



ULTRA-SONIC PERCUTANEOUS TENOTOMY



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LATERAL EPICONDYLITIS (TENNIS ELBOW) & MEDIAL EPICONDYLITIS (GOLFERS ELBOW) & PATELLAR TENDONOSIS (JUMPERS KNEE)

Tendons are tough bands of tissue that connect muscles to bones. There are several types of tendon problems. Repetitive activities and sudden trauma can injure tendons and lead to inflammation, pain, and difficulty using the joint. This is called tendonitis. As people age, tendons can break down or even tear. This is called tendonosis. Symptoms of tendonosis usually last more than 3 months. Less commonly, tendon problems can be caused by other conditions, including rheumatic diseases. Tendonopathies are common problems. The risk of having a tendinopathy increases with age and is greater in people who routinely perform activities that require repetitive movements that increase stress on susceptible tendons.

Tendinopathy (tendinitis or tendonosis) is the most common condition affecting the elbow and knee. It is referred to as tennis elbow when it affects the lateral (outside) elbow and golfers elbow when it affects the medial (inside) elbow. It is known as patellar tendonosis (jumpers knee) when it involves the knee. Elbow tendinopathy can be caused by sports such as golf and tennis as well as work-related activities that involve heavy use of the wrist and forearm such as painting.

Jumpers knee is one of the more common tendinopathies affecting athletes with mature skeletons. It occurs in up to 20% of jumping athletes (basketball, volleyball, long/high jumping). It involves repetitive stress placed on the patellar tendon in the front of the knee.

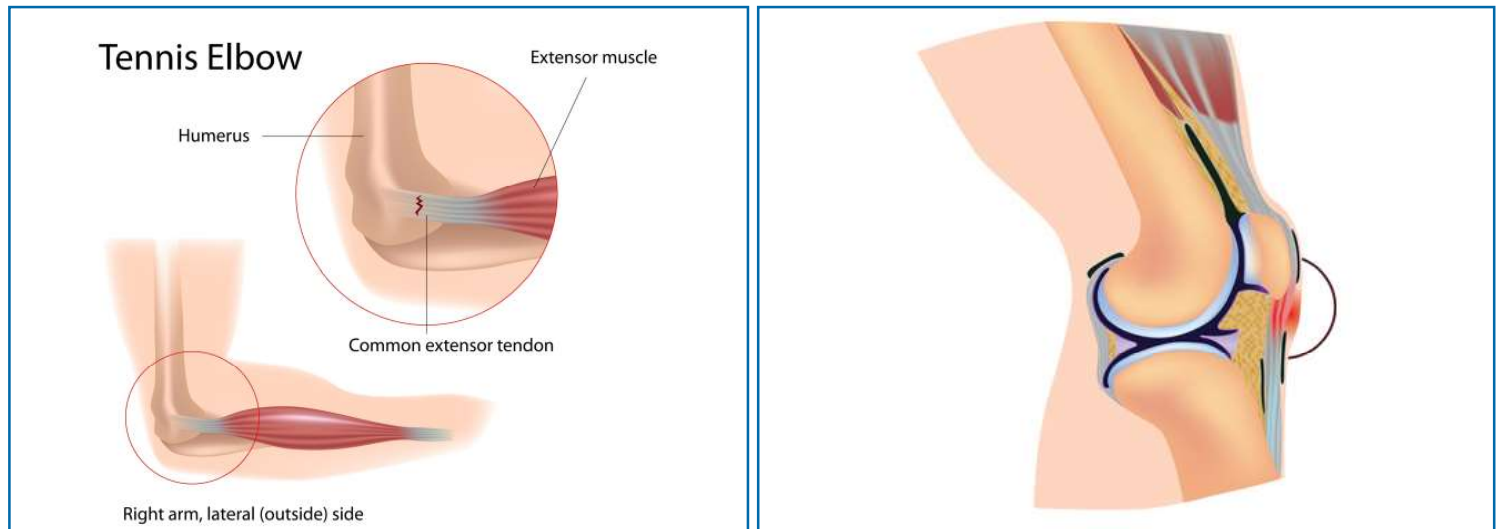
THE ANATOMY & PHYSIOLOGY

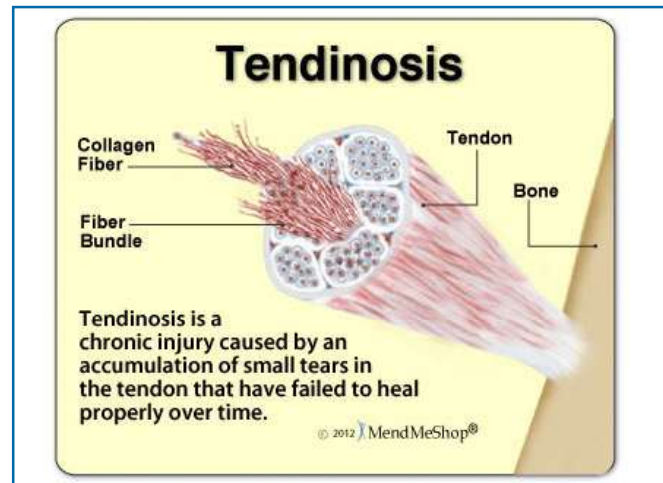
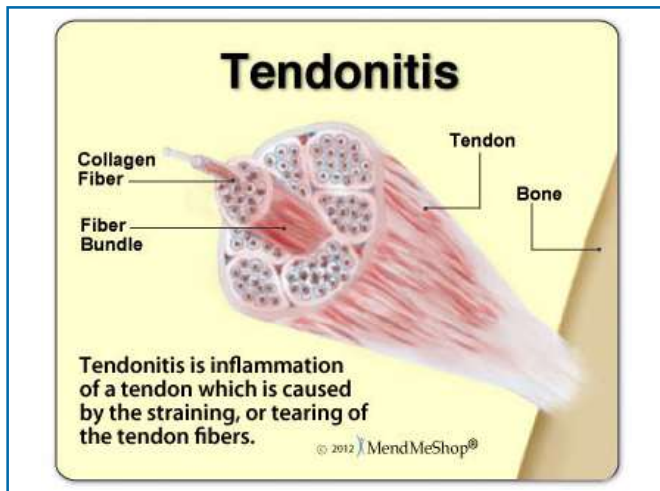
The humerus (arm bone) has a medial (inside) and lateral (outside) epicondyle. The lateral epicondyle serves as the common origin for the wrist extensors. The medial epicondyle serves as the bony common origin of the wrist flexors.

Lateral Epicondylitis: Injury to the extensor carpi radialis brevis muscle (ECRB) and occasionally extensor digitorum communis muscle (EDC)

Medial Epicondylitis: Injury to the pronator teres and flexor carpi radialis muscles

The knee joint is formed from the femur (leg bone) and Tibia (shin bone), as well as the Fibula. In order for the muscles to straighten or bend the knee a small bone called the patella (knee cap) moves between a groove of the femur. Attached to this small bone is the quadriceps tendon. This tendon engulfs the patella (knee cap) and inserts on the tibia (shin bone).





SYMPTOMS:

Epicondylitis:

Patients often complain of severe, burning pain on the outside or inside of the elbow. In most cases, the pain starts in a mild and slow fashion. It gradually worsens over weeks or months. The pain can be made worse by pressing on the outside or inside of the elbow or by gripping or lifting objects. Lifting even very light objects (such as a small book or a cup of coffee) can lead to significant discomfort. In more severe cases, pain can occur with simple motion of the elbow joint. Pain can also radiate to the forearm.

Jumpers Knee:

Patient will describe pain just below the knee cap with activity such as jumping, running, and squatting. There is usually pain with any pressure through the tendon with kneeling and even touching. There is typically aching and stiffness after activity with stiffness more prominent in the mornings. The tendon can also become thickened. There are 4 stages of jumpers knee.

Stage 1: pain only after activity which doesn't affect function

Stage 2: Pain with initial activity that disappears as you warm up, but returns after activity. Performance is not usually affected.

Stage 3: Prolonged pain during and after activity with increasing difficulty performing at a satisfactory level.

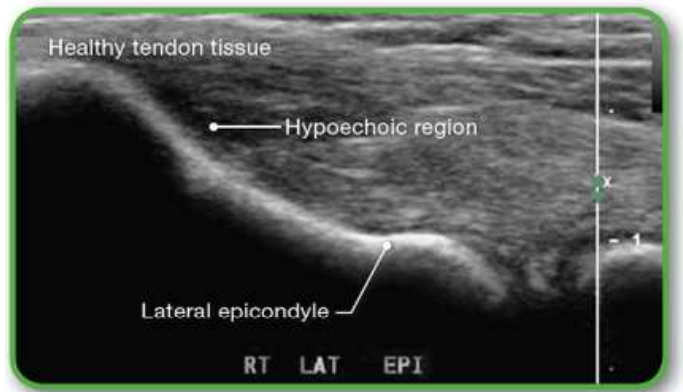
Stage 4: complete tear of the tendon requiring surgical repair.

ULTRASONIC PERCUTANEOUS PARTIAL TENOTOMY OVERVIEW



PREPARATION

The area is prepared with sterile draping and disinfectant soap. You will be fully awake for this procedure.

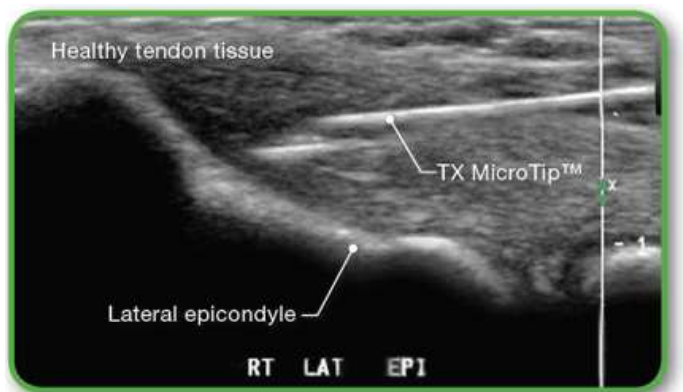
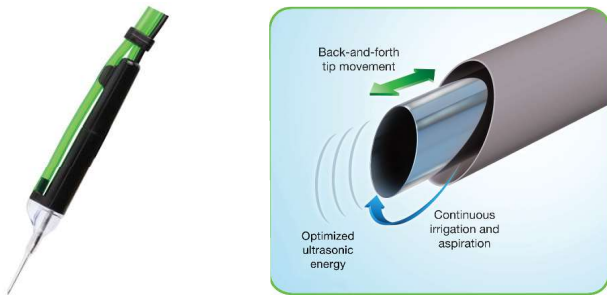


ULTRASOUND IDENTIFICATION

Ultrasound is used to identify the area of tissue damage tendon. Lateral epicondyle of elbow is displayed to the left.

EQUIPMENT

Ultrasonic energy simultaneously cuts and removes targeted diseased tissue.



DAMAGED TISSUE REMOVAL

The ultrasonic MicroTip breaks down and extracts the damaged tissue. When the damaged tissue is removed there is increased bloodflow which allows the tendon to heal.

HOW IS TENDINOSIS/TENDONITIS TREATED?

- Activity modification: General activities which make the pain worse should be avoided.
- Ice: Cold therapy can be helpful. The area can be iced daily for 2-3x a day. Ice message can be done by freezing water in a paper Dixie cup, tearing off the top of the cup, and rubbing the ice over the area while holding the base of the cup. You should ice until the area becomes numb and then ice for 5 more minutes. Ice area after aggravating activity.
- Over The Counter Pain Medication (Ibuprofen, Advil, Aleve, Motrin, Naprosyn, Tylenol): these medications are helpful in reducing acute swelling and pain. They should not be taken if you have a hx of acid reflux or hx of stomach irritation from these medication in the past. Take 2-3 Aleve, 3 Ibuprofen/Advil with 2 extra strength tylenol at the same time as needed for pain.
- Counter Force Straps: “counterforce straps” can be helpful in patients with tennis elbow, golfers elbow, and patellar tendonitis. They should be worn 2-3 cm below the elbow. They are intended to take the pressure off of the tendon insertion which is the area of dysfunction/damage.
- Braces: Commonly referred to as “cockup wrist splints”. They keep the wrist supported and in a small amount of extension to relieve tension on the extensor tendons in lateral epicondylitis. They are used at night while sleeping, or during the day when performing work on a computer.
- Cortisone injections: These have been performed in the past. Studies have shown cortisone injections do not benefit patients and some studies showed negative effects on tendon healing over time and worse outcomes. Dr. Norberg and Ryan Nelson PA-C do not recommend this treatment to patients with tendinosis.
- Physical Therapy/Occupational Therapy/Athletic Training: Therapeutic exercise has been shown to be helpful with a focus on intrinsic strengthening, instrument assisted soft tissue mobilization, flexibility, and activity modification.

WHEN TO CONSIDER PROCEDURAL TREATMENT

If symptoms are not relieved after at least 3 months of conservative treatment (shown above) it is unlikely the symptoms will improve. At this point, it may be time to consider procedural or surgical treatment.

Surgical: Arthroscopic Partial Tenotomy

Procedural: Ultrasonic Percutaneous Partial Tenotomy

CURRENT RESEARCH

Koh, Joyce; Mohan, P.; Bernard et al. “Fasciotomy and Surgical Tenotomy for Recalcitrant Lateral Elbow Tendinopathy” American Journal of Sports Medicine, Vol. 41, 636-644, 2013

Hackel, Joshua; Williams, Michael “Ultrasonic energy helps perform fasciotomy surgical tenotomy for tendinosis, fasciosis” Orthopedics Today, May 2013

Morrey, Bernard “Ultrasound Percutaneous Tenotomy for Epicondylitis” Techniques in Shoulder and Elbow Surgery. Vol. 14 Number 2, June 2013

Elattrache, Neal; Morrey, Bernard “Percutaneous Ultrasonic Tenotomy as a Treatment for Chronic Patellar Tendinopathy- Jumper’s Knee”. Operative Techniques in Orthopaedics, Volume 23 Issue 2 June 2013

Traister, Lingor, and Simons. The Effect of Percutaneous Tenotomy Using Tenex on Short Term Average Pain Scores in Refractory Tendinopathies (presented at Annual Meeting of American Medical Society for Sports Medicine, April 2014).

Kamineni, Srinath; Butterfield, Timothy; and Sinai, Anthony. Percutaneous ultrasonic debridement of tendinopathy- a pilot Achilles rabbit model. Journal of Orthopedic Surgery and Research, 2015

Langer, Paul (TCO). Two emerging technologies for Achilles Tendinopathy and Plantar Fasciopathy. Clin Podiatric med. Surg. 32, 183-193, 2015.

RISKS OF THE PROCEDURE:

With any surgery/procedure there are potential risks involved. However, the risks with this procedure are substantially lower. These risks include but are not limited to infection, continued pain, damage to blood vessels or nerves, decreased motion, and anesthetic complications. Call if you have any signs of infection: redness, warmth, fever, discolored drainage.

QUITTING SMOKING

Smoking or using any form of nicotine or tobacco products (including cessation products), can delay your body's healing process. Smoking makes your blood vessels constrict (become smaller), which reduces the amount of oxygen-rich blood delivered to healing tissues. Smoking can cause your blood to clot faster, which can lead to heart and blood flow problems. If you are going to stop smoking around the time of your surgery, you should not use a nicotine based program or cessation products.

BEFORE SURGERY:

Ultrasonic percutaneous partial tenotomy is performed on a same day basis. You will return home within 1-2 hours after the procedure. There is no general anesthetic involved for this procedure, however a local anesthetic will be used. Arrange for a ride to and from the surgery center. Let all medical providers know of any allergies you may have and medications you are taking. Please bring a list of medications.

AFTER SURGERY:

You will be placed in a cockup wrist splint after the procedure for tendon repair in the elbow and will be placed in a straight leg knee immobilizer for knee tendon repair. Wear the cockup wrist splint for 2 weeks continuously, and the knee immobilizer for 1 week continuously following the procedure. Your first appointment after surgery is with Ryan Nelson PA-C and will be approximately 7 - 10 days after surgery.

INCISION CARE:

- Keep the dressings dry and do not remove the Tegaderm dressing for 24 hours after surgery. Small tape strips (steri-strips) will be placed over all incisions. Leave in place until they fall off. Usually this is 10-14 days.
- Do not poke anything into your dressings.
- Do not apply lotion, cream or powder to your incision.
- You can shower safely 24 hours after surgery, without covering the incision. The incision may get wet, but should not be submerged in water for at least 2 weeks after the surgery.
- Do not soak or scrub the incisions until fully healed.
- Watch for signs of infection. Increased redness or drainage from the incisions Fever and or chills
- No sutures will be used for your incision.

RECOVERY TIME:

A wrist splint will be worn for 2 weeks continuously except for showering. Following the 2 weeks in a splint mild activity can be resumed as tolerated. An exercise protocol will be given in person or online through PTLinked. No heavy grasping or gripping for 6 weeks to avoid tendon irritation. It can take 3-6 months before normalizing.

PAIN RELIEF:

- The block involves an injection of a local anesthetic (Ropivacaine) similar to novocaine. It is injected above and below the area of tendon irritation. The local anesthetic allows the procedure to be performed with minimal sensation. The anesthetic can last 3-5 hours, and will have an onset of minutes. Additional local anesthetic will be used until the area is numb.

- You should take pain medication approximately 1 hour after procedure is performed, even if you have no pain.
- Typically one prescription of #10 Hydrocodone/Acetaminophen (Norco, Vicodin) will be provided to patient if needed for pain. Typically patients do not need strong narcotic medications for pain management following the procedure. Dr. Norberg & Ryan Nelson PA-C recommend taking them as written the first day and then gradually spacing them out and taking them only if needed.
- The pain medications will make your pain manageable but will not necessarily take away all of your pain.
- Tylenol (acetaminophen) can be taken with Norco. Whether you are taking Norco or Vicodin, be careful not to exceed 4000mg per day as this can damage your liver. You may take Tylenol instead of Norco or Vicodin. After one week Ibuprofen, Naproxen (Advil, Aleve) can be taken for pain relief. We recommend 600-800mg of Ibuprofen (Advil) every 6 hours, or 440mg of Naproxen (Aleve) every 12 hours.
- If the pain is still not controlled, please call the clinic (952-456-7107)
- Exceeding the recommended dose or taking medication with alcohol may result in liver damage. If you see that you are running out of pain medication, you must call the office number 952-456-7107 during regular clinic hours (8:30-4:00). Pain medications are not filled after hours or on weekends.
- Take pain medication with food. They may also cause cognitive impairment so you are not to drive or operate heavy machinery. Another common side effect is constipation. You may use over the counter stool softeners (i.e. Colace or Dulcolax) to help with this. See packages for recommended dosages.
- Ice the procedure site 3x daily to control inflammation and aid in managing pain.

CALL 952-456-7000 IF:

- Your temperature is 101.5 degrees Fahrenheit or more that does not go down with medication like Tylenol or Advil.
- You see a large amount of new bleeding or drainage from the incision area. Some drainage the first day after surgery is expected.
- Notice increased or unusual redness, swelling or warmth in the surgery area.
- Have a lot of discomfort that doesn't get better with pain medicine, ice and rest.
- Notice a big change in color, movement or feeling to the fingers or hand
- Have any questions or concerns

DIET:

You will need to eat healthy meals to give your body the energy, vitamins and minerals needed to recover from surgery. Return to your usual diet as soon as you are able. Drink six to eight glasses of water each day. Eat more food that has fiber (fruits, vegetables and whole grains) to avoid constipation from the pain medications. Avoid alcohol while taking prescription pain medicine.

FREQUENTLY ASKED QUESTION:

Do I have to go to physical therapy?

No, Physical Therapy/Occupational Therapy is optional depending on your improvements in range of motion. If you are not making the progress we expect we will refer to PT/OT. Online physical therapy is an option through PTlinked.

How long is recovery time?

Recovery for this procedure is typically 3-6 months, but some people will have symptoms out to 3 months.

Work Status?

This will depend on your employer. You will be released to work with restrictions for 6 weeks. These restrictions may conflict with current job expectations.

Are there any complications from surgery?

Yes, there is always the possibility of complications. However, the risk of complications with this procedure is extremely low and is similar to the risk of getting a shot except no steroid is used.

What are the signs of an infection?

Fever over 101.5 degrees, the incision becomes red or swollen, or any foul drainage. If these symptoms occur, call Dr. Norberg's office right away. (952-456-7107).

Is swelling and pain normal?

Yes. It is normal to experience swelling and pain after this procedure. However, a pain prescription will be given following the procedure.

Can I shower?

Yes. You may shower if incision is covered. Remove dressing after 24 hours.. Do not scrub your incisions. Do not submerge your incision for 1 week.

Do I have stitches?

No, no stitches are used for this procedure.

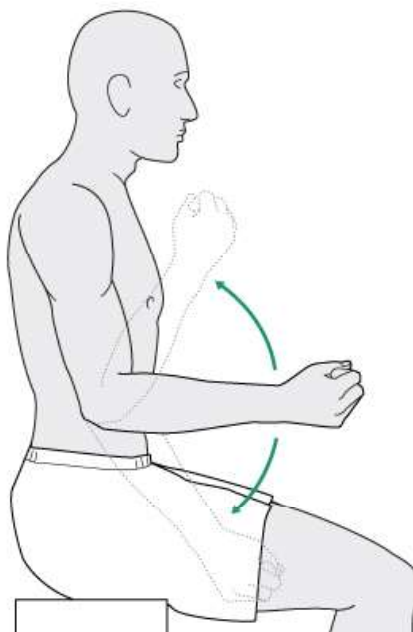
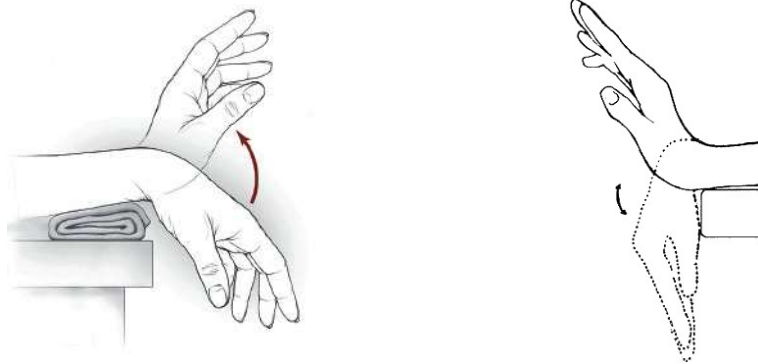
Will I be awake for this procedure?

Yes, there is no general anesthetic during this procedure. A local injection of ropivocaine will be used to numb up the area.

POST PROCEDURAL INSTRUCTIONS:

- Lateral/Medial Epicondylitis: wear wrist brace for 2 weeks
- Knee: wear straight leg immobilizer for 1 week
- Follow-up after procedure in 1 week
- After 2 weeks in brace work back into activity as tolerated not pushing through pain. No heavy lifting for 6 weeks which includes: heavy grasping, carrying, lifting weights. For knee/patellar tendon procedures no return to athletic participation for 6-8 weeks.
- Physical Therapy/Occupational Therapy is optional. However, online PT/exercise program is available through PTlinked. If no progress is made referral for formal PT will be made.

IMMEDIATE POST OPERATIVE EXERCISES





Reinventing Patient Recovery

PTLINKED is a digital health company focused on optimizing the injury recovery process.
Follow the steps below to get your exercise program prescribed by:



FRANK B. NORBERG, MD

Orthopedic Surgeon

Twin Cities Orthopedics

- **STEP 1:** Go to www.ptlinked.com
- **STEP 2:** Enter the code below to access your program

KVU6132

PAIN MEDICATION AGREEMENT FOR POST-OPERATIVE PAIN TREATMENT

The official policy of our practice is as follows:

1. Patients will not be provided with narcotic pain medication prior to surgery.
2. After surgery, appropriate prescription pain medications will be prescribed for adequate pain control. The amount of medication prescribed will be based on typical pain control needs for the surgery performed. This is at the discretion of Dr. Norberg and Ryan Nelson PA-C.
3. We will not prescribe pain medications longer than **TWO WEEKS** after surgery.
4. Prescription pain medications do not help with healing after surgery. Take prescription pain medications only if pain cannot be controlled with over the counter medications such as tylenol.
5. If a patient takes prescription pain medication prior to surgery (prescribed by another provider) we will establish a specific pain mediation plan for that patient.
6. Patients should avoid NSAID's (Ibuprofen, naproxen, aspirin, etc.) for at least two weeks after surgery if they have a superior capuslar reconstruction, rotator cuff repair, labral repair, biceps tenodesis, or fracture. NSAID's have been associated with decreased healing rates.
7. Taking prescription Opiates/Opioids (such as oxycodone, hydrocodone, morphin, hydromorphone) are well known to cause death and addiction/dependency and should never be taken while driving. Prescription opiates/opioids are the leading cause of prescription related deaths.

Patient Name _____

Patient Signature _____

Date: _____

References:

Increases in Drug and Opioid-Invovled Overdose Deaths- Unitted States, 2010-2015. MMWR Morb Mortal Wkly Rep, 64(50-51), 1378-1382.

Dowell D, Haegerich TM, C.R. (2016). CDC Guideline for Prescribing Opioids for Chronic Pain- United States, 2016. MMWR Morb Mortal Wkly Rep, 65(1), 1-49.

O'Neill. (2014). Less is More: Limiting Narcotic Prescription Quantities for Common Orthopedic Procedures. The Physician and Sportsmedicine, 42(4), 100-105.

Rudd RA, Seth P, David F, S. L. M. M. M. W. R. 2016;65:1445-1452. D. <http://dx.doi.org/10.15585/mmwr.mm655051e1>. (2016)