29CFR 1926.20(b)-Accident Reduction, **29CFR 1926.21-** Safety Training & Education

Hand and Wrist Injury Prevention and Care

Preparation

1. Read Applicable Background information and related Company Policy Chapter.
2. Make _____ Copies of this Lesson Plan for Personnel
3. Make Transparency, procure transparency pens, etc.
4. Coffee, tea, snacks

Material

1.

Objective

By the end of this session, personnel shall be able to describe:

1. The Muscles and Bone Structure of the Wrist & Hand
2. Kinds of Wrist and Hand Injuries
3. Care of Injured Hands and Wrists

Background

Hands are complex and wonderfully designed machines. Together with your wrists, they help you do a remarkable variety of tasks. From playing the piano to cooking dinner or hammering a nail. Your hands respond daily to various commands that ask for feats of strength and dexterity. To put it simply, <u>your hands are literally extensions of your brain</u>. More of your brain is reserved for controlling hand movements then for controlling any other part of your body. Clearly your hands and wrists are important to every aspect of your life. You use your hands all day, everyday, both at home and at work. Yet in doing all of these things that they do everyday, your hands and wrists are prone to accidents and injuries.

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Lesson

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Structure of the Wrist and Hands

Let's begin with the bones. Bones form the structural support and strength in your hand and wrist. All together there are 27 different bones in your hand and wrist. In comparison there are only 3 bones in your arm. The bones are surrounded and tied together by muscles, ligaments and tendons.

Ligaments are strong, fibrous bands of tissue that serve to stabilize joints and prevent damage by limiting side movements of joints.

Tendons permit flexibility. When a muscle contracts, the tendons lift or curl the fingers.

All of these working together enable your hand to perform some remarkable things, including grasping and the ability to pick up small objects with your thumb and index finger.

Wrist and Hand Injuries

Now let's take a look at the different kinds of hand and wrist injuries. Remember the information we've just discussed about bones, ligaments and tendons.

1. **Wrist fractures**. This injury is most often caused by trying to break a fall with an outstretched hand. Sometimes the ends of the forearm bones can be broken too.

2. **Hand and finger fractures**. Generally this is caused by trapping or twisting the fingers suddenly. The finger is caught in a car door for example. Accidentally hitting the finger, such as with a hammer, can cause a finger fracture.

3. **Hand sprains**. These occur when the ligaments in the hand or wrist are stretched too far and tear. Thumb sprains, for example, are a common sports injury.

4. **Finger tip injuries**. Finger tips are subject to many different types of injuries; the bones can be fractured, the fleshy part of the finger may be torn or the finger nail may be damaged.

5. **Lacerations**. Lacerations or cuts can be minor, that is, only affecting the layers of skin or major, serious deep cuts which sever nerves, muscles or tendons. Lacerations can occur if your not careful while handling sharp cutting tools, such as knives or saws.

6. **Nerve compression**. This injury results from a swelling of tissues that surround a nerve. As a result there is a loss of feeling or sometimes a tingling sensation. Repetitive movements are the culprit here as they tend to create the swelling of tissues.

Kinds of Wrist and Hand Injuries

Caring for hand and wrist injuries depends upon the type of injury. A hand surgeon or emergency physician can treat the problem. Emergencies, such as lacerations, will be cleaned and sutured, while x-rays will be taken first, for fractures, to properly diagnose the problem.

Your doctor may ask you questions about how the accident or injury happened. If the injury is believed to be a sprain or fracture, the fingers, hand or forearm will be examined and gently moved to determine the limits of movement. This helps to diagnose the injury correctly. Fractures of the fingers, wrists or forearm are treated by being repositioned or set to their former position before the broken bone is immobilized with a cast or splint. Pins may be used if the fracture is in an unstable area. A cast is generally used here and the cast will probably be removed in 6 to 8 weeks.

Sprains are treated in a different manner. Usually anti-inflammatory medication is prescribed to reduce swelling and the area is immobilized with a splint or cast until the ligament heals properly.

Other specific hand and wrist injuries require very specific treatments. For example, hitting your fingernail with a hard direct blow, such as from a hammer, can cause bleeding beneath the fingernail. This condition is called black nail. Sometimes this will disappear as the nail grows out but if pain or pressure continue your doctor will relieve this by drilling a hole in the nail to drain off the blood.

Care of Injured Hands and Wrists

A crushing blow to the fingertip, such as a finger being caught in a moving machine, can fracture the last bone of the finger and drive the nail upwards. This avulsion of the nail is treated with a thorough cleansing and fragments of the bone are removed. Damaged portions of the nail are removed as well.

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Tissue loss, as from a pinching or tearing injury, is usually repaired with either suturing or surgery. Skin will be sutured back together or in very complex injuries, surgery will carefully repair tendons and ligaments. Sometimes skin grafting will be necessary to restore function and appearance. A splint may be used to protect the finger as it heals.

Lacerations or cuts are treated according to their depth. Minor injuries, like those from a sharp knife, are usually fairly shallow because the force of the cutting instrument is not very great. This type of cut is cleaned and can be closed with either a butterfly bandage or a few stitches. Major lacerations usually cut skin, tendons and nerves. This type of deep cut usually occurs from an accident involving machinery or power tools. Surgery is necessary to repair damaged tissues and the skin is stitched closed. Splints are used to immobilize all major lacerations while they heal. Physical therapy may be necessary to restore full use of the tendons and help loosen scar tissue.

Nerve compression. This is often called Carpal Tunnel Syndrome. Pain and numbness of the hand and fingers is generally caused by swollen tissues pressing on the median nerve which runs through the carpal tunnel in the wrist. This injury is a bit different than the previous ones, as it's caused by repeated flexing of the hand and very repetitive motions. It's an acquired injury, not the result of a sudden accident. Treatment involves medication to relieve pain and swelling, followed by splinting to keep the wrist straight. Severe cases are treated with surgery where the carpal ligament is cut to relieve the pressure on the nerve. And there are other proven treatments besides surgery to correct Carpal Tunnel Syndrome.

Treatment for Carpal Tunnel Syndrome- Your doctor will probably want to take x-rays of your hand to make sure that you haven't fractured your wrist or have another condition such as arthritis. You may then need to take a flexibility test or perhaps have electrodes placed on your wrist to measure muscle and nerve conditions. Just what will your treatment be? Basically, there are two options.

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The first treatment program usually consists of wearing a wrist splint. This splint may be worn at night or during the day while you are working. The night splint helps keep your wrist in a safe position while you sleep, and minimizes nighttime pain. Day splints are known as occupational splints because they are designed with a specific task in mind.

The splint designed to protect a painter's wrist will look different from one designed to help a typist. Nevertheless, each splint will cushion the wrist, protect it from further injury and keep it in a 'neutral' position during the work day.

The second treatment option for CTS is the use of medication. Medications are used to reduce the swelling and inflammation, there by relieving the pressure on the median nerve. The medication may be either injected directly into the carpal tunnel or it may be taken in pill form. Sometimes both splints and medications are used at the same time to help reduce the pain of CTS. These simple treatments are usually all that's needed to treat the syndrome. However, if these treatments do not prove effective then surgery may be necessary.

Surgical treatment consists of a procedure known as carpal tunnel release, in which the transverse ligament is cut, allowing the flexor tendons to expand and ease the pressure on the median nerve. This option is always a last resort, it's usually reserved for those patients who have excruciating pain or the threat of permanent nerve damage. A hospital stay and rehabilitation therapy are necessary.

Despite all of the treatments we've mentioned, prevention is still the best treatment of all for Carpal Tunnel Syndrome. If you take the time to protect your wrist and to find out how you can prevent any damage to it, you'll be well on your way to avoiding the pain of carpal tunnel syndrome. Take a few minutes to think about how you do your job, and how you could be more careful.

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Closure

Because you use your hands all day, everyday, there's always the chance that you may injure them. However, you can decrease the chance of injury even further by working safely and carefully, both at work and at home. While at work, be extra careful around machinery and power tools. Use caution while handling knives or other sharp objects.

You can prevent a hazardous fall by watching where you're walking and avoiding tripping hazards. Watch out for potential hazards. Don't take chances around broken glass or sharp pieces of metal. Think about keeping your hands and wrists safe on the job and at home. Just think about all the wonderful things your hands and wrists do for you everyday. Isn't it time you took a little time to care for them?

What questions do you have?

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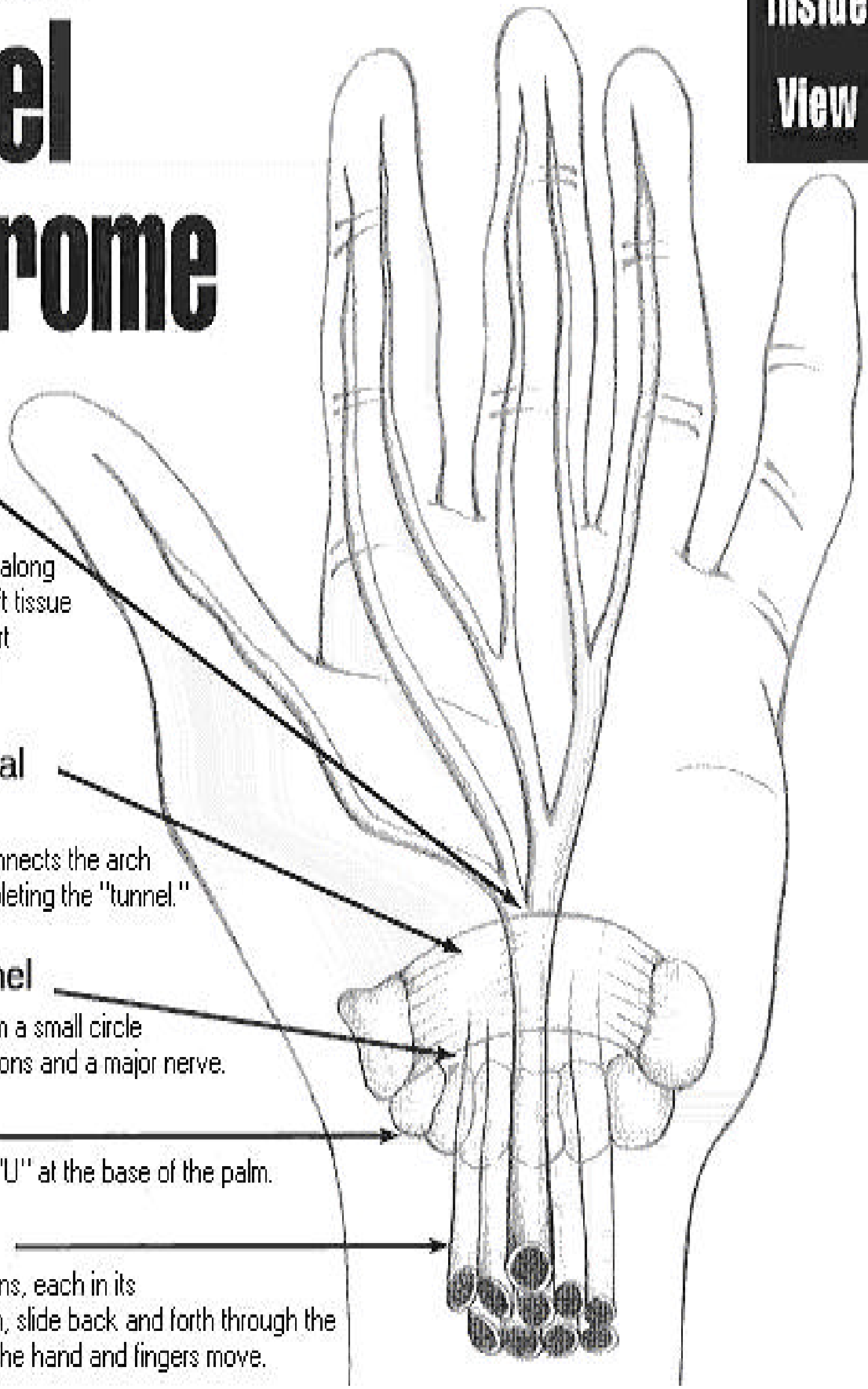
Carpal Tunnel Syndrome

An Inside View



Median Nerve

The only nerve that travels through the tunnel along with the tendons. This soft tissue carries sensations from part of the hand to the central nervoussystem.

Transverse Carpal Ligament

A very strong ligament connects the arch of the carpal bones, completing the "tunnel."

The Carpal Tunnel

Bones and a ligament form a small circle through which travel tendons and a major nerve.

Carpal Bones

Eight small bones form a "U" at the base of the palm.

Flexor Tendons

Nine tiny but tough tendons, each in its lubricating lining or sheath, slide back and forth through the tunnel as the muscles of the hand and fingers move.