



HANDBOOK OF HOME REHABILITATION

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A complete care guide with holistic approach

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Dr. Mahmoud Sous – Ph.D.

During the period of 1995-1999, I went to the medical school in Poland to research about the various methods of back pain treatment. After finishing my PhD, I took variety of courses including naturopath, acupuncture, and manual techniques. This gave me an idea that exercises, and massage could be helpful in treatment of chronic pain. But my findings didn't stop me here, I also worked as a naturopath practitioner in Canada where I got familiar about treatments with Chinese medicines, osteopath techniques and some other manual therapies which helps in pain management.

Fixing injuries requires an understanding of anatomy and biomechanics. That is why my research and treatment belong to the holistic approach of using different techniques and remedies for the treatment of back pain. In 1990, I realize that there are some complex spinal aspects and issues which leads to of back pain. So, from my case studies I formulated a guideline which is clear and easy to understand and will fix your issues.

My goal is to help people visualize how the body functions and what happens inside when you experience pain. Healing requires to focus on one's action because pain results due to faulty actions and movements. This thought motivated me to work on a book which will include all home remedies where people can treat themselves to fix their pain. I have included knowledge based on my clinical research using manual massage therapy, food habits, nutrition facts, heat, sauna, hydrotherapy, cold water treatments which overall helps in pain management. It gives me pleasure to introduce this book to the community where I have shared all my experienced treatment plans.



Priyanka Yadav (Physiotherapist)

I started my career in 2011, since then I have worked as a Physiotherapist in several clinics and hospitals in India. Working mostly in the Outpatient department made me realize that Physio's role is extremely crucial in the rehabilitation and recovery process of a patient. My desire to reach out to more people motivated me to work for this book. Have worked with Dr. Mahmoud on several research books on self-pain management. We have been constantly working on curating the best suited protocol for various Musculoskeletal conditions. Additionally, we have also included approaches with alternative medicine.



Bhoomika Pathak (Physiotherapist)

After graduating in 2014, I have been working with various clinical conditions like sports injury, musculoskeletal injury, and neurological disorders for more than 5 years. Along with Dr. Mahmoud & colleagues I have worked on treatment and pain management for various musculoskeletal injuries and pain population. With all the successful outcomes till now, we have designed this book with stagewise guide to treat your knee pain.

We Believe in a Pain-Free Society!

This book is a complete home care guide for rehabilitation of patients after brain injury. It has a holistic approach towards helping patient relearn simple things which can be a difficult task for a brain injury patient. This book will cover the topics like brain injury & its consequences, body positioning, bed mobility and transfers, stretches & exercises of upper & lower limb, suspension therapy, role of massage therapy during recovery period, useful herbs and its benefit in the rehabilitation process in full length. This book will help the patient to recover well, and also provide the family members or the caregivers with all the essential information to take proper care of their loved ones. We have written this book in good faith that this will help people who have gone through a traumatic experience and struggling to get back to normal life.

Dr. Sous's Team who have contributed with their approaches in this book.

- * Priyanka Yadav - Physiotherapist
- * Bhoomika Pathak - Physiotherapist
- * Liming Nang - Acupuncturist
- * Navjot Kaur - Physiotherapist
- * Payal Vaghani - Physiotherapist
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- * Donaliza Mendoza - Massage Therapist
- * Haitham Ajoury - layout and design

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CHAPTER 1: IMPORTANCE OF HOLISTIC REHABILITATION

Early medical management

The aim early medical management is to limit the development of secondary brain damage while providing the best conditions for recovery from any reversible damage that has already occurred. This involves establishing and maintaining a clear airway with adequate oxygenation and replacement fluids to ensure good peripheral circulation with adequate blood volume.



Surgical intervention

Usually after injury the brain tissue reacts and there is loss of excess fluid in the spaces which compresses the brain and affects its functions. Emergency surgery is often required to decompress the injured brain and minimize damage:

- Surgery to remove the hematoma and thus reduce pressure on brain tissue.
- Removal of part of the skull to relieve pressure.
- Surgical repair of severe skull fractures, and/or removal of skull fragments from brain tissue.
- Insertion of intracranial pressure (ICP) Monitoring Device.

Rehabilitation post brain injury

Rehabilitation channels the body's natural healing abilities and the brain's relearning processes so an individual may recover as quickly and efficiently as possible and involves learning new ways to compensate for abilities that have permanently changed due to brain injury. The focus of rehabilitation is to enable individuals to perform their activities of daily living (ADLs) safely and independently so they can move on to other forms of rehabilitation or transition to their home.



There are several rehabilitation options based on a person's ability to participate in a rehabilitation program. As every individual is unique, each brain injury case is not the same. Therefore, approach to neurological rehabilitation and physiotherapy post-traumatic brain injury should observe various aspects like their functional status, learning skills, understanding of injury, extent of injury as well as age of patient. Physiotherapy is an integral part of neurological rehabilitation team and neurological physiotherapy is an integral part of rehabilitation. The physiotherapy programme requires input from a range of clinicians, including Physiotherapists, Occupational Therapists and Orthotists. It is directed by professionals with experience in the management of neurological conditions.

Treating acquired brain injuries demands a personalized, evidence-based, and multidisciplinary approach guided by the patient's needs and goals. Creating a therapeutic environment that matches the patient's tolerance for distraction and need for structure results in a much higher likelihood of the patient being able to return to home, work and community. Scientific literature says that a combination of individual therapies and therapies provided with other people around is proven effective for brain injury rehabilitation.

History of advancement in rehabilitation

Rehabilitation of brain injury developed during world wars I and II with astounding works of Poppelreuter, Goldstein, Russel, and Luria. They identified neurocognitive and affective disorders as a key in rehabilitation, but later this was forgotten. In the 1950s and 1960s rehabilitation practices were mainly emphasized on clinically obvious movement issues, within orthopedic area of care. Later, psychological approaches were developed but remained less familiar. However, these approaches were commonly used in 1980s, with both behavioral and holistic approaches.



Importance of “HOLISTIC REHABILITATION”

The rehabilitation for brain injury is constantly emerging with innovative and diverse approaches to treatment. There must be a continuum of services to support the individual throughout the recovery process which includes the inpatient phase, as well as the community phase. It includes many forms like physical, occupational, speech, and psychiatric as well as social support. Many times, rehabilitation is determined by the medical examination the individual report during the event. This often leads to the time when patient care is neglected considering the chances of recovery. But despite of all the reports and existing symptoms, there is evidence that intense rehab can give good functional outcomes. Although it is evident that there is always lack in single approach and rehabilitation for such people must follow a holistic approach.

The holistic approach in rehabilitation emphasizes practioners to view the person as whole and focus on all the needs as well as address all the unique needs of an individual. It includes physical, emotional, mental, social, and spiritual aspects with other adjunctive therapies like massage, acupuncture, nutritional diet, salt-cave (Halo) therapy, hydrotherapy, acupressure and many more.



CHAPTER 2: BRAIN INJURY AND ITS CONSEQUENCES

Acquired brain injury or head injury are umbrella terms describing a cascade of injuries that occur to the skull, brain, underlying tissue, and blood vessels in the head.

How does brain injury occur?

Brain injury can occur through:

- Sudden onset – caused by trauma, infection, lack of oxygen (for example, during near drowning or suicide attempts or motor vehicle accident), strokes or drug use episodes
- Insidious onset – from prolonged alcohol or substance abuse, tumors, or degenerative neurological diseases.

What happens after brain injury?

Immediately following a brain injury, two things occur:

- Brain tissue reacts to the trauma from the injury with a series of biochemical and other physiological responses. Substances which are present in the brain cells start getting accumulated in brain, further damaging, and destroying the cells which is called secondary cell death.
- Depending on the severity of brain injury, effects may include temporary loss of consciousness or coma, respiratory (breathing) problems, and/or damaged motor functions.

Waking up following loss of consciousness is not immediate. It is important to be aware of the various neurologically based symptoms that may occur during this period, such as irritability, aggression, posturing, and other issues. Post-traumatic amnesia (PTA) is also typically experienced as an injured person regains consciousness. PTA refers to the period when the individual feels a sense of confusion and disorientation (i.e., wondering who or where they are and what has happened to them) and an inability to remember recent events.

As time passes, these responses typically subside, and the brain and other body systems approach stability. Unlike bones or muscle tissue, the neurons in the brain do not mend themselves. New nerves do not grow in ways that lead to full recovery. In fact, certain areas of the brain remain damaged, and the functions that were controlled by those areas may be disrupted and lead to changes in the individual's life.

What is an Acquired Brain Injury?

Acquired brain injury is any damage to the brain that happens after birth by any external trauma or unusual medical event. The effects of an acquired brain injury can be severe and life-altering. The brain controls every area of human body: physical, intellectual, behavioral, social, and emotional. It affects the life of a person adversely when damaged.

Common causes of acquired brain injury include:

- External forces applied to the head and or neck (traumatic brain injury)
- Anoxic/hypoxic injury (cardiac arrest, carbon monoxide poisoning, airway obstruction, hemorrhage, & drowning)
- Intracranial surgery
- Infectious diseases
- Seizure disorders
- Toxic exposure (substance abuse, ingestion of lead and inhalation of volatile agents)
- Aneurysms
- Medical causes like stroke (vascular obstruction)

The severity of damage to the brain after an injury is the primary factor in predicting the injury's impact on the individual. Brain injury is typically categorized as mild, moderate, or severe.



MILD BRAIN INJURY	MODERATE BRAIN INJURY	SEVERE BRAIN INJURY
Brief, if any, loss of consciousness	Unconsciousness up to 24 hours	Unconsciousness exceeding 24 hours (coma)
Vomiting and Dizziness	Signs of brain trauma	No sleep/wake cycle during loss of consciousness (LOC)
Lethargy	Contusions or bleeding	Signs of injury appear on neuroimaging tests
Memory Loss	Signs of injury on neuroimaging	

A severe brain injury may cause the individual to experience an unconscious state, where one appears to be in a deep sleep and cannot be aroused or respond purposefully. Assessments will typically reveal that the individual has no sleep and wake cycles. This loss of consciousness (LOC) is referred to as a coma. Depending on varying factors and the severity of injury, the individual may remain in a coma, emerge from a coma, or experience an increased level of consciousness.

A person who is truly in a coma will not be considered for any type of brain injury rehabilitation program. People can, however, experience different states of consciousness after brain injury. Understanding these disorders of consciousness can be important when discussing treatment and possible rehabilitation options.

How to know if someone is having brain injury?

After an impact or injury to the head, a person can experience a variety of symptoms. Common symptoms of a brain injury include:

- Thin, clear liquid coming out of the ears or nose
- Loss of consciousness
- The black center of the eye is large and does not get smaller in light or unequal size of pupils
- Vision changes - blurred vision or seeing double, not able to tolerate bright light, loss of eye movement, blindness
- Dizziness
- Balance problems
- Difficulty breathing
- Not alert and unable to respond to others
- Paralysis, or difficulty moving body parts
- Weakness
- Poor coordination
- Slow pulse
- Slow breathing rate, with an increase in blood pressure

- Vomiting
- Lethargy
- Headache
- Confusion
- Ringing in the ears, or changes in ability to hear
- Difficulty with thinking skills
- Inappropriate emotional responses
- Difficulty speaking
- Body numbness or tingling
- Loss of bowel control or bladder control



Diagnosing brain injury and determining injury severity are two different things. In cases where the injury is more severe, it is usually clear from the individual's symptoms that some type of brain injury has occurred. In situations where the brain injury is mild or moderate, further assessment is often needed to diagnose the brain injury.

What are the diagnostic tests performed in hospital?

Immediately post injury, all patients undergo an urgent neurological examination in addition to a surgical examination. Magnetic Resonance Imaging (MRI) and Computerized Tomography (CT) scanning are frequently used for brain imaging. CT scanning is indicated in the very early stages of post-injury. A CT scan can show potential fractures and can detail hemorrhages and hematomas in the brain, as well as contusions and swelling. An MRI is often used once the patient is medically stable which gives a more detailed view of their brain tissue and the damage.

What is the recovery time?

The first question person with brain injury ask is, "when will I be myself again?"

The second question is, "how long will it take?"

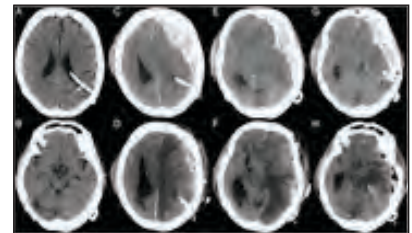
You can expect the most rapid recovery from acquired brain injury in the first 18 months to two years following the injury; however, recovery can be a life-long process. The type of injury, the severity of injury, the age of the person injured, as well as many other factors, affect the degree of improvement.

Family and other support persons play a major role in helping an individual resume meaningful activity. An acquired brain injury often requires a major life adjustment around the person's new circumstances, and making that adjustment is a critical factor in recovery and rehabilitation.

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How is the prognosis after the injury?

In the hospital, the goal is that the person should be stable medically first. After the hospital, the next phase is long term recovery with rehabilitation. The goal in treating an acquired brain injury is to focus on the cognitive, physical, emotional, or behavioral impairments that have caused changes in functioning. Brain injury is a very complex phenomenon with dramatically varied effects, and these greatly influence the results of rehab. No two persons are alike or can expect the same outcome or type of difficulties. If the rehab is not done accordingly, it affects the long term recovery which results in poor functional status.



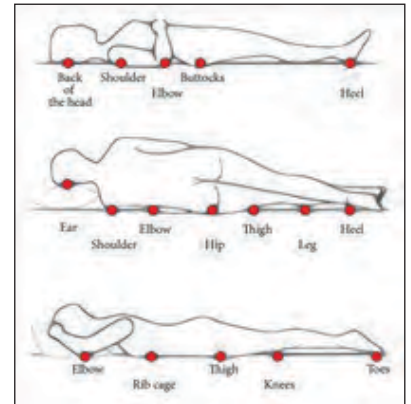
CHAPTER3: BODY POSITIONING

Proper positioning both in bed and in a wheelchair is essential. Appropriate positioning will assist in preventing skin breakdown and contractures, improve pulmonary hygiene and circulation, and may modify muscle tone. If joints stay in the same position for a very long time, e.g., always bent or extended, contractures may occur. Different positions can prevent contractures. Remaining in one position for a long time increases the tension on the body (spasticity, spasms). Varying positions support the regulation of body tension.

- Bed elevation: The upper end of bed should be minimal elevated or done only for a short period of time. When elevating the upper end of the bed, the patient slides down – this causes shear forces that affect the skin of the buttocks. Being half-seated places great strain on the buttocks, which means increased risk of pressure sores.

- Areas of particular risk are those covering the bones.

When positioning a patient in bed, supportive devices such as pillows, rolls, and blankets, along with repositioning, can aid in providing comfort and safety. There are various positions for patients in bed, which may be determined by their condition, preference, or treatment which are as follows,

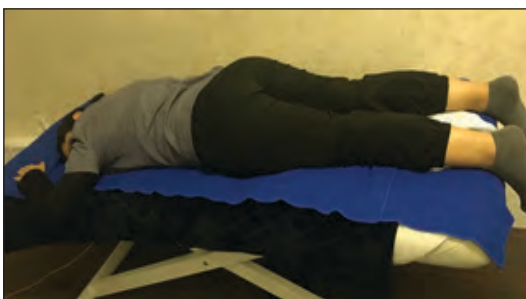


Stress-relief positions

1. Lateral position: This position aims to prevent risk on vulnerable areas and promotes relaxation. Let the person be relaxed on one side, support the upper part of body with a pillow. This will reduce the stress on shoulders.



2. Prone position: Check the vulnerable skin areas like hips, knees, and toes before placing a person in this position. Also, monitor breathing of a person while complete paralysis when placed in prone. This position eases the strain on vulnerable areas, promotes relaxation and avoid contractures.



3. Extended position: In this position the upper part of body is opposite the bent knees. It helps regulation of body tension.



4. Frog leg or crossed leg position: The legs are supported on the outer side to prevent the tension. The buttocks are elevated which



reduces the risk of pressure sores. This position also helps in reducing spasms and spasticity.

5. When the person is lying down, the head should be kept in neutral position with hips and knees slightly bend. The foot should also be in neutral position. Special boots are used to help keep the foot in proper alignment. If the person is unable to move by himself, ensure repositioning in bed every 2 hours. This will help prevent skin breakdown and pressure sores.

6. Semi Side-lying: This position relieves pressure from bony landmarks which avoids pressure directly on the greater trochanter (hip). Precaution should be taken that a pillow or roll must be used between legs and knees. Consider placing top leg over bottom leg instead



of on top of bottom leg if it does not increase pressure on the hip.

7. Supine: The upper end of the bed is elevated to 30 degrees. Make sure the respiratory functions are working optimal. A pillow can be kept between the knees to prevent the body from sliding down. Precaution should be taken to not elevate the upper bed end beyond 30 degrees.

8. For those people who are unable to move by themselves if they are sitting a reclining or tilt-in-space wheelchair is preferred. This will help support the hips and head in proper alignment.

9. You can also support the foot with wrap bandage in slight plantarflexed position.



CHAPTER4: BED MOBILITY AND TRANSFERS

Bed mobility and transfers are extremely important functional activities that individuals with brain injury need for independent mobility.

What is bed mobility?

Bed mobility refers to activities such as shifting in bed, rolling (turning to side-lying), lying to sitting, and sitting to lying down. It also includes shuffling to sit on the edge of the bed when preparing to stand or transfer.

Why is bed mobility important?

People who have limited mobility from injury, weakness, or disability may have difficulty moving in and out of bed. Also, there is an increased risk of injury for the caregiver when assisting patients who have limited mobility. For this good body mechanics and certain positions should be practiced.

Things to keep in mind!

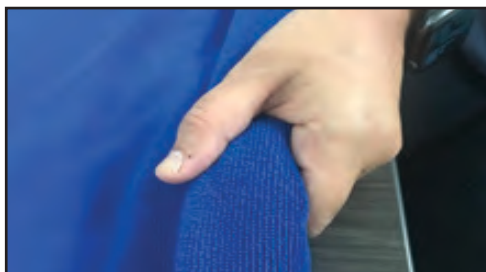
- The area surrounding should be clear before shifting or moving.
- If the person has lines attached to the chest or tubes, make sure it does not interfere with the activity.
- The side from which the person will get up is decided based on the strength of the patient.
- If the moving is assisted by a caregiver or another person, make sure the instructions given to the patient are clear.
- Avoid forcing or pulling the limb of patient while shifting them.
- For caregivers and assisting persons, while lifting the patient always remember to bend the knees and keep the back straight.

Steps for moving the patient up in bed:

1. If the patient is unable to move this can be done with the help of two-person assistance.
2. Before starting any activity, inform the process what movements will take place and how the patient can participate in it.
3. Raise the bed to waist level and ensure that brakes are applied. Care givers must stand on each side of bed.
4. Lay the patient on the back. Place a pillow under the head and at the headrest of the bed. This will prevent the head from accidentally hitting the head to the bed.
5. Stand between shoulders and hip of patient. The feet of caregiver must be wide apart. While moving the weight will be shifted from back foot to front foot.



6. Fanfold the bedsheets towards the patient with palm facing up. This provides a strong grip while shifting the patient.



7. Ask patient to tilt head toward chest, fold arms across chest, and bend knees to assist with the movement. Let the patient know when the move will happen.



8. Tighten your gluteal and abdominal muscles, bend your knees, and keep back straight and neutral.

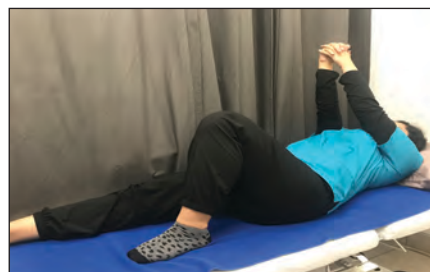
9. On the count of three by the lead person, gently slide (not lift) the patient up the bed, shifting your weight from the back foot to the front, keeping back straight with knees slightly bent.

10. Replace pillow under head, position patient in bed, and cover with sheets.

Rolling:

Used to dress and change position at night. It is also a prerequisite for getting from lying to sitting. For rolling to be effective, patient is required to learn to move the head, neck, upper limb, lower limb, and trunk in a balance manner. Initially, rolling should be taught to a patient on mat but afterwards patient gets confidence to perform it over bed.

- Patient lies in supine position.
- Patient flexes his head, neck, and right shoulder.
- Right arm is moved towards left side to create momentum.
- The momentum of arm is transferred to trunk and lower limb.
- The lower half of body will be rolled to prone position. Flexion of hip and knee will facilitate the roll.
- Patient takes his right shoulder at the back side by putting weight on left forearm and thus, weight is distributed on both upper limbs.
- Patient lies prone.



Assisting the patient to sitting position:

- The leg closest to the edge of the bed can be straight or bent depending on which is more comfortable for the patient. Have the patient bend the opposite hip and knee. For example, you should bend the patient's right hip and knee if getting the patient out on the left side of the bed.
- Place your hands behind the patient's shoulder and hip or thigh on the far side. Have the patient reach with their opposite arm across their body, toward the side of the bed. Important tip: the patient should always roll toward you not

away from you.

- Assist the patient in rolling toward you and have them use their opposite arm to reach across their body into a side lying position.
- The patient should place their arms in a position that is comfortable for them. However, having the arms positioned as pictured below, allows the patient to use their arms and upper body strength to help push up to a seated position. The patient should now be lying on their side with hips and knees bent.
- Have the patient move their legs off the edge of the bed. If needed, you can assist the patient to move their legs from behind their knees (fig 5).



- The patient can use both arms to push up to help achieve a sitting position. If needed, assist the patient to achieve a sitting position by placing one arm behind their shoulder. The other arm could be placed behind the other shoulder, supporting their trunk (as pictured) or on the patient's pelvis. Important tip: If assisting the patient, perform the activity in a continuous smooth motion. Always take your time, do not rush.



- To help the patient move from a sitting position on the bed to a standing position first assist the patient to scoot to the edge of the bed. With you standing in front of the seated patient, the patient leans to one side while you support the shoulder on that same side. With your other arm help the patient shift the hip forward. This process would be alternately repeated on the opposite side.



- Make sure the patient's feet are flat on the floor and he/she sits for a few seconds (or minutes, as needed) before leaning forward to be assisted to a standing position.

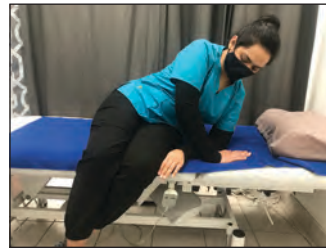
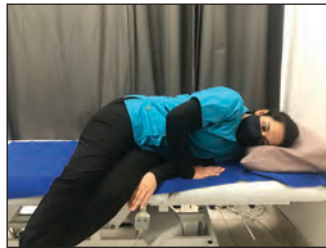
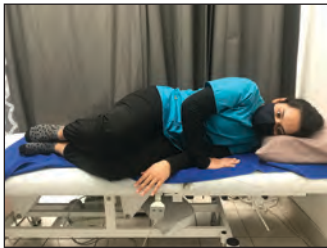


Assisting the patient from sitting to lying in the bed:

- Have the patient sit on the bed (closer to the head of the bed) and away from the edge which allows for less repositioning once in bed.
- Assist the patient as needed to get into side lying position.
- Have the patient bend both knees and roll onto their back. Assist patient as needed.
- The patient can scoot in bed to adjust to a comfortable position. Assist patient as needed.

Supine to sit independently:

- Turn on side with interlocking your fingers.
- Move your legs outside.
- Push your elbow and move up.



Sitting unsupported:

The seated position is less stable when reaching or using the hands to grasp, manipulate and lift objects. Reaching forwards or sideways displaces the centre of mass, causing a tendency to fall. However, patients with brain injury have limited proprioception and are unable to use their body parts to maintain an upright position. They need to adopt alternate strategies.

- One strategy is to use upper limb muscles to help stabilize the trunk in an upright position.
- Patient who has profound lower limb weakness can use compensatory strategies to maintain their posture. To reach sideways with one arm they can abduct the contralateral arm. Similarly, to reach forwards with one arm they reach backwards behind the body with the other arm while at the same time extending the neck.



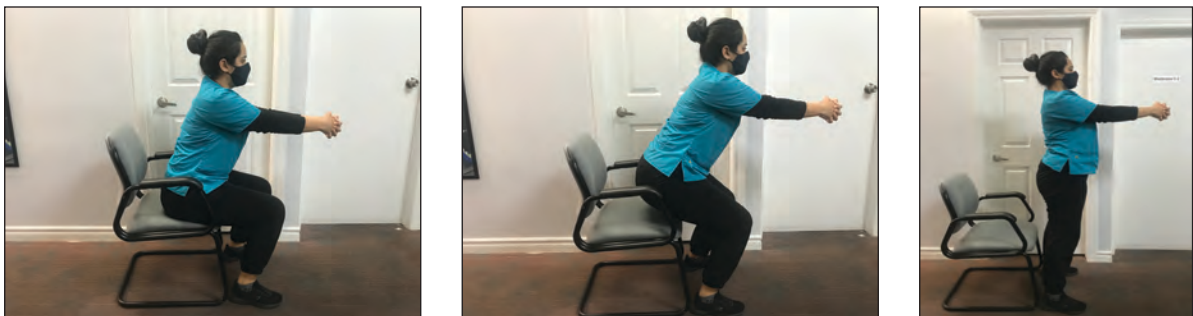
Assisting sit to stand with one person assistance:

- The caregiver must face the patient. Legs can be supported by blocking with your knees if necessary.
- Ensure that the patient's feet are supported on the floor.
- Place your hands around the patient's waist or under the buttocks.
- Have the patient scoot their bottom to the edge of the bed/chair, if unable to do this independently you can assist him/her by "bum walking"
- Patient brings feet back (knee flexion and ankle dorsiflexion) to the chair, so they are underneath of him/her when standing. Knees are positioned around 80-90 degrees.
- Patient leans forward (trunk/hip flexion) in preparation for standing. It is imperative that they lean their 'nose over their toes.' To bring their center of mass forward. He/she can hold onto a piece of equipment, the therapist's forearms, or hips.
- Encourage your patient to become independent. The patient is encouraged to "push-up" through his/her feet and knees.
- Assist the patient to straighten his/her knees and hips by providing a forward and upward pressure on their pelvis.
- The patient's knees can be blocked/supported if required
- Once up, ensure the patient is steady and able maintain their safety independently before letting go.



Sit to stand independent:

- Take a chair with arm support.
- Interlock your fingers and shift the body weight forward.
- Lift your hips and keep shifting your weight forward in effort to straighten the knee.



Sit to stand with walker:

- Hold the walker close
- Shift your body forward
- Lift the hips and push your body weight forward



What are transfers?

Learning and practicing safe transfers is a vital part of rehabilitation for all individuals who suffer brain injury.

Pivot transfers:

Pivot transfers are useful for a person who is not able to walk safely between surfaces. “Pivot” indicates that the person bears at least some weight on one or both legs and spins to move their bottom from one surface to another. A pivot transfer can be performed in both squatted and full standing positions and can be completed with anywhere from minimal assistance to total assistance from a caregiver or helper.

Assisting standing pivot with one person assistance:

- The caregiver must stand in a walk stance with knees slightly flexed and toes pointing toward the chair.
- Maintain the back erect, lean forward and place hands behind the patient’s lower back/pelvis
- When necessary, block the patient’s weaker leg by placing his/her feet on either side of the patient’s feet and use your knees to support the patient’s weaker leg.
- Let the patient sit on edge of the bed with his/her feet on the floor, toes pointing away from the chair.
- When necessary, protect the weaker side of a patient (e.g., shoulder).
- The patient can place his/her hands on the transfer surface, or the assisting person’s waist or forearms.
- Transfer first towards the patient’s stronger side. Let the patient assist by full or partial weight bearing.
- While transferring, position (wheel) chair at a 30-degree angle to the side of the bed. If applicable, remove the footrest and arm rest nearest to the patient.
- Patient places hands on arm of chair and lowers down.





Assisting standing pivot with help of walker:

- Let the patient sit on edge of the bed with his/her feet on the floor, toes pointing away from the chair.
- When necessary, protect the weaker side of a patient (e.g., shoulder).
- The patient can place his/her hands on the walker, stand with the help of walker from the bed or chair.
- Turn the walker and pivot slowly towards the transferring surface. Let the patient assist by full or partial weight bearing.
- Sit slowly with proper balance.



Assisting standing pivot independently:

- Let the patient sit on edge of the bed with his/her feet on the floor, toes pointing away from the chair.
- When necessary, protect the weaker side of a patient (e.g., shoulder).
- The patient can place his/her hands on the transfer surface.
- Let the patient transfer from the stronger side first towards. Let the patient assist by full or partial weight bearing.
- While transferring, position (wheel) chair at a 30-degree angle to the side of the bed. If applicable, remove the footrest and arm rest nearest to the patient.
- Patient places hands on arm of chair and lowers down.



Assisting the patient for sliding board transfer:

- Let the patient sit at the edge of bed and angled towards chair.
- Armrest of wheelchair is removed.
- Have patient lean to the side and slide one end of board under their hips/buttocks and the other end half-way covering the transfer surface (chair/bed).
- Adjust the two surfaces between the sliding board to be a similar height (if possible, position height of bed so patient is going downhill).
- Ensure the patient does not place his/her fingers under the ends of the board, because as they shift their bodyweight their fingers will get pinched underneath.
- Encourage the patient to use their arms to scoot along the board. You can assist at the hips/buttocks as needed to complete the transfer.
- Once the patient is settled in the chair, have them lean to the side again to remove the board.
- If using a wheelchair, ensure the brakes are on, and the arm rest and footrest on the appropriate side are removed.

CHAPTER 5: UPPER EXTREMITY STRETCHING AND EXERCISES

Any kind of brain injury can lead to spasticity when it disrupts areas of your brain that control that natural tension of a muscle (also called muscle tone). Spasticity affects up to 43% in people who've survived an injury within a year of the event. The condition makes muscles stiff and tight.

Exercises for spasticity help enhance neuroplasticity, or the brain's ability to create new pathways to perform functions (like managing muscle tone) as said by the experts. Stretching and moving can also help you avoid some long-term effects of spasticity, such as contracture.

How is it treated?

Treatment options for spasticity depend on the severity of your symptoms after brain injury. Your doctor may also suggest trying a variety of treatments and management strategies at the same time. Here are some common treatment options,

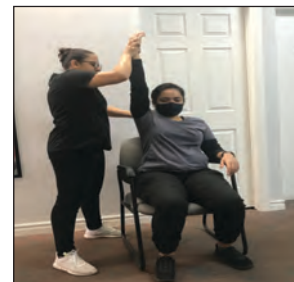
- exercise and stretching
- muscle braces
- injections of certain medications, such botulinum toxin (Botox)
- oral medications, such as baclofen, diazepam, tizanidine, and dantrolene sodium
- intrathecal baclofen therapy (ITB)

Precautions to Stretching

- Wear clothing that doesn't restrict movement
- Ensure the room temperature is comfortably cool
- Don't force any movement that causes pain or increases spasticity. Some feeling of stretch is fine; pain, numbness or tingling is not.
- If pain occurs, stop. Check with your health care professional before trying that move again. If discomfort occurs, cut back to a motion that's easier
- Go slowly. All movements should be done evenly, allowing the muscles time to respond to the stretch by relaxing
- Moving quickly can increase spasticity or stiffness. Hold each stretch for 30–40 seconds at the comfortable far end of your range.
- It may help to count out loud or use a timer. Then gently return to the starting position.
- Progress as tolerated; the body will vary from day to day. The idea is to increase the range of pain-free motion. Therefore, it's important to distinguish between pain and the feeling of stretch. Stretch is okay; pain is not.
- A family member or caregiver may be able to help with stretching. It is important that the support partner knows what they are doing when assisting; otherwise, they may be at risk to injuring the patient or themselves
- Avoid over-exertion. Include rest periods, and sip cool water to prevent over-heating or dehydration.

Passive stretching:

Shoulder Flexion: Supporting the arm and wrist, pick the arm up and over the head to a position behind the ear or as high as tolerated by patient. Allow to return to resting position under control. Over-pressure can be applied to gently increase the stretch as tolerated by the patient.



Shoulder Abduction: Supporting the arm and wrist, pick the arm up and move out to the side towards the head or as high as tolerated by the patient taking additional care with a low tone shoulder. Allow to return to resting position under control. Over-pressure can be applied to gently increase the stretch as tolerated by the patient.



Shoulder Rotation: Supporting at the wrist and elbow take the shoulder out to the side, then rotate the arm forwards and backwards within the range available. Take particular care with a low tone shoulder. Over-pressure can be applied to gently increase the stretch as tolerated by the patient.



Elbow Flexion/Extension: Supporting at the wrist and elbow, bend the arm towards the shoulder. Keeping the same position, straighten the arm towards the bed. Over-pressure can be applied to gently increase the stretch as tolerated by the patient.



Elbow Pronation/Supination: Supporting the wrist and elbow, gently turn the hand and wrist outwards and inwards. Over-pressure can be applied to gently increase the stretch as tolerated by the patient.



Wrist Flexion/Extension: Holding the arm and hand, with the wrist straight, bend the hand forwards and backwards. Repeat with the hand in a fist position if possible. Over-pressure can be applied to gently increase the stretch as tolerated by the patient. Allow to return to resting position, applying any splints or supports as advised.



Finger Flexion/Extension: Take each finger and pull gently to touch the base of the finger and then outstretched away from the palm. Can be completed individually or together. Repeat this movement for the thumb. Over-pressure can be applied to gently increase the stretch as tolerated by the patient. Allow to return to resting position, applying any splints or supports as advised.



Self – Stretches:

Shoulder forward arm lift: Interlock your fingers or hold your wrist. With your elbows straight and thumbs facing the ceiling, lift your arms to shoulder height. Slowly lower your arms to starting position.



Shoulder – Rock the baby stretches: Hold your affected arm by supporting the elbow, forearm, and wrist (as if cradling a baby). Slowly move your arms to the side, away from your body, lifting to shoulder height. Repeat this motion in the other direction. Slowly rock your arms side-to-side and keep your body from turning.



Shoulder – Rotation stretches: Interlock your fingers or hold your wrist. With your elbows bent at 90 degrees, keep your affected arm your side. Slowly guide your affected arm across your stomach. Hold for few seconds. Slowly guide your forearm away from your body, keeping your elbow at your side.



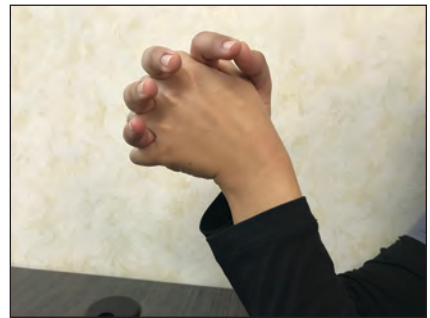
Elbow stretch: Interlock your fingers or hold your wrist. Start with your arms straight. Slowly bend your elbows. Hold for few seconds. Slowly return to starting position, with elbows straight.



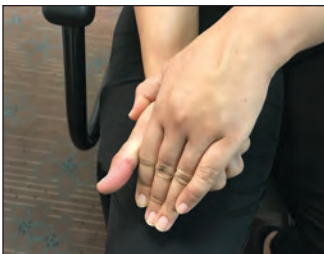
Wrist side to side stretch: Interlock your fingers or clasp your hands together. Slowly bend your wrist to the left, then to the right. Hold for few seconds.



Wrist forward and backward stretch: Interlock your fingers or clasp your hands together. Place your hand on your lap or supported on a table. Slowly bend your wrist towards you, then away from you. Hold for few seconds.



Thumb and fingers stretch: Place your affected hand on your lap or supported on a table. Place the thumb and index finger of your non-affected hand, between the thumb and index finger of your affected hand. Stretch the thumb and index finger apart.



Exercises for strength control: There are many ways to improve strength and awareness of your weak side. If you have good recovery of movement and can do most basic activities, strengthening can be done by using equipment such as weights. Exercise should be directed toward strengthening specific movements. It is important to select the right exercise for your stage of recovery. If you have doubts about what you can do, stick to the simple basic exercises and work on them until you are confident that you are doing them correctly.

Active range of motion exercises:

Active range of motion is movement of a joint provided entirely by the individual performing the exercise. In this case, there is no outside force aiding in the movement.

Purpose

- increase strength
- maintain/improve endurance

- promote circulation
- maintain/increase range of motion (ROM)

Shoulder:

Flexion: Begin with your arms straight at your side. Keeping your elbow straight, lift one arm up over your head as far as possible.



Abduction: Lift your arm out to side with palm up. Keep elbow straight.



Shoulder rotation: Bring arm(s) behind head. Bring arm(s) behind back.



Shoulder extension: Move arm(s) backwards. Do not lean forward.



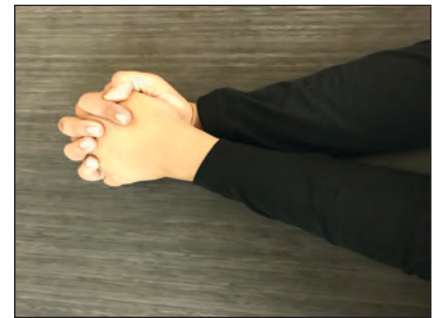
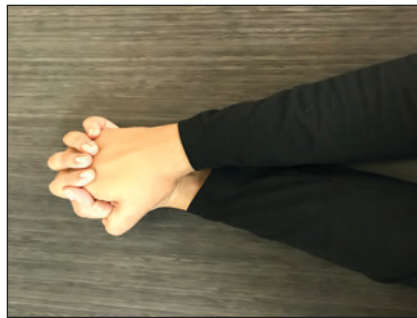
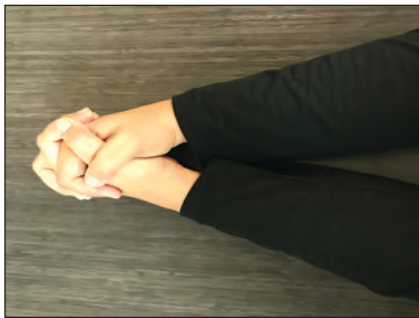
Elbow:

Flexion and extension: Bend elbow. Straighten elbow and hold.



Elbow extension: Hold arm above head, elbow pointing to ceiling. Straighten elbow.

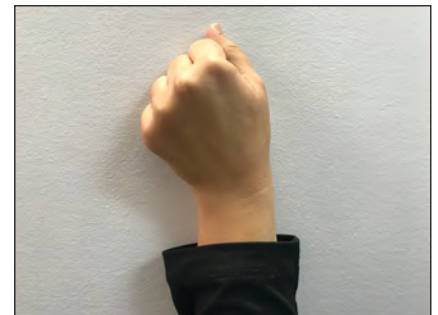
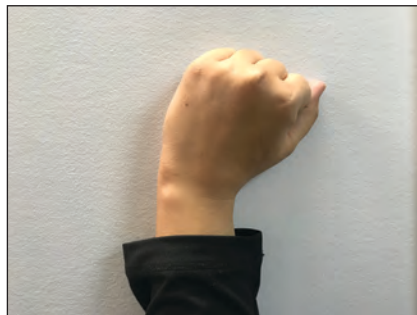
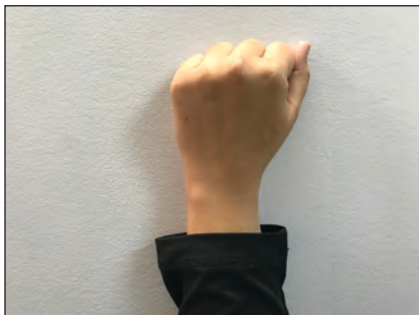
Forearm pronation and supination: Turn palm up. Keep elbow at side. Turn palm down and hold.



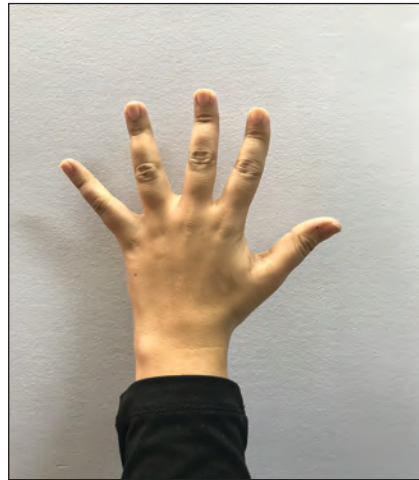
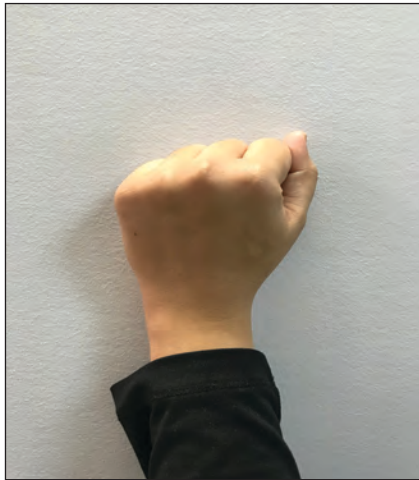
Wrist flexion/extension: Begin with palm down, raise hand up and then bring down.



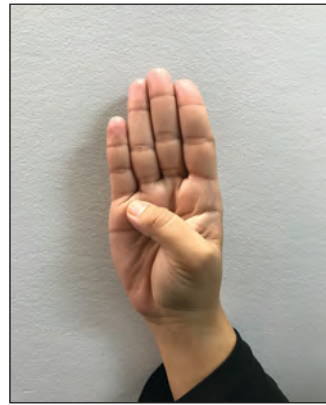
Wrist Ulnar/radial deviation: Make a fist, begin with wrist taking on the sideways.



Fingers flexion/extension: Make a fist and open all the fingers following.



Thumb movements:

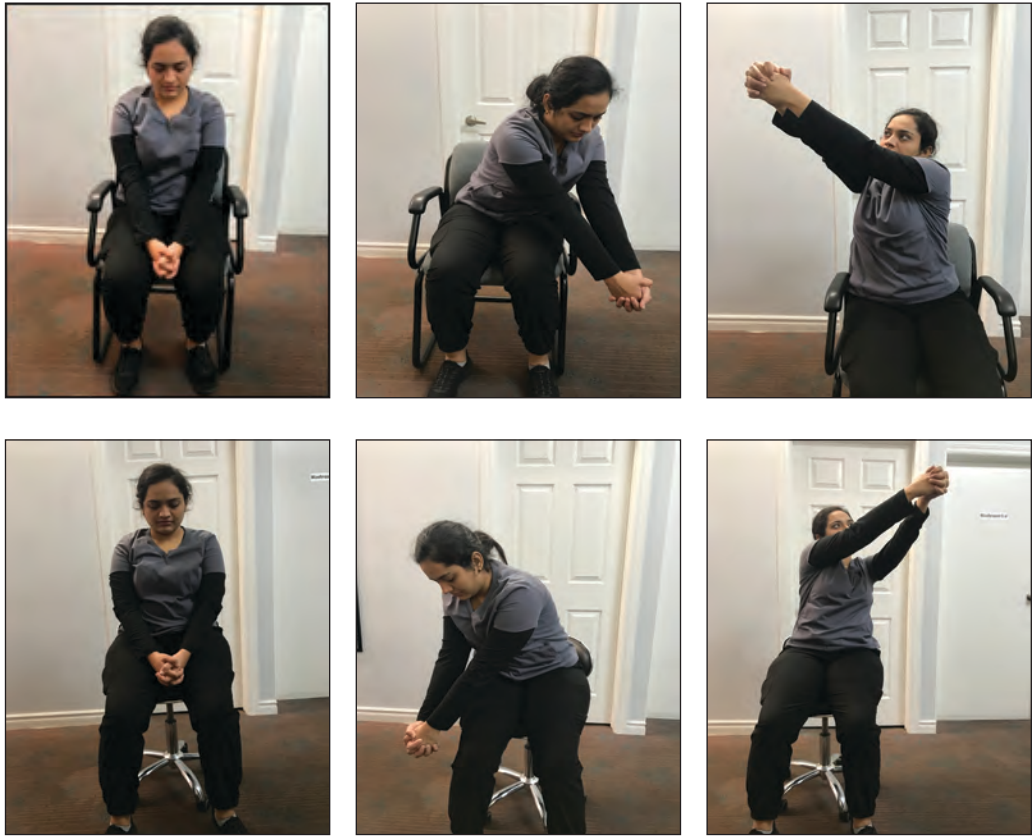


Exercise to improve functional ability:

Shoulder shrug: Sit in a chair with your arms by your side. Make sure your back is touching the back of the chair. Raise your shoulders towards your ears for a count of 3. Return to the starting position.



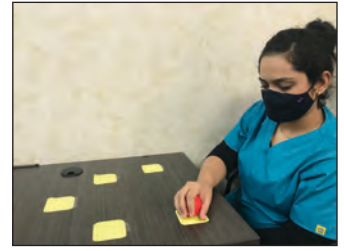
Twisting: Make sure your back is touching the back of the chair for the whole exercise. Clasp your hands together and pull forward until you feel a stretch through your back. Turn your body to the left. Hold for a count of 3. Turn your body to the right. Hold for a count of 3.



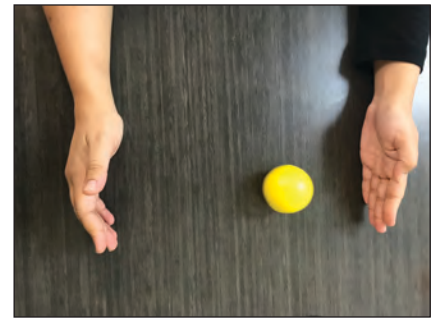
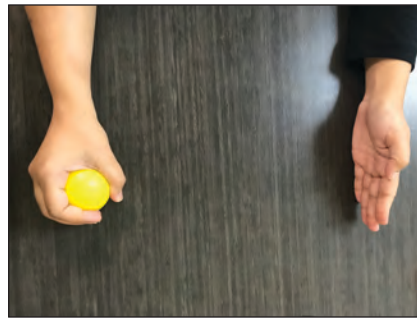
Push-ups: Place the table against a wall. Place your hands on the table-palms down or you can place your palms on the edge of the table. Lean your chest towards the table for a count of 5. Push away from the table for a count of 5. If you cannot put your weaker hand flat on the table, place your forearms on the table and then do the push-up.



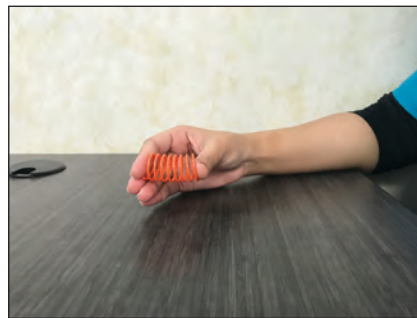
Object moving: Place the bean bag in your weaker hand. Pick the bean bag up and move it to the 1st dot. Drop the bean bag on the dot and place your weaker hand in your lap. Then reach with your weaker hand to pick up the bean bag, placing it on dot 2 and following the others until you have dropped the bean bag on each dot. Once you have finished the arc, start at dot 5 and retrace your steps.



Ball rolling with no partner: Place your hands shoulder width apart. Roll or push the ball back and forth between your hands. Continue until you have caught the ball with your weaker hand. If this is easy for you try rolling the ball faster or placing your hands further apart. If this is hard for you, use the bean bag and push it towards each hand.



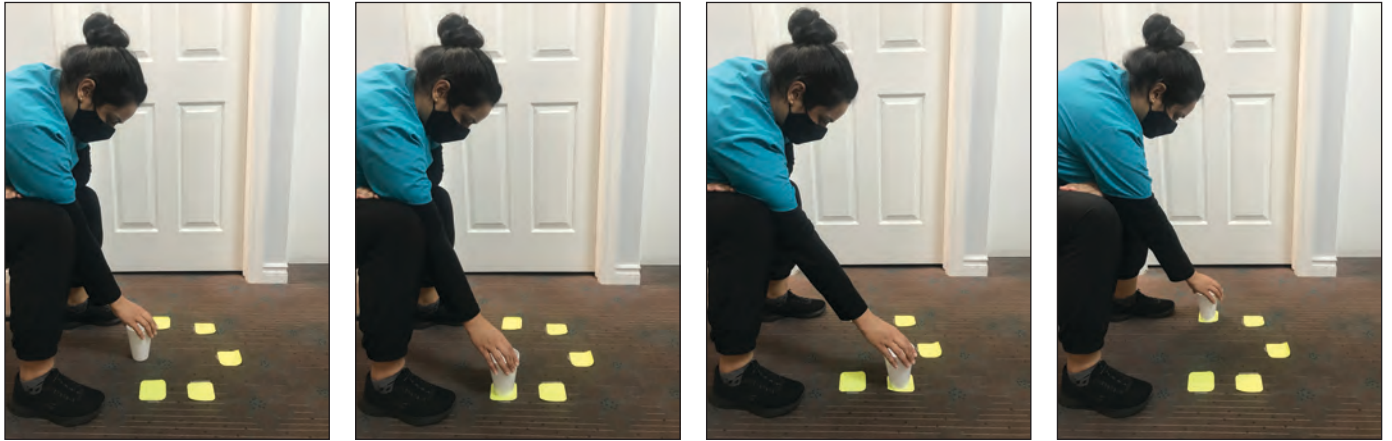
Grip power: Place your weaker arm on the table. Place the gripper in your palm between your knuckles and your thumb pad. Squeeze the gripper as hard as you can for a count of 3. Relax your hand for a count of 3. Remember to focus on opening your hand.



Chair ups: Sit in a chair with both your hands on the arm rests. Using your arms NOT your legs, push your body upwards so that your bottom comes off the chair. Put as much weight as can through your arms NOT YOUR LEGS when pushing up.



Advanced moving the object: Place the target board on the ground about 6” in front of your chair. Place the ball in your weaker hand. Hold on to the arm rest with your stronger hand and lean forward. Place the ball on dot 1 - now sit upright with back against chair. Lean forward and pick up the ball placing it on dot 2, sit up. Repeat this process for each dot. If at any time you feel dizzy STOP and rest for 1 minute. Try again but if you continue to feel dizzy go to next exercise.



Pouring: Place two cups on the table, one half full of water. Hold the empty cup with your stronger hand, pick up the cup with water with your weaker hand. Pour the water into the empty cup.



Drop and catch the ball: Place the ball in your stronger hand. Raise this arm as high as you can but not higher than your shoulder. Place your weaker hand on the table. Drop the ball and try and catch it with your weaker hand. Then switch and drop the ball with your weaker hand. If it is hard to use the ball, use the bean bag instead.

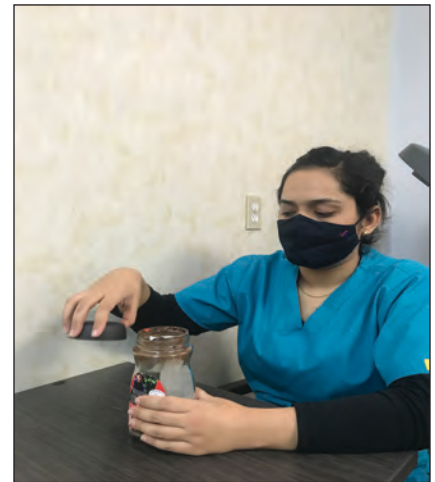
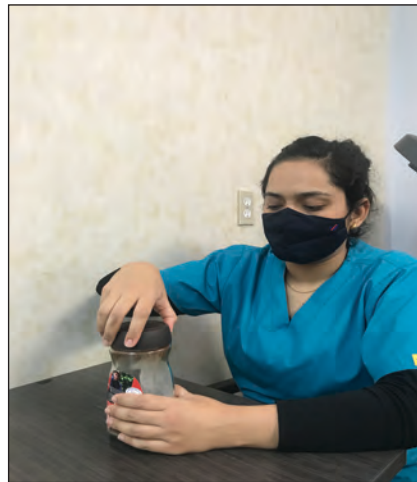
Hanging up clothes: Place a cup on the table. Using your weaker hand, take each clothes peg and clip it on the edge of the cup. Using your weaker hand, take each peg off the cup and place on the table.



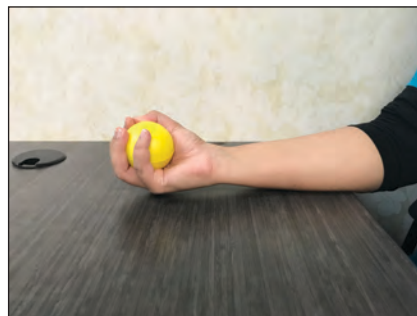
Picking up the sticks: Put your sticks and a cup on the table. Using your weaker hand, take each stick and place in the cup. Using your weaker hand, turn the cup upside down and dump them out.



Opening/Closing the jar: Place the jar on the table. Hold the jar with your weaker hand and take off the lid with your stronger hand. Now hold the jar with your stronger hand and take off the lid with your weaker hand.



Squeeze: Place your weaker arm on the table. Place the ball in your hand and squeeze as hard as hard as you can for a count of 5. Relax your hand for a count of 5.



Finger power: Place the putty on the table and roll into a thick rope. Take each finger of your weaker hand, starting with your thumb, and push into the putty. After you finish all 5 fingers, take a 30 second break. Then repeat two more times.



Waiter-cup: Follow the arc pattern you did with the bean bag with a cup, do it 3 times. Repeat the arc pattern with the cup but do it as fast as you can, do it 3 times.



Hanging up the clothes: Place a cup on the table. Using your weaker hand, take each clothes peg and clip it on the edge of the cup. Using your weaker hand, take each peg off the cup and place on the table.

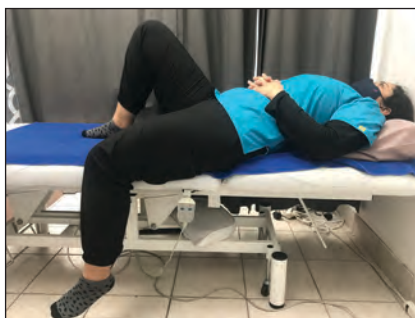


CHAPTER 6: LOWER EXTREMITY STRETCHES AND EXERCISES

Leg rehabilitation is one of the keys to recovering full independence after brain injury. Because every person is different, some of you may need to start with passive techniques such as assistive treadmills, while others might jump straight to active training.

Whatever you start with, the only way to fully regain lower limb function is to persevere. Even if you can only move your foot a little, keep activating your muscles.

Contractures can develop anywhere but are particularly apparent in the paretic limbs. As contractures progress, edema and pain may develop and further restrict mobility. LE training activities essentially prepare the patient for the gait. To promote proper gait recovery, no single strategy will suffice. Rather, the most effective treatment uses a combination of approaches.



Lengthening of leg muscles: Stretching your thigh muscles

Stretching your calf muscles. Keep your heel on the floor.



Now that you know a little more about the basic types of lower limb stroke rehab, we can show you some exercises that will help you regain control of your legs.

To get the most out of these exercises, make sure to practice them every day. The more you can stimulate your muscles, the stronger the neural pathways your brain creates will become. This will, in turn, give you more control over your leg muscles.

Passive movements:

Passive range of motion guidelines:

- Passive range of motion should be done in lying position.
- Always support the weight of the leg.
- Support above and below the joint you are moving.
- Keep your movements slow and smooth.
- DO NOT force the movement if the muscle or joint is stiff – move only as much as the muscle or joint will allow.
- Passive range of motion should be pain-free. If the movement causes pain, STOP, and let your therapist know.

1. Straight leg raises: Gently support the leg under the ankle and knee. Lift the leg off the bed while keeping the knee straight. Hold for few seconds. Lower leg to the bed.



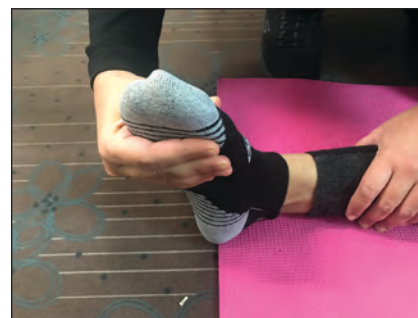
2. Bending the hip up and down: Place one hand behind the knee. Place other hand under the heel of the foot. Bend the hip and knee towards the chest. Hold for few seconds. Slowly lower the leg into a straightened position.



3. Bending the foot up: Place your hand under the heel of the foot so you can cup the heel. Let the foot rest on your forearm. Hold the leg just below the knee to keep the leg from moving. Apply pressure with your arm against the foot to bend the foot at the ankle. Hold for few seconds.



4. Turning the foot in: Place your hand around the top of the foot near the toes. Support the leg with your other hand holding above the ankle to prevent the leg from rolling. Apply gentle pressure to turn the foot inward. Hold for few seconds. Straighten foot.



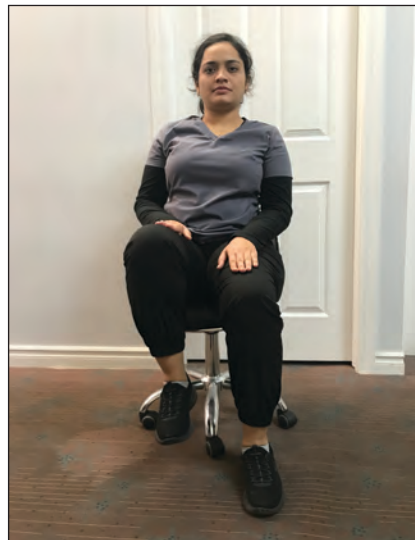
5. Turning the foot out: Place your hand around the top of the foot, near the toes. Support the leg with your other hand holding above the ankle to prevent the leg from rolling. Apply gentle pressure to turn the foot outward. Hold for few seconds. Straighten foot.



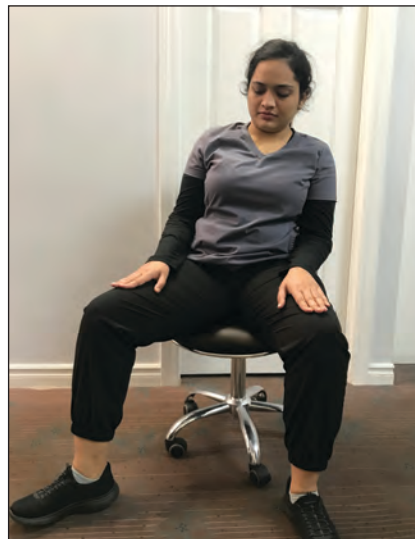
Active movements of leg:

Hip:

Flexion: Sit on a chair with feet on the ground. Raise your leg up keeping the knees bend and then bring down.



Abduction/Adduction: Begin with knees bend and take your hip outside. Knee away from the body. Slowly, bring it back.



Internal rotation: Sit on a chair with feet on the ground. Bring your foot out, away from the ankle of opposite side with keeping the knees bent.



External rotation: Bring your foot inwards to the opposite ankle.



Knee:

Flexion/Extension: Sit on a chair with knees bent. Slide your heel towards the chair for flexion. Straighten your leg from knee to the original position for extension.



Ankle:

Plantarflexion/Dorsiflexion: Raise your toes. Raise your heel.

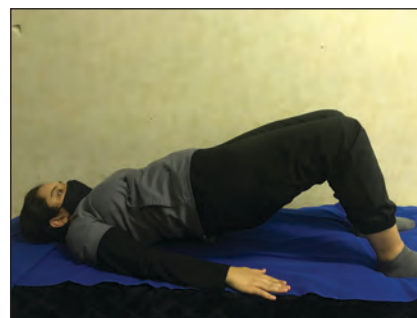


Strengthening exercises:

Inner range quadriceps: Place a pillow or rolled-up towel under a knee in bent position. Lift the heel off the bed and straighten the knee. Do not lift the entire leg away from support.



Bridging: Keep the patient's knees bent up and pressed together. Ask patient to lift affected buttock up. This exercise helps the patient to move from side to side and move up and down.



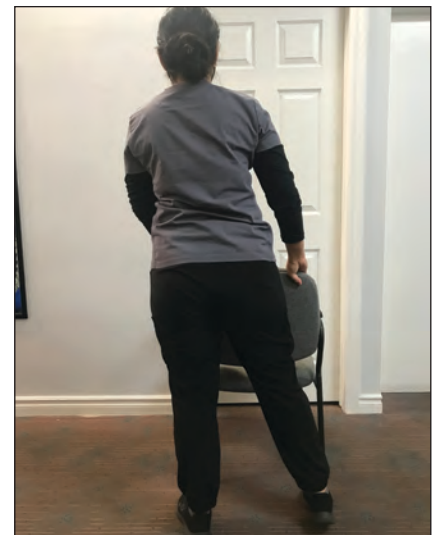
Knee rolling: Lie on the back with knees bent up and pressed together. Bring both knees from side to side, keeping both feet on the bed.



Hip Abduction: Support the patient below their knee and heel. Bring the whole leg out to the side. Hold for up to 30 seconds, or as the patient's tolerance permits. Keep the patient's foot pointed upwards. Allow the patient to bring their leg out if they have the strength.



Weight shifting in standing: Stand with legs apart, feet level. Shift the hips to the left then right. Keep the hips and knees straight. strength.



Knee control exercises: Stand with a chair or support on wall on the unaffected side for support. Practice stepping up onto a block with the unaffected leg. Keep the affected hip and knee straight and affected heel on the floor.



Heel Slides: Lying on your back, slide the affected foot up toward your buttocks, bending your knee and then slide back down until the knee is straight.



Mini Squats: Holding to a stable surface, partially bend the knees as if sitting back on a chair and then stand back up straight.



Hamstring curl in standing: Holding to a stable surface, try to bring the heel of the affected leg toward the buttocks and back.



Hip Abduction in standing: Holding to a stable surface, lift the affected leg out to the side and back down.

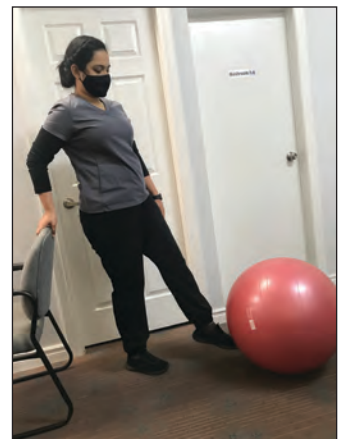
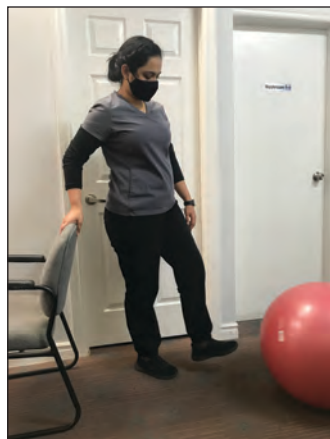


Hip extension in standing: Holding to a stable surface, raise the affected leg backwards and back down (attempting to keep the knee straight).

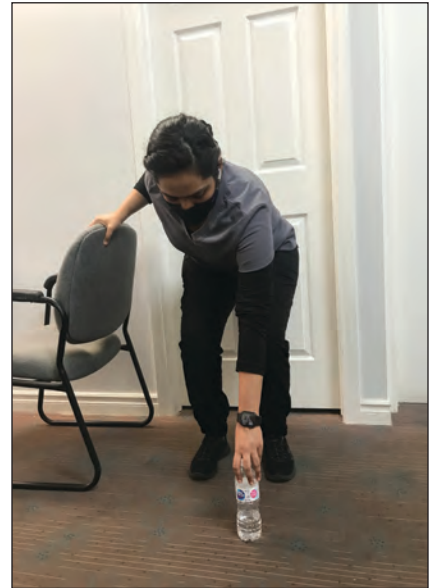


Functional Exercises:

Kicking a ball: stand opposite a wall holding. Kick the ball against the wall with your hemiplegic foot.



Picking up objects from the floor: 10 objects on the floor, hemiplegic side. Pick up the objects one by one, if possible, with your hemiplegic hand. Place them on the table.



CHAPTER 7: MAT AND BALANCE ACTIVITIES

Mat activities are one of the most important parts of rehabilitation programme of brain injury patients. Mat exercises are included in the treatment programme as soon as weight bearing is permitted.

Mat activities are given to:

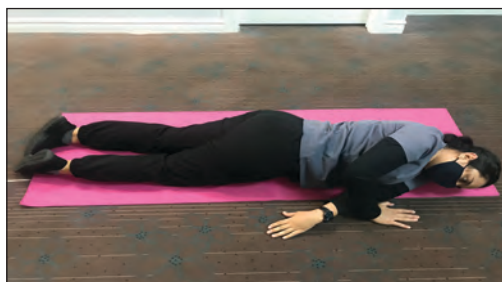
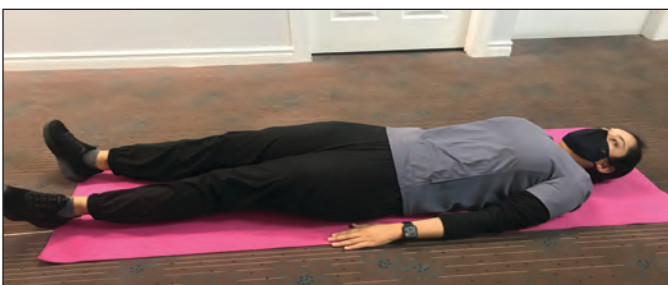
- Facilitate balance
- Promote stability
- Mobilize and strengthen the trunk and limb.
- Train for functional activities

Different mat activities taught to patient are:

1. Rolling: For rolling to be effective, patient is required to learn to move the head, neck, upper limb, lower limb, and trunk in a balance manner. Rolling is needed to improve bed mobility and to change position independently. Initially, rolling is taught to patient in mat but afterwards patient gets confidence to perform it over bed.

Action to role prone from supine position:

- Patient lies in supine position.
- Patient flexes his head, neck, and right shoulder.
- Right arm is moved towards left side to create momentum.
- The momentum of arm is transferred to trunk and lower limb.
- The lower half of body will be rolled to prone position. Flexion of hip and knee will facilitate the roll.
- Patient takes his right shoulder at the back side by putting weight on left forearm and thus, weight is distributed on both upper limbs.
- Patient lies prone.
- Rolling to prone can also be assisted by use of pillows under one side of pelvis or scapula if needed. The number of pillows is decreased in progression.



2. Prone on elbows: This position on mat activities given to patient facilitates head and neck control and strengthens serratus anterior and other scapular muscles. This position is very important to train the patient to gain stability in quadruped and sitting position.

Action of patient:

- Patient lies prone and places his elbows close to trunk.
- Elbows are pushed down while lifting head and upper trunk.
- Now, patient brings the elbow to the level of shoulder and body weight is shifted through elbows.



3. Prone on hands: This position is given to paraplegic patient because it requires strong pectoralis major and deltoid muscles. However, this activity is not appropriate to all paraplegics as excessive lordosis is produced. Prone on hand position is required to gain postural alignment during standing, ambulation and standing from floor with use of orthosis and crutches.

Position of hands in this position is same as standard push up position except that arm are laterally rotated.



4. Quadruped position: In this position, trunk lies horizontal to ground and body weight is distributed over both hands and both knees. It is also called as prone kneeling position. This is the first sequence in mat activities that allow weight bearing through hips. This position helps to initiate control of muscle of lower trunk and hips. This position can either be achieved from prone on elbow position or from long sitting position.



To assume position from long sitting:

Patient in long sitting.

- Body weight is bore through hands with extended elbows by rotating the trunk.
- Now, from the side sitting position patient moves into quadruped position by shifting weight over hands.
- Position is achieved by available trunk strength and momentum from head and shoulders.

5. Kneeling: It is more difficultly to manage for patient with instability at trunk. In this position, center gravity is raised, base is small and gravity falls near the edge of the base. This position is important to promote upright balance control. This position is best achieved from quadruped position.

Action of patient

- Patient moves the hand backward towards knees in prone kneeling position.
- Knees are further flexed.
- Pelvis is dropped towards heel.
- Patient sits on heel.
- Patient supports his upper limb on therapist's shoulder.
- By thrusting with his upper limb and extending his neck and hips, patient rises himself to kneeling position.



6. Four-Point Kneeling: Kneel on the ground and place your hands flat on the ground so you are in a crawling stance. Contract the pelvic floor and raise one leg while lifting the opposite arm. Hold for a few seconds, and return to the starting position, repeating with the opposite arm and leg. Repeat for two to three sets of 10 reps each.

Balance Exercises

What are balance exercises?

Balance exercises are exercises which are prescribed by a physiotherapist to challenge your balance to improve it. Balance exercises will challenge the body's vestibular system and the musculoskeletal system. They aim to improve the body's ability to maintain posture and center of gravity and to improve muscle reaction time and joint proprioception (the body's ability to recognize where the joints and limbs

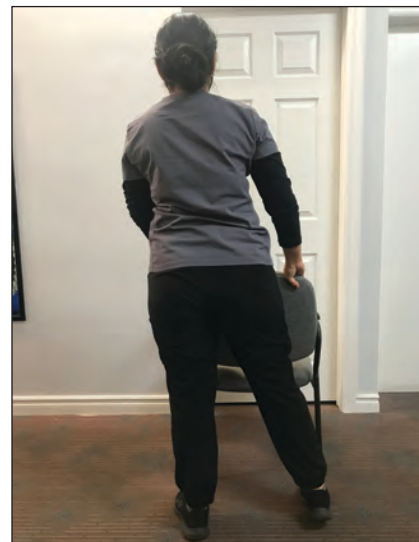
What are the benefits of Balance Exercises?

If you have balance problems a physiotherapy assessment and balance exercises programme will be of benefit to you. There are many benefits of balance exercises which are:

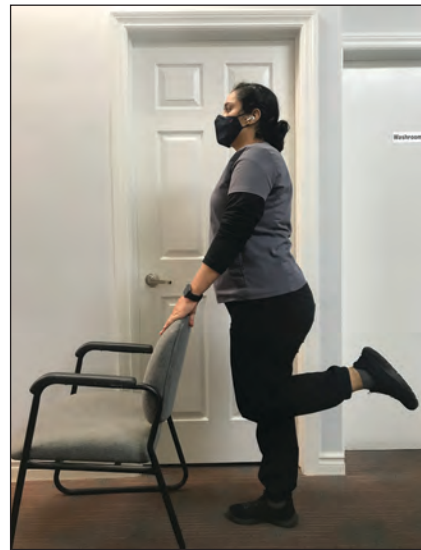
- Improved static balance
- Improved dynamic balance
- Improved joint proprioception
- Improved muscle reaction time – increasing the body's ability to react to balance challenging situations
- Reduced risk of falls
- Improved function – tasks can be done outside of the base of support without risk
- Decreased muscle compensation – muscles can become overactive to compensate for poor balance
- Improved mobility – improved balance will increase mobility and improve energy efficiency.

Exercises:

Weight Shifts: Stand with your feet hip-width apart and your weight equally distributed on both legs. Shift your weight to your right side, then lift your left foot off the floor. Hold the position if you can maintain good form, up to 30 seconds. Return to the starting position and repeat on the other side. As your balance improves, increase the number of repetitions.



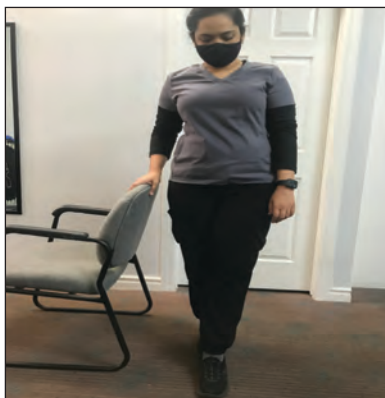
Single leg standing: Stand with your feet hip-width apart and your weight equally distributed on both legs. Place your hands on your hips. Lift your left leg off the floor and bend it back at the knee. Hold the position if you can maintain good form, up to 30 seconds. Return to the starting position and repeat on the other side. As your balance improves, increase the number of repetitions. For variety, reach out with your foot as far as possible without touching the floor. For added challenge, balance on one leg while standing on a pillow or other unstable surface.



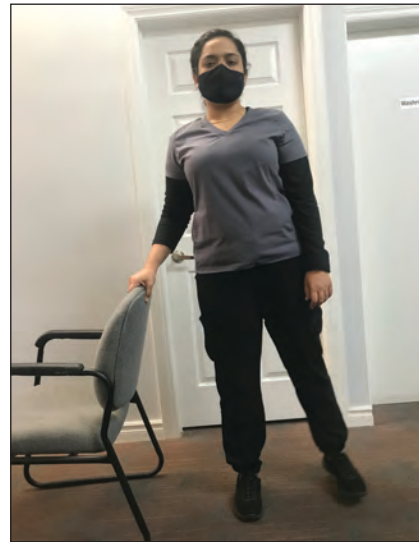
Romberg exercise: Stand with a chair in front of you and a wall behind you. If you begin to fall, you may use them for support. Put your feet together and your arms to your side. Hold this position for 30 seconds.



Tandem standing: Stand behind a chair, close enough that you can reach the chair and hold on with both hands if necessary. Place right foot in front of the left foot, directly in front of the other, with the right heel touching the toes of the left foot. Think of placing them as if you were trying to walk on a balance beam. It is perfectly fine to have them slightly separated/staggered if you cannot bring them that close together. Work to balance this stance and hold for 30-45 seconds, keeping head up, tummy tight, and shoulders back. Repeat with the left foot, 30-45 seconds in this stance.



Sidekicks: Stand behind the chair with feet shoulder-width apart. Put head up, keep tummy tight, and shoulders back. Slowly raise your right leg out to the side as high as you feel comfortable. Bring your right leg back down to touch the floor. Perform 10 to 15 kicks on each leg. Repeat with left leg.



Standing calf raise: Stand behind a chair with feet shoulder-width apart, touching back of the chair with fingers. Head up, tummy tight, and shoulders back. Come up onto the ball of your foot or your toes as far as you feel comfortable. Hold for 30-45 seconds and work on balancing in this position. Repeat 10 to 15 times.



Narrow stance reaches: Begin with your feet together, or as close together as possible while still feeling stable. Stand tall and reach forward with one hand while holding onto a counter or solid surface for safety. Alternate arms as you reach forward. Progress by reaching with both hands' forwards. You can make this more challenging by reaching out to the side or in varying directions. Perform 10 reaches with each arm. Repeat 2 to 3 times.

Standing Marches: Stand with your feet shoulder-width apart. While holding onto a counter or firm surface, raise one leg in a marching motion. Alternate legs. Focus on smooth, controlled movements and keep your body tall to avoid leaning side to side. You can make this exercise more difficult by letting go of the counter or chair. Perform 20 marches (10 on each leg). Repeat 2 to 3 times.



Step up: Use a step, preferably with a railing or near a wall, to use as support. Step up with your right leg. Bring your left leg up to join it. Step down again and return to the start position.



CHAPTER 8: WALKING TRAINING

Walking after brain injury is a common goal during rehabilitation. Many people who survive brain injury are eager to improve their gait, or manner of walking, to regain independence and feel confident with the activities of daily living again.

To help you regain the ability to walk on your own, this guide will explain some of the challenges when learning to walk again after a brain injury (TBI) along with the steps you can take to improve your walking.

Why does a brain injury affect walking skills?

- Balance problems. Between 30% and 65% of traumatic brain injury survivors struggle with balance issues. These can stem from a range of issues including muscle weakness, inner ear damage, and damage to the cerebellum, which plays a role in maintaining balance.
- Primary motor cortex damage. The primary motor cortex is also responsible for the coordination of muscle movements. If a brain injury damages this area, then activities that involve multiple muscle groups, like walking, can become impaired.
- Spasticity. When a brain injury disrupts the connection between the brain and the muscles, the brain can no longer send signals to the muscles telling them when to contract. As a result, spasticity and muscle tightness can set in, making walking after brain injury much more difficult.

Safety considerations while walking:

- Perform hand hygiene.
- Check room for additional precautions.
- Introduce yourself to patient.
- Confirm patient ID using two patient identifiers (e.g., name and date of birth).
- Listen and attend to patient cues.
- Ensure patient's privacy and dignity.
- Assess ABCCS/suction/oxygen/safety.
- Ensure tubes and attachments are properly placed prior to the procedure to prevent accidental removal.
- Bring in required assistive devices and proper footwear.

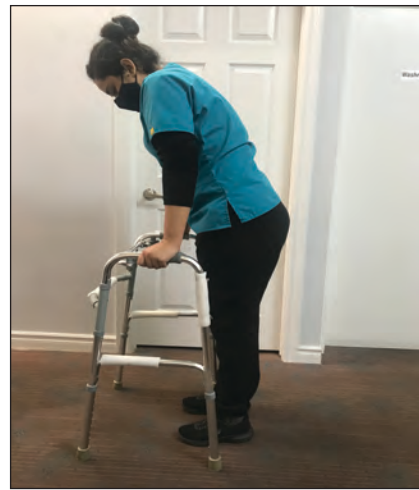
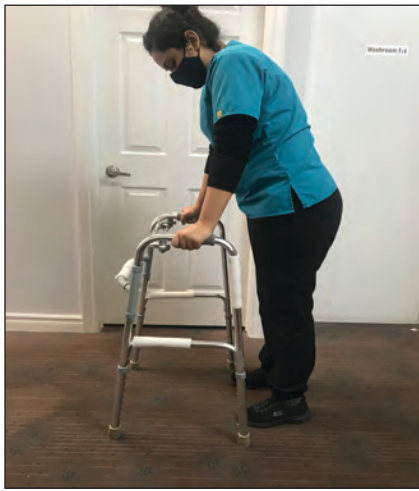
Use of assistive devices: Assistive devices (ADs) are given to them who have difficulty maintaining balance while walking or difficulty lifting a limb due to brain injury. Other factors that would necessitate use of an AD include loss of perception in the legs, weakness of the legs, pain while walking, and a history of falling, among other indications. Different ADs are assigned to each patient depending on the severity of their condition and how much extra support they need provided.

The following list presents the ADs from the least supportive to the most supportive.

- Straight cane
- Lofstrand crutches
- Axillary crutches
- Walkers
- Parallel Bars

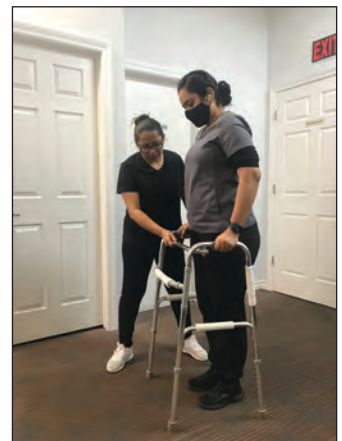
Training using assistive devices:

Two-point pattern: It includes the use of two crutches or two canes with one on either side of the body. In this pattern one crutch and the leg opposite to the crutch is moved in unison. For example, if the right crutch is moved forward, then the left leg would advance with it. This gait pattern requires a high level of coordination and balance.

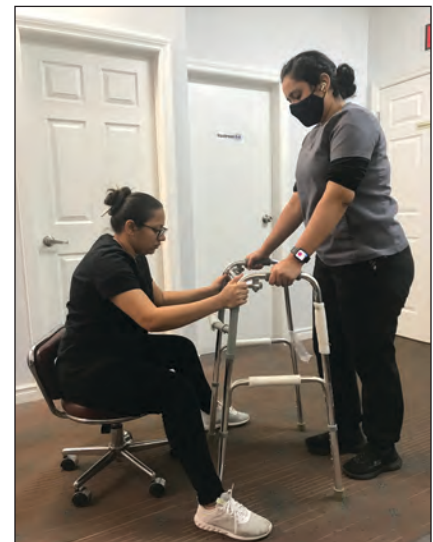
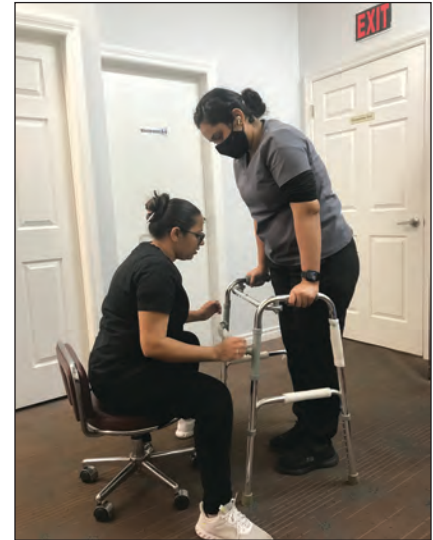


Another two-point gait pattern is the modified two-point pattern. In this pattern there is only use of one crutch or cane on the side opposite to the injured leg, therefore there cannot be any weight bearing restriction but is more used to provide extra balance. For this pattern the AD is move simultaneously with the injured leg.

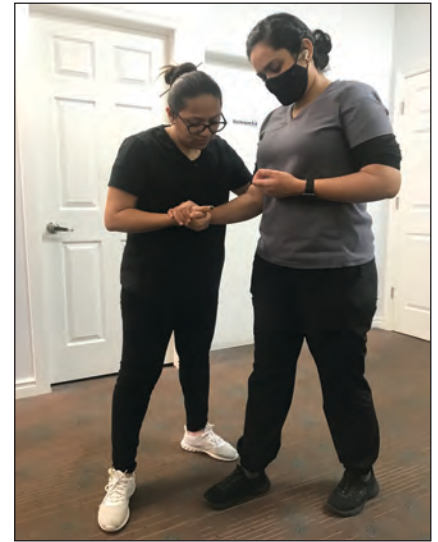
Three-point pattern: This requires the patient to have good balance as well as strong upper limbs.[1] A walker or two crutches must be used, as this pattern cannot be performed with the use of a single cane. For this pattern the AD is advanced first, then the uninjured leg is moved up as the body is supported on the AD. The uninjured leg can either be brought up to be level with the AD (swing to) or brought up to be ahead of the AD (swing through).



There is also a modified three-point gait pattern which can be used. This pattern also requires the use of 2 crutches or a walker but is slower and more stable than the three-point gait pattern. In the modified pattern, the AD is advanced first, followed by the injured leg that has a PWB status, then finally the uninjured leg is moved up. Similarly, a four-point gait pattern has also been described. Just as in the three-point gait pattern the patient may use a swing to or a swing through pattern.



Walking with one person assistance: Patient should use the aid on the 'good' side if possible. Caregiver should assist on the 'bad' side. Use a thumb-to-thumb grasp – place your right hand (palm up) into the patient's right hand (palm down) (or left hand to left hand depending on patient and space). Use a firm trouser belt or preferably a transfer belt to support the patient. Reach across the patient's back to grasp the belt. Do NOT lift on the belt. Remain at the side of the patient to provide support with your hip and hand grasp. Only move away from the chair once you are sure the patient can balance. Maintain contact and only provide as much support as the patient needs: Raising your hand grasp will allow the patient less support from you. Lowering your hand grasp will enable the patient to take more support from you (like a cane)



Walking with two-person assistance:

Reduce friction and weight by using a transfer belt. Bring the buttocks forward in chair. Positioning client's feet to receive weight (strong foot forward). Lean the upper body forward to raise buttocks off chair. Initiate the body rock to create momentum. Have client assist by pushing on chair with hands. Ensure they are given appropriate time after they come out of the chair to rise to their necessary level to allow them to determine if they are physically able to walk. Let client rise, then reposition yourselves to begin walking. The momentum achieved with the body rock starts, assists the move, and will allow the client to come forward out of the chair (not up). Load to the back of the chair by PUSHING through your end foot and shifting your body weight as a unit to the start foot.



Next, PUSH through your start foot and shift your body weight as a unit to your end foot. The force is relayed through your braced body and arms to the transfer belt allowing the client to come forward out of the chair. Ensure you do not shift up; maintain your shift along a horizontal line throughout the move. Pause and allow the client time to receive their weight and stabilize. Now reposition yourself to walk the client by setting yourself up in a side-to-side stance. Your end foot should adjust with each step-in sync with the client as their front foot moves forward.

What is reflexology?

Reflexology is the application of pressure to areas on the feet. Reflexology is generally relaxing and may help alleviate stress. The theory behind reflexology is that areas of the foot correspond to organs and systems of the body. Pressure applied to the foot is believed to bring relaxation and healing to the corresponding area of the body.

It stimulates the circulation, improving the nerve and blood supply to areas of the body which is congested. Reflexology can do no harm; it only helps bring the body back into a state of balance by giving the body back its resources through improved circulation.

How does reflexology work in brain injury?

For patients with little or no mobility, it is vital to ensure that three key systems – circulatory, eliminatory, and immune – are all stimulated to encourage them to work as effectively as they can. It works on many levels and being a holistic therapy, it deals with the mental/emotional side of things as much as the physical body. Prolonged illness, injury or emotional upset will in time start to alter the body's ability to function effectively. In simple terms, long term pain and injury can cause depression, an unhappy state of mind can start to show itself in physical ailments. This is where reflexology works on a subtle level. The body and mind have a fantastic ability to heal and sometimes a little nudge is all that is needed to help it to remember what it knows and needs to do, to function as well as it can.

It shows a remarkable improvement in the participants' ability to walk and use their hands and arms, as well as improvements in speech. Foot reflexo-therapy can restore the damaged brain function and revive the limb and speech performance of patients with cerebral thrombotic sequelae. It was also proposed that foot reflexo-therapy is useful in the prevention of cerebral thrombosis, as well as in the treatment.

Steps to perform foot reflexology:

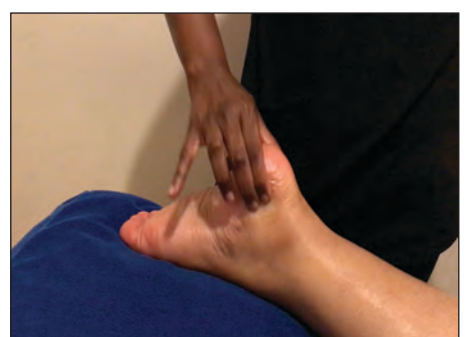
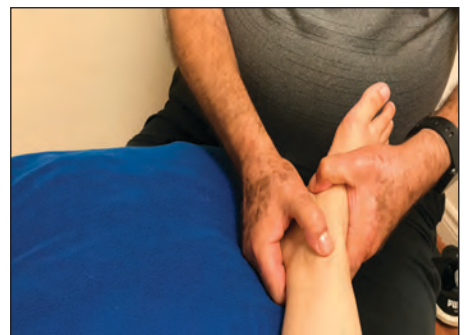
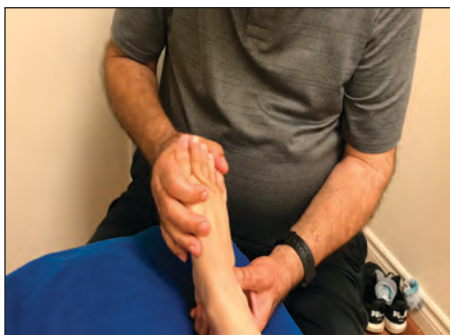
1. Understand the reflexology zones: When you perform reflexology, it's necessary to learn where the reflexes are on the feet that correspond to every limb, organ, and gland of your body. When you apply pressure to these specific points, you stimulate the corresponding limb, organ, or gland. Engaging the tip of a particular zone by applying pressure to a place on the foot activates the body's healing power for that entire zone.



2. Apply pressure on the reflex points: When you identify which zone you want to engage, find the correct reflex spots on your foot by looking on a chart or consulting with a reflexologist. For brain injury the zone is located under the big toe. Apply gentle pressure to the area. The pressure you apply to these spots will stimulate your body to create endorphins that interrupt the pain cycle and relieve stress.



Steps for complete foot massage:





Importance of Halotherapy/salt therapy in rehabilitation:

Halotherapy is dry salt inhalation. Tiny particles of salt are ground and dispersed in the air by a machine called a halo generator. It is a holistic method that reproduces the natural microclimate of a salt cave by dispersing saline aerosol in a high concentration in a room



whose surfaces are covered with layers of salt.

The dry salt aerosol in the room plays an important role in the relief of health problems.

How does it work?

Patients sit in the salt cave for 45 minutes and breathe in the fine salt aerosol, which is transported to the smallest bronchi, or airway passages, in the lung as well as to other parts of the respiratory tract such as the sinuses and nasal cavities.

The salt particles act as an antibacterial agent, dissolving bacteria and pollutants lodged in the respiratory tract. These are then either coughed up by the patient or are expelled during the metabolic processes via the bloodstream.

This treatment also reduces inflammation in the lungs, thins out mucus build up, improves lung function, and opens breathing passages.

Walking barefoot on sand:

Sand walking is beneficial due to the added stress and strain that is placed on the muscles, tendons, and joints. The foot “sinks” into the sand and this requires the muscles to work harder to propel you forward for the next step. The soft sand is unstable which requires more neurological input to the foot and ankle complex. This instability helps to strengthen the ankle and foot muscles and enables the lower extremity to be able to move you forward. The entire lower extremity is forced to “work” harder on an unstable surface and it

can enhance the strength throughout the leg. Most people perform sand walking without wearing shoes therefore the little muscles of the foot that help support the arches of the foot are strengthened, also.



The instability that occurs when someone is sand walking creates an environment that is especially helpful to re-educate and stimulate more neuromuscular activity in the lower extremities. This is extremely important for people who have previously suffered injuries. An injury or pain in any body part can negatively affect the neuromuscular activity, reducing the response within the muscle. This response of the muscle to the nerve is referred to proprioception. The muscles respond reflexively, and it is not a cognitive process. The foot and ankle complex are very susceptible to this phenomenon and can be treated with sand walking.

CHAPTER 9: FACIAL EXERCISES AND SWALLOWING TECHNIQUES

When individuals suffer from brain injury it usually also results in facial palsy and difficulty in swallowing. They may experience various sequelae that interfere with their facial function. Common sequelae are:

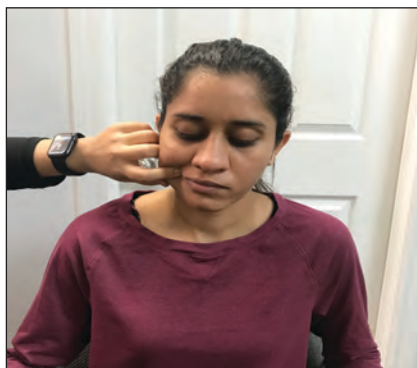
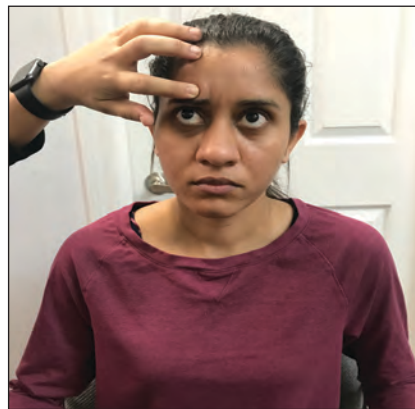
- Asymmetry
- Muscle contracture
- Facial muscle weakness
- Synkinesis

Because the facial muscles provide little intrinsic information about posture and movement, it is difficult for patients to perform voluntary facial movements without some feedback. Activation of the facial muscles alone is not, however, sufficient to recover facial expressions. It has been proposed that because emotions generate specific facial muscle contractions to achieve reactionary expressions. From a practical perspective, it is useful to consider incorporating facial exercises that focus on emotions and expressions into a rehabilitation programme. For example, ask the patient to remember a time when she / he was very happy when practicing a smile to activate the positive effect marker associated with smiling.

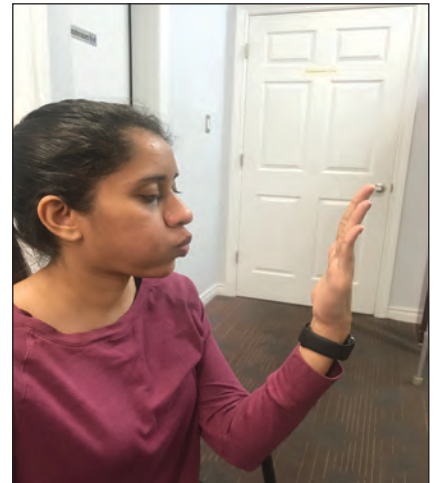
Exercises:

1. Before you start your exercises consciously try to relax the unaffected side of your face.
2. Using your index or middle finger to assist the weaker side, gently lift the eyebrow.
3. Using your finger to assist the weaker side, gently close your eyelid to assist with eye closure.
4. Using one finger to assist the weaker side, gently pull your mouth into midline and then assist into a smile.
5. Slowly pucker mouth then relax.
6. Slowly open eyes wide open and lift eyebrows.
7. Slowly close eyes tightly and relax.

Passive movements:



Self exercises:



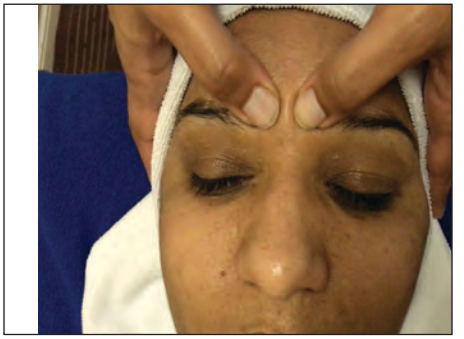
Massage for facial contractures: Usually when the muscles are not working, it starts getting tight and needs massage to release.

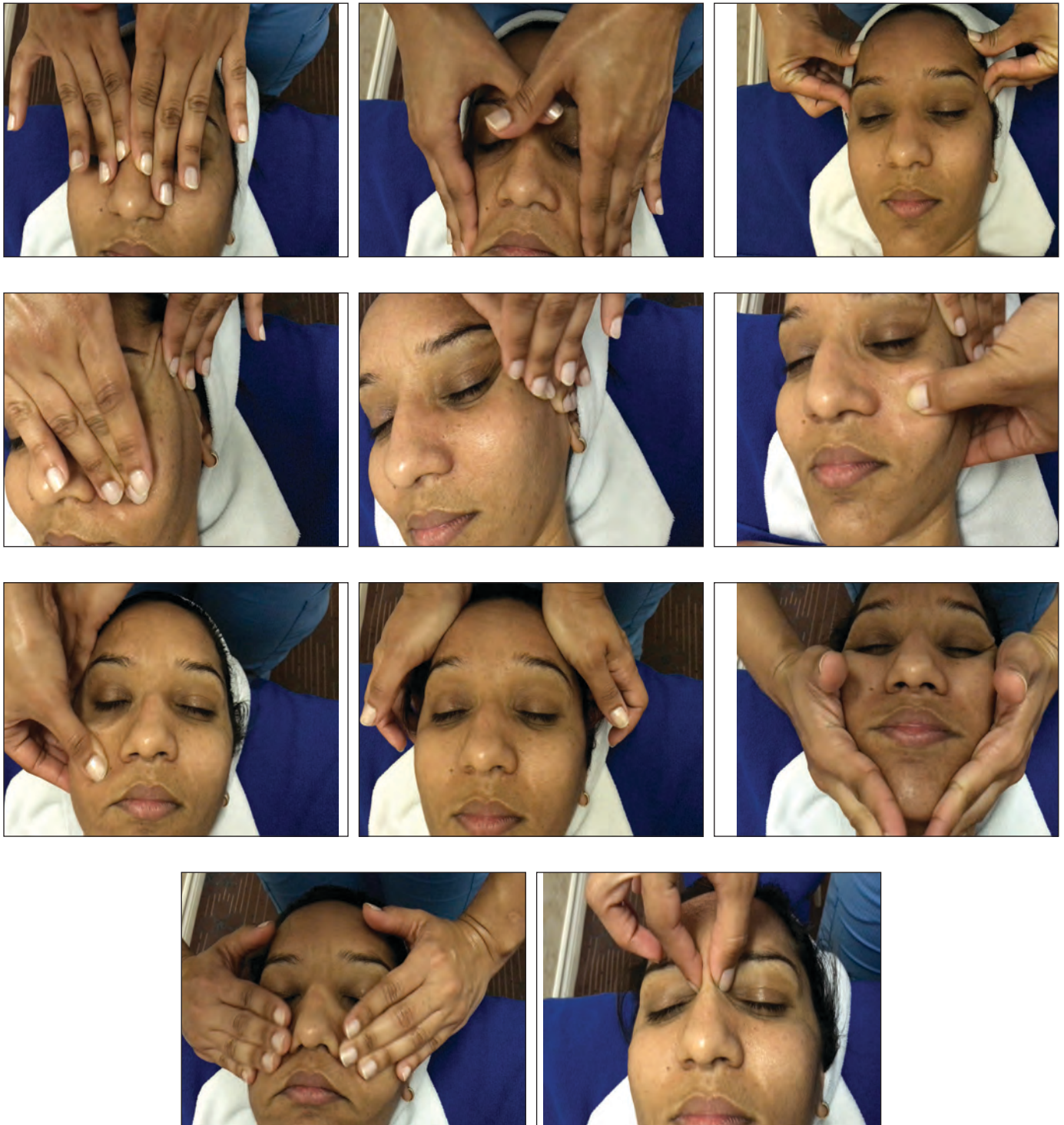
Considerations and precautions to take in mind before applying massage are as follows:

- no deep, lengthening or dragging techniques to the flaccid side
- no extreme temperature with hydrotherapy
- concern with eye infection
- do not place client prone (pressure on flaccid muscles)
- do not work from midline toward flaccid side

Steps to apply facial massage are,

- position supine, no prone – gently support opposite side of head
- Local heat over muscle shortened (if no edema)
- Unaffected side first
- Effleurage, Petrissage, a Muscle Stripping, chest, posterior neck, and shoulders
- Manual Lymphatic Drainage if edema is present
- Unaffected facial muscles: pressure TOWARDS the lesion from LATERAL to MIDLINE of the face
- fingertip kneading, compressions, stroking, vibrations, short fascial spreading





Facial acupressure points: The acupressure points located on the face have been used to help with anything from congestion and headaches to fevers and chills. Although research on the benefits of acupressure is limited, some research suggests it may help reduce physical pain as well as stress.

There are several acupressure points located on your face. Points on the front of your face include:

1. LI20: LI20 is in the nasolabial groove, which is the groove where your nostril meets your face.



2. GV26: GV26 is located right in the center between your lips and your nose.



3. Yintang: Yintang is located between your eyebrows, which is the area otherwise known as your “third eye.”



Points on the side of your face include:

1. Taiyang: Taiyang is in the tender depression of the temple.



2. SJ21: SJ21 is in the depression anterior to the supratragic notch, which is right above the tragus of the ear, closer to the face.



3. SJ17: SJ17 is located right behind the earlobe.



On the hand: LI4 can help with disorders of the face and relieve pain as well as chills and fevers. To find it, squeeze your thumb to the base of your index finger. You can locate it at the highest point of the bulge of the muscle and nearly level with the end of the crease.

Dysphagia: It is the medical term for difficulty swallowing. It is more common in older people but may also be present in people with certain neurological conditions. Difficulty swallowing can lead to nutrition and hydration issues, choking, and aspiration pneu-

monia (an infection resulting from material from the mouth and stomach entering the lungs). People with dysphagia benefit from doing different swallowing exercises. Such condition-specific exercises can help to improve swallowing muscle strength and coordination, improving the symptoms of dysphagia.

Exercises to help dysphagia: Those with dysphagia should first do exercises like the ones listed below under the care of a medical professional. They can guide the person step by step through the exercises and tell them if they're doing the exercises correctly. The exercises are,

Effortful Swallow: Gather the saliva in your mouth in the middle of your tongue. Keep your lips pressed together. Swallow all the saliva at once like you're swallowing a grape or a pill.

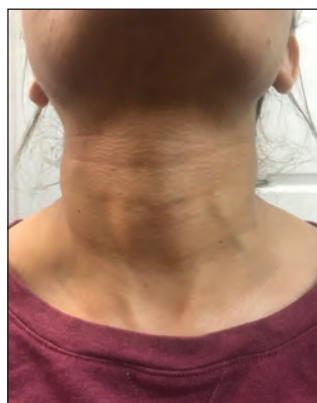
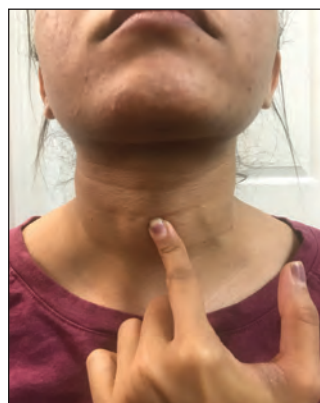
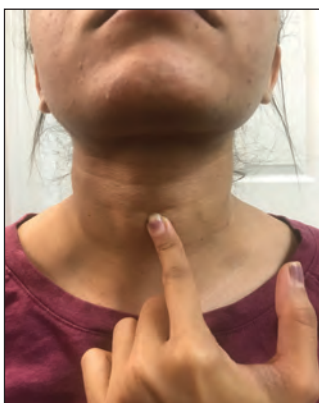
Dynamic shaker: Lie on your back on a flat surface. Make sure your shoulders are against the surface and do not use a pillow or headrest. Keeping your shoulders on the surface, lift your chin as if you're trying to look at your feet. Lower your head back down to the surface. Repeat 30 times. Then rest for 2 minutes. Repeat as many times as indicated by a medical professional.

Jaw Thrust: Push your lower jaw as far forward as possible, placing your lower teeth in front of your upper teeth. Hold the position for time determined by your doctor or physical therapist. Repeat as many times as indicated by your doctor or physical therapist.

Masako maneuver: Stick your tongue out of your mouth. Bite down gently on your tongue to keep it in place. Swallow while holding your tongue between your teeth. Release your tongue. Then, repeat as many times as indicated by a medical professional.



Mendelsohn maneuver: Press the index, middle, and ring finger of one hand on your neck to locate your Adam's apple—the small bump or simply the skin on the front of your neck below the chin. Swallow once, noticing how the Adam's apple moves up and down when you swallow. Swallow again, but this time, squeeze your throat muscles to hold your Adam's apple at its highest point. Hold it for as long as indicated by your doctor, or if you can if you can't yet hold it for that long.



Supraglottic maneuver: Collect a bit of saliva in your mouth. Take a deep breath and hold it. Swallow while holding your breath. Immediately after swallowing, cough. Once you have this down with saliva, you can try with food or drink, at the direction of a medical professional.

Hyoid lift maneuver: Gather materials—a drinking straw, pieces of paper towel, and a cup. Place the straw in your mouth. Suck on the straw, picking up a piece of the paper with the suction that forms. Keep the suction strong enough to carry each piece of paper over to a cup. Stop sucking and let the paper fall into the cup. Repeat until all pieces of paper are in the cup.

Tongue strengthening exercises:

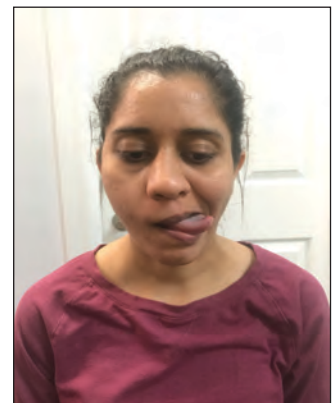
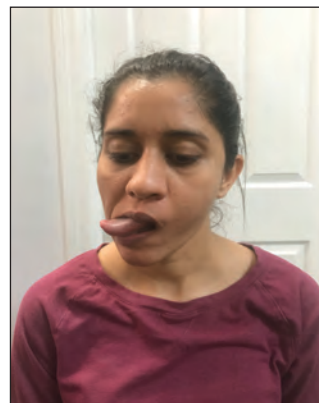
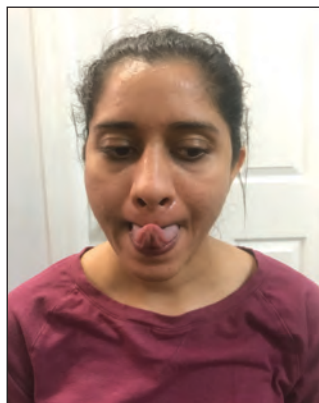
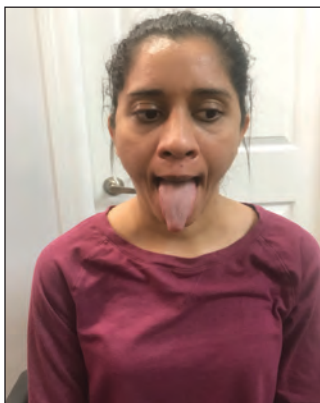
What is tongue strengthening exercises?

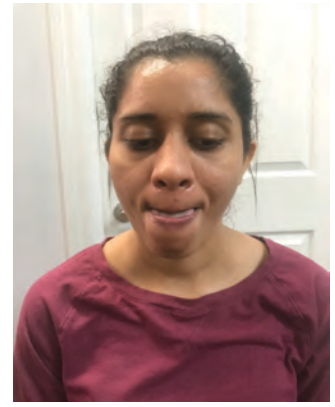
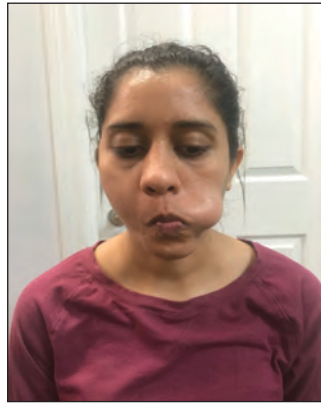
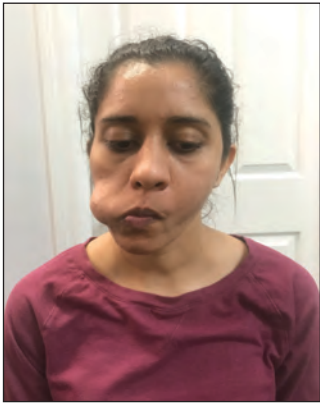
Tongue-strengthening exercises can help improve your swallowing. With practice, these exercises may help you increase your tongue strength and mobility. This may improve your ability to swallow, especially when used with other types of swallowing exercises.

Before you swallow, you chew your food to a size, shape, and consistency that can be swallowed. When you swallow, this material passes through your mouth and into a part of your throat called the pharynx. From there, the chewed food passes through a long tube (esophagus) before entering your stomach and the rest of your digestive tract.

This movement requires a series of coordinated actions from your muscles along this path. If something doesn't work properly, it can lead to problems swallowing. Muscle weakness in these areas can make proper swallowing difficult. Swallowing exercises can increase strength, mobility, and control of these muscles. Over time, this may help you to swallow normally again. The specific tongue exercises are as follows:

- Stick out your tongue as far as you can. Put something flat like a spoon or tongue depressor on your tongue. Push against your tongue with the flat object and push your tongue against the object. Hold for a couple of seconds. Repeat 5 times.
- Extend your tongue as far as possible to the corner of your mouth while pushing against a depressor. Hold for a couple of seconds. Relax. Repeat on the other side of your mouth. Repeat the whole process 5 times.
- Extend your tongue to the bumpy part on the top of your mouth right behind your teeth. Then curl your tongue back toward the back of your mouth as far as possible. Hold for a few seconds. Repeat 5 times.
- Inhale and hold your breath very tightly. Bear down like you are having a bowel movement. Keep holding your breath and bearing down as you swallow. This is called a super-supraglottic swallow. Repeat a few times.
- Pretend to gargle while holding your tongue back as far as possible. Repeat.
- Pretend to yawn while holding your tongue back as far as possible. Repeat.
- Do a dry swallow, squeezing all your swallowing muscles as tightly as you can. Imagine swallowing a vitamin whole, without water. Repeat a few times.





Resisted Tongue Exercises:



Guidelines for safe swallowing: Remember that dysphagia patients have individual requirements, so all these guidelines may not apply to every patient.

- Maintain an upright position (as near 90 degrees as possible) whenever eating or drinking.
- Take small bites — only 1/2 to 1 teaspoon at a time.
- Eat slowly. It may also help to eat only one food at a time.
- Avoid talking while eating.
- When one side of the mouth is weak, place food into the stronger side of the mouth. At the end of the meal, check the inside of the cheek for any food that may have been pocketed.
- Try turning the head down, tucking the chin to the chest, and bending the body forward when swallowing. This often provides greater swallowing ease and helps prevent food from entering the airway.
- Do not mix solid foods and liquids in the same mouthful and do not “wash foods down” with liquids unless you have been instructed to do so by the therapist.
- Eat in a relaxed atmosphere, with no distractions.
- Following each meal, sit in an upright position (90-degree angle) for 30 to 45 minutes.

Food consistency for people with dysphagia:

Level 1: Foods in this group are puréed to a smooth, mashed potato-like consistency. If necessary, the puréed foods can keep their shape with the addition of a thickening agent. Meat is puréed to a smooth pasty consistency. Hot broth or hot gravy may be added to the puréed meat, approximately 1 oz of liquid per 3 oz serving of meat. Be cautious that if any food does not purée into a smooth consistency, it may make eating or swallowing more difficult.



Level 2: Foods in this group should be minced/chopped into very small pieces (1/8 inch). The flecks of food are similar in size to sesame seeds.



Level 3: Foods in this group should be ground/diced into 1/4-inch pieces. These pieces of food are similar in size to rice.



Level 4: Foods in this group should be chopped into 1/2-inch pieces. These pieces of food are similar in size to uncooked elbow macaroni or croutons (small bread cubes).



Level 5: Foods in this group are soft, moist, regularly textured foods



Thickening and Thinning Agents

Foods can be thickened or thinned to individual requirements. Many foods can be used to change a liquid to a different consistency. The amount of thickening agent needed to reach a certain food consistency varies depending on the food being thickened and on the thickening agent used.

How to Thin Liquids? Add hot milk-based liquids (hot milk or cream) to puréed soups, puréed vegetables, or cooked cereal. Add other hot liquids (broth, gravy, sauces) to mashed potatoes, puréed, or ground meats, and puréed or chopped vegetables. Butter or melted margarine may also be used. Add cold milk-based liquids to cream, yogurt, cold soups, puréed fruits, or puddings and custards.

How to Thicken Liquids and Foods? Add baby rice or commercial thickener to hot milk-based liquids. Add potato flakes, mashed potatoes, or flaked baby cereal to other hot liquids (soups, sauces, gravies). Add plain unflavored gelatin, puréed fruits, banana flakes, or a commercial thickener to cold liquids. Add potato flakes, mashed potatoes, thick sauces, or gravies, canned puréed or strained meat (baby food), or a commercial thickener to puréed soups. Add flaked baby cereal, flavored gelatin, cooked cream of rice or wheat cereal, or a commercial thickener to puréed fruits. Add mashed white or sweet potatoes, potato flakes, sauces, or commercial thickener to puréed vegetables.

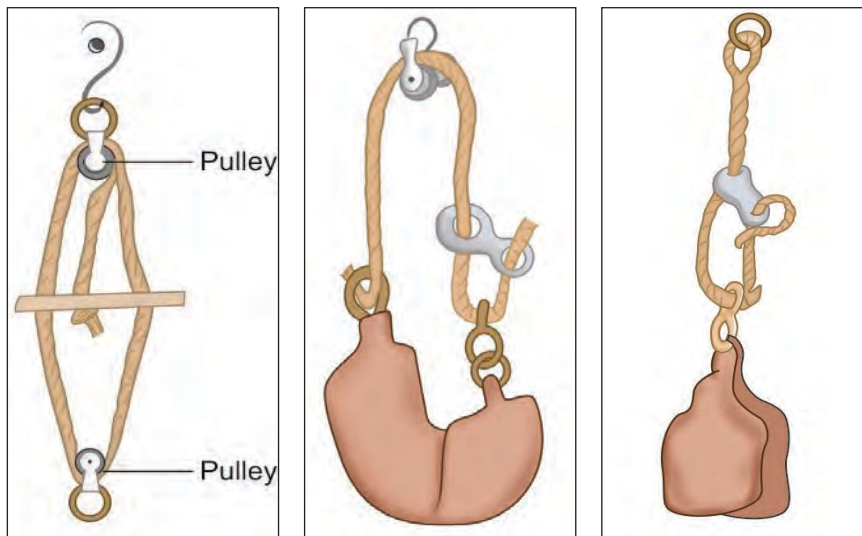
CHAPTER 10: SUSPENSION THERAPY

What is suspension therapy?

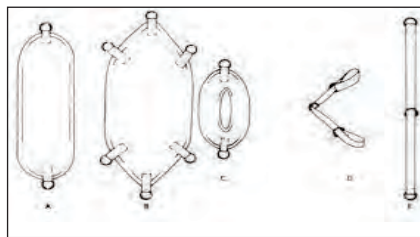
Suspension Exercise therapy is a technique in Exercise therapy in which a body or a part of it is suspended in the air by ropes and slings attached to fixed points. It increases range of motion and muscle strength. It is an efficient way of carry out exercises with ease which can be beneficial to the therapist and to the patient.

What are the parts used in suspension therapy?

- Ropes – Single, Double or Pulley Rope



- Slings- Single, Double, Three Ring and Head Slings



- Wooden Cleat – Usually have two to three holes which are used to change the length of the rope without having the disadvantage of tying the rope every time for a specific rope length.



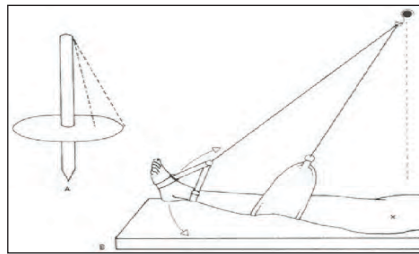
- Springs – Used to assist especially when the patient has an MMT between 2 and 3
- Dog Clip and S hooks – Used to attach Slings with the rope and the Frame. Dog Clips are safer than S hooks as they can secure the rope without slipping.



Types of Suspension therapy:

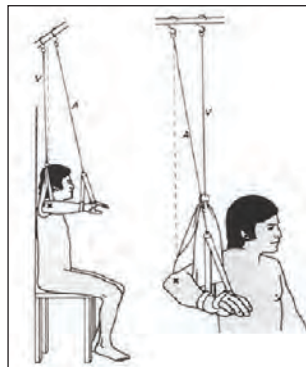
Axial Suspension: Joint axis is taken as the point of the suspension. The limb is supported by the slings above the axis of the joint. If the movement is initiated the limb is moved both sides. The part moves parallel to the floor. Uses-

- Relaxation
- Maintain muscular property
- To Increase the blood circulation
- Increase the venous drainage
- Increase the lymphatic drainage



Vertical suspension: COG of the body part or the body is taken as a point of suspension. Used to provide support to the body part of the patients. Uses-

- To support the body part
- To reduce the pressure sore



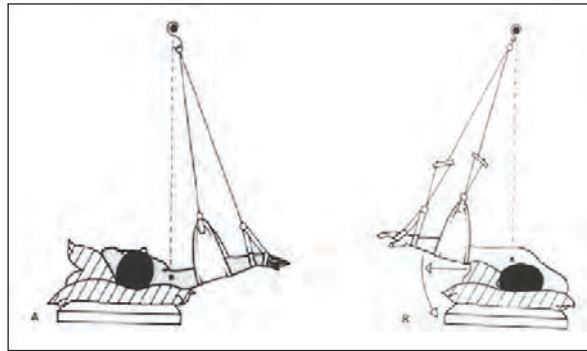
Pendular suspension: The point of suspension should be shifted away from the joint axis. Movement usually takes place against gravity. Muscle will be getting resistance while moving if the axis is shifted opposite to that movement. Uses-

- To strengthen the muscle.
- To increase the muscle power
- Increase the endurance.

Exercises for different joints of body with suspension frame:

Shoulder Abduction/Adduction: The starting position is lying, the arm which is to be moved should be placed up. This allows the normal movement to be performed. Two single ropes are required, one attached to a single sling under the elbow and one to a

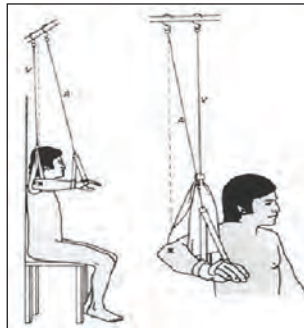
three-ring sling applied to the wrist and hand. The fixation point is over the shoulder joint. If there is some muscle power the patient can do the movement by himself or if there is no power, someone can assist with the movement.



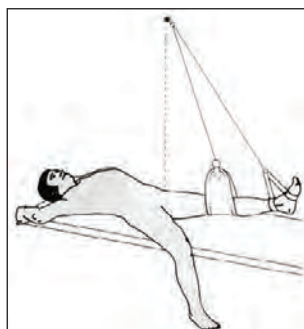
Shoulder Flexion/Extension: The starting position is side lying on pillows. Female patients need two pillows under the head and one under the shoulder to allow the forearm to clear their wider pelvis. The slings and ropes are arranged as described above.



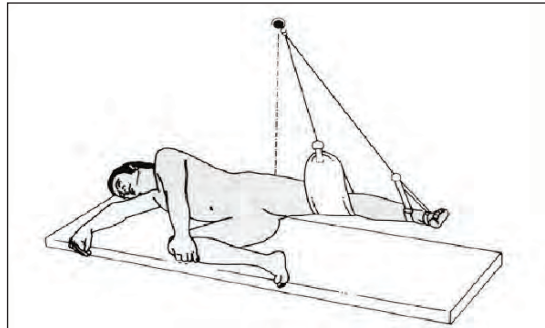
Elbow flexion/Extension: The starting position is sitting. One point is fixed over the elbow joint. One sling is used to support the elbow and three-ring sling used at the wrist and hand.



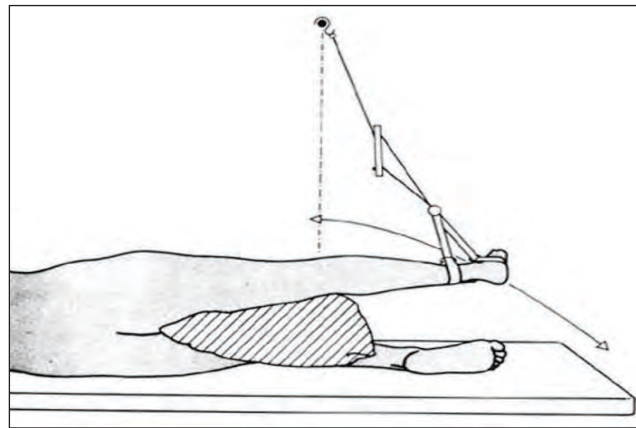
Hip Abduction/Adduction: The starting position is lying with the opposite leg abducted to its limit, even if the knee must be bent over the side of the plinth and the foot supported on a footstool. The fixation point is immediately above the hip joint. One sling is put under the lower thigh and one three-ring sling on the foot and ankle; each is attached to a rope hung from the fixation point. The limb is lifted just clear of the plinth.



Hip Flexion/Extension: The starting position is side lying with the underneath leg flexed as far as possible. The fixation points and sling arrangements are as above, with the limb lifted until it is horizontal. If the movement of flexion is to be mobilized the knee and hip must be flexed together to overcome the passive insufficiency of the hamstrings.



Knee flexion/extension: The starting position is side lying with one or two pillows between the slightly flexed thighs. One three-ring sling is applied to the foot and ankle and one rope attached to a fixation point above the knee joint. By keeping the hip slightly flexed on the trunk the foot can be seen each time the knee is extended and part of the arc of movement is thus observed by the patient. This position may be used to mobilize the knee joint or to work the flexors or extensors of the knee.



How can you do suspension exercises at home? Here is a quick and easy step-by-step guide that can help,

Gather the supplies: A small pulley, 12-foot to 14-foot length of 5/16" polyester rope, Household scissors, Discarded tubing or garden hose for handles (optional). Polyester rope is preferred because it is soft and glides easily on the pulley wheel. It is also pliable enough so that you can close a door on it without damaging the door. This is important since the pulley will be anchored in this way. While a bigger rope may feel comfortable in your hand, you will probably be unable to close the door on it. If anything, it is better to have a thinner rope than a thicker one.

Make the pulley hanger: You will start by cutting a one-foot length of rope to make your pulley hanger. Simply string the rope through the top of the pulley and tie a double overhand knot to secure (as pictured). A double overhand knot is simply a basic overhand knot done twice. There should be around two inches of rope on one side of the knot and nine inches on the other.

Create the pulley anchor: To make the anchor, tie another double overhand knot on the longer end of the hanging rope. The knot will be situated on the outside of the door when shut and prevent the rope from slipping out. If the anchor is small or looks flimsy, make addition knots to ensure the pulley system is properly anchored when installed.

Build the pulley line: Cut another piece of rope around 10 to 12 feet long. Don't worry if it is too long; you can adjust the size of the line to fit your needs. Feed one end of the rope through your pulley, tying the end of the rope into a handle using an overhand

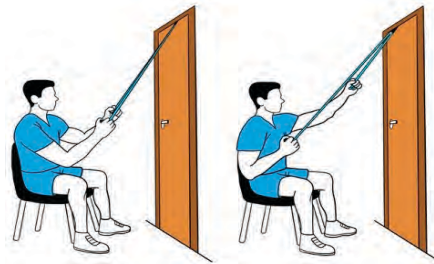
loop knot (as pictured). Like the overhand knot, the overhand loop is the most basic of knots. To make one:

- Create a loop large enough to accommodate your hand.
- Take the loop and create another loop, passing the end once or twice through the circle.
- Pull tight to secure.
- The loop also prevents the rope from slipping out of the pulley.

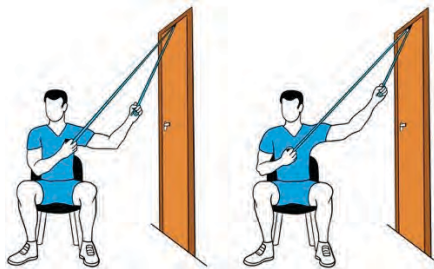
Create a second handle: Create another looped handle at the opposite end of your rope. Some people like to string a four-inch length of plastic tubing (or a cut piece of a discarded garden hose) into the loop to create a comfortable grip.

Hang your pulleys: Once you have made your pulley, sling the knotted anchor over the top of the door and shut it. The door should be able to close tightly, and the knot should hold firmly when tugged. You now have a basic but effective shoulder pulley system you can use at home. Speak with your physical therapist to determine which pulley exercises are most appropriate for you.

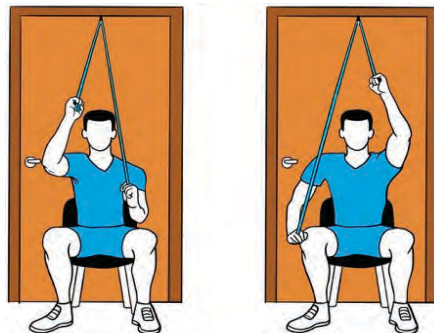
Exercise 1: In the first shoulder pulley exercise, your chair faces the door square on, with the door anchor fixed over the door. The uninjured arm pulls the injured arm, gently stretching it forwards and up. Hold in the final position for 10 seconds and then lower the arm.



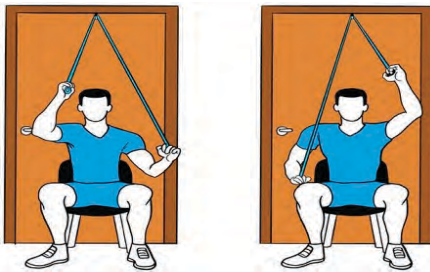
Exercise 2: Once you are comfortable with the first exercise, turn your chair 90 degrees and perform the same exercise from the side. Gradually let your shoulder stretch and increase its range of motion.



Exercise 3: When you feel that your range of motion has improved, you can turn the chair so you're facing away from the door. Using the uninjured arm, lift the injured arm up directly in front of you, holding in the final position for 10 seconds or more.



Exercise 4: The next step is to adjust the angle of your arm from your body to 45 degrees. Perform the same movement at this angle, stretching the arm as high as you can go without too much pain. Always hold in the final position for at least 10 seconds.

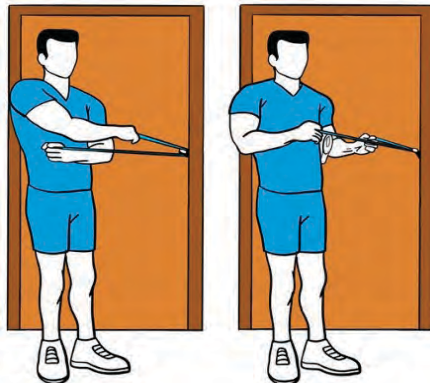


Exercise 5: The next exercise is done in a standing position. Lift the injured arm behind your back, as in the picture. Start off slowly



with only small movements and gradually increase the range of motion.

Exercise 6: Once you have gained a good level of mobility you can begin rotational shoulder exercises. Standing side on to the door, pull the affected arm so that it is rotating outwards, again holding in the final position, and gradually increasing the range of motion. Do not let your shoulder hunch up or move forward. Maintain a natural upright posture, and keep your elbow fixed at your side. Holding a rolled-up towel between your elbow and body will help with this.



CHAPTER 11: BODY SOAK FOR RELAXATION

But first let us understand how soaking helps?

Salt is considered a home remedy for generations. Soaking the foot with it relieves aches and pains, reduces inflammation, improves blood circulation, reduces, or removes unpleasant odors from the feet, and has anti-fungal and microbial properties. It helps with skin infections and wounds, including athlete's foot, nail fungus and small wounds. In addition, there is a lot of research indicating that it helps to remove toxins from the body and relieve stress. Skin absorption of minerals relieves cramping and foot pain, enhances the absorption of magnesium through the skin, which helps relax muscles and nerves and relieves foot pain. It has antibacterial and anti-fungal properties, improving blood flow to the skin, thus enhancing the chances of recovery.

Recipes for body soaking

Recipe 1

Ingredients:

A cup of Epsom salt/Dead Sea or homemade table salt

Half a cup of apple cider vinegar

Dry chamomile, mint, basil, and thyme



Method:

- ★ Mix all the dry herbs and boil it with water until simmers.



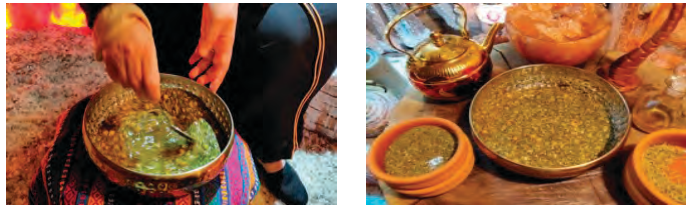
- ★ Add warm water and stir well.



- ★ Add salt, apple cider vinegar and stir well.



- ★ Soak your body in tub filled with this mixture every evening for 15-20 minutes. (You can be there for longer time if you need).



Benefits:

- It reduces toxins present in the body and lessens the pain
- Reduces infections, bacteria, and fungus
- Stimulates blood circulation
- Nourishes the skin and make it smooth.

Recipe 2

Ingredients:

Half a cup of Dead Sea Salt or Epsom salt
 10 teaspoons of dry or fresh mint leaves
 10 teaspoons of dry or fresh mint leaves

Method:

- ★ Mix all the dry herbs in a bowl.



- ★ Add warm water, salt, and apple cider vinegar into it and mix well.



- ★ Soak your body in tub filled with this mixture every evening for 15-20 minutes. (You can be there for longer time if you need).

Benefits:

- It reduces toxins present in the body and lessens the pain
- Reduces infections, bacteria, and fungus
- Stimulates blood circulation
- Nourishes the skin and make it smooth.

Recipe 3

Ingredients:

- A large cup of dead sea salt, Himalayan salt, or Epsom salt
- 4 teaspoons of ginger
- 4 teaspoons basil
- 5 teaspoons of olive oil
- A cup of apple cider vinegar



Method:

- ★ Mix all the dry herbs in a bowl.



- ★ Add warm water, olive oil, and apple cider vinegar into it and mix well.



- ★ Then, soak your body in tub filled with this mixture every evening for 15-20 minutes. (You can be there for longer time if you need).

Benefits:

- It reduces toxins present in the body and lessens the pain
- Reduces infections, bacteria, and fungus
- Stimulates blood circulation
- Nourishes the skin and make it smooth.

Recipe 4

Ingredients:

- 10 teaspoons of table salt
- A large cup of apple cider vinegar
- 3 teaspoons of mint
- 3 teaspoons of sesame
- 5 teaspoons of wild thyme
- 5 teaspoons of black seed powder
- 5 teaspoons of flaxseed



Method:

- ★ Take flax seeds, black seeds, sesame seeds, and grind it well. Take it in a bowl.



- ★ Mix all the dry herbs (mint, thyme, and salt) in a bowl.



- ★ Add warm water, olive oil, and apple cider vinegar into it and mix well.



- ★ Then, soak your body in tub filled with this mixture every evening for 15-20 minutes. (You can be there for longer time if you need).

Benefits:

- It reduces toxins present in the body and lessens the pain
- Reduces infections, bacteria, and fungus
- Stimulates blood circulation
- Nourishes the skin and make it smooth.

Recipes especially for foot soaking:

Recipe 1

Ingredients:

- 2 teaspoons of fennel
- 3 tablespoons of mint
- 5 spoons of ginger
- 4 tablespoons of sage
- 4 tablespoons of table salt
- A cup of white vinegar

Method:

- ★ Mix all the dry herbs in a bowl.





- ★ Add warm water, olive oil into it and mix well.



- ★ Then, soak your feet in tub filled with this mixture every evening for 15-20 minutes. (You can be there for longer time if you need).
- ★ Prefer a bowl or tub which is non-metallic.

Recipe 2

Ingredients:

- 3 tablespoons of ginger
- 2 tablespoons of lavender
- 4 tablespoons of mint

Method:

- ★ Mix all the dry herbs in a bowl.



- ★ Take hot pepper and grind it well. Take it in a bowl and mix with the other herbs.



- ★ Add warm water, olive oil, and lavender into it and mix well.



- ★ Then, soak your feet in tub filled with this mixture every evening for 30 minutes. (Repeat it for 2 times a day).

★ Prefer a bowl or tub which is non-metallic.

Recipe 3

Ingredients:

A cup of apple cider vinegar

3 teaspoons of Moringa

3 teaspoons of sesame seeds

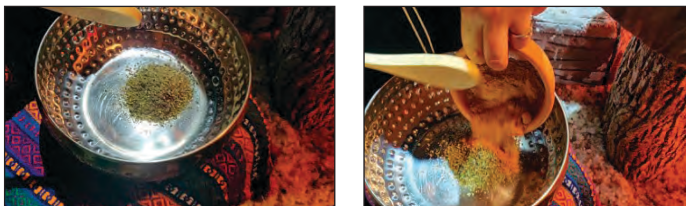
5 teaspoons of cinnamon

A quarter cup of olive oil



Method:

★ Mix all the dry herbs (moringa and cinnamon powder) in a bowl.



★ Take sesame seeds and grind it well. Take it in a bowl and mix with the other herbs.



★ Add warm water, olive oil into it and mix well.



★ Then, soak your feet or the whole body in tub filled with this mixture every evening for 15-20 minutes. (You can be there for longer time if you need).

Benefits:

- It reduces toxins present in the body and lessens the pain
- Reduces infections, bacteria, and fungus
- Stimulates blood circulation
- Nourishes the skin and make it smooth.

Recipe 4

Ingredients:

- A cup of apple cider vinegar
- 3 tablespoons of coriander seed
- 5 spoons of moringa sowing
- 5 spoons of cinnamon
- 3 tablespoons of basil
- 2 tablespoons of thyme
- A cup of extra-virgin olive oil



Method:

- ★ Mix all the dry herbs in a bowl.



- ★ Add warm water, olive oil into it and mix well.



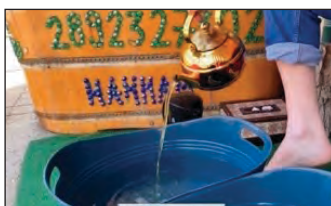
- ★ Then, soak your feet or whole body in tub filled with this mixture every evening for 30 minutes. (Repeat it for 2 times a day).
- ★ Prefer a bowl or tub which is non-metallic for foot.

How to prepare foot soak:

To best ease soreness, a foot soak should be between 92°F and 100°F. foot soak involves immersing the feet in warm water. Follow these steps to perform a foot soak:

1. Fill a basin or foot spa or a bucket with enough warm water to cover the feet up to the ankles.
2. Add any of the following ingredients mentioned above for foot soak, according to your conditions to the water.
3. Place the feet in the soak for about 20 to 30 minutes.
4. Dry thoroughly after the soak and then moisturize the feet.

An Epsom salt foot soak can dry out the feet, so it is best not to do it every night. Try soaking the feet once or twice a week to make sure it does not cause dryness. Always end your foot soak with moisturizer.



Benefits:

- It reduces toxins present in the body and lessens the pain
- Reduces infections, bacteria, and fungus
- Stimulates blood circulation
- Nourishes the skin and make it smooth.

CHAPTER 12: ROLE OF MASSAGE THERAPY IN REHABILITATION

Massage therapy has long been used to ease pain, provide comfort, and address cognitive and neurological issues. Currently, there are many massage therapists who focus their practice solely on headaches, sports related concussions and other TBI related issues. Massage therapy helps people who have suffered from TBI by easing the pain of a traumatic injury, providing comfort, flushing the lymphatic system to enable healing and by helping with neurological issues.

Effectiveness of massage therapy:

Individuals who have suffered a brain injury are often unable to exercise and can remain inactive for long periods. This can cause issues with metabolic waste products that needs to be removed from the body. Massage therapy can help, ensuring that the flow of blood and lymph fluid is improved.

Using massage therapy, it's possible to improve and potentially partially restore the proper joint function. This can include everything from the spine to the extremities.

Brain injuries can also cause chronic tension in certain areas of the body. To improve this, oxygen flow needs to be improved in these areas. This provides healthy nutrients to the body and awakens sensory receptors and ensures that the muscles become more active.

People who suffer from a brain injury often experience painful muscle spasms. This can be recurring and unfortunately common throughout even a short time. This is typically caused by scar tissue that hasn't healed fully and instead becomes stretched or broken. A deep muscle massage can help here, particularly if a person has inactive muscles due to this type of injury.

Application of massage therapy

Guidelines for therapist

- First, and foremost, find your center of gravity. If you are unaware of its presence in your body, develop a feel for it through yoga, T'ai chi, martial arts, dance, gymnastics, or a similar practice.
- All movements should emanate from this center as well. Keep weight equally balanced over the pelvis and legs, with knees "soft," when standing symmetrically.
- When you are standing asymmetrically, such as when performing effleurage up the leg from the side of the table, always keep your weight balanced between your front and back legs with emphasis on the back foot and leg.
- Do not allow the knee to bend more than 90 degrees, moving past the ankle, as this could cause in- jury to the knee.
- Shoulders should remain over or slightly in front of hips. The length in the back should continue up through the cervical spine. Remember, the head can weigh up to 6 pounds; occasionally look up and straight ahead rather than down at the body you are working on to lessen neck strain. Shoulders should be relaxed and down.
- If using the forearm in a technique, keep the shoulder over or slightly behind the elbow to avoid putting pressure on or damaging the shoulder joint.
- The pad toward the tip of the thumb is used for all work, not the nail tip or first joint.
- With developed palpation and usage skills, the elbow is a great substitute for the thumb. Some therapists also find it more comfortable to use a knobble of a T-Bar for holding pressure points. When using the heel of the hand, do not put undue pressure on a hyperextended wrist.
- Keep your back as straight as possible without being rigid, with shoulders slightly in front of the hips. Weight can be shifted forward to move a part of the client's body via a lunge (one knee on the floor, one knee off with a 90-degree bend).
- For any pressure-point holding, position your body above the point with thumbs, wrists, elbows, and shoulders soft and in alignment. Do not allow your head to drop; this will help to prevent the neck muscles from becoming tired.

- Do not allow your head to drop; this will help to prevent the neck muscles from becoming tired.
- A general rule of thumb is fingertips or knuckles should brush the top of the table as you stand next to it; set it on the higher side for lighter work or smaller bodies and on the lower side for deeper work or larger bodies.
- Be sure to familiarize yourself with the basic strokes, elementary anatomy, indications and contraindications, and basic safety precautions before beginning to practice a full sequence.

Preparation of client for massage:

- Ask your client to sit in the middle of the table, then lay on her side, using the arms to support her weight while lying down.
- Have her turn onto her stomach with her face in the face cradle. Place a bolster under the ankles and adjust the drape.
- Deep, rhythmic breathing by you, the therapist, throughout the massage will help you maintain your focus, connect with your client, and facilitate the flow of the massage.

Techniques for different areas of body:

Back (Approximately 20 Minutes)

- Draw the drape down to the low back/pelvic crest. Place your right hand at the inferior angle of the scapula; cross your left arm over your right arm and place your left hand on the flesh of the buttocks (gluteal) with fingers pointing laterally.
- Perform a myofascial stretch. Switch. Standing at the head of the table, place your fists on either side of, but not directly on, the spine between the shoulder blades; apply direct pressure for a deep tissue sculpting move (a technique performed without lubricant).
- Ask your client to inhale and exhale; allow your fists to slide down as the muscle “melts.” Change to the ulnar side of the fist before your wrists “break over” and finally to the palmar surface of your hand at the pelvis; hold traction.
- With lubricant, effleurage the entire back several times. Effleurage on one side of the spine (over the paraspinals) with one hand placed on top of your other hand; follow with the same movement on the other side.
- Move to the opposite side of the table; with palmar surface of the hand, glide laterally and medially over the right quadratus lumborum. This last stroke draws your hand over to the left quadratus lumborum and puts you in position to work on the left quadratus lumborum. Repeat all movements.
- Step to the right side of the table; with fingertips, glide up the paraspinals and over the latissimus attachment.
- Thumb glide intercostals and up under the scapula. Stepping to the head of the table on the client’s left side, use one or both thumbs to glide and friction rhomboid attachments along the vertebral border of the scapula and spine, thumb glide rhomboids.
- Stepping back to client’s right side, carefully remove the client’s hand from the low back and lower the arm off the table. Compress the infraspinatus; use thumb glide and friction. Glide your hands down the arm to pick it up and place back on the table.
- Step to the head and palpate the supraspinatus. Step to the left side of the client and petrissage the right upper trapezius, flowing over to the left. Perform the same movements on the left shoulder.
- Effleurage the upper trapezius and neck. Use the back of loose fists to further effleurage. Hold pressure points across the trapezius (using both thumbs, simultaneously hold points nearest the neck, move laterally and hold two more points, move laterally, and hold two more points, then move back medially on same points). Effleurage. Glide the palmar surface of your left hand up the neck to the occipital ridge and hold the ridge.
- With your right thumb, glide from occiput to levator attachment at the scapulae; move laterally and glide from the occiput over the trapezius. The palmar surface of your right-hand glides over the shoulder and up the back of the neck to the occipital ridge to position your left thumb to perform the same movements on the left side of the neck. Effleurage the trapezius and neck.
- some clients will roll over on the side that is easiest for them, so make sure you stand and hold the drape up on the side that will not exacerbate an injury. For example, in the prone position, if the client has a right arm or shoulder injury, stand on his right side, and ask him to roll over toward you using his left arm.

UPPER BACK



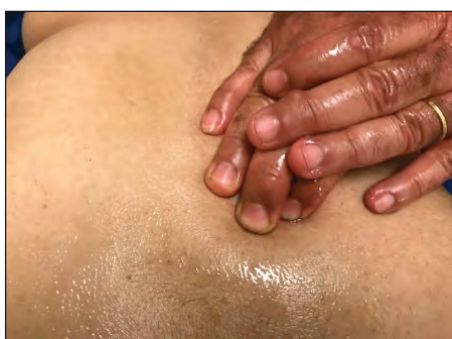
MIDDLE BACK







LOWER BACK

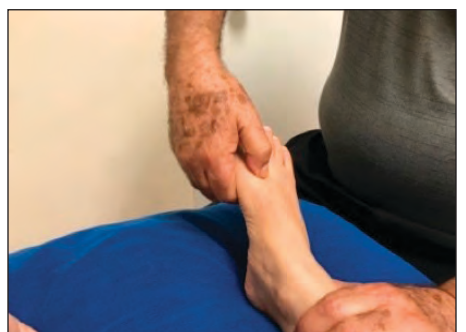


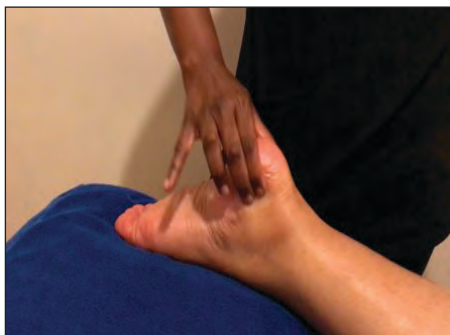
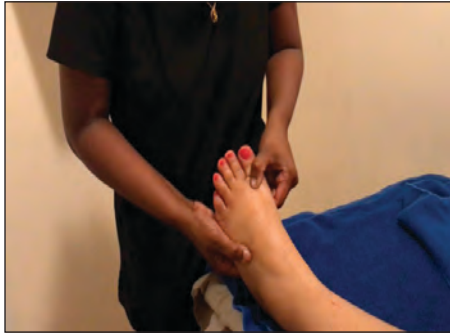
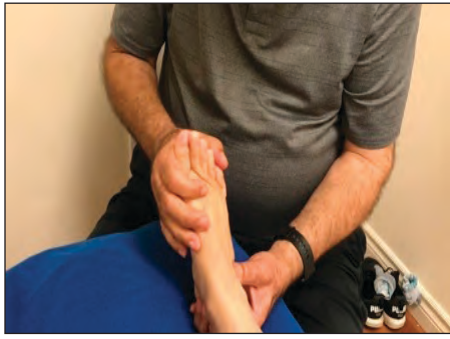


Feet and Legs (Approximately 10 Minutes)

- Gently place your hands on the client's heels to initiate touch. Undrape the client's right leg.
- Effleurage the entire foot and leg several times to spread the lubricant and warm the tissues.
- Work on the bottoms of the feet using alternating one-handed petrissage, horizontal and vertical thumb glides, and static pressure on acupressure points (six points: starting under the middle toe, move one thumb's width down toward the heel for point 2, move one thumb's width down for point 3, move one thumb's width over toward the arch for point 4, move one thumb's width up for point 5, move one thumb's width up to just under the big toe for point 6).
- Use compression/broadening on the heels, followed by sliding the ulnar side of the hand back and forth over the Achilles heel.
- Follow with hand over hand up the gastrocnemius and soleus. Petrissage the center, medial, and lateral aspects of the lower leg from ankle to just below the knee; follow with thumb glides, stopping to friction any spasms. Use compression/broadening and effleurage to complete the lower leg.
- Use the back of a loose fist (with pressure) to glide from just above the knee to the buttock. Petrissage the center, medial, and lateral aspects of the thigh, follow with thumb glides, and friction all the hamstring muscles. Follow with compression/ broadening and wringing.
- To finish, effleurage the entire foot and leg once again, giving it a gentle rocking motion (with no pressure) coming down the leg. Cover with the drape.
- Begin again at the feet. Undrape the left leg. As with the prone position, all strokes are performed with venous flow. Effleurage the foot and leg to spread lubricant and warm the tissues.
- Use alternating one-handed petrissage and thumb glides between the metatarsals of the foot.
- Use finger circles around the ankles followed by hand over hand up the shin. There is not much to work on the lower leg; petrissage the medial gastrocnemius again and thumb glide up the tibialis anterior muscle.
- Effleurage up the thigh; petrissage the thigh. Use the back of alternating loose fists to glide from above the knee to the hip, covering each of the quadriceps, adductors, and IT band. Follow with thumb glides and stripping, compression /broadening, or wringing. Effleurage up the entire leg with a gentle rocking motion (no pressure) coming down. Move to the right leg and repeat the movements.

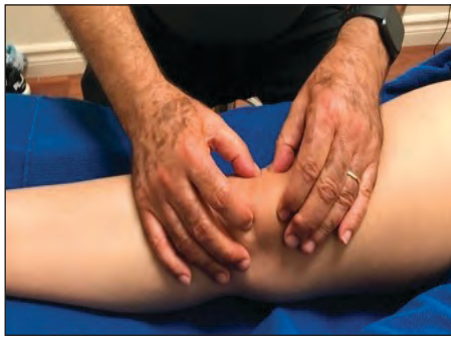
FOOT



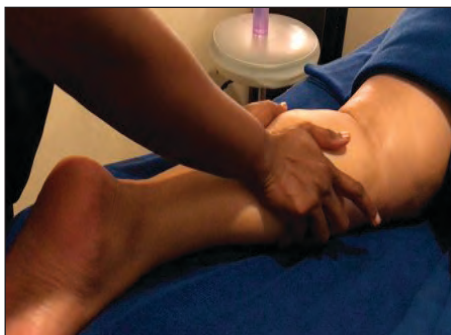


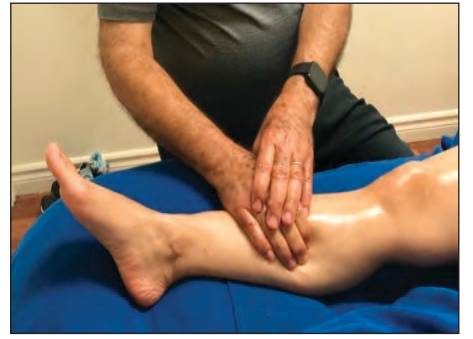
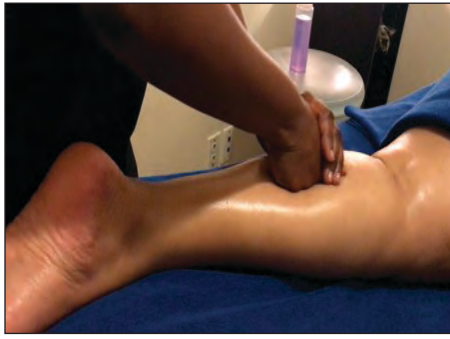


KNEE AND LOWER LEG









THIGHS





Hands and Arms (Approximately 8 Minutes)

- Effleurage the client's right hand and arm several times to spread lubricant and warm the tissues. Use alternating one-handed petrissage on the palm and thumb glide between the metacarpals.
- Turn the hand over: slip your little finger in between the client's middle and ring finger, and your fourth finger between the client's ring and little finger.
- Slip your other little finger between the client's middle and index finger, and your ring finger between the client's index finger and thumb. Open the palm of the hand and work with thumb glides; hold acupressure points (unlike the foot, these points are held two at a time: hold 1 and 2 at the palm heel, move one thumb's width toward the fingers for 3 and 4, move one thumb's width toward fingers for 5 and 6, and move back down).
- Release the fingers and hold the hand with one of your hands; draw the forearm up to a 45-degree angle, elbow resting on the table. Use one-handed petrissage on the forearm, alternating hands. Thumb glide and friction the forearm.

FOREARM AND HAND





SHOULDER



Chest (Approximately 1 to 2 Minutes)

- Effleurage the chest (pectoralis) with fingers pointing toward the sternum (not down toward the breasts), out over shoulders, around the back of the upper trapezius, and up the back of the neck.
- Repeat several times; give the neck a gentle traction as you draw the hands up the neck. Thumb glide from clavicles downward slightly (staying on the pectoral muscle and above the breasts).
- Work one side of the sternum and then the other. Step to the client's left, lay the right arm out to the side, and glide with your fingertips over the pectoralis from sternum to shoulder, changing to a flat hand over the shoulder joint. Maintaining contact with the shoulder, walk around to the other side, slide the hands down the arm to place it back on the table. Repeat the movements on the left side of chest (pectoralis).

CHEST

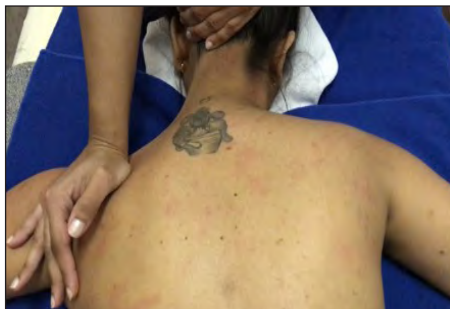
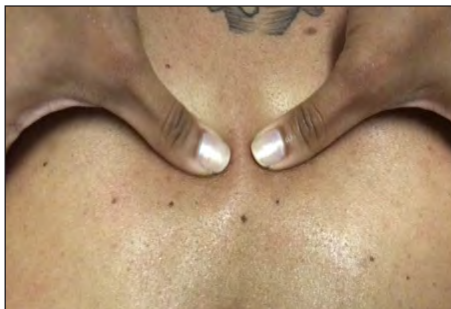
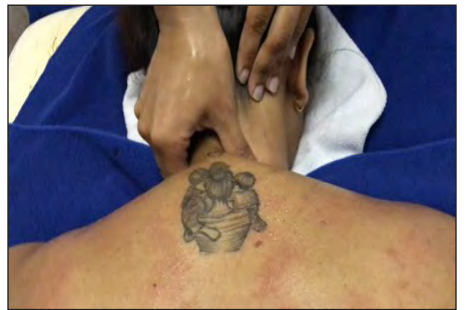
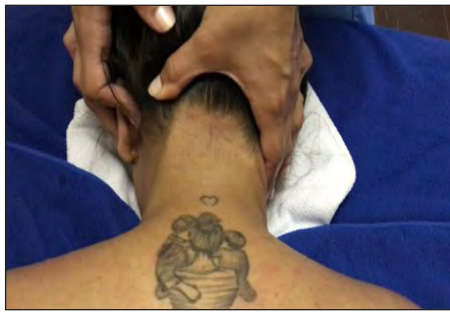
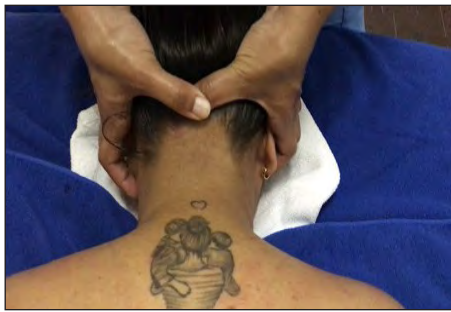


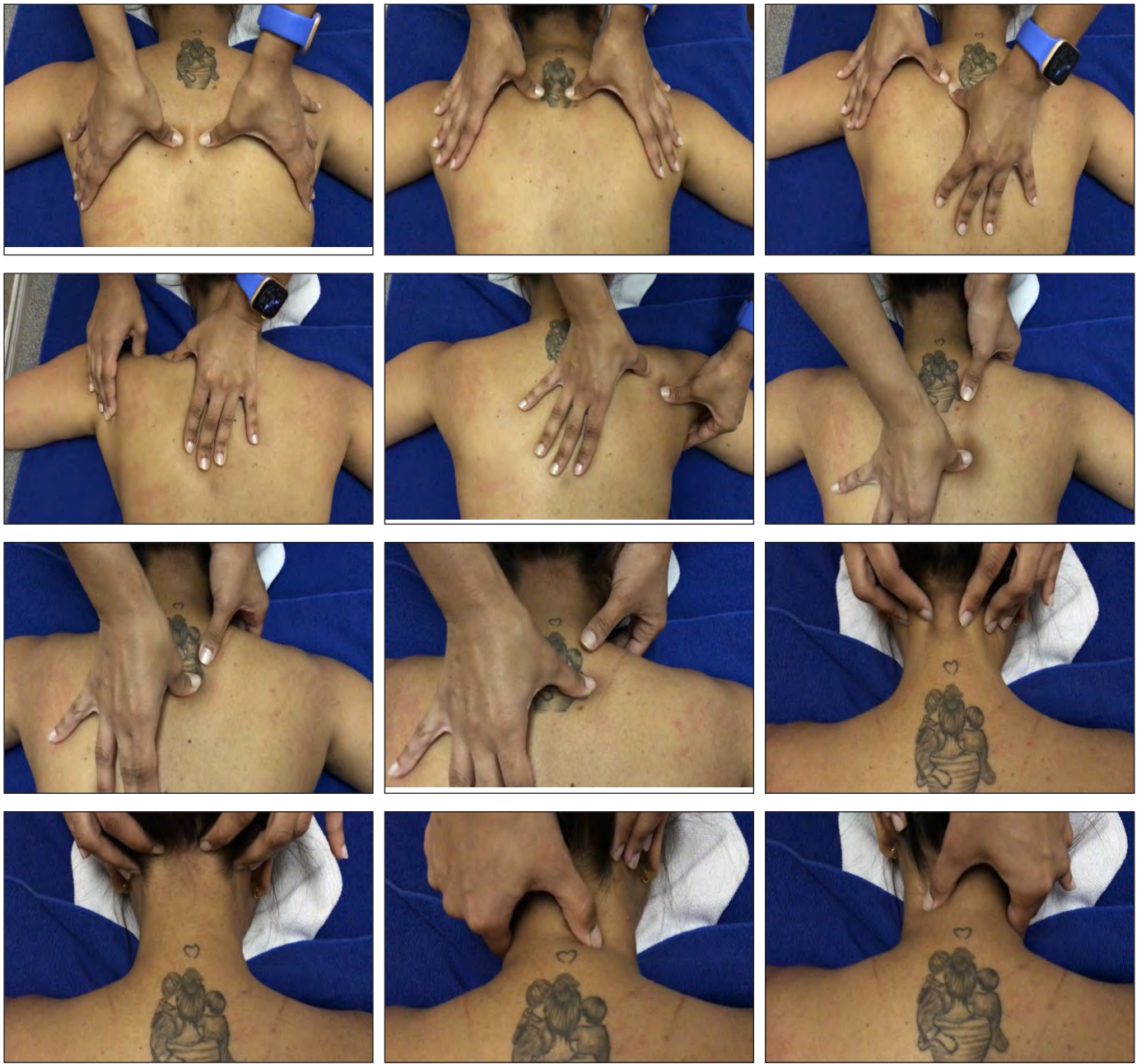


Neck and Head (Approximately 10 Minutes)

- Effleurage the shoulders and up the back of the neck several times. Slip your hands and arms under the back as far as you can reach (palms are up, fingers press up, and hands are on either side of the spine).
- With fingertips starting at the superior angle of both scapulae, press and hold these points; continue to move medially and up the back of the neck, back of the head, and over the top of the head (switch to the thumbs to press across the top of the head).
- With thumbs, press two points on the forehead, gliding down to the temples for thumb circles. Repeat two more times.
- Press under the cheekbones at the nostrils, gliding up to the temples and doing thumb circles; press at the chin and glide up to the temples for thumb circles. Massage all over the scalp with fingertips.
- Effleurage across the shoulders and up the back of the neck a few times. Gently slide the client's head laterally with left ear to left shoulder, back to neutral, and right ear to right shoulder.

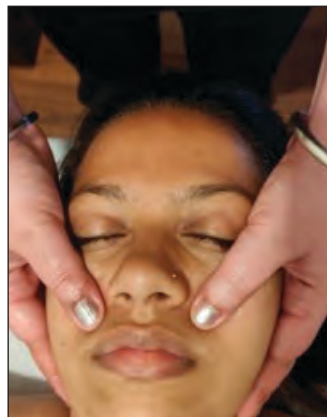
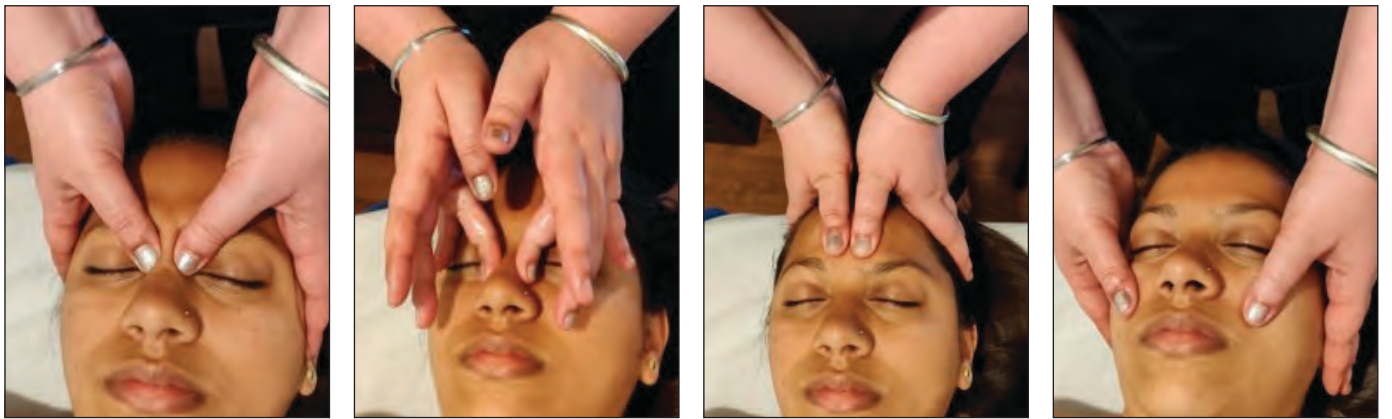
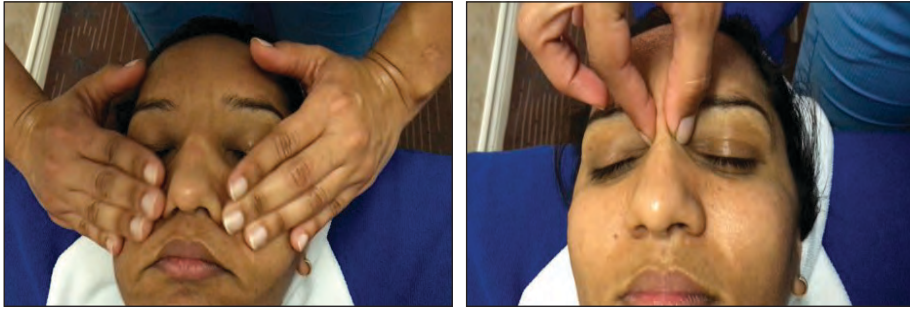
HEAD AND NECK





FACE





CHAPTER 13: HERBS AND HERB INFUSED OILS

From ancient time, one of the more versatile use of herbs is mixing it to make infused oil. These oils work in two ways – causes emotional and physical response and penetrates the skin to underlying tissue and distributes their therapeutic properties. There are many herbs found locally who has amazing therapeutic properties and are used to make infused oil. Knowing some of the differences can be helpful to choose the best herb for the situation.

We have conducted a research study with back pain participants. Total 42 participants were involved in the study. They were screened with non-specific low back pain by filling out a questionnaire. Herb infused oil was used for treatment of pain here. It included garden cress seeds, oregano, sesame, Himalayan salt and olive oil. All the herbs had specific properties in relieving pain, inflammation and improving flexibility. The application of oil was explained to the participants. This included first cleaning of the area with lukewarm water and applying the oil directly (3 times a day and keep it on for 5 minutes) with firm pressure. The participants were asked to continue the application regularly, with other back pain preventive measures to be taken. After one week, the participants were assessed again by filling the same back pain questionnaire and results were compared. None of the participants received any kind of treatment during the one-week time which could affect the effectiveness of oil. There was significant decrease of pain at the end of one week for each participant. Thus, herb infused oil was effective in treatment.

We will share you the recipes for the above-mentioned ways. But, first let talk about the important herbs which will help reduce pain, inflammation and promote flexibility. There are few herbs which you will get in your kitchen who has amazing healing properties. Let's see their benefits,

Ginger

It has phytochemicals with excellent anti-inflammatory properties, which relieve pain in joints and muscles. It promotes the circulation of blood and acts as a cure for nausea, headache, and cramps. The easiest way to incorporate ginger in your diet is to have ginger tea. You can also grate the root, wrap cheesecloth around it, soak it in hot water for 30 seconds, and place it on your back for 20 minutes. It also reduces muscle pain and soreness. A topical application of the paste of ginger, cinnamon, sesame oil, and mastic can reduce pain and stiffness in muscles. Ginger also dramatically lowers blood sugar levels.



Feverfew

This plant grows throughout the year and belongs to the daisy family. It has an acrid smell, and it is used to treat rheumatoid arthritis, migraines, toothaches, stomach-ache, and headaches. It is available as tinctures, extracts, and capsules. Standardized products have at least 0.2% of parthenopid. There is not much information available about exactly why it works, but it has been a popular remedy for centuries. People report feeling much better after taking the herb. Besides, it doesn't have any significant side effects. These herbs are not ideal for consumption during pregnancy.



Turmeric

Turmeric has a chemical called curcumin, which helps fight pain because of its antioxidant and anti-inflammatory properties. However, turmeric contains only 3% of curcumin, which is quickly gets eliminated from the body. The liver processes curcumin in two hours and removes it. There is not much absorption that takes place. According to observations, the incorporation of curcumin increases by 2000% when you consume it with black pepper. Turmeric supplements contain not only higher percentages of curcumin but also black pepper to enhance their effectiveness.



Capsaicin

Found in plants belonging to the Capsicum genus like Chili Pepper, Capsaicin, has medicinal value. It comes in various forms such as ointments, gels, lotions, films, sticks, or creams. These products are basically for the skin. Leaving the lotion on the surface for a few hours offers a tremendous amount of pain relief. Substance P transmits the signals of pain from the peripheral nervous system to the central nervous system, making you aware of the pain. Capsaicin depletes substance P in two days after application. You will feel relatively that the pain has reduced tremendously.



Devil's Claw

A suitable alternative or even addition to turmeric would be Devil's claw. It belongs to the sesame family, and the seeds appear in a flowering plant. It has been used in Sub Saharan Africa for thousands of years as a painkiller. Devil's claw is also known to contain anti-inflammatory properties which relieve back pain. It also eases symptoms of gout, promotes weight loss, improves osteoarthritis, and reduces inflammation in all parts of the body.



Clove

Clove is a perfect home remedy for toothache since ages. Not many people know that it can also be a cure for back pain. It can be more effective when you consume it in your diet. It can also be used on your back, applied in the form of clove oil. Clove, which forms on the Eugenia Caryophyllids plant, has been shown to possess anti-inflammatory properties that relieve pain. This spice also kills bacteria, fungi, and viruses. These are the functions of the chemical called eugenol. Clove essential oil is quite inexpensive and very beneficial.



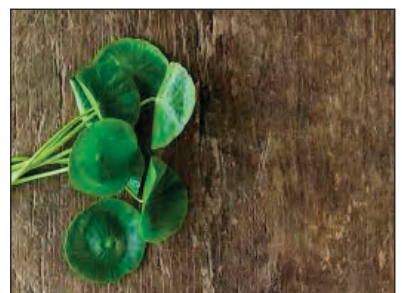
Willow Bark

The White willow bark has been a remedy for centuries to relieve fever, inflammation, and back pain. Nowadays, it is available as a dried herb which can be used to make tea. It is also sold as capsules and in liquid form as extracts. Avoid excess of willow bark. It can be poisonous for children. Salicin that comes in the willow bark is the same compound found in aspirin, and this explains why it works so well.



Valerian Root

Muscle spasms are associated with back pain and problems, which is where valerian root excels. This herb is a natural muscle relaxer that also reduces nerve sensitivity. Therefore, if you suffer with back pain that includes muscle spasms, this is one of the best herbs for back pain. Since it can make you drowsy, it is advised that you take it at night and only as directed to avoid overdose.



Eucalyptus

You might relate the eucalyptus herb as a remedy for the flu or for colds. While it does help with these conditions, it is also an effective herb for back pain relief due to its ice, cooling effect. The leaf contains tannins which are known to reduce swelling and inflammation, resulting in pain relief. The common use is as a topical pain relief treatment.



Oregano

Oregano is the herb found locally and widely used in the culinary arts. Besides from its taste this herb also serves in various ailments due to its anti-inflammatory and antioxidant properties. Oregano leaves are high in phenols, which are natural phytochemical compounds with beneficial antioxidant effects. The two most abundant phenols in it are thymol and carvacrol. Among these, Carvacrol — has antimicrobial, antitumor, ant mutagenic, analgesic, anti-inflammatory and antiparasitic properties, making it one of the most active components of oregano when infused in carrier oil.



Sesame

Sesame seeds are used for traditional remedy against various ailments for centuries. It has high antibacterial and antioxidant properties. Sesamol, Sesamolin and Sesamin are the antioxidant components present in its seeds. Among these, Sesamin is a lignin with anti-inflammatory properties which helps in pain relief, reduce spasm, and increase range of motion when applied to the affected area. Many studies have proved its therapeutic and healing properties that sesame seeds when infused in oil, applied to the painful area stimulate the blood flow due to its excellent emollient properties.



Garden cress seeds

also known as *Lepidium Sativum* is an edible fast-growing herb which has been used in ancient medicines for a long time. Its seeds contain a significant amount of plant sterols which are antioxidant and anti-inflammatory compounds. It also contains phenolic compounds which fight at a molecular level and inhibit the substance involved in inflammation. The seed when infused in the carrier oil and applied to joints or muscle pain helps recover from muscle weakness, reduce muscle tension, and promotes pain relief.



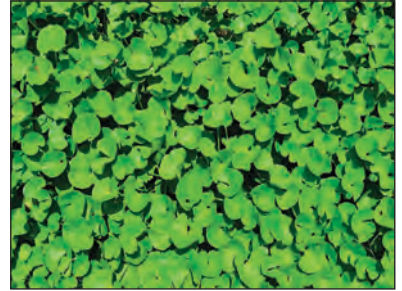
Cramp Bark

Cramp Bark is also known as cranberry bush; this herb is popular due to its ability to treat spasms in the back and uterine pain. It comes in the form of liquid extracts, tinctures and capsules. Native Americans consume cramp bark since ancient times. Most people find it challenging to identify Cramp bark and Black Haw, which is also sometimes referred to by the same name. As the name suggests, it is used to relieve pain from all sorts of cramps. For acute pain, 30 drops of the tincture can be taken every hour until the pain subsides. Cramp bark contains chemicals that significantly reduce muscle spasms. They also decrease heart rate and lower blood pressure. The bioactive compounds are extracted from dried bark and made into tinctures.



Gotu Kola

Gotu kola is an herb known to boost brain function and is an anti-inflammatory used to treat arthritis pain. While it is used to treat a variety of conditions, it is an effective treatment for back pain.



Himalayan Salt

Himalayan Salt is the world's purest and richest, boasting 84 minerals and trace minerals. It's become increasingly popular nowadays, as many have attributed numerous health benefits to it. The healing properties of pink Himalayan salt are believed to restore restful sleep, relieve muscle aches, and increase energy in body. Other than being beneficial for muscle aches and pains, it can also be used to relieve muscle spasms. When infused the salt in carrier oil and applied to the surface, the natural antioxidants present can help to prevent free radical damage and thus reducing the possibility of future muscle pain.



Pepper

Black pepper contains essential oils like piperine, a naturally occurring alkaloid, which is the source of its bold character and heat,¹⁵ as well as the monoterpenes sabinene, pinene, terpenene, limonene, and mercene, which give this spice its aromatic qualities. All combined, these oils, when used in aromatherapy, can help ease aching muscles, chilblains, and arthritis, and have curative properties for constipation and sluggish digestion.



Mustard Seeds

Mustard seeds contain vitamins A, B6 and C (and other vitamins), dietary folate, omega-3 fatty acids, and minerals like magnesium, potassium, selenium, manganese, phosphorus, and copper.¹¹ The seeds also have the following health-promoting plant compounds, which include Glycosylates and isothiocyanates: The former is a compound broken down by myrosinase enzymes to produce isothiocyanates. Sinigrin is also a precursor of a compound called allyl isothiocyanate (AITC), which is produced by the myrosinase enzyme when sinigrin mixes with water.



Using essential oils for back pain:

Apart from the list of herbs mentioned above, you can also use rosemary essential oil, eucalyptus peppermint essential oil, and lavender essential oil. These essential oils treat the back when gently massaged. Directly inhaling these oils also brings some amount of pain relief. Research suggests that these oils can be used in the body as the pain-relieving anti-inflammatory and antioxidant properties. With all the essential oil choices available, it can be confusing to know which ones can help with your back pain. The following oils could help.

HERBS	BENEFITS
Lemongrass oil	Lemongrass oil has been widely studied for its antifungal properties. One study in mice also evaluated its notable anti-inflammatory properties. Reduction of inflammation may lead to reduced pain, but studies are needed in humans.
Ginger oil	Often used in cooking, ginger has other effects outside of the spice cabinet. Its most notable benefits are anti-inflammatory properties, such as a 2016 study on rheumatoid arthritis showed.
Eucalyptus oil	Known for both its anti-inflammatory and antibacterial properties, eucalyptus oil can have analgesic effects in muscles and joints. A 2015 clinical review found that the oil has promise in treating ailments like arthritis, the flu, and wounds.
Roman and German chamomile oils	While chamomile is best known for its soothing and calming properties (the reason why many people drink chamomile tea when sick), the essential oil has other noted benefits. These include reduced muscle spasms and overall inflammation. Take care when using chamomile if you have a ragweed allergy, as the plants come from the same family
Rosemary oil	Rosemary is more than just a cooking herb. Rosemary essential oil has clinically proven benefits. These include reduced pain from rheumatic disorders and menstrual cramps. Such anti-inflammatory and analgesic effects may also be helpful for back pain.
Sandalwood oil	Sandalwood oil contains anti-inflammatory properties. Such effects have been studied for their similar effects to over-the-counter medications. Reducing inflammation in the back with sandalwood oil could possibly decrease pain, too.
Olive oil	Olive oil is valued not only for its flavor, but also for its range of wellness benefits. Olive oil is rich in oleic acid, a type of monounsaturated fat. Studies have shown that oleic acid is linked to reduced biomarkers of inflammation ¹⁷ such as C-reactive protein. This oil when infused with herbs, doubles the benefits with its rich properties and gives the best results. Extra virgin olive oil is considered the highest-quality olive oil to be used as carrier oil with herbs. It is unrefined and contains more nutrients compared to other processed varieties.

The first recipe

Ingredients:

3 teaspoons of turmeric powder,

Half a teaspoon of black pepper

A teaspoon of lemon peel

A teaspoon of Himalayan salt

$\frac{3}{4}$ cup of regular drinking cups of olive oil

Method:

- ★ Take all the ingredients and coarse grind in the mixture. Take the powder and add olive oil into it and stir it up. You can store this in a dark color bottle to prevent it from direct sunlight.
- ★ Also, it can be placed in a refrigerator to ensure its protection.
- ★ Take small amount of oil, massage on your upper back with gentle pressure, try working on the areas which are stiff.
- ★ After massage, you can take a hot compress and gently wipe off your skin.
- ★ Massage can be done once in a day.

Benefits:

- Relieves acute pain

- Stimulates blood circulation
- Stimulates and revitalizes nerves
- Reduces inflammation
- Moisturizes the skin and nourishes the muscle



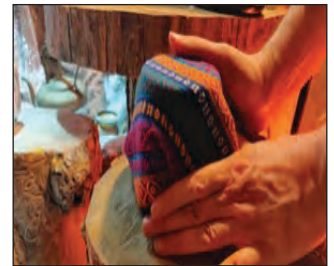
The second recipe

Ingredients:

- 3 teaspoons ground dry olive leaves
- 6 teaspoons of dried sour grapes
- 3 teaspoons of dried wild thyme
- Half a cup of drinking cups of extra-virgin olive oil

Method:

- ★ Take the amount of dried olive leaves, thyme, and dried sour grapes, grind the dry ingredient until it becomes like powder.
- ★ Then, add virgin olive oil and mix it well.
- ★ And put in an airtight container, away from heat and sun or in the fridge
- ★ Take small amount of oil, massage on your upper back with gentle pressure, try working on the areas which are stiff.
- ★ Use it 3 to four times a day with gentle pressure on back.
- ★ After massage, you can take a hot compress and gently wipe off your skin.



The third recipe

Ingredients:

- A teaspoon of hot pepper
- 5 spoons of green tea
- 3 teaspoons of sesame seeds
- 2 teaspoons of salt
- A full cup of extra-virgin olive oil

Method:

- ★ Take all the dry ingredients and grind it in a coffee grinder until it becomes a fine powder.

- ★ Add virgin olive oil to it and mix well.
- ★ Place it in an airtight container, away from heat and sun and in the fridge
- ★ Use 3 times a day (morning, noon, and evening) with gentle pressure on the back.
- ★ After massage, you can take a hot compress and gently wipe off your skin.
- ★ Make sure you stir the mixture before using.

Benefits:

- Eliminates pain directly
- Stimulates blood circulation
- It stimulates and revitalizes the nerves and aids in healing
- Eliminates inflammation
- Nourishes muscle and moisturizes the skin



The fourth recipe

Ingredients are:

- 3 teaspoons of fine turmeric powder
- 3 teaspoons of sage powder
- A teaspoon of cinnamon powder
- A cup of regular cups olive oil

Method:

- ★ Take all the dry ingredients and grind it in a coffee grinder until it becomes a fine powder
- ★ Add virgin olive oil to it and mix well.
- ★ Place it in an airtight container, away from heat and sun and in the fridge
- ★ Use 3 times a day (morning, noon, and evening) with gentle pressure on the back.
- ★ Make sure you stir the mixture before using.
- ★ After massage, you can take a hot compress and gently wipe off your skin.



The fifth recipe

Ingredients are:

- 3 teaspoons of sesame seeds
- 2 teaspoons of cinnamon bark
- 4 teaspoons of Cress seeds
- Half a large cup of olive oil

Method:

- ★ Take all the dry ingredients and grind it in a coffee grinder until it becomes a fine powder
- ★ Add virgin olive oil to it and mix well.
- ★ Place it in an airtight container, away from heat and sun and in the fridge.
- ★ Take a small amount and Use 3 times a day (morning, noon, and evening) with gentle pressure on the back.
- ★ Make sure you stir the mixture before using.

Benefits:

- Reduces the pain
- It activates the free nerve endings and blocks the pain receptors.
- Stimulates blood circulation
- Reduces inflammation and swelling



The sixth recipe

Ingredients are:

A teaspoon of black mustard

A teaspoon of sesame

3 teaspoons of ground bay leaves

Half a large cup of drinking glasses of olive oil

Method:

- ★ Take all the dry ingredients and grind it in a coffee grinder until it becomes a coarse powder.
- ★ Add virgin olive oil to it and mix well
- ★ Place it in an airtight container, away from heat and sun or store it in the refrigerator.
- ★ Use 3 times a day (morning, noon, and evening) with gentle pressure on the back.
- ★ Make sure you stir the mixture before using.
- ★ After massage, you can take a hot compress and gently wipe off your skin.

Benefits:

- Reduces the pain
- It activates the free nerve endings and blocks the pain receptors.
- Stimulates blood circulation
- Reduces inflammation and swelling



The seventh recipe

Ingredients are:

A teaspoon of chili powder

5 teaspoons of chamomile powder

3 teaspoons of turmeric

Half a large cup of extra-virgin olive oil

Method:

- ★ Do not buy any powders from the store. Instead use whole herbs to enhance more benefits.
- ★ Take all the dry ingredients and grind it in a coffee grinder until it becomes a coarse powder.
- ★ Add virgin olive oil to it and mix well.
- ★ Place it in an airtight container, away from heat and sun or store it in the refrigerator.
- ★ Use 2 times a day (morning, evening) with good pressure on the back.
- ★ Make sure you stir the mixture before using.
- ★ After massage, you can take a hot compress and gently wipe off your skin.

Benefits:

- Relieving acute pain
- Relaxes the muscle and calms the nerves, in addition to softening and lightening the skin
- Stimulates nerves
- Reduces inflammation



The eighth recipe

Ingredients are:

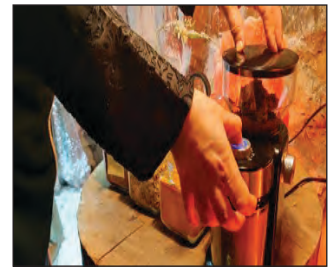
- 5 teaspoons of mustard
- 5 teaspoons of black seeds
- 5 teaspoons of chia seeds
- 1 cup of olive oil

Method:

- ★ Take all the dry ingredients and grind it in a coffee grinder until it becomes a coarse powder.
- ★ Add virgin olive oil to it and mix well.
- ★ Place it in an airtight container, away from heat and sun or store it in the refrigerator.
- ★ Use 4 times a day with gentle pressure on the back.
- ★ Make sure you stir the mixture before using.
- ★ After massage, you can take a hot compress and gently wipe off your skin.

Benefits:

- Relieving acute pain
- Relaxes the muscle and calms the nerves, in addition to softening and lightening the skin
- Stimulates nerves
- Reduces inflammation





The ninth recipe

Ingredients are:

- 5 teaspoons of ground ginger
- 2 teaspoons of fenugreek
- 3 teaspoons of bay leaf powder
- 2 teaspoons of wild thyme powder
- Half cup of olive oil

Method:

- ★ Take all the dry ingredients and grind it in a coffee grinder until it becomes a coarse powder.
- ★ Add virgin olive oil to it and mix well.
- ★ Place it in an airtight container, away from heat and sun or store it in the refrigerator.
- ★ Use 3 times a day with gentle pressure on the back.
- ★ Make sure you stir the mixture before using.
- ★ After massage, you can take a hot compress and gently wipe off your skin.

Benefits:

- Relieving acute pain
- Relaxes the muscle and calms the nerves, in addition to softening and lightening the skin
- Stimulates nerves
- Reduces inflammation



The tenth recipe

Ingredients are:

- Half a cup of apple cider vinegar
- 5 teaspoons of table salt
- A teaspoon of turmeric
- 2 teaspoons garlic powder
- A cup of olive oil

Method:

- ★ Take all the dry ingredients and grind it in a coffee grinder until it becomes a coarse powder.
- ★ Add virgin olive oil to it and mix well.
- ★ Place it in an airtight container, away from heat and sun or store it in the refrigerator.
- ★ Use 3 times a day with gentle pressure on the back.
- ★ Make sure you stir the mixture before using.
- ★ After massage, you can take a hot compress and gently wipe off your skin.

Benefits:

- Relieving acute pain
- Relaxes the muscle and calms the nerves, in addition to softening and lightening the skin
- Stimulates nerves
- Reduces inflammation



The eleventh recipe

Ingredients are:

- 7 teaspoons of bran
- 4 teaspoons cinnamon powder
- 3 teaspoons of wild thyme
- 2 teaspoons of laurel powder
- Half a large cup of olive oil

Method:

- ★ Take all the dry ingredients and grind it in a coffee grinder until it becomes a coarse powder.
- ★ Add virgin olive oil to it and mix well.
- ★ Place it in an airtight container, away from heat and sun or store it in the refrigerator.
- ★ Use 3 times a day with gentle pressure on the back.
- ★ Make sure you stir the mixture before using.
- ★ After massage, you can take a hot compress and gently wipe off your skin.

Benefits:

- Relieving acute pain
- Relaxes the muscle and calms the nerves, in addition to softening and lightening the skin
- Stimulates nerves
- Reduces inflammation



RECIPES FOR ACUTE LOWER BACK PAIN

The first recipe

Ingredients are:

- A teaspoon of basil
- 4 teaspoons of green thyme
- 1 teaspoon of cumin
- A teaspoon of garlic powder

Method:

- ★ Take all the dry ingredients in a bowl and mix well.
- ★ Add virgin olive oil to it and mix well.
- ★ Place it in an airtight container, away from heat and sun or store it in the refrigerator.
- ★ Use 3 times a day with gentle pressure on the back.
- ★ Make sure you stir the mixture before using.
- ★ After massage, you can take a hot compress and gently wipe off your skin.



The second recipe

Ingredients are:

- 5 teaspoons of parsley
- 3 teaspoons of fennel
- 5 teaspoons bay leaf powder
- 2 teaspoons of moringa seeds
- A large cup of olive oil

Method:

- ★ Take all the dry ingredients and grind it in a coffee grinder until it becomes a coarse powder.
- ★ Add virgin olive oil to it and mix well.
- ★ Place it in an airtight container, away from heat and sun or store it in the refrigerator.
- ★ Use 3 times a day with gentle pressure on the back.
- ★ Make sure you stir the mixture before using.
- ★ After massage, you can take a hot compress and gently wipe off your skin.

Benefits:

- Relieving acute pain
- Relaxes the muscle and calms the nerves, in addition to softening and lightening the skin
- Stimulates nerves
- Reduces inflammation



The third recipe

Ingredients are:

- 2 teaspoons of cloves
- 3 teaspoons of sage powder
- 3 teaspoons of coriander powder
- A teaspoon of honey

Method:

- ★ Take all the dry ingredients and grind it in a coffee grinder until it becomes a coarse powder.
- ★ Add honey to it and mix well.
- ★ Add olive oil to it and mix well.
- ★ Place it in an airtight container, away from heat and sun or store it in the refrigerator.
- ★ Use 3 times a day with gentle pressure on the back.

Benefits:

- Relieving acute pain
- Relaxes the muscle and calms the nerves, in addition to softening and lightening the skin
- Stimulates nerves



The fourth recipe

Ingredients are:

- 3 teaspoons of fenugreek
- 3 teaspoons of mustard
- 3 teaspoons of mint
- A large cup of olive oil

Method:

- ★ Take all the dry ingredients and grind it in a coffee grinder until it becomes a coarse powder.
- ★ Add virgin olive oil to it and mix well.
- ★ Place it in an airtight container, away from heat and sun or store it in the refrigerator.
- ★ Use 2-3 times a day with gentle pressure on the back.
- ★ Make sure you stir the mixture before using.

Benefits:

- Relieving acute pain
- Relaxes the muscle and calms the nerves, in addition to softening and lightening the skin
- Stimulates nerves



The fifth recipe

Ingredients are:

- 6 teaspoons of chia seeds
- 3 tablespoons of flaxseed
- 2 tablespoons of green thyme
- A large cup of olive oil

Method:

- ★ Take all the dry ingredients and grind it in a coffee grinder until it becomes a coarse powder
- ★ Add virgin olive oil to it and mix well
- ★ Place it in an airtight container, away from heat and sun or store it in the refrigerator.
- ★ Use 3 times a day with gentle pressure on the back.
- ★ Make sure you stir the mixture before using.



CHAPTER 14: NUTRITIONAL FACTS FOR BRAIN RECOVERY

A healthy diet after brain injury can help boost recovery. Therefore, it's important to understand what the best foods for brain injury recovery are, so that you can intentionally include them in your diet.



What Are the Best Foods for Brain Injury Recovery?

Dark Chocolate:

Dark chocolate's high levels of both magnesium and antioxidants, two nutrients essential for a healthy brain, make it a great food for TBI recovery. Of course, that doesn't mean you should add it to every meal. Even though dark chocolate has less processed sugar than milk chocolate, there is still some in it.



Fatty Fish:

The omega-3 fatty acids found in certain types of fish are some of the best foods for brain injury recovery. This is because the brain is nearly 60% fat, and over half of that fat is omega 3. Thus, if you really want to fuel your brain's recovery, giving it omega-3 is critical. Plus, your brain uses omega-3 to rebuild brain cells. Omega-3 also plays a huge role in preserving the brain's plasticity. Since a big part of TBI rehabilitation revolves around engaging neuroplasticity to repair the brain, you are going to want to include omega-3 in your brain injury diet.



Flaxseed:

If seafood isn't really appealing to you, there are many other foods that are rich in omega-3 that you can add to your head injury diet. For example, flaxseed oil is an excellent source of omega-3 fatty acids and is a great alternative to fish. For example, just pouring one tablespoon on top of your food will give you 57% of your daily value of omega 3.



Dark leafy greens:

Dark, leafy greens such as kale and spinach are excellent foods for brain injury patients. Not only are they some of the most nutrient-dense foods on earth, but they also contain high levels of omega-3. Kale contains a high level of B-vitamins. B-vitamins improve communication between neurons and boost neuronal repair after TBI. Therefore, if you are looking for foods to add to your head injury diet plan, make sure it includes kale.



Walnuts and Pumpkin seeds:

Pumpkin seeds contain good amounts of omega-3 as well, but they also are high in omega-6 fatty acids. Research indicates that too much omega-6 can increase inflammation, something that individuals should avoid during their recovery from a brain injury. Therefore, consume pumpkin seeds sparingly.



Berries:

Berries are full of antioxidants, which, as we learned, are very helpful in protecting the brain from damage and reducing inflammation. Blueberries can also increase the production of BDNF, an important growth protein that acts as a fertilizer for your brain. BDNF triggers your brain to enter a process known as neurogenesis



Turmeric root powder:

Finally, one of the best foods for brain injury recovery is technically a spice. Turmeric is a curry spice used in many dishes, and it is a rich source of curcumin, which has many benefits for TBI patients. Not only is curcumin an antioxidant, but it also stimulates the production of an essential growth factor in the brain, called BDNF. Turmeric has a strong taste and can take some getting used to. But, because it is a spice, you can add it to almost anything! You can sprinkle some on rice or add some to your tea. Chicken soup also goes great with turmeric.



Here are some recipes which can be added to the meal

1. Chocolate-berries smoothie

Ingredients:

- 1 cup frozen blueberries
- 2 teaspoons cocoa powder
- 1 cup milk of choice

- 1/4 teaspoon vanilla extract
- Dash cinnamon
- Dash nutmeg
- 2 teaspoons maple syrup (or agave)

Method:

Combine all ingredients in a blender until smooth. If desired, strain through a fine-mesh strainer into a glass for a smoother texture. Garnish with fresh blueberries, if desired.

2. Carrot, Ginger and Turmeric soup

Ingredients:

- 3 Carrots
- 1 White Onion
- 3 cloves garlic minced
- 1 inch Piece of Fresh Ginger finely grated
- 2-inch Piece of fresh Turmeric finely grated
- 4 cups (950ml) Vegetable Stock
- 1 tbsp Lemon Juice
- Canned Coconut Milk (for topping)
- Black Sesame Seeds (for topping)

Method:

Dice the onion and carrot into small chunks (no need to be precise as everything will be blended at the end) and grate the ginger and turmeric finely. Heat a small amount of olive oil in the bottom of a large stock pot and sauté the onion for 3 minutes until translucent, then add the minced garlic, turmeric and ginger and sauté for another 1 minute. Next, add the diced carrot and sauté for another 2 minutes. Then add the vegetable stock and simmer for 20-25 minutes until the carrot is cooked through and soft. Use a stick blender to blend the soup until it's smooth, or transfer into a standing blender and blend. Stir in the lemon juice, then serve with a swirl of coconut milk and some black sesame seeds.

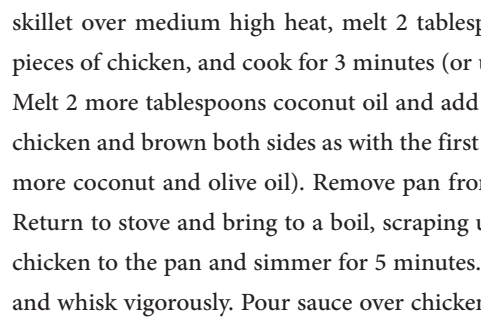
3. Chicken Piccata

Ingredients:

- 2 boneless chicken breasts, butterflied
- 1/3 cup almond flour
- 5 tbsp extra virgin olive oil
- 6 tbsp coconut oil
- 1/3 cup fresh lemon juice
- 1/2 cup low sodium chicken broth
- 1/4 cup capers
- 1/3 cup fresh parsley chopped
- salt to taste
- pepper to taste
- 5 oz baby portabella mushrooms slice

Method:

Season chicken with salt and pepper. Pour almond flour in a bowl and dredge both sides in almond flour, shaking off excess. In a large



skillet over medium high heat, melt 2 tablespoons of coconut oil with 3 tablespoons olive oil. When mixture starts to sizzle, add 2 pieces of chicken, and cook for 3 minutes (or until browned), flip, and cook other side or until browned. Remove and transfer to plate. Melt 2 more tablespoons coconut oil and add another 2 tablespoons olive oil. When this mixture starts to sizzle, add 2 more pieces of chicken and brown both sides as with the first batch. At the same time, add mushrooms and sauté for 5 minutes (may need to add a tad more coconut and olive oil). Remove pan from heat and add chicken to the plate. In the pan, add the lemon juice, stock, and capers. Return to stove and bring to a boil, scraping up brown bits from pan for extra flavor. Taste to check for seasoning, then return all the chicken to the pan and simmer for 5 minutes. Remove chicken to a serving dish. Add 2 remaining tablespoons of coconut oil to sauce and whisk vigorously. Pour sauce over chicken and garnish with parsley.

Dr. Mahmoud Sous – Ph.D.

During the period of 1995-1999, I went to the medical school in Poland to research about the various methods of back pain treatment. After finishing my PhD, I took variety of courses including naturopath, acupuncture, and manual techniques. This gave me an idea that exercises, and massage could be helpful in treatment of chronic pain. But my findings didn't stop me here, I also worked as a naturopath practitioner in Canada where I got familiar about treatments with Chinese medicines, osteopath techniques and some other manual therapies which helps in pain management.

Fixing injuries requires an understanding of anatomy and biomechanics. That is why my research and treatment belong to the holistic approach of using different techniques and remedies for the treatment of back pain. In 1990, I realize that there are some complex spinal aspects and issues which leads to of back pain. So, from my case studies I formulated a guideline which is clear and easy to understand and will fix your issues.

My goal is to help people visualize how the body functions and what happens inside when you experience pain. Healing requires to focus on one's action because pain results due to faulty actions and movements. This thought motivated me to work on a book which will include all home remedies where people can treat themselves to fix their pain. I have included knowledge based on my clinical research using manual massage therapy, food habits, nutrition facts, heat, sauna, hydrotherapy, cold water treatments which overall helps in pain management. It gives me pleasure to introduce this book to the community where I have shared all my experienced treatment plans.



Priyanka Yadav (Physiotherapist)

I started my career in 2011, since then I have worked as a Physiotherapist in several clinics and hospitals in India. Working mostly in the Outpatient department made me realize that Physio's role is extremely crucial in the rehabilitation and recovery process of a patient. My desire to reach out to more people motivated me to work for this book. Have worked with Dr. Mahmoud on several research books on self-pain management. We have been constantly working on curating the best suited protocol for various Musculoskeletal conditions. Additionally, we have also included approaches with alternative medicine.



Bhoomika Pathak (Physiotherapist)

After graduating in 2014, I have been working with various clinical conditions like sports injury, musculoskeletal injury, and neurological disorders for more than 5 years. Along with Dr. Mahmoud & colleagues I have worked on treatment and pain management for various musculoskeletal injuries and pain population. With all the successful outcomes till now, we have designed this book with stagewise guide to treat your knee pain.