured or inflamed, this inward migration of the disc material relieves pressure on the outer walls of the disc and any nerve fibers that may be being impinged upon by the inflamed disc.
2. Ligaments are stretched.
3. Joint spaces are separated.
4. Muscles relax.
5. The openings in the spinal column for the spinal nerves (the intervertebral foramen) are enlarged.
6. The spinal curves are straightened.
7. Circulation has increased in the area.

These effects will depend partly on whether static or intermittent traction is used. Static traction (where the traction stays on continuously) tends to put the tissues at rest causing discs to return toward a more normal position, joint spaces to separate, and muscles to relax. Intermittent traction (where the traction goes on and off at preset intervals) tends to improve circulation in the area, relieve swelling and increase the elasticity of the muscles.

32.2 Indication

1. Disc protrusion ("slipped" disc)
2. Joint dysfunction
3. Nerve root compression
4. Scoliosis
5. Muscle spasm

32.3 Contraindications

1. Tumor or infection that has affected bony structure
2. Circulatory problems
3. Acute sprains, strains or other acute soft tissue problems
4. Pregnancy
5. Osteoporosis or other bone weakening conditions
6. Any patients who cannot report what they feel (including the very young or very old)

32.4 Precautions

Traction can have a very strong effect on the tissues. It is important to start with light traction and increase gradually. Report any problems to the supervising physician.

1. 

33. Braces

Braces are generally used by a patient to allow a part of the body to rest. They allow relaxation of the muscles, joints, ligaments, and other tissues of the area being braced. For an acute condition, a brace will permit the tissues to rest and avoid further injury while the initial inflammation process is going on. For a chronic condition, a brace can give added support to the weak and injured tissues and can also act as a reminder to patients to keep them from doing things they should not be doing.

Braces come in a variety of materials and styles. Some offer very little support while others can be very restrictive and supportive. The supervising physicianwill choose the brace that best meets the needs of the patient.

Ace bandages are sometimes used as temporary braces. They provide some rest and compression, but they must be rewrapped often and do not provide a lot of support. Taping is also used as a temporary brace, especially in sports. Taping offers a lot of support but must be redone often.

33.1 Application

The supervising physician may ask CAs to fit a brace or periodically check the fit of a brace. Some basic principles to remember when fitting a brace are:

1. The brace should hold the part in a neutral or resting position without any twisting or bending of the part.

2. The brace should fit as snugly as possible without pinching the skin or cutting off the circulation. If the skin turns white or the patient complains of numbness or tingling, the brace is too tight and should be loosened.

The supervising physician will tell the CA and/or the patient how often and how long the brace is to be worn. Most often the brace is worn all the time during the acute phase of the condition, after which, wearing time is gradually reduced so that the patient's muscles will not get weak and dependent on the brace. Sport braces are usually worn whenever the patient is playing the sport.

The following is a list of some of the more common braces and their special fitting needs:

Soft cervical collar (Figure 41) should be tall enough to take some of the weight of the head off of the neck but should not tip the chin up or down.

Figure 41 - Soft cervical collar

Back brace (Figure 42) should be tall enough to support the part of the back that needs to rest. The brace should not slip up or down. Narrow braces, such as sacroiliac belts, tend to slide up, especially on those with narrow waists.

Figure 42 - Back brace

Clavicle brace (Figure 43) holds the shoulders back to keep the clavicles from moving.

Figure 43 - Clavicle Brace

Shoulder sling (Figure 44) should take the weight of the arm off the shoulder and hold the hand slightly higher than the elbow (for good blood circulation).

Elbow strap (Figure 45) is a strap that wraps around the wide part of the muscles in the forearm near the elbow. It is most often used for lateral epicondylitis or "tennis elbow" and helps to keep the muscles from pulling on the bone.

Figure 45 - Elbow strap

Wrist splint. (Figure 46) usually holds the wrist in slight extension (knuckles up) and allows full use of the fingers and thumb. It is frequently used for carpal tunnel syndrome.

Figure 46 - Wrist Splint

Knee brace (Figure 47) gives support in the side-to-side direction but allows bending and straightening of the knee. The knee brace is often used in sports.

Figure 47 - Knee brace

Knee splint keeps the knee from bending in any direction.

Ankle brace (Figure 48) gives support in the side-to-side direction but still allows up-and-down bending of the foot. It is often used in sports.

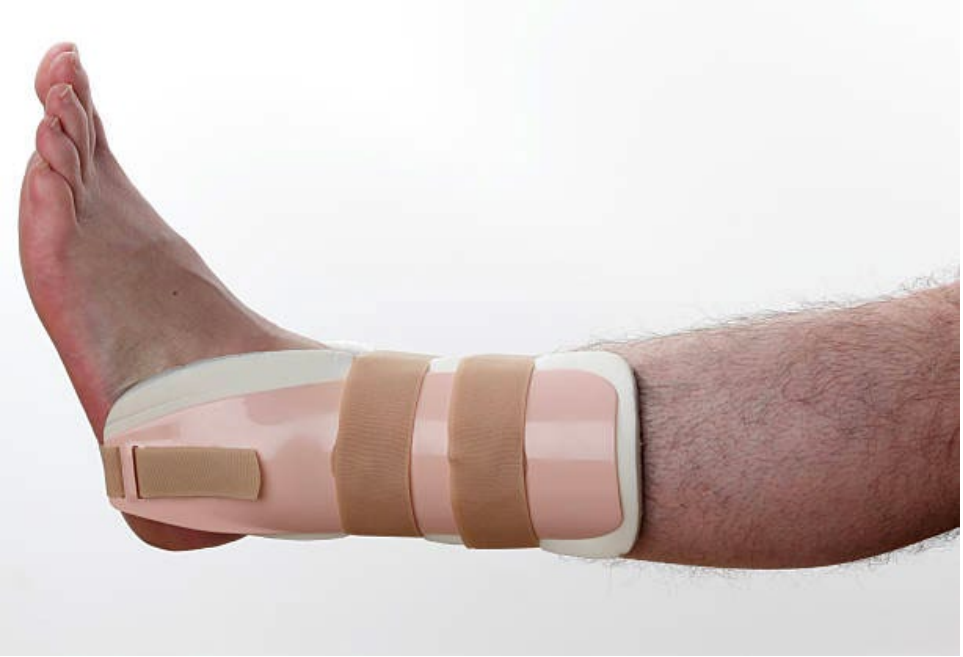

Figure 48 - Ankle brace

34. Crutches, Walkers, and Canes

Crutches are often needed when a patient is unable to support normal weight on one leg. The crutches can take all the weight bearing off the leg, or any part of it.

A walker can provide added stability for the patient who is unable to walk safely. It can also be used to take weight-bearing off one leg.

A cane should not be used for weight bearing. It is used to increase stability in walking.

The supervising physician will tell the CA which device the patient should use and how much weight the leg

can bear.