

Laser Therapy in Sports Medicine

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Lasers to optimize rehabilitation outcomes for injured athletes, while maximizing performance and encouraging injury prevention in healthy athletes?

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By RICHARD COLLINGE, MSC

Earning Elite-Level Status

Watford Football Club's athletes get a leg up thanks to high-power laser therapy



When Watford Football Club earned a spot in the English Premier League (EPL) 15 months ago, it's safe to say that the stakes were raised to a level that I couldn't have imagined. Along with this came the pressure one would expect when you have been elevated to the very highest level of play.

Promotion to the EPL is no simple task. It is the most competitive (and watched) football league in the world. Qualifying for a spot in the EPL is very different from many professional sports, in that a team truly does have to "qualify." If a team's performance diminishes, they can be relegated out of the league to make room for a better team from the league below.

As you can imagine, once you arrive on the big stage and the spotlights are on, it's "game time" and the goal is to have everyone performing at their best. It's hard to describe the pride that pulses through the club and fuels everyone in the organization to perform at the highest level in every way.

It's especially evident within our medical program. We are doing all we can to incorporate the most effective evaluation and treatment methods.

It's About The 1%

At this high level of game-play it's about the 1%. The finest of margins can make a difference. Getting that extra 1% of performance or the extra 1% of recovery can make a difference between winning and losing. Getting these players on the pitch even one day sooner could tilt the scales in our favor at the most crucial time.

Medically, we created the right infrastructure to accomplish these marginal, but essential, improvements. It's my job to decide what's going to be most beneficial for the team and the individual players. We strive for the best outcomes but the solutions also have to be cost-effective. We treat injuries when they happen, but we also have a substantial injury prevention strategy to keep our players

well — and having the right programs and technologies to prevent injury is important to us.

Sifting through the noise can be difficult. I vividly remember the day we were promoted to EPL. I instantly received a battery of e-mails from companies trying to

Getting that extra 1% of performance or the extra 1% of recovery can make a difference between winning and losing.

sell me all kinds of things. I began looking at research and decided to evaluate a few modalities. We are pretty much practicing 24-7 medicine in our environment, and the purpose of trialing equipment is to ensure new technologies are going to hold up to our harsh demands. Additionally, and most importantly, we need to see results and experience positive feedback from players.

Time is not on your side when you have a match right around the bend. Finding the right methods and technologies to incorporate can be a challenge when you're looking for outcomes fast and trying to keep players comfortable and happy.

Exceeding Expectations

As I conducted research and talked to my colleagues, it was recommended that we take a look at deep-tissue laser therapy. I had encountered laser therapy 15 years ago but did not pay it much mind.

Historically, my impression had been that laser therapy was limited in its application. But I was told that the new higher-power lasers were more versatile and effective. We decided to bring it in for evaluation. When we began our trial of the laser with Watford FC, it was a rebirth of laser in terms of application, potential and results.

Richard Collinge is Head of Medical for Watford Football Club in Watford, United Kingdom.



Professional soccer players for Watford Football Club in the United Kingdom now request laser therapy treatment from the medical staff. There is a deep-heat feeling in the tissue and athletes can feel the difference. Player feedback is crucial to compliance and outcomes.

We've been so impressed with the wide variety of conditions we can effectively treat. Of all our modalities the laser is most versatile. We treat the array of acute, chronic, post-surgical and early degenerative conditions with fantastic results. Results have been extremely positive in players with Achilles, shoulder, and patellar tendinopathy. Numerous knee pathologies have also responded extremely well.

With our eyes open to the newfound versatility of laser therapy, our club did in fact invest in the technology, and I'm sure we'll be looking to expand with it over the coming years.

Player Favorite

As we prepare for play, we monitor injuries and attempt to get players on the field so they can compete safely and without discomfort. Laser therapy has been excellent in reducing overall recovery times and is a fast, easy treatment that we feel gives us tremendous results leading up to a match.

As a pre-performance treatment, the ability to quickly stimulate blood flow and warm up deep-tissue structures makes players more comfortable as they prepare for heavy competition. Players come in for treatments before they go to the gym to

work out, before practice, and especially before matches. Players are more comfortable in their movements after receiving laser therapy treatments.

Players now come in and ask for the treatment. There is a deep-heat feeling in the tissue and they can really feel the difference.

Player feedback is crucial to compliance and outcomes. You can believe that the technology is the greatest in the world, but if the players do not gravitate toward it, you will have an uphill battle trying to make it a daily event. The therapy laser has actually become a mandatory part of my kit based on player demand.

Simple Solutions

Laser therapy has been easy for staff to grow accustomed to. We've learned dosing techniques that were completely foreign to us in the past and are developing our skill through education opportunities.

We're finding that the technology is not intimidating, and is actually quite the opposite. Built-in protocols have made it easy to set up and delegate treatments, and keep things consistent. Treatments are fast and easy and you don't have to be a laser scholar to operate.

We've learned to use the laser adjunctively with shockwave therapy, cryotherapy chambers, and other recovery strategies. As an added benefit we've been combining laser with manual therapy treatments by utilizing the massage ball head attachment. This allows us to work with the tissue more effectively while delivering a dose of laser energy.

Portability is a massive bonus. We stay in hotels every night before home and away games. Having equipment that can become part of our travel kit is important since we often set up our medical clinic in a hotel room. A battery-operated unit allows us more mobility in tight work spaces.

Proof Case

In January we signed a player who had come to us from another club. He had undergone surgery in November for a meniscal injury. When we conducted his initial medical exam there was still inflammation in the area; however, we accepted this as a risk that came along with the player.

In his previous rehabilitation program, he had not been exposed to the therapy laser, so we began that straight away. We started at a medium power and progressively became more aggressive.

After just the first treatment, the player reported positive results, and the swelling quickly subsided. Six months later we still treat him with the therapy laser pre-training and pre-game. He comes in asking for it every day because it has worked so well.

We have also seen impressive results in surgical cases where scar tissue had persisted. The laser is helping optimize the tissue in a state in which it is more prepared to heal. The results we saw on scar-tissue from a post-surgical lower-abdominal procedure were impressive.

A Kit Essential

We are well underway and having fantastic experience with deep-tissue laser therapy. We've had terrific outcomes and the players have come to expect and appreciate the benefits.

The portability and ease of use have made it easy to adopt, and the unit has been great for the entire staff regardless of level of experience. I can confidently say the therapy laser is an essential part of our medical kit. ■

LASERS IN MEDICAL SCIENCE
Volume 31, Issue 7, 2016, pp. 1325-1332
© Springer-Verlag London 2016
doi:10.1007/s10103-016-1979-7
LiteCure® Laser Used in Study



Photobiomodulation Delays the Onset of Skeletal Muscle Fatigue in a Dose-Dependent Manner

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Abstract: Photobiomodulation (PBM) therapy has been implicated as an effective ergogenic aid to delay the onset of muscle fatigue. The purpose of this study was to examine the dose-response ergogenic properties of PBM therapy and its ability to prolong time to task failure by enhancing muscle activity and delaying the onset of muscle fatigue using a static positioning task. Nine participants (24.3 ± 4.9 years) received three doses of near-infrared (NIR) light therapy randomly on three separate sessions (sham, 240, and 480 J). For the positioning task, participants held a 30 % one-repetition maximum (1-RM) load using the index finger until volitional fatigue. Surface electromyography (sEMG) of the first dorsal interosseous muscle was recorded for the length of the positioning task. Outcomes included time to task failure (TTF), muscle fatigue, movement accuracy, motor output variability, and muscle activity (sEMG). The 240-J dose significantly extended TTF by 26 % ($p=0.032$) compared with the sham dose. TTF for the 240-J dose was strongly associated with a decrease in muscle fatigue ($R^2=0.54$, $p=0.024$). Our findings show that a 240-J dose of NIR light therapy is efficacious in delaying the onset and extent of muscle fatigue during submaximal isometric positioning tasks. Our findings suggest that NIR light therapy may be used as an ergogenic aid during functional tasks or post-injury rehabilitation.

Key Words: Ergogenic; Motor output variability; Near-infrared; Surface electromyography; Task failure

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Andy Wood,
Director of Export Sales
Litecure Medical
250 Corporate Blvd. , Suite B
Newark, DE 19702

Dear Andy,

On behalf of Rowing Canada, I would like to thank you for your past and present support of our Canadian Olympic Rowing Team.

The Litecure Class IV laser has been used for a myriad of injuries and there is no doubt it has aided in faster recovery times for our athletes.

We were particularly impressed with the new "Lightforce Pro" laser. Big things do come in small packages!

The portability and ease of use makes it a must-have for any therapist or doctor traveling with teams. This technology played a large part in allowing our athletes to compete to their greatest potential...and we have the hardware to prove it...2 Olympic silver medals!

A sincere thank-you on behalf of myself, the athletes, and Rowing Canada Aviron.

Best Regards,

Michael J. Murray, DC, FRCCSS(C), FICC
Team Chiropractor, Rowing Canada



2012 Olympic Canadian Rowing Team



Laser Therapy is a Slam Dunk for Basketball Injuries



Basketball players stack up the miles – both on the court and on their bodies. Fouls, falls, and failure to rest lead to acute and chronic injuries that can end games and occasionally careers. Prevention and treatment of these injuries is a primary concern for practitioners and players alike.

Laser therapy is helping to address this concern by quickly and effectively treating pain and inflammation related to numerous common basketball-related injuries. Here are 3 common basketball injuries and the recommended treatment protocols for each:

Ankle Sprains

The most common basketball injury is the ankle sprain. This injury often occurs when a player lands on another player's foot or the ankle rolls inward (inversion) during a pivot motion, stretching and tearing ligaments (partially or completely). Treatment for ankle sprains often involves immobilization via casting or taping, ultrasound or muscle stimulation.

Laser therapy is also a very effective modality to help reduce swelling and pain, and to accelerate recovery time. Laser light triggers ATP production to accelerate the repair of damaged cells and growth of healthy new cells, including those that make up cartilage (chondrocytes), bone (osteocytes), and connective tissue (fibroblasts). The sooner you can apply laser therapy to an ankle sprain, the quicker the recovery will be.

Treatment suggestions:

Acute stage: Lower power (5-6 W) and lower dosages (6-7 J/cm²), with an average total dose of 1500 J. Treat daily for 3 days and then every other day. Total number of sessions depends on the client.

Chronic Stage: Higher power (10-15 W) and higher dosages (8-10 J/cm²), with an average total dose 3,000 J. Treat every other day for 4-6 sessions.

Knee Injuries

Knee injuries are some of the most serious basketball related injuries. Knee sprains, meniscus tears and ACL tears occur often. To help the injuries heal, immobilization is often a first go-to option for treatment. After rest, progression to stretching and strengthening exercises is typical if surgery is not indicated.

In addition to rest and strengthening exercises, decreasing inflammation helps further the recovery process. Laser light fights excess inflammation by increasing the anti-inflammatory cytokines that bring chronic inflammation to an end. They lower the number of neutrophil cells that can contribute to chronic inflammation, and they increase the number of macrophage cells in the immune system, helping to remove damaged cells.

Treatment suggestions:

Treat areas surrounding and including the location of pain in an off-contact method.

Acute stage: Lower power (5-6 W) and lower dosages (6-7 J/cm²), with an average total dose of 1500 J. Treat daily for 3 days and then every other day. Total number of sessions depends on the client.

Chronic Stage: Higher power (10-15 W) and higher dosages (8-10 J/cm²) with an average dose 3,000 J. Treat every other day for 4-6 sessions.

Overuse Injuries

Relentless practice and a demanding competitive game schedule can lead to overuse injuries. The constant start, stop, pivot, acceleration and deceleration motions can put strain on joints and soft tissue.

One common overuse injury is patellar tendinitis, or "jumper's knee," which is characterized by pain in the tendon just below the kneecap. Achilles tendinitis is another common overuse injury, causing pain in the back of the leg and foot that can often take a player out of competition for extended periods of time. Players who engage in repetitive shooting motions also frequently suffer from tendinitis in the rotator cuff and elbow that can drastically impact their ability to shoot effectively.

Laser therapy is a great option for treating injuries such as this because it preferentially affects damaged cells, or cells that are struggling to function and need cellular energy the most. Cells that have a limited blood supply and lack of oxygen due to poor circulation are more sensitive to near-infrared laser light than are well-functioning cells.

Treatment suggestions:

Acute stage: Lower power (6-7 W) and lower dosages (6-7 J/cm²), with an average total dose of 1800 J. Treat daily for 3-5 days and then every other day. Total number of sessions depends on the client progress. Use the open cone attachment for bony areas and the massage ball for deeper tissue.

Chronic Stage: Higher power (10-15 or more W) and higher dosages (10-12 J/cm²), with an average dose 3,000 J- 5,000 J. Treat every other day for 4-6 sessions.

"Prevention and treatment of these injuries is a primary concern for practitioners and players alike."



In Focus: LiteCure®

Lightforce™
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LightForce® Helps Keep Wolves in the Hunt

Wolverhampton Wanderers achieved promotion to the Premier League with one of the lowest injury rates in the Championship last season. fcbusiness speaks to 1st team physiotherapist Oliver Leaper, about his use of laser treatment within the medical department.

WORDS: AARON GOURLEY

fcbusiness: How long have you been using your LightForce therapy laser and what ailments is it used to treat?

Oliver Leaper: We introduced the system to our medical department in November 2017 and all of our therapists were trained in its use when we purchased it. It's primarily used to treat acute and chronic musculoskeletal problems but we also use it for pre-training and on the rehabilitation of players that we have in the department.

Due to it being a Class 4 therapy laser, it's very good for a range of deeper musculoskeletal problems or injuries because the infrared light can penetrate more deep tissue structures. We deal a lot with sub-acute muscle injuries, so in the initial acute stage, we use it to speed up the recovery of those problems.

We found it very useful for managing tendinopathies - so the patella, achilles and perennial tendinopathies respond well to treatment with the system. Tendinopathy is a degenerative condition of the tendons - as a result of that it can become a more chronic problem and takes time to heal but we found using the LightForce system it reduces the stiffness and discomfort that the players would experience with these problems.

Is that a common problem among footballers?

Yes, especially at the start of the season and usually follows a change in training load. For instance players come back into pre-season after having a period off or they go from a hard pitch to a soft pitch - the change in load can create problems with tendons. We found those pathologies responded quite well to the LightForce treatment.

What is your opinion of the LightForce system and the general opinion of those that use it?

Within our department all of our therapists



are trained to use the system and we've found that it's been positively received. I find that it's something that, depending upon the pathology, you use it in different ways.

Even post-op it can be used to help with the recovery of scar tissue.

Are there any specific cases where you've used the treatment?

We had a had a player who came to us during the transfer window last season who'd had a chronic problem with his foot and ankle for quite a while which he unfortunately injured further and required surgical intervention. Post-surgery other treatment options were limited but we were able to start fairly early with a low intensity laser treatment programme once the initial operating wound had healed.

We were then able to adjust the power and the associated treatment during the rehabilitation process to assist with the healing of that area. We continued to use it once he was fit to help his body fully heal the area in which he'd had the injury and operation. He's a player that comes to the treatment room and requests the LightForce treatment which is a good sign that the player is feeling it's having a positive effect on them.

How do you identify and monitor the damage of injuries and the progress being made during treatment?

Primarily following injury or upon a complaint of an injury to our department, they would be assessed by a physiotherapist initially through a standard musculoskeletal assessment. But we're very lucky to also have a very experienced doctor who is experienced in ultrasonography - so using an ultra-sound machine and he can perform an ultrasound scan in the treatment room which can give us more information and detail about a problem area and subsequently there could also be an MRI scan depending on whether the doctor requests it.

Are you planning to use the LightForce system in the new season ahead?

Yes. It's a very good system and its able to be used by a range of our therapists within the department as well as being very portable. As it has a battery pack, when we travel to away fixtures or to training camps it's easy to take with us and means we can continue any treatment wherever we are - we're not confined to the training ground. So it will travel with us to every game this season.

FIVE THINGS TO KNOW ABOUT PBM (PHOTOBIO-MODULATION THERAPY)

Medics are using laser therapy more often than ever before to help reduce pain and inflammation related to many common conditions. Thousands of medics and patients have experienced the benefits of laser therapy and are familiar with its therapeutic effects, but for those who aren't, there are 5 key things to know.

1. It reduces pain and inflammation without side effects

Laser therapy uses a process called photobiomodulation. Photons enter the tissue and interact with the cytochrome c complex within mitochondria. This interaction triggers a biological cascade of events that leads to an increase in cellular metabolism and a decrease in both pain and inflammation. Unlike medications, laser therapy reduces pain without undesirable side effects. It is also important to point out that patients report long-lasting pain relief. While the number of treatments required may vary depending on the acuity of the condition, many patients experience lasting relief after only a couple treatments.

2. Can be used for acute and chronic conditions

When treating acute conditions with laser therapy, it is particularly effective when it is administered as soon as possible following injury (assuming there is no active hemorrhaging). The faster the inflammation is reduced and the healing process can begin, the better. In the case of acute injury, laser therapy helps restore the body

to normal function quicker. With chronic conditions, laser therapy is used most often to help combat persistent pain and inflammation.

3. Treatments can be customized for each situation

Lasers that have larger power ranges offer versatile treatment options. A laser that can be set to operate from 0.5 W all the way up to 25 W allows the clinician flexibility to treat 'low and slow' or at maximum output. The availability of multiple treatment heads offers additional flexibility for the clinician. The LightForce Empower™ Delivery System, for example, features 5 different treatment heads, each designed to facilitate optimal delivery in different scenarios. It is important to have several delivery options to ensure the delivery method is appropriately matched to the situation. For instance, when treating over bony prominences, an off-contact treatment method is advisable. However, when treating deep-tissue structures, such as a hamstring muscle, an on-contact 'massage ball' attachment is best to reduce reflection and scattering, and also encourage deeper penetration by displacing excess fluids.

4. Treatments Feel Good

One common question related to laser therapy is, "What does it feel like?" Depending on the laser, it can create little to no sensation or it can create a gentle, soothing warmth. Many patients receiving Laser Therapy treatments report enjoying the experience, especially when a massage-ball treatment head is used to deliver what is often referred to as a "laser massage." Patients receiving treatments with higher-power lasers also frequently report a rapid decrease in pain. For someone suffering from chronic pain, this effect can be particularly pronounced.

5. Treatments Are Fast

With LightForce Class 4 lasers, treatments are quick, usually 5-10 minutes depending on the size, depth, and acuteness of the condition being treated. High-power lasers are able to deliver a lot of energy in a small amount of time, so therapeutic dosages are achieved quickly. For people with packed schedules, patients and clinicians alike, fast and effective treatments are a must.

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Recovering in Record Time – From Fracture to Finishing in 5 Weeks

By Lesley Paterson



When the Dreaded Injury First Happens

It's never a pleasant thing when you first feel something "go" while training. Knowing deep down that you have just sustained an injury is very traumatic, especially when you're only 5 weeks from the XTERRA Off-Road Triathlon World Championships.

Needless to say, I'd been here many times before and I knew what had to be done. Before doing anything else, I had to call up my physio (who luckily is one of my good friends) to get an assessment and form a plan of action.

The first step in my plan of action was to get my LightForce Laser on the area of damage. This technology helps to quickly reduce pain and inflammation, and speeds up the healing process, so I knew that the sooner I could start using it on my injury, the faster my recovery would be. After applying the laser over my hip for 11 minutes, it already felt much better.

The next step was to figure out exactly what was going on so I wouldn't make the injury any worse while getting geared up to compete. I knew it had to dig a little deeper and get some imaging done.

Looking for a Quick Recovery

After an MRI confirmed a pelvic stress fracture, I realized that I would have to treat this injury with everything at my disposal to make it to the start line of the 2017 XTERRA Off-Road Triathlon World Championships.

Once I sustain an injury like this, so close to a major event, the primary goal is to get things healing as quickly as possible and to figure out what activities I can do that do not cause further pain.

So, even though not as fit as I wanted to be coming into the competition, I finished the race and was able to do so with minimal pain. Of course I had not run that much in over 5 weeks, so things were still a little stiff and sore, but it honestly was a miracle that I was able to compete in this championship race, let alone finish.

By doing daily physiotherapy and using my laser once in the morning and then immediately after activity, I know I'm helping to prevent further damage from happening, but I'm also reducing inflammation and helping hasten the healing process.

Unfortunately (and fortunately) I had a family "training" vacation planned in Europe. While I could not continue with my daily physio treatments, my LightForce Laser was portable enough to carry on flights

and travel with me all the way to Europe. For me, the mental relief that came from feeling proactive about my injury was worth its weight in gold. Throughout those first few weeks of treatment, I noticed that the stiffness and swelling decreased immensely. Furthermore, immediately after using the laser, my pain decreased to the point where I could move around much easier. Bit by bit I was able to do more activities and work towards maintaining my fitness for worlds.

Counting Down to Competition

With only 10 days left to taper and rest up for the World Championships, my pelvis was starting to feel much better with my daily treatments. I was able to walk without pain and eventually I was able to run for 2-3 minutes at a time without really hurting afterward.

While I knew I would not be in the best shape for the race, my hopes were high that I would at least be able to get on the start line, and ideally also complete the race - an outcome that I wouldn't have believed was possible when my injury first happened.

So, keeping up with my regular laser treatments, I watched my stiffness decrease, range of motion increase, and was able to work my way up to doing more and more activities without pain.

Race Day – I Will Start, But Will I Finish?

Race day finally arrived, and I am happy to say that I made it! After being diagnosed with a very painful pelvic fracture just 5 weeks prior, I was honestly excited to be able to even start.

Before the race began, I did a quick LightForce Laser treatment just to get



the blood flowing to the area and reduce any last minute pain. I knew this would likely not be my best race, but I was still competing!.

So, even though not as fit as I wanted to be coming into the competition, I finished the race and was able to do so with minimal pain. Of course I had not run that much in over 5 weeks, so things were still a little stiff and sore, but it honestly was a miracle that I was able to compete in this championship race, let alone finish.

The best part is that not only did I finish, I placed 5th! Not a bad finish considering all that I have been through with this injury.

If it weren't for my LightForce Laser, I don't think I would have even competed at all in this year's XTERRA Off-Road Triathlon World Championships. This technology is truly incredible!

Watch Lesley's Testimonial



www.litecureinfo.com/LesleyTestimonial

LASERS IN SURGERY AND MEDICINE
Volume 45, Issue 5, 2013, pp. 311-317
© 2013 Wiley Periodicals, Inc.
doi: 10.1002/lsm.22140
LiteCure® Laser Used in Study

Lasers in Surgery
and Medicine

The Effectiveness of Therapeutic Class IV (10 W) Laser Treatment for Epicondylitis

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Background and Objective: Photobiomodulation has been shown to modulate cellular protein production and stimulate tendon healing in a dose-dependent manner. Previous studies have used class IIIb lasers with power outputs of less than 0.5 W. Here we evaluate a dual wavelength (980/810 nm) class IV laser with a power output of 10 W for the purpose of determining the efficacy of class IV laser therapy in alleviating the pain and dysfunction associated with chronic epicondylitis.

Methods: Sixteen subjects volunteered for laser therapy, or an identically appearing sham instrument in a randomized, placebo-controlled, double-blinded clinical trial. Subjects underwent clinical examination (pain, function, strength, and ultrasonic imaging) to confirm chronic tendinopathy of the extensor carpi radialis brevis tendon, followed by eight treatments of 6.6 ± 1.3 J/cm² (laser), or sham over 18 days. Safety precautions to protect against retinal exposure to the laser were followed. The exam protocol was repeated at 0, 3, 6 and 12 months post-treatment.

Results: No initial differences were seen between the two groups. In the laser treated group handgrip strength improved by $17 \pm 3\%$, $52 \pm 7\%$, and $66 \pm 6\%$ at 3, 6, and 12 months respectively; function improved by $44 \pm 1\%$, $71 \pm 3\%$, and $82 \pm 2\%$, and pain with resistance to extension of the middle finger was reduced by $50 \pm 6\%$, $93 \pm 4\%$, and $100 \pm 1\%$ at 3, 6 and 12 months, respectively. In contrast, no changes were seen until 12 months following sham treatment (12 months: strength improved by $13 \pm 2\%$, function improved by $52 \pm 3\%$, pain with resistance to extension of the middle finger reduced by $76 \pm 2\%$). No adverse effects were reported at any time.

Conclusions: These findings suggest that laser therapy using the 10 W class IV instrument is efficacious for the long-term relief of the symptoms associated with chronic epicondylitis. The potential for a rapidly administered, safe and effective treatment warrants further investigation.

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A Modality with Momentum

Laser therapy brings power to the Major League Baseball lineup

By Steve Smith, PT, DPT, SCS, CSCS



Three years ago, when I first started working in professional baseball and began using deep tissue therapy lasers, I would not have imagined writing an article about laser therapy and the impact it's having on treating and rehabilitating elite athletes in the big leagues. Furthermore, back in 2007, I hadn't even considered it as a treatment option when I made the transition to exclusively working with athletes at Athletes' Performance in Phoenix, Ariz.

Yes, the technology has always been

intriguing, and the science makes sense, but I didn't think using it would translate into results in the athletes and conditions we see. I have to confess — I was a laser skeptic, but after giving it a chance in both training room and rehab environments, the laser is measuring up, and has become a critical component of our treatment programs.

Skeptical on Modalities

I pride myself in a hands-on, movement-based treatment approach. Because of this, my record would show that I've been

a modality skeptic. Consistent results are paramount in order for me to consider a modality.

Since graduating physical therapy school in 2002, I've done my best to debunk the old "PT stereotype" — one that characterizes PTs as being known for non-skilled and passive therapies. I believe this misconception has changed over the last decade, but still somewhat lingers today.

My adverse impression of modalities, in general, is what mostly kept me from considering laser as a treatment option. We are constantly inundated with treatment fads, so laser therapy had the odds stacked against it. Rarely does something "stand up" and become part of our everyday regimen.

Also, the vast misinformation about laser made it difficult. Sifting through the different messages out there was frustrating at times. Depending on which self-proclaimed expert you speak with, there are multiple approaches to "dosing" with laser.

Based on my experiences, I now subscribe to the simple premise that if you can deliver an appropriate number of joules to target tissue, you will get results. Delivering an appropriate dose of energy to deep structures can be especially challenging, so it's necessary to deliver a lot of energy at the skin surface in order to get an appropriate dose at depth, especially since a lot of the energy is being absorbed by the skin and subcutaneous tissues. I've found that higher-power lasers provide the ability to accomplish this in a reasonable period of time.

Outcomes have been the key to laser therapy becoming an increasingly bigger part of what we do day-to-day, both in the



LASER THERAPY

Players have a lot to do before the game even starts, and medical care is just one component of their preparation, so reducing treatment time is critical.

big league training room as well as in our rehabilitation facility in Phoenix. Results are consistent and predictable, which gives us the confidence we need across the board.

Value in Versatility

Not unlike a utility player who’s an asset to the team by playing multiple positions, the laser provides great versatility, allowing us to incorporate it into treatment protocols in many different ways. It’s effective on both acute injuries and chronic conditions, and we can vary the power settings accordingly.

The flexibility to combine deep-tissue laser therapy with manual tissue manipulation gives us the multipurpose tool we need in the training room, and it’s great for myofascial work. In some acute injury cases we even treat a player twice daily with 6 to 8 hours between treatments. The adaptability of contact and non-contact treatment delivery gives us customizable solutions we need for each player’s treatment program.

Professor Karel Lewit once said, “He who treats the site of pain is lost.” I agree. However, you still need a method to treat the site of pain. We need to be concerned with both structural pathology and functional pathology.

Deep tissue laser therapy is our “go-to” tool to treat the site of pain and injured tissue. When treating large areas, including dysfunctional pain referral regions, the laser is effective and efficient in that our treatment times are reasonable.

Players who use laser for maintenance or as part of their daily or 5-day routine typically say that they immediately feel some relief. They like the soothing warmth they experience during treatment, and they trust it as effective. Athletes are experiencing accelerated healing, especially soft-tissue shoulder strains in pitchers, and low-back soft tissue strains and postoperative cases.

Put Me In Coach

Baseball has a unique schedule — we play almost every day from March until late September, and hopefully into October. Between the constant play and a packed travel schedule, players inevitably get injured and have aches and pains from the demanding nature of the sport. Everyone wants these high-impact players on the field.

Performing at top level is the nature of the profession and it’s in

the training room that players look for therapies that will speed recovery. Ultimately, the goal is for players to play pain free and without hindrance.

However, in reality, the schedule is grueling and almost all players have something that we’re either challenged with reversing or, at least, maintaining the status quo. In either case, laser therapy plays a role and the players support it.

In the training room, players will use the laser daily to help them warm up “tight” or “sore” areas before the game. We’re also using it as part of a maintenance program for old injuries or chronic problems. For acute conditions, we use the laser to help reduce swelling, improve microcirculation, and facilitate lymph drainage.

We work in a fast-paced environment — there’s no time for lengthy treatments when we have five other players in line. Players have a lot to do before the game even starts, and medical care is just one component of their preparation, so reducing treatment time is critical. The ability to deliver an effective treatment quickly is a principal advantage that keeps the flow of our training room moving.

At our rehab facility, we treat more long-term injuries. With the respite from the player’s demanding schedule, we can focus on a rigid treatment program. We treat the injured tissue to facilitate quicker healing and again, treat twice daily if possible. I use the laser before or after soft-tissue or joint work, and have found that it works well to reduce tension and improve blood flow in ischemic areas that have trigger points.

In both the training room and rehab facility environments, deep tissue laser therapy is used to complement our manual therapy and provide faster results.

Looking Ahead

Despite initial skepticism, I’ve truly gravitated to deep-tissue laser therapy as an approach I can count on. I still don’t use a lot of modalities but, in laser, I have something I’m confident in. Fast, consistent results can be a game changer.

Evidence is building, and laser therapy is becoming a standard of care within our organizations and those around us. I expect it to only grow, and to play an even bigger part within rehab in the future. ■

Steve Smith is head physical therapist for the Los Angeles Dodgers.

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Score a Home Run When Treating Baseball Injuries With Laser Therapy



Baseball players throw – they throw a lot. They also get hurt a lot. During the action of throwing, players have to generate massive force from the foot all the way up, over, and out to the throwing arm. It's this generation of force, coupled with the inability to slow these movements down, that can often cause injuries. Deceleration injuries are the most common in all sports.

Deceleration, otherwise known as eccentrics, is the ability to control movement. In baseball you have to control throwing, running, sliding, frequent start and stop motions and unexpected impacts. When an athlete has the inability to control force, musculoskeletal injuries occur. Force production is strength. Stability always precedes force production. Three of the most common injuries in the sport of baseball occur from an inefficient control of force and stability in the shoulder, knee, and hip.

Many major league baseball teams are currently using a technology called Deep Tissue Laser Therapy for their athletes. Using laser therapy over affected areas can decrease recovery time and accelerate athletes' return to the field. Laser therapy stimulates injured areas to recover at a faster rate (through a process known as photobiomodulation) by increasing blood circulation and modifying certain cellular processes in a noninvasive manner. It may also be combined with other treatment

modalities like therapeutic taping to complement these effects.

Here are 3 big treatment areas to cover when using laser therapy for baseball injuries:

The Thoracolumbar Fascia (TLF)

The thoracolumbar Fascia is a vitally important area for treatment of musculoskeletal injury/pathology and when developing a long-term strategy for recovery and regeneration treatment protocols. The TLF is a key component of the Posterior Oblique Subsystem of movement including your latissimus dorsi and opposite side glute max.

This is the primary force generation and stabilization system of your backside. If you want to throw you need to own this system and most athletes don't. If there is a restriction in the TLF, the arms and legs need to work harder to generate force. Arms and legs are designed to amplify force, not generate it. When they are called on to do both the body is at greater risk of injury.

Treat the TLF with a dose of approximately 4000 to 5000 joules. Don't just treat this region when it's the primary source of pain either - it should be treated for any and all injuries of the body.

Popliteus

A major cause of knee injury is tightening of the popliteus muscle. The popliteus is the unlocking mechanism of the knee when walking, by medially rotating the tibia during the closed chains portion of the gait cycle, and it's also used when sitting down and standing up.

The popliteus is often referred to as the 'key' to unlocking the knee since it begins knee flexion by laterally rotating the Femur on the tibia. It's also attached to the lateral meniscus of the knee. Pain in the knee is often attributed to overuse of this muscle. The knee can't unlock and it torques in itself injuring tissue. Deep tissue laser therapy to the posterior part of the knee with slight flexion will help relax the popliteus that is overworking. Every ACL injury should have the popliteus muscle evaluated.

Apply a dose of approximately 2,000 joules to the posterior part of the knee.

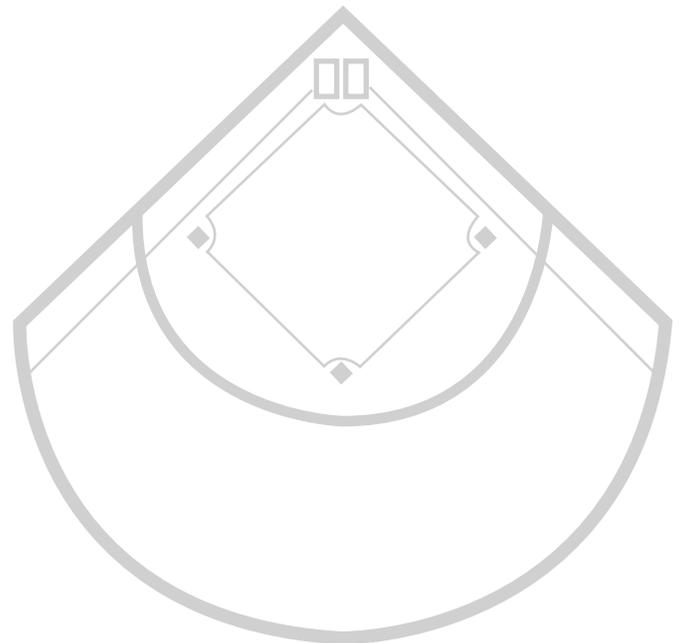
The Infrapinatus

The infrapinatus is one of the four rotator cuff muscles of the shoulder that give the glenohumeral joint stabilization. This muscle is often overused when someone does not have efficient function in the posterior oblique subsystem mentioned earlier. Over activity of the infrapinatus is the most common cause of pain in the anterior part of the shoulder. Its action is to externally rotate the humerus. The infrapinatus is also going to have eccentric control of shoulder internal rotation during the end part of a throw. If this muscle is too tight, it will not allow full range of motion in the glenohumeral joint and the elbow may compensate.

Apply a dose of approximately 3000 J to the entire infrapinatus and posterior compartment of the shoulder

Application of deep tissue laser therapy to these three areas will go a long way to helping recovery of baseball injuries. Laser therapy should play a major role in the comprehensive regimen of sports injury recovery and prevention.

"Deceleration injuries are the most common in all sports."



LASERS IN SURGERY AND MEDICINE
Volume 47, Issue S26, pp. 44-45
© 2015 Wiley Periodicals, Inc.
doi: 10.1002/lsm.22351
Presentation Abstract
LiteCure® Laser Used in Study

**Lasers in Surgery
and Medicine**

Effects of Laser On Endurance of the Rotator Cuff Muscles

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Presented at Laser 2015, the annual meeting of ASLMS

Background: The purpose of this study was to measure the effects of therapeutic laser (TL) on endurance of the shoulder external rotator muscle group during isokinetic dynamometry.

Study: Twenty healthy subjects participated in a double blind, cross-over design study, approved by the University of Tennessee at Chattanooga IRB. Informed consent was obtained from all subjects meeting the inclusion criteria. Subjects were trained and tested using the BIODEX System 3 Pro isokinetic dynamometer. The protocol consisted of a 5 minute warm-up on an upper extremity ergometer, followed by testing. Subjects had their dominant arm positioned at 30 degrees of shoulder horizontal adduction and 45 degrees of shoulder abduction, and performed 21 repetitions of external rotation in each of 12 sets, at 60 degrees/second, with standardized rest between sets. Subjects were acclimated to the isokinetic testing to eliminate a possible training effect prior to being entered into the treatment portion of the study. In the last two sessions, subjects randomly received TL or placebo laser (PL). Laser, 810 nm and 980 nm with a combined output power of 10 watts, was applied immediately prior to testing to the infraspinatus and teres minor muscles at an average fluence of 10 J/cm² (1.8 W/cm²).

Results: A factorial ANOVA was performed to compare TL to PL at all 12 sets for peak torque, peak torque normalized by body weight, average torque, total work, and power. In sets 1–9 there was no statistically significant difference (NSSD) between any of the variables. In set 10 results varied from NSSD to $p < 0.01$ depending on the variable. In sets 11 and 12 TL treated subjects displayed greater endurance for all variables ($p < 0.001$).

Conclusion: Laser increased endurance of the shoulder external rotators in the latter stages of endurance exercise.

Bringing Laser on Board

Published on Training-Conditioning.com

December 5, 2017

By Craig Brown

About a year ago, APEX Physio in Bermuda decided to investigate the benefits of photobiomodulation (PBM) therapy to determine if we should add a therapy laser to our clinic. We did a lot of research about PBM therapy and discovered it could help us add value and promote a better environment for healing— thus adding and improving on our current treatment methods. Also through our research, we determined that a Class IV device had the most compelling evidence.

We decided that to accomplish our goal of maintaining best practice and enhancing the APEX experience, a Class IV laser had to become part of our clinician toolkit. Our staff quickly took to the technology as they began to see immediate positive results, with many patients reporting reduction in pain after just one treatment.

Now, all the therapists on our team have been trained to use the therapy laser. Once patients are assessed, laser is prescribed and, depending on their condition, the number of sessions ranges from four to 10. As we see more and more results with our patients, the laser has only become more prominent in our delivery of patient-centered care.

One particular group of our clients who have seen fantastic results has been the Artemis Racing team. These athletes compete in the America's Cup, which is a Formula 1-type sailing event for the fastest wind-powered boats on the planet. Our experience with adding laser therapy to



treatments for Artemis Racing athletes has been very positive. The use of the therapy laser has enabled us to add an additional component to our traditional treatments, returning them to activity faster than we imagined possible.

Clinical Support: If a patient comes in and you are not sure how to approach their condition is there someone at the laser therapy company you can talk to? Clinical support is a must-have. Ask about who the clinical experts are on staff that will answer your questions – what are their credentials

For example, Australian helmsman and Olympic gold medalist Nathan Outteridge had a severe ankle sprain that threatened to keep him out of the Louis Vuitton America's Cup World Series event and the 2016 Rio Olympics. We added Class IV laser therapy to Outteridge's treatment program. Within six days of the injury, he was able to compete in the America's Cup World Series event and went on to win a silver medal in Rio.

"Once I suffered my ankle injury, I was worried I would miss the [America's Cup] World Series racing and a large chunk of the Rio Olympic build-up campaign," said Outteridge. "The use of the therapy laser treatment really aided my recovery, enabling me not to miss a single event as a result of this potentially serious injury."

Craig Brown is the Owner and Clinical Manager for APEX Physiotherapy Orthopaedic and Sport Injury Clinic Ltd., in Hamilton, Bermuda.

LASERS IN MEDICAL SCIENCE
Volume 31, Number 1, 2016, pp. 127-135
© 2015 Springer-Verlag
doi:10.1007/s10103-015-1840-4
LiteCure® Laser Used in Study



Photobiomodulation and Eccentric Exercise for Achilles Tendinopathy: A Randomized Controlled Trial

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Background: The common regime of eccentric exercise in use for Achilles tendinopathy is somewhat arduous and compliance issues can arise. This is the first study to investigate the effectiveness of a regime of fewer exercise sessions combined with photobiomodulation for the treatment of Achilles tendinopathy.

Methods: A double blind randomized controlled trial and intention-to-treat analysis were performed. Eighty participants, 18-65 years with Achilles tendinopathy and symptoms for longer than 3 months, were included in the trial. Participants randomized into one of four groups; 1 (Placebo + Ex Regime 1) or 2 (Laser + Ex Regime 1) or 3 (Placebo + Ex Regime 2) or 4 (Laser + Ex Regime 2). The primary outcome measure was the Victorian Institute of Sports Assessment- Achilles (VISA-A) questionnaire. Outcomes were collected at baseline, week 4 and week 12.

Background: Sixteen participants were lost to follow-up at 12 weeks, 4 of which due to adverse reactions. As per intention to treat, missing data were imputed, 80 participants were included in the final analysis. For VISA-A at 12 weeks, group 4 achieved significant gains over the other 3 groups: group 1 (18.5 [9.1, 27.9]), group 2 (10.4 [1.5, 19.2]), group 3 (11.3 [3.0, 19.6]). There was a moderate effect size in favour of exercise twice per week (7.2 [-1.8, 16.2], ES .7).

Conclusions: Twice-daily exercise sessions are not necessary as equivalent results can be obtained with two exercise sessions per week. The addition of photobiomodulation as adjunct to exercise can bring added benefit.

Key words: Dose response; Exercise therapy; Laser therapy; Rehabilitation

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