

Shock Wave Therapy



An explanation in the development, use and benefits of;

Extracorporeal Shock Wave Therapy, (or ESWT), is an advanced technology using shockwaves to treat chronic, painful conditions of the **NeuroMusculoSkeletal (NMS)** system. A shockwave is an intense, but very short energy wave traveling faster than the speed of sound. The word "Extra-corporeal" means "outside the body" and refers to the fact that the shockwaves are generated outside the body.

The basic science behind **SHOCKWAVE THERAPY** is similar to the more commonly heard of; lithotripsy, or the non-surgical breaking up of kidney stones using acoustic waves. This technique/technology has been around for decades and has helped thousands of people. When people undergoing this treatment had dramatic improvements in unrelated aches and pains scientists began studying this "discovery" and developed better devices more appropriate for **NeuroMusculoSkeletal (NMS)** disorders.

We are pleased to offer Shockwave Therapy that assists in the treatment of NMS disorders. Shockwave emerged to initially demonstrate improvement for **Entheisopathic** (tendon to bone connection) **Desmopathic** (ligament to bone) conditions like Tennis Elbow and Plantar Fasciitis. But since, Shockwave has been improved upon to successfully treat a wide variety of disorders involving muscle, bone, ligament, tendon and neural (referring to the nervous system) disorders. Find below a list of some of the more common NMS applications for ESWT.

Shockwave Therapy is a non-invasive non-surgical solution that accelerates the recovery from injured tissue

Plantar Fasciitis/Fasciosis and Heel Spurs	Achillies' Tendinitis
(Calcific) Rotator Cuff Tendinitis	Jumpers Knee/Runners Knee
Reflex Sympathetic Dystrophy	Tennis Elbow/Golfers Elbow
Peyronies' Disease	Myofascial Pain/Shin splits
Mortons' Neuroma	Non-union or stress fractures
Hallux Rigidus	Bursitis of the upper/limbs
Calcifications	Arthritic Pain/ Conditions
Post-Surgical Pain/Scar Tissue	Many other pain syndromes and conditions

Cost of therapy and number of sessions vary depending on area, severity and response

Extracorporeal Shock Wave Therapy – Real Pain Relief

Shock Wave Therapy should be considered when the following conditions are met:

- A diagnosis that is considered to be responsive to ESWT is established.
- When simpler and less expensive treatment alternatives have failed or aren't appropriate for whatever reason.
- When surgery or other more invasive treatments are considerations as alternatives.

How effective is shockwave therapy?

There are a number of articles studies available on this topic and answer to this question depends upon which study you read, what methods were used in the study, how "success" is measured in the study, the patients selected to be included in the study, the condition being treated, and the device/brand of shockwave being used.

While there are some studies that suggest that shockwave hasn't been proven to be effective, the vast majority of recent studies suggest that shockwave is highly effective. For example, over 70 studies were presented at the 2006 international shockwave seminar in Brazil, and over 80 were presented the year before in Vienna--and this doesn't even include the numerous published findings in the medical literature.

Assuming you have an injury appropriate to extra-corporeal shockwave technology treatment, most recent independent studies suggest somewhere between a 65% and a 95% "success" range, with values around 80% being the most commonly cited number. When adjunctive therapy is used (which is the norm at Advanced Pain Relief Clinic) the success rates increase proportionately. It's important to note that most of these studies have success rates as determined by the patient themselves, in terms of pain and function.

Even though we can't always predict with 100% accuracy which patients will respond successfully we can tell you at Advanced Pain Relief Clinic we find that our results are typically better than the published literature.

How fast does ESWT work?

Many patients report an improvement almost immediately following treatment. This effect is usually (but not always) temporary, and is associated with an anesthesia effect from the hyper stimulation of the tissue treated by the Shockwave Therapy.

It takes several days for injuries to begin to heal, and most patients see an improvement before the end of the second week. Depending upon your diagnosis, the healing process may take several weeks or even months or more to be completed, but pain relief often precedes the completion of the healing process.

Relief often begins with the first treatment

Extracorporeal Shock Wave Therapy – Real Pain Relief

Is Shockwave Therapy safe?

As previously noted the basic technology involved with extracorporeal shockwave technology has been used for decades now on quite literally millions of people. The technology has been used most extensively in Europe, particularly the German-speaking countries, where this technology originates. In all its use, ESWT of the musculoskeletal system has been found to have virtually no serious side-effects. In fact, even mild side effects like tingling, aching, redness, or bruising are relatively rare, modest and short-lived. In addition, the side effects listed are more associated with the earlier generations of Shockwave devices.

How does Shockwave therapy work?

In simple terms, extracorporeal shockwaves stimulate certain components within the body so the body is able to heal. ESWT is able to accomplish this even in chronic cases, when the body has demonstrated a previous unwillingness or inability to do so by itself.

In addition to stimulating the healing process, ESWT seems to have a direct effect on nerves, and the central nervous system, diminishing pain. Find attached an article termed, [a neural model for chronic pain and pain relief using shockwave therapy](#) by Othmar J. Wess, that explains in depth how shockwave therapy can “reset” a brain that has become sensitized by chronic pain. This sensitization process lies at the core of many chronic painful conditions. If this article is not attached please ask at the front desk and a copy will be provided. Copies can also be found on the world wide web.

Many traditional therapies--such as anti-inflammatory medications, steroid injections, physiotherapy, massage, acupuncture, and so forth--can assist the body during the early, acute phase of an injury. However, they are much less effective in assisting the body to heal when an injury becomes chronic (this is often, at least in part, due to the brain sensitization process). As an example, many patients can relate to a history where a steroid injection (like cortisone) seemed to be effective in resolving pain early in their healing process, but subsequent injections were much less effective. This isn't really surprising when you realize that a chronic-state, degenerative injury isn't likely to respond well to a medication designed to affect an acute-phase, inflammatory condition.

What makes ESWT unique is that it is one of the very few technologies in any field of medicine that seems to work best when an injury reaches the chronic, non-healing state. ESWT appears to be able to jump start the healing process in chronic, non-healing injuries and move them back into the acute phase of healing. One of the unique approaches at Advanced Pain Relief Clinic is that (in in some cases or conditions) we convert the unresponsive, chronic injury in to a responsive more acute type of injury then apply therapies like Low Intensity Laser Therapy to support and guide appropriate healing. This often leads to better long term relief profile.

*Treatments are typically accepted for coverage under
Physiotherapy or Chiropractic and are also eligible for
income tax reimbursement.*

Extracorporeal Shock Wave Therapy – Real Pain Relief

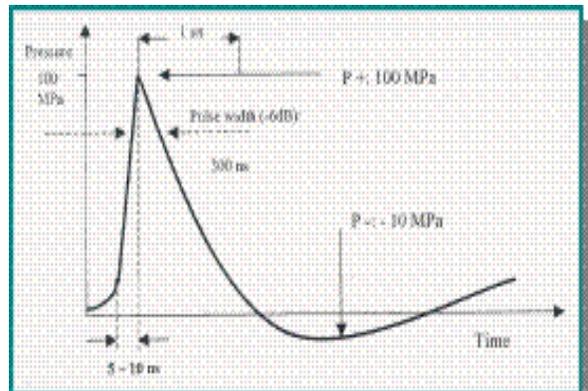
How does the Shockwave Therapy promote healing? A look at the physics involved.

While research continues to further and more fully understand the precise mechanism behind ESWT's effects on injured tissues, the picture is becoming much clearer.

Some of the added benefits of Shockwave Therapy (when compared to surgery) include no extended recovery, no nerve damage, no risk of infection or permanent scarring

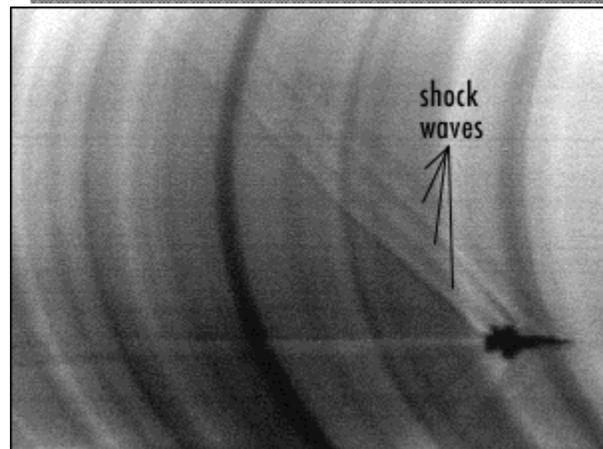
True ESWT produces a very strong energy pulse (5-100 MPa) for a very short length of time, (approximately 10 milliseconds).

The energy pulse quite literally breaks the sound barrier, and this is what creates the shockwave.



To the right is a photograph of a plane flying faster than the speed of sound and creating shockwaves. Shockwaves produced by an extracorporeal shockwave machine are identical, only on a smaller scale.

One difference with the shockwaves our machine is able to produce is that the shockwave is generated, controlled, and focused precisely.



Extracorporeal Shock Wave Therapy – Real Pain Relief

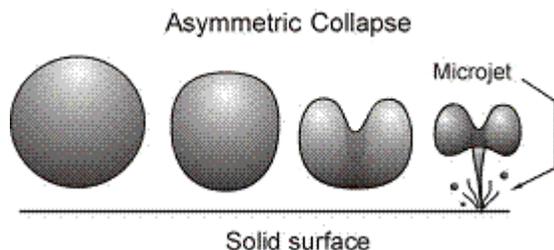
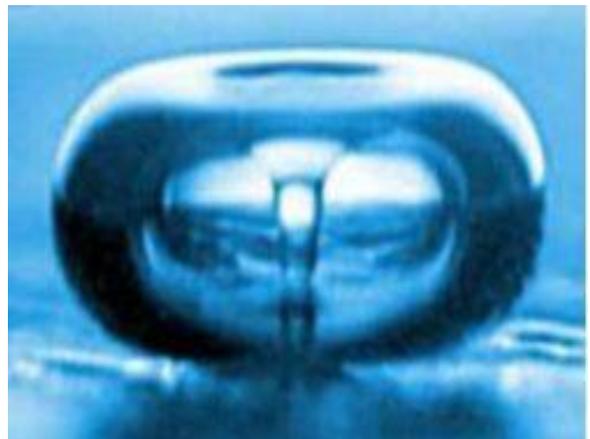
In fact, the machine we use allows us to be able to control and focus the shockwaves to such an extent we are able to pass the shockwaves through the uninjured portions of the body without any effect, and deliver the energy to a focus point at the level of the injured tissue, where it has several known medicinal effects:

- First, this shockwave exerts a mechanical pressure and tension force on the afflicted tissue. This has been shown to create an increase in cell membrane permeability, thereby increasing microscopic circulation (right) to the tissues and the metabolism within the treated tissues, both of which promote healing and subsequent dissolution of pathological calcific deposits.
- Second, the ESWT shock waves pressure front creates behind it what are known as "cavitation bubbles". An example of a single cavitation bubble is pictured to the right.

Cavitation bubbles are simply small empty cavities created behind an energy front. They tend to expand to a maximum size, then collapse, much like a bubble popping.

As these bubbles burst, a resultant force is created. In the human body, this force is strong enough to help break down pathological deposits of calcification in soft tissues.

- Third, as cavitation bubbles collapse, they create smaller, secondary energy waves known as microjets. You can see how a microjet forms in the diagram to the right, and you can see it pictured in the center of the cavitation bubble in the photograph immediately above.



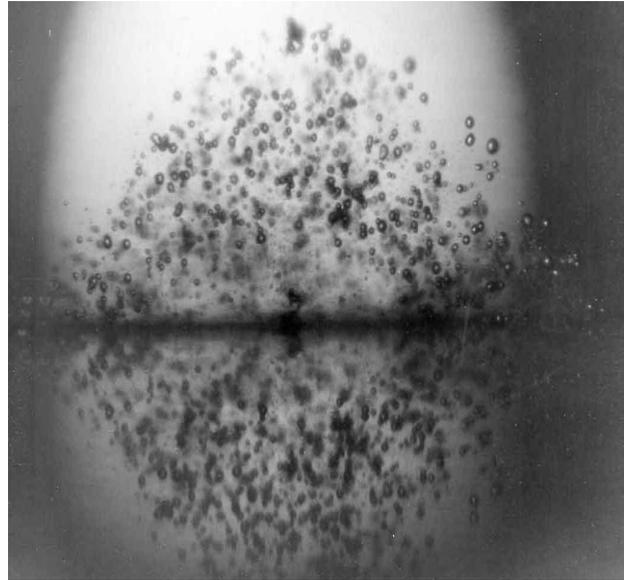
Extracorporeal Shock Wave Therapy – Real Pain Relief

These microjets also create enough force to also break down pathological deposits of calcification in the soft tissues through direct, mechanical means.

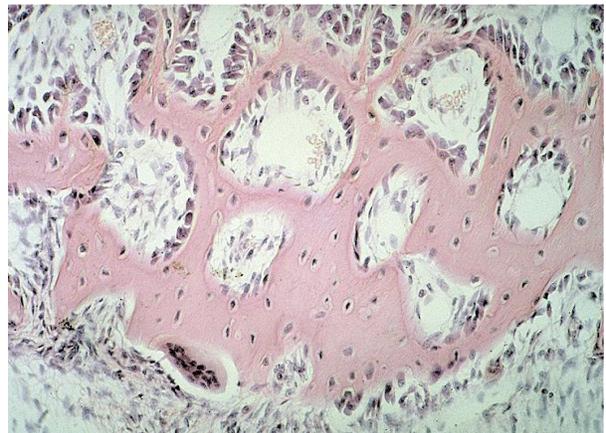
In the application of an ESWT treatment in a medical setting, however, it's not just one cavitation bubble or just a few cavitation bubbles being produced, but hundreds and thousands.

To the right you can see what hundreds of cavitation bubbles formed from a single shockwave looks like.

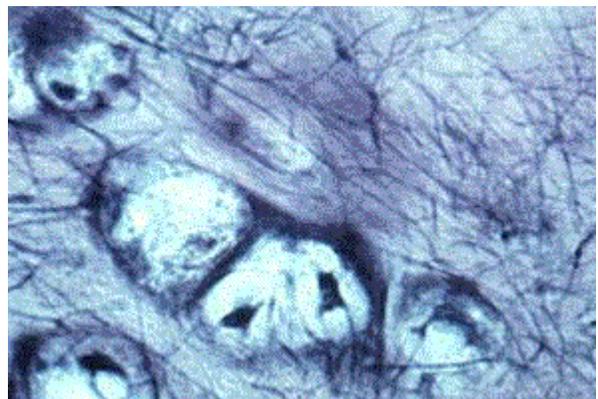
Multiply this by several thousand shockwaves being administered to an injured tissue through a course of ESWT treatment and you can imagine the forces that can be mustered to break down deposits of calcification that are found in joints, soft tissues and spurs.



- Beyond breaking down pathological calcification deposits, ESWT has been shown to stimulate cells in the body known as osteoblasts. These bone cells, (pictured to the right), are responsible for bone healing and new bone production, so stimulating them obviously enhances the healing process of bone.



- ESWT shockwaves have also been shown to stimulate fibroblasts, (pictured to the right). Fibroblasts are the cells responsible for the healing of connective tissues such as tendon, ligaments, and fascia.



Extracorporeal Shock Wave Therapy – Real Pain Relief

- ESWT also diminishes pain. It does so in two ways. First, as mentioned above, ESWT initially diminishes pain through what is known as hyperstimulation anesthesia. This is where the nerves sending signals of pain to the brain are stimulated so much that their activity diminishes, thereby decreasing or eliminating pain. This effect is usually, (but not always), short lived.
- ESWT is also believed to diminish pain over longer periods of time through the stimulation of what is known as the "gate-control" mechanism, where nerves can be stimulated to "close the gate" to pain impulses sent to the brain. It is sometimes thought of as activating a sort of "reset" button that recalibrates pain perception.

Interestingly, and in apparent support of this theory, it was demonstrated by research presented at the 2005 conference in Vienna that using anesthesia with ESWT alters the sensor input - motor output balance of nerve fibres, inhibiting the pain-killing effect of ESWT.

In other words, ESWT appears to be most helpful for patients who are not anesthetized. (This explains why some early studies where anesthesia was used before the administration of extracorporeal shockwave therapy did not get results as good as what is found in patients where no anesthesia is used.)

Our versions of shockwave DO NOT require anesthesia, this serves as one explanation as to why this version of shockwave works so well.

While most studies discuss the benefits of Shockwave on Enthesisopathies (tendon to bone) and Desmopathies (ligament to bone) conditions, publications for the use of Shockwave Therapy on other conditions continues to grow. Advanced Pain Relief Clinic was the first clinic of its' kind in the area and the first regional, no referral required, clinic to introduce Shockwave in a comfortable non-hospital setting. This gives us the distinct advantage of experience. Please feel free to come in and discuss any health related problems and/or to find out if you can benefit from Extra Corporeal Shockwave Therapy on its' own or as part of a treatment plan.



Offices in:
Kitchener-Waterloo
Owen Sound
Guelph
Call 310-PAIN or visit:
www.advancedpainreliefclinic.ca