

## **Pinched Nerves:**

### **Treatment with Class IV High Power Laser Therapy**

Pinched Nerves are often accompanied by sharp pain, numbness, tingling or burning along the track of the injured nerve. Pinched Nerves in the neck commonly cause symptoms in the arms and hands. Symptoms in the legs and feet often originate from irritated nerves in the lower back. In some circumstances, muscle weakness also occurs.

#### ***How Does High Power Class IV Laser Therapy Help Nerves that are Pinched?***

Unlike other tissues in the body, nerves do not have an external blood supply. Therefore, the blood vessels that are responsible for feeding the nerve itself are actually located within the nerve. This makes the nerve vulnerable to both trauma and repetitive motion injuries. When the nerve becomes impinged the blood supply that feeds the nerve also becomes “pinched”. Without this blood the cell does not receive its supply of oxygen and nutrients which are needed for the cell to create energy for healing. In summary:

NO OXYGEN + NO GLUCOSE = NO ENERGY & NO HEALING

Without energy to power the healing process the injured nerve cannot heal itself. Over time, this leads to a painful chronic condition called Neuropathy. The symptoms of Neuropathy include sharp pain, numbness or tingling either at the site of the nerve injury or wherever the nerve travels. For example, the condition known as sciatica is a form of Neuropathy that specifically affects the sciatic nerve.

#### ***How High Power Laser Therapy Works***

**Nerve Injury (Neuropathy)** is similar to a bad accident where emergency crews must travel through heavy traffic before they can offer assistance. The roadway can be compared to the nerve's blood supply and the emergency crew represents the body's ability to heal itself. There are two primary challenges to the emergency crews, 1) the injured individuals can't be helped until the traffic jam is cleared, and 2) the traffic can't be cleared away until the damaged **vehicles** are removed. As you can see with this example it could take a very long time before rescue crews are able to help out.

However, in the real world we have a better option, Life Flight – a helicopter that *bypasses* the traffic and goes *directly* to the site of the accident to heal the sick and injured.

**The equivalent to Life Flight is Class IV High Power Laser Therapy.**

**Class IV High Power Laser Therapy** does not rely upon the blood stream to deliver its benefit to injured nerves as in the case of oxygen, glucose, or medications. Laser Therapy delivers the necessary energy directly to the nerve cell to jump start the healing process. The focused, high-energy light waves stimulate the cells to produce the vitally important energy (ATP). This process completely bypasses the arterial “highway” that was damaged as a result of the initial injury. Our formula then becomes:

NO OXYGEN + NO GLUCOSE = NO ENERGY + NO HEALING

### **1. Laser Therapy Delivers Healing Energy Directly to the Nerve Cells**

Class IV High Power Laser Therapy sends bio-available energy directly through intact skin to photoreceptors within the injured cells to “jump start” the healing process. The photoreceptors act like solar panels. They accumulate and store energy (ATP) which is then used by the cell. The powerhouse then releases this energy to activate the healing process.

### **2. Laser Therapy Improves the Function of Blood Vessels that Feed the Nerves**

The Class IV High Power Laser sends radiant infrared energy deep into the walls of the blood vessels that feed the injured nerves. This improves the elasticity and function of the blood vessels. As the blood vessels become healthier the nerves begin to thrive. The Laser Therapy improves the oxygenation of the individual nerve cells allowing them to lengthen to fill-in the gaps between the nerve cells. This allows the nerve signals to “jump” from cell to cell more quickly since the distance between the nerve cells is lessened.

The **opening up of the electrical pathways** and the **accelerated nerve cell repair** allow for clear, correct communication between the brain and the rest of the body. The result is healthy function and a return to normal sensation.

### ***Spinal Discs Do Not Have a Blood Supply***

Unlike other tissues in the body, the spinal discs do not have a direct blood supply. Without a blood supply the outer covering of the disc tends to become brittle and pain sensitive. Any subsequent trauma may make the situation worse. This is because trauma causes inflammation and muscle rigidity. These factors combine to produce increased pressure on the disc and prevent the disc from pulling in the fluids needed to keep it inflated.

### ***The Solution: Class IV Laser Therapy Softens the Disc to Allow Oxygen & Nutrients into the Disc***

Laser therapy softens and reactivates the discs.

It does this by stimulating the cells of the disc. The laser delivers light energy directly into photo receptors within the cells. The cells convert this light energy into biologic energy (ATP). This energy is used to improve the elasticity of the disc and restore the exchange of fluids needed to “plump up” the deflated disc.

#### LASER STIMULATION OF CELLS

- ✓ IMPROVED DISC ELASTICITY
- ✓ RESTORATION OF ENERGY FLOW
- ✓ REVERSAL OF DEGENERATIVE DISC DISEASE

#### **Tendonitis including Golfer’s Elbow, Tennis Elbow, Biceps Tendonitis & Achilles Tendonitis: Treatment with Class IV High Power Laser Therapy**

***Muscles are attached to bones via tendons. Contraction of the muscle pulls on the tendon acting as a lever to move the bone.***

#### **The Problem: Tendons Have Notoriously Poor Blood Supplies**

Unfortunately, tendons have notoriously poor blood supplies. While muscles can be fed by several different arteries located outside the muscle, the tendon can only be fed by blood from within the muscle that it is attached to. This means that any problem, especially inflammation as seen in tendonitis, will “block” this blood vessel. This will starve the tendon of oxygen and glucose. A starving tendon can’t heal.

*Think of it like this:* The ambulance can’t get to the scene of an accident because it is stuck in the traffic jam caused by the accident. The injured muscle tissue depends on the oxygen and glucose that are delivered to the injury site by the blood stream. They are then converted to a form of energy (called ATP) that the body uses to repair the damage. In simplest terms it can be described this way:

NO OXYGEN + NO GLUCOSE = NO ENERGY + NO HEALING

#### **The Solution: Laser Therapy Delivers Energy Directly to the Injured Tendon Cells**

Class IV High Power Laser Therapy *bypasses* the blood stream altogether and delivers the much-needed energy *directly* into the cells of the injured tendon cells. The focused, high-energy infrared waves stimulate the cells to produce the vitally important healing energy called ATP. The photochemical process does not rely on oxygen or glucose and, therefore,

completely bypasses the arterial “highway” that was damaged as a result of the Tendonitis. We can simplify this concept as follows:

LASER STIMULATION OF CELLS = ENERGY PRODUCTION + HEALING

### **TMJ Dysfunction: Class IV High Power Laser Therapy Treatment**

#### ***Temporomandibular Joint Disorder (TMD)***

The **Temporomandibular Joint (TMJ)** is the hinge that connects the lower jaw (mandible) to the bones of the skulls. Joint and muscle dysfunction of the jaw is called **Temporomandibular Disorder (TMD)**.

Typically, symptoms are caused or aggravated by **clenching** or grinding of teeth. The initial cause may be associated with trauma (such as injury to the neck or head) or developmental factors. However, the condition becomes more serious when the disc (soft cushion) between the ball and socket of the joint begins to develop a form of arthritis called Degenerative Disc Disease.

#### ***Why TMJ Disorders Are Such a Chronic Problem***

1. TMJ Dysfunction chronically irritates the outer surface of the damaged disc causing it to become hard and brittle. Over time the progressively **Dehydrated Disc** becomes displaced. Displacement of the disc causes the joint to move abnormally which often leads to chronic inflammation and pain.
2. TM Joint Dysfunction tends to irritate adjacent muscles leading to **Chronic Jaw Muscle Spasm**.
3. These chronically contracted (or tightened) muscles pinch off their own blood supply. A disrupted blood supply prevents the spasmed muscles from receiving adequate amounts of oxygen, glucose and nutrients. Without this fuel the injured cells cannot manufacture the energy to heal.

#### ***Anatomy: Temporomandibular Disc***

The fibers that make up the outer layer of the disc are highly pain sensitive. Swollen by inflammation, the disc cannot assist the movement of the joint. Because of this, the joint and attached muscles become impaired. This impairment causes the inflammation and pain to spread. Headaches, spasm and locking of the joint become increasingly common symptoms.

## ***Standard Medical Treatment of TMJ Dysfunction***

### **Temporomandibular Disorders (TMD) and Temporomandibular Joint (TMJ)**

**Dysfunctions** are typically treated with dental splints, physical therapy, night guards, pain killers and anti-inflammatory medications. Some people get temporary relief utilizing these approaches. Others are warned they may need surgery or years of orthodontic care to correct their specific condition. These extreme measures were once required because, until recently, no technology existed that could restore the health of the disc. **TMJ Disc Restoration** is now possible with the use of the revolutionary, new **High Power Laser Technology**.

### ***Disc Restoration***

Many sufferers of TMJ Dysfunction are able to attain a permanent correction of their TMJ problem by first healing the damaged disc and the nerves that surround the joint. Repair of these structures can often be accomplished with the use of **High Power Laser Therapy**.

**High Power Laser Therapy** re-establishes blood flow to the disc and directly delivers energy into the oxygen deprived cells within the disc. As the disc softens and repositions itself, the nerves that infuse the wrapping around the disc stop sending out pain signals. This allows pain-free movement of the jaw.

### ***High Power Laser Works to Correct TMJ Dysfunction / TMD***

Traditional therapies (exercise, ultrasound and medication) rely on the blood stream to send repair nutrients and raw materials the cells need to manufacture energy. But these methods have only limited success because the circulatory pathways are often blocked by ongoing inflammation and muscular spasm.

**Avicenna High Power Laser Therapy** bypasses the blood stream and delivers laser energy directly into the cells and adjacent muscles. The mitochondria (the power house of the cell) convert laser energy into biological energy. The *focused light energy* is then used by the tissue to repair itself. As the tissue heals, the inflammation subsides and the natural flow of oxygenated, nutrient-rich blood is re-established allowing for long-term improvement.

With all the components of healing in place, *permanent restoration of the TMJ Disc and return of muscle function* is possible. Laser Therapy directs the healing energy into the body using two pathways.

## ***Two Healing Mechanisms Using High Power Laser Therapy:***

### LASER THERAPY

- STIMULATION OF CELLS
- ENERGY PRODUCTION (ATP)
- HEALING
- REDUCED JOINT, DISC & MUSCLE INFLAMMATION
- INCREASED BLOOD FLOW
- MORE OXYGEN & NUTRIENTS AVAILABLE TO CELLS
- ENERGY PRODUCTION (ATP)
- HEALING

### **Plantar Fasciitis (Fasciitis):**

#### **Permanent Solution Using the High Power Laser**

#### ***What Causes Plantar Fasciitis?***

**Plantar fasciitis** develops because of repeated small tears to the flat band of ligamentous tissue that connects your heel to the bones of your toes. These tears weaken the arch that supports the foot. As the arch of the foot weakens, increasing strain is placed on the deeper ligaments and tendons of the foot and lower leg. Over time, Plantar Fasciitis can result in **Chronic Pain, Heel Spurs and Degenerative Joint Disease (Arthritis)**.

#### ***Standard Medical Treatment for Plantar Fasciitis***

Physicians typically treat Plantar Fasciitis with anti-inflammatories. These medications temporarily reduce the pain associated with Plantar Fasciitis but do not treat the cause of the problem.

#### ***The Solution: HEAL the Plantar Fasciitis with Laser Therapy***

**Permanent correction of Plantar Fasciitis requires two procedures.**

#### **1. Heal the Damaged Fascia**

Ending the pain caused by Plantar Fasciitis requires stopping the cycle of inflammation. This is critical because chronically inflamed tissues block the flow of needed nutrients and oxygen to surrounding muscles and joints. Deprived of these building blocks, healthy tissue deteriorates and the inflammation spreads. More importantly, spreading inflammation chokes off blood flow to the nerves. The revolutionary **Laser** establishes and promotes the permanent solution to inflammation by **bypassing the blood stream and delivering bio-available infrared high power laser energy directly into the injured cells**. This “focused” energy is then used by the cells to repair themselves. As the tissue heals, the inflammation subsides and oxygenated nutrient-rich blood flow is re-established.

## 2. Correct the Foot and Gait Mechanics

This involves stabilizing the arch. Stabilization is achieved by utilizing shoe inserts called **Orthotics** and implementing a simple series of specific strengthening and stretching exercises. Our office can supply you with expertly crafted inexpensive orthotics and teach you how to recondition the foot and lower leg.

### ***High Power Laser Therapy: How Does it Work?***

Research biologists describe the healing process in the following way.

1. Reduced blood flow deprives human tissue of oxygen and glucose.
2. The powerhouse of the cell needs this oxygen and glucose to manufacture energy.

Without ATP the cell cannot function (e.g. a muscle cell cannot contract or relax) and it cannot repair components of the cell that have been damaged.

Simply stated,

NO OXYGEN + NO GLUCOSE = NO ENERGY + NO HEALING.

### **The Solution**

Laser therapy bypasses the blood stream and delivers laser energy to light receptors (photoreceptors) within the mitochondria. The mitochondria accept this energy and use it to create ATP, which the cell can use to power the healing process.

LASER STIMULATION OF CELLS + ENERGY PRODUCTION (ATP) = HEALING

Treatment with the Laser is pain-free. The patient experiences only a gentle warming spa-like sensation over the surface of the skin.

### **Rotator Cuff Injuries:**

#### **Class IV High Power Laser Therapy Treatment**

The **Rotator Cuff** muscles (four muscles in total) are the primary support structures for the shoulder. Therefore, even minor dysfunction associated with these muscles can create significant pain and disability including shoulder pain, arm weakness, and decreased athletic performance.

Severe Rotator Cuff injury often irritates the many nerves that pass through the shoulder joint causing a pinched nerve. This is commonly called a **Rotator Cuff Impingement Syndrome** and is often associated with symptoms such as numbness, tingling and sharp, shooting pain into the arm or hand.



A Rotator Cuff problem can be caused by many everyday activities. These activities include traumatic events (e.g. fall on an outstretched arm, “yanking” of the arm), repetitive motions (e.g. throwing a ball, weightlifting, swimming) and chronic, improper postures (e.g. operating a computer, driving).

There are three major types of Rotator Cuff injury all of which respond well to **Class IV High Power Laser Therapy**:

1. **Rotator Cuff Muscle Tears**: Partial muscle tears of one or more of the four Rotator Cuff muscles. Rotator Cuff muscle tears are often accompanied by deep achy pain in the shoulder and arm weakness.
2. **Tendonitis or Tendinosis**: All muscles have tendons where they attach to bones. Inflammation of these tendons is called Tendonitis or Tendinosis. The symptoms of a Rotator Cuff Tendonitis are often similar to that of a Rotator Cuff Muscle Tear: deep, achy pain in the shoulder and arm weakness.
3. **Rotator Cuff Impingement Syndrome**: Chronic injury of the Rotator Cuff can lead to a “pinching” of the nerves passing through the shoulder. This is commonly referred to as a Shoulder Impingement or Rotator Cuff Impingement. Symptoms often include numbness, tingling or sharp, shooting pain into the arm or hand.

#### ***Class IV High Power Laser Therapy Treatment for Rotator Cuff Injuries***

Fortunately, all three types of Rotator Cuff Injury respond well to Class IV High Power Laser Therapy.

#### ***1) Rotator Cuff Muscle Tears and Class IV High Power Laser Therapy (HPLT)***

**The Problem: Torn Muscle Leads to Torn Arteries and Capillaries**

Blood vessels that carry blood to the injured portion of the muscle are also torn along with the muscle fibers. Think of it like this: The ambulance can't get to the scene of an accident because it is stuck in the traffic jam caused by the accident.

The injured muscle tissue depends on the oxygen and glucose that are delivered to the injury site. They are then converted to a form of energy (called ATP) that the body uses to repair the damage. In simplest terms it can be described this way:

NO OXYGEN + NO GLUCOSE = NO ENERGY + NO HEALING

***The Solution: Laser Therapy Bypasses the Blood Stream to Deliver Energy Directly to the Torn Muscles***

Class IV High Power Laser Therapy *bypasses* the blood stream altogether and delivers the much-needed energy *directly* into the powerhouses (mitochondria) of the injured muscle cells. The focused, high-energy infrared waves stimulate the mitochondria to produce the vitally important healing energy called ATP. The photochemical process does not rely on oxygen or glucose and, therefore, completely bypasses the arterial "highway" that was damaged as a result of the Rotator Cuff muscle tear. We can simplify this concept as follows:

LASER STIMULATION OF CELLS + ENERGY PRODUCTION = HEALING

***2) Tendinitis / Tendinosis and Class IV High Power Laser Therapy (HPLT)***

***The Problem: Tendons Have Notoriously Poor Blood Supplies***

Muscles are attached to bones via tendons. Contraction of the muscle pulls on the tendon acting as a lever to move the bone.

Unfortunately, tendons have notoriously poor blood supplies. While muscles can be fed by several different arteries located outside the muscle, the tendon can only be fed by blood from within the muscle that it is attached to. This means that any problem, especially inflammation as seen in tendonitis, will "block" this blood vessel. This will starve the tendon of oxygen and glucose. A starving tendon can't heal.

*Think of it like this:* The ambulance can't get to the scene of an accident because it is stuck in the traffic jam caused by the accident.

The injured muscle tissue depends on the oxygen and glucose that are delivered to the injury site by the blood stream. They are then converted to a form of energy (called ATP) that the body uses to repair the damage. In simplest terms it can be described this way:

NO OXYGEN + NO GLUCOSE = NO ENERGY + NO HEALING

### ***The Solution: Laser Therapy Bypasses the Poor Blood Supply and Delivers Energy Directly to the Injured Tendon Cells***

Class IV High Power Laser Therapy bypasses the blood stream altogether and delivers the much-needed energy directly into the powerhouses of the injured tendon cells. The focused, high-energy infrared waves stimulate the mitochondria to produce the vitally important healing energy called ATP. The photochemical process does not rely on oxygen or glucose and, therefore, completely bypasses the arterial “highway” that was damaged as a result of the Rotator Cuff Tendonitis. We can simplify this concept as follows:

LASER STIMULATION OF CELLS + ENERGY PRODUCTION = HEALING

### ***3) Rotator Cuff Impingement and Class IV High Power Laser Therapy (HPLT)***

#### ***The Problem: Nerves Don't Have an External Blood Supply***

Serious Rotator Cuff injuries can lead to a painful nerve condition called Rotator Cuff Impingement Syndrome.

Unlike other tissues in the body, nerves do not have an external blood supply. Therefore, the blood vessels that are responsible for feeding the nerve itself are actually located within the nerve. This makes the nerve VERY vulnerable to both trauma and repetitive motion injuries. When the nerve becomes impinged the blood supply that feeds the nerve also becomes “pinched off”. Without this blood the cell does not receive the supply of oxygen and glucose that is needed to power the healing process.

In other words:

NO OXYGEN + NO GLUCOSE = NO ENERGY + NO HEALING

#### ***The Solution: Laser Therapy is Like LifeFlight for Impinged Nerves***

A Rotator Cuff Nerve Impingement is similar to a bad car accident where emergency crews must travel through heavy traffic before they can offer assistance. The freeway can be compared to the nerve's blood supply and the emergency crew represents the body's ability to heal itself. There are two primary challenges to the emergency workers, 1) the injured individuals can't be helped until the traffic jam is cleared, and 2) the traffic can't be cleared away until the damaged vehicles are removed. As you can see with this example it would likely take a very long time before rescue crews are able to help out.

However, in the real world we have a better option, Life Flight – a helicopter that *bypasses* the traffic and goes *directly* to the site of the accident to heal the sick and injured. The Cellular Medicine equivalent to Life Flight is Class IV High Power Laser Therapy.

**Class IV High Power Laser Therapy** does not rely upon the blood stream to deliver its healing resources. Laser therapy delivers the necessary energy directly to the powerhouses of the nerve cell to jump-start the healing process. The focused, high-energy light waves stimulate the cells to produce the vitally important ATP. This photochemical process completely bypasses the arterial “highway” that was damaged as a result of the Rotator Cuff Impingement. In simplest terms this process can be described as such:

LASER STIMULATION OF CELLS = ENERGY PRODUCTION (ATP) = HEALING

### **Which Molecule is Used as Fuel for a Cell?**

The body consumes large amounts of energy throughout any given day. Every process within the body, and every action performed requires ongoing sources of energy. Every cell is a mini-manufacturing plant of this energy. The cell's fuel comes from ATP molecules, and is rightly considered the currency of the cell.

#### ***Identification***

1. For the cells of the body to make use of nutrients from the **foods** you eat, these nutrients have to be broken down into a form that cells can digest. The final result of this digestion process is a molecule called ATP, or adenosine triphosphate. ATP molecules store and expend energy as needed within the cell's environment. Everything from cell metabolism to nervous system functions to muscle contractions to the forming of a thought in the brain is fueled by ATP molecules, which reside in every cell.

#### ***Function***

2. Cellular respiration happens when glucose molecules are broken down into **energy sources**. Glycolysis is one of two processes involved in cell respiration. This is an anaerobic series of chemical reactions that break down glucose molecules into usable cell forms. The Krebs Cycle is the second process involved in cell respiration. In the Krebs Cycle, cells use stored oxygen reserves to breakdown carbohydrates, fats and amino acids into fuel for the cell. The energy produced in cellular respiration is the catalyst for the ATPase enzyme, and its breakdown of ATP.

#### ***Significance***

3. Overall, there are three primary processes taking place in every cell of the body; metabolism, catabolism and anabolism. Metabolism incorporates all of the energy produced and consumed by a cell. The energies used in catabolism and anabolism are part of this total energy. Catabolism is an energy producing process which is carried out by glycolysis and the Krebs Cycle. Anabolism is an energy consuming process where small molecules like glucose are used to make larger molecules, like glycogen and ATP.

## ***Effects***

4. In effect, an ATP production-reproduction cycle takes place in each cell, as ATP is broken down into ADP and phosphates components for fuel. These same components then recombine to form more ATP molecules. Since the energy produced in the breakdown of ATP comes from the energy released when phosphate **bonds** are broken, the remaining byproducts are available for reuse. The reproductive quality of ATP is why it's called the currency of all cells, as this molecule spends and saves energy according to the needs of the cells.