PREPARED BY MICHELLE BROOMFIELD RN

PURPOSE

The purpose of this course is to educate and reinforce the knowledge of nurses; ARNP, RN, LPN, CNA /HHA, Occupational Therapists and other individuals who are working in the health care environment, as well as other students/ individuals regarding the various types of Fractures, causes and treatment modalities.

OBJECTIVES/ GOALS:

After successful completion of this course the students will be able to:

1. Define Fracture and the various types of fractures

2. Describe hip fracture and hemiarthroplasty procedure

3. Discuss various imaging testing to confirm fractures

4. Describe first aid treatment for the individual with a fracture

5. Describe some home safety interventions to prevent falls

6. Describe some strategies that patients can do to help prevent hip fractures by taking steps to strengthen their bones and prevent falls

7. Discuss self care tips for patients after surgery

8. Discuss signs and symptoms of infection that patients need to monitor for postoperatively.

FRACTURES

A fracture is a break, usually in a bone.
If the broken bone punctures the skin, it is called an open or compound fracture.

There are different types of fractures:

When the broken bone cuts or punctures through the skin, this is called an open fracture. This is a very serious type of fracture because the skin is open and infection in the bone and the wound can develop.

A closed fracture occurs when the bone is broken but there is no open wound or puncture in the skin. A bone may also be partially fractured or completely fractured.

There are other types/ descriptions of fractures such as a comminuted fracture where the bone injury results in more than two separate bone components and others later mentioned.

The most common causes of fractures are:

- The result of trauma such as from a car accident or fall,
- Overuse of muscles can place more stress or force on the bone. This can cause a stress fracture.
- Osteoporosis - disorder that weakens the bones and makes them much easier to break. Sometimes, the victim may just be walking and hears a popping sound- due to a fracture; then he/she experiences pain and may even fall due to the fracture for example if it is in the hip or lower extremities.

Some Signs / Symptoms of a fracture are:

•Abnormal shape of the limb or joint,

• Limited mobility or unable to move the extremity/ limb,

•Joint is out-of-place,

• severe pain,

•Swelling,

•bruising or cyanosis of a limb,

•bleeding,

•Tingling and numbness.

Patients need to get medical care right away for all fractures.

- May need to wear a cast or splint,
- Sometimes the patient needs surgery to put in plates, pins or screws to keep the bone in place.

Different Types of Fractures and Bone healing complications

The following table describes various types of fractures and some bone healing complications:

Types of Fractures & Bone healing complications	**Description**
Greenstick Fracture	A greenstick fracture occurs when a bone bends and cracks, instead of breaking completely into separate pieces. This type of broken bone most commonly occurs in children because their bones are softer and more flexible than are the bones of adults.
Delayed Union Fracture	A delayed union is when a fracture takes longer than usual to heal.
Malunion Fracture	Malunion is a clinical term used to indicate that a fracture has healed, but that it has healed in less than an optimal position.
Nonunion Fracture	Some broken bones do not heal even when they get the best surgical or nonsurgical treatment. When the broken bone fails to heal it is called a nonunion.
Oblique Fracture	An oblique fracture is when the break has a curved or sloped pattern

Spiral Fracture	A Spiral fracture, sometimes called a torsion fracture, in which a bone has been twisted apart.
Transverse Fracture	A transverse fracture is when the broken piece of bone is at a right angle to the bone's axis.
Compound Fracture	A fracture in which a bone is sticking through the skin. Also known as an open 'fracture.
Comminuted Fracture	A comminuted fracture is when the bone breaks into several pieces.
Pathologic Fracture	A pathologic fracture is caused by a disease that weakens the bones.
Stress Fracture	A stress fracture is a hairline crack.

TREATMENT/ FIRST AID

A fracture requires medical attention. If the broken bone is the result of major trauma or injury, call 911 or the local emergency number.

Also call for emergency help if:

- The person is unresponsive, is not breathing or is not moving. Begin CPR if there is no breathing or heartbeat.
- There is heavy bleeding.
- Even gentle pressure or movement causes pain.
- The limb or joint appears deformed.
- The bone has pierced the skin.
- The extremity of the injured arm or leg, such as a toe or finger, is numb or bluish at the tip.
- You suspect a bone is broken in the neck, head or back.

  Do NOT move the person except if necessary to avoid further injury.

Take these actions immediately while waiting for medical help:

- **Stop any bleeding.** Apply pressure to the wound with a sterile bandage, a clean cloth or a clean piece of clothing.
- **Immobilize the injured area.** Do NOT try to realign the bone or push a bone that is sticking out back in. If trained in how to splint, apply a splint to the area above and below the fracture sites. Padding the splints can help reduce discomfort.
- **Apply ice packs to limit swelling and help relieve pain.** Do NOT apply ice directly to the skin. Wrap the ice in a towel, piece of cloth or some other material.
- **Treat for shock.** If the person feels faint or is breathing in short, rapid breaths and lay the person down with the head slightly lower than the trunk and, if possible, elevate the legs.

In the Emergency department, the Physician may order Imaging tests to confirm the fracture diagnosis; Imaging tests such as, an x-ray, Bone scan, or a Magnetic resonance imaging (MRI).

- **X-rays:** Sometimes, a stress fracture is not seen on a regular X-ray taken shortly after the time the victim develop signs and symptoms. It sometimes takes several weeks for evidence of stress fractures to show up on the X-rays.
- **Bone scan:** A few hours before the bone scan, the victim will receive a small dose of radioactive material through an intravenous line (I.V.). The radioactive substance will accumulate mainly in the areas where the bones are being repaired.
- **Magnetic resonance imaging (MRI):** MRI uses radio waves (a type of electromagnetic radiation) and a strong magnetic field to produce detailed images of your internal structures. MRI usually can see/ visualize stress fractures within the first week of injury, and this type of test is more capable of distinguishing between the stress fractures and soft tissue injuries.

Sometimes, after the fracture diagnosis has been made, the victim may need other tests such as :

- an angiogram, a special X-ray of the blood vessels to determine whether other tissue around the bone has been damaged,
- Computerized Axial Tomography (CAT or CT scan) which combines X-rays and computer analysis to generate detailed images of the body.

The victim may need to wear a cast or splint.
Sometimes he/she needs surgery to put in pins,
plates or screws to keep the bone aligned or in place.

Sometimes medication is limited to pain medication to help to reduce the pain and the physician may prescribe antibiotics for open fractures, to prevent infection from developing.

HIP FRACTURE

A hip fracture is a break within the upper quarter of the femur /thigh bone. The extent of the fracture depends on the forces and the factors that are involved. Hip fractures most commonly occur from falling or from direct trauma/blow to the side of the hip.

Sometimes underlying medical conditions may contribute to the fracture such as osteoporosis, stress injury, cancer can weaken the bones and make the hip more susceptible to breaking.

According to the CDC, as observed among the older adult population, one of the most serious fall injuries is a broken hip. It is hard to recover from a hip fracture and afterward many people are not able to live on their own. As the U.S. population gets older, the number of hip fractures is likely to go up (CDC 2015).

The CDC reported that:

- Each year at least 250,000 older people, those 65 and older, are hospitalized for hip fractures.
- More than 95% of hip fractures are caused by falling, usually by falling sideways.
- Women experience three-quarters of all hip fractures.
    - Women fall more often than men.
    - Women more often have osteoporosis, a disease that weakens bones and makes them more likely to break.
- The chances of breaking your hip go up as you get older (CDC 2015).

PREVENTING HIP FRACTURES

INSTRUCT THE OLDER PATIENTS REGARDING TIPS TO PREVENT HIP FRACTURES

Patients can help prevent hip fractures by taking steps to strengthen their bones and prevent falls such as:

- Speaking with the physician or pharmacist; ask them to review their medications to see if there is any possible side effect such as dizziness, or sleepy effects. Review both prescriptions as well as over-the counter medications.
- Consulting with the physician/ healthcare provide to evaluate the risk for falling
- Learning about specific things that they can do to strengthen their bones and prevent falls.
- Patients can get screened for osteoporosis and get treatment if needed.
- Patients can ask the physician or healthcare provider about taking vitamins and/ or supplements such as vitamin D supplements with calcium.
- Patients can do strength and balance exercises that make the legs stronger and improve their balance.
- Follow up with the eye examination with an eye doctor (at least once a year) and get new eyeglasses if needed.
- Make the home safer; remove obstacles that they could trip over such as rugs
- Place grab bars inside and outside the tub or shower
- Place grab bars next to the toilet.

- Place railings on both sides of stairs.
- Make sure the home has adequate lighting (add more light or brighter light bulbs as needed).

HIP FRACTURE SURGERY

Hip fracture surgery is done to fix/ repair a break in the upper part of the thigh bone. The thigh bone is called the femur. It is part of the hip joint.

The patient may receive general anesthesia before surgery. This means that the patient will be unconscious and not able to feel pain.

The patient may receive spinal anesthesia. With this type of anesthesia, medication is put into the back to numb below the waist.

The type of surgery depends on the kind of fracture the patients have.

If the fracture is in the neck of the femur, the patient may have a hip pinning procedure.

During this procedure:

• The patient lies on a special table to allow the surgeon to use an x-ray machine to see how well the parts of the hipbone lines up.

•The surgeon makes a small incision on the side of the thigh.
•Place special screws to hold the bones in the correct position.
•The surgery may take two to four hours.

If the patient has an intertrochanteric fracture (area below femur neck), the surgeon will use special metal plate and screws to fix it. Usually there are more than one piece of bone broken in this type of fracture.

During the surgery:
• The patient lies on a special table. This allows the surgeon to use an x-ray machine to see how well the parts of the hip bone lines up.
•The surgeon makes a surgical incision on the side of the thigh.
•The metal plate / nail is attached with a few screws.
•The surgery may take about less than two hours.

The surgeon may perform a Hemiarthroplasty - partial hip replacement. Hemiarthroplasty replaces the ball part of the hip joint.

Risks of surgery

Avascular necrosis

Avascular necrosis occurs when the blood supply in a section of the femur is reduced or cut off for a period of time. This will cause part of the bone to die.

Other risks of surgery:

•Injury to the nerves or damage to the blood vessels

•Parts of the hip bone may not join together

•Parts of the hip bone may not join in the correct position.

•Blood clots in the lungs or legs.

•Mental confusion sometimes affects the older patients who already have a history of confusion and may also result in some increased confusion.

Older adults who fracture a hip may already have problems thinking clearly.

Sometimes surgery can make this problem worse.

•Pressure ulcers or bed sores may develop from spending a prolonged period of time in bed or a chair

BEFORE THE PROCEDURE

Patients are admitted to the hospital for the a hip fracture repair/surgery.

On the day of the surgery:
The patients are kept NPO (nothing to drink or eat after midnight) before the surgery.

Instruct patients:

•That NPO status includes no candies, chewing gum or breath mints. To rinse mouth with water if feels dry, but not to swallow (unless have special medications).
•To take the medications that the physician has instructed them to take, but only with a small sip of water.

After the hip surgery Procedure
The patients will stay in the hospital for about 3 to 5 days.
Full recovery will take from three to four months to a year.

After surgery:

• The intravenous (IV) catheter will deliver IV fluids until able to drink on their own.

•Special compression stockings placed on the legs to help improve blood flow in the legs and reduce the risk of developing blood clots, which are common after hip surgery.

•Pain medications will be ordered.

•Antibiotics may also be prescribed to prevent infection.

•A foley catheter may be inserted into the urinary bladder to drain urine. It will be removed when the patients are ready to start urinating on their own. The urinary catheter is often removed two to three days after the surgery.

•Patients will be taught and encouraged to complete coughing and deep breathing exercises and effectively using a spirometer to help prevent pneumonia.

ACTIVITY / AMBULATION

Patients will be encouraged to start moving around and complete ambulation activities as soon as the 1st day after surgery because most of the issues/ problems that may develop after hip fracture surgery can be prevented by becoming active such as getting out of bed and start ambulating as soon as possible.

•The patient will require assistance bed to a chair on the first day after surgery.

•The patient will start to walk with crutches or walker (will not be able to place too much weight on to the leg that was operated on).

DISCHARGE PLANS

The patient will be able to be discharged home when:

•They can move around safely with a walker or crutches.

•They are correctly completing the prescribed exercises to strengthen the hip and leg.

• Their home is ready.

Some patients may need short stay in rehabilitation facility after they are discharged from the hospital and before they go home.

At the rehabilitation facility, they will learn how to safely do daily activities on their own. Patients might need to use crutches or a walker for a few weeks or months after surgery.

PATIENT TEACHING/ DISCHARGED HOME

The patient may have bruises around the incision site. The bruises will fade away over time. It is normal for the skin around the incision to be a little red. It is also normal to have a small amount of watery or dark bloody fluid draining from the incision for a few days.

ABNORMAL SIGNS

It is not normal to have foul smell or drainage that last more than the first 3 to 4 days after surgery. It is also not normal for the wound to start hurt more after leaving the hospital.

IMPORTANCE OF ACTIVITY

Patients need to do the exercises the physical therapist taught them while they were at the hospital.

The physician and physical therapist will help the patients decide when they no longer need cane, crutches or a walker. Information will also be given to them regarding when to start using a stationary bicycle and swimming and other exercises to build the muscles and the bones.

INSTRUCT THE PATIENTS:

•Not to sit for more than Forty-five minutes at a time without moving around.

•DO NOT sit in low chairs that put the knees higher than the hips.

•Choose chairs with arm rests to make it easier to rise up / stand up.

•Sit with the feet flat on the floor, and point the feet and legs outward a little.

•DO NOT cross the legs.

•DO NOT bend at the waist or the hips when putting shoes or socks on.

•DO NOT bend down to pick up things from the floor.

•Use a raised toilet seat for the first few weeks.

•DO NOT sleep on the stomach or on the side of the surgery.

HOME PREPARATION

INSTRUCT PATIENTS TO:
Have bed in low position (so that feet touch the floor when patient sits on the edge of the bed).

Maintain a safe, hazard free environment:

Prevent falls:
Remove loose cords/wires from walk areas or hallways.
Remove loose carpets or throw rugs.
Fix uneven floors in doorway.
Use good lights.

Make the bathroom safe:

Place hand rails in the shower /bathtub
Place hand rails next to toilet.
Place a slip-proof mat in the shower /bathtub.

DO NOT carry anything when walking around.
Keep the hands free to help with balance.
Put things where they can be easily reached.

OTHER SAFETY TIPS

• Avoid stairs,

• Set up a bed on the first floor or use a bedroom on the first floor,

• Have a commode or bathroom on the same floor where the patients spend most of the day.

For the first 1 - 2 weeks, patients will need some assistance or may have physician order home health care to send a trained caregiver to the house to provide some assistance.

WOUND CARE

Patients may start showering about 5 - 7 days after the surgery.

Teach/ instruct patients that after shower, just to gently pat the incision site dry with a clean towel. DO NOT try to rub it dry.

DO NOT soak the wound in a bathtub, swimming pool, or hot tub until the physician gives the all clear.

Change the dressing over the incision every day (as ordered by the physician).

Gently wash the wound with soap and water (or with approved substance ordered by physician) and pat it dry.

Check the incision for any signs of infection at least daily.

The signs of infection include:

•Increased redness
•Increased drainage
•Wound is opening up

Other important Self-care tips

To prevent another injury/ fracture, take steps to keep the bones strong.

• After patients have healed from the surgery and are able to do more tests, follow up with the physician to check for osteoporosis; weak, thin bones. There might be treatments available to help with weak bone.

•If the patients smoke, they need to stop; follow up with physician regarding ways to help to quit. Smoking will keep the bone from healing.

•Avoid drinking alcohol regularly.
Alcohol will cause a bad reaction from taking pain medications and drinking alcohol. Alcohol may also make it harder to recovery from surgery.

•Continue wearing the compression stockings used in the hospital until the physician

order to discontinue use. Wearing the compression stockings for at least 2 or 3 weeks may help reduce blood clots after surgery.

Teach patients to take the pain medications as prescribed.

To also move around because the activity can help to reduce the pain.

CALL THE PHYSICIAN IF EXPERIENCE:

•Chest pains

•Shortness of breath

• Increased redness at incision site

• Increased pain around the incision

•Drainage from incision

•Swelling in one of the legs (it will be red and warmer than the other leg)

•Pain in the calf

•Fever higher than 101°F (38.3°C)

•Pain that is not controlled by the pain medications

•Nosebleeds (if taking anticoagulants/ blood thinners)

•Blood in the urine or stools (if taking anticoagulants/ blood thinners)

•Frequent urination

•Burning on urination

TAKE EXAM

BIBLIOGRAPHY

American Academy of Orthopaedic surgeons (2012) Fractures. Retrieved from http://orthoinfo.aaos.org/topic.cfm?topic=a00139

Doenges, Moorhouse & Murr (2010). Nurse's Pocket Guide; Diagnosis, Prioritized Interventions, and Rationales (12th ed.) Philadelphia: F.A. Davis Company

Deglin, Vallerand & Sanoski (2011). Davis's Drug Guide For Nurses (12th ed.) Philadelphia: F.A. Davis Company

GHR.NLM. GOV (2012) Marfan Syndrome. Retrieved from http://ghr.nlm.nih.gov/condition/marfan-syndrome

Jarvis, C. (2012) Physical Examination & Health Assessment (6th ed.) St. Louis, Missouri: ELSEVIER SAUNDERS

Lewis, S., Dirksen, S., Heitkemper, M., Bucher, L., Camera, I. (2011) Medical-Surgical Nursing; Assessment and Management of Clinical Problems. (8th ed.) St. Louis, Missouri: ELSEVIER MOSBY

Mayoclinic.org (2013) Marfan syndrome. Retrieved from http://www.mayoclinic.org/diseases-conditions/marfan-syndrome/basics/definition/con-20025944

NLM nih.gov (2015) Systemic Lupus Erythematosus. Retrieved from https://www.nlm.nih.gov/medlineplus/ency/article/000435.htm

Shepherd Center (2015) Understanding Spinal cord injury: Level of Injury. Retrieved from http://www.spinalinjury101.org/details/levels-of-injury

Web MD. (2013) First Aid & Emergencies-Puncture Wound Treatment: First Aid Information. Retrieved from www.webmd.com/first-aid/puncture-wound-treatment

www. CDC.GOV (2015) Hip Fractures Among Older Adults. Retrieved from http://www.cdc.gov/HomeandRecreationalSafety/Falls/adulthipfx.html