FREQUENTLY ASKED QUESTIONS

1. *How does laser and light therapy work?*

Laser and light therapy is similar to photosynthesis in plants; sunlight is absorbed by the plant and converted into energy so the plant can grow. Laser and light therapy provides light energy to assist the body to heal itself and support cells to function optimally.

Laser and light therapy is a physical modality that produces photons of energy between the visible red and infrared spectrum (600 nm and 950 nm) that have proven to penetrate tissue and be absorbed at a cellular level. A series of photochemical reactions occur resulting in enhanced tissue healing, pain control and stimulation of the vascular, immune and lymphatic systems. It is the only therapeutic modality with a cumulative effect in cells and tissue. Light is absorbed at a cellular level resulting in increased production of nitric oxide and ATP, as well as changes in cell membrane permeability. This provides additional energy to assist the body to heal itself and support cells to function optimally, resulting in:

- Increased blood flow (microcirculation)
- Accelerated healing process
- Reduced acute or chronic pain
- Greater tensile strength in tissue repair
- Decreased edema and inflammation
- Formation of new blood and lymphatic vessels through angiogenesis

2. *What exactly is Phototherapy?*

As scientists have understood more about the nature of light and its positive effects on the body, new techniques and devices have been developed to use light as part of the healing process. This is referred to as low level laser therapy or phototherapy. Phototherapy is an umbrella term that can include light from low level lasers as well as superluminous diodes, also known as light emitting diodes (LEDS). Low level lasers, also known as cold laser light is compressed light, it is different from natural light in that it is one precise colour. Lasers are coherent waves, synnchronized, and monochromatic (a single wavelength). Therapeutic light energy can be produced by Low Level Laser Diodes (LLLD) and/or Superluminous Diodes (SLD). These diodes can be within the visible red to the near infrared and infrared electromagnetic spectrum.

These properties allow laser light to penetrate the surface of the skin with no heating effect, no damage to the skin and no known side effects. Specific wavelengths and power levels result in different levels of penetration and cellular effects.

3. *What is low level laser therapy?*

There are two types of medical lasers: high power and low power. High power lasers are used to cut through tissue. Low-level lasers, on the other hand, are used to stimulate tissue repair through a process of bio-stimulation. The word “laser” is an acronym for Light Amplification by the Stimulated Emission of Radiation. The theory was first described by Albert Einstein (1879-1955) who paved the way for the development of the therapeutic laser. The first low level therapeutic laser was developed in 1962. By the end of the 1960’s, Endre Mester in Hungary was reporting an improved healing of wounds through low level laser radiation. Since then, scientists and doctors around the world have been using laser light to treat conditions which can affect all age groups.

Low level laser therapy is the application of red and near infrared light over injuries or wounds to improve soft tissue healing and relieve both acute and chronic pain. Low level therapy uses cold (sub-thermal) laser light

energy to direct bio-simulative light energy to the body's cells without injuring or damaging them in any way. The therapy is precise and accurate, offering safe and effective treatment for a wide variety of conditions. The energy range of low level laser light lies between 3,000 and 10,000 mW.

4. How are phototherapy treatments administered?

MedX Laser/Phototherapy devices are positioned directly on the skin with gentle pressure applied. Generally there is no discomfort or sensation associated with treatment. Various areas may be treated including:

- Directly over the lesion or site of injury
- Muscle insertion
- Relevant trigger points or tender points
- Nerve roots or superficial nerve trucks
- Acupuncture points

5. *What conditions are MedX units used for?*

- Wounds – pressure ulcers, diabetic ulcers, venous and arterial ulcers
- Compression Fractures – decrease pain, accelerate healing
- Post-Op Ortho Conditions – decrease pain, inflammation, swelling, improve quality of tissue repair
- General Pain Control – decrease or eliminate acute, chronic and palliative pain
- Increase Circulation of Lower Limb – recover protective sensation and decrease or eliminate pain

6. *Who is "qualified" to use the MedX?*

It is an FDA requirement that the MedX equipment be sold to registered health care professionals. So this should include PT, OT (if their program includes modalities, if not they may need to attend a course to certify them for modalities, including ultrasound, e-stim etc.), nurses for wound healing, chiropractors and physicians. Osteopaths and naturopaths can also use laser and light therapy. Additionally, podiatrists can use it very effectively to treat plantar fasciitis and Achilles tendonitis. They in turn can delegate the use of the equipment to assistants that they train.

7. *Does a Physiotherapist (PT) need a prescription to use the MedX lasers and lights?*

Generally yes the Physiotherapist (PT) or Occupational Therapist (OT) will need an MD order, unless they are in a direct access state allowing patients to see PT without an order for the first 12 visits.

8. *An MD could obviously use the MedX?*

Yes, a MD can use the MedX.

9. *Can "anyone" purchase the MedX lasers and lights and charge a patient, (ie: massage therapist)?*

Massage therapist should be able to if they have been trained in a certified school. They can charge extra for the service.

10. *Will insurance cover treatments?*

Insurance coverage for MedX treatments is dependent upon the code used, the company and the region. Generally the laser and light therapy treatments are prescribed by a medical doctor.

11. *Does phototherapy affect only the area being treated?*

The affects of MedX Phototherapy treatment can be:

- Local: with a direct benefit over the affected injury
- Regional: with positive effects seen in the surrounding tissue
- Systemic: broader effects evident through increased cell membrane permeability and chemical mediators carried in the blood, lymphatic and nervous systems.

12. ***Can laser and light therapy be used directly over a tattoo?***

Generally the laser and SLDs can be used directly over the tattoo, but start with a smaller dose and ask the patient if any sensitivity or heat is felt during treatment. If discomfort is present use low pulsed setting. If it continues, treat as close to the area as possible without direct treatment over the tattoo. Depending upon the condition, also consider treating referred areas of pain, nerve roots or trigger points.

13. ***Medications***

It is important to ask patients if they are taking any medications prior to using laser or light therapy. The following medications should be considered:

(a) Steroid injections?

Laser or light therapy should not be used directly over a site of a recent steroid injection for 72 hours. If laser or light therapy is used directly over an area that has been recently injected with steroids, the patient may experience an exacerbation of symptoms. The vasodilatation effect may cause release of the steroid from the localized injection site. Since laser or light therapy can accelerate the inflammatory process in a chronic condition to initiate healing, this is counter-productive to the use of steroids. After 72 hours, start with the minimum recommended dose of the laser or lights and gradually increase. For patients taking oral steroids or NSAIDS, the results of laser or light therapy may be delayed.

(b) Immune Suppressing Medications

Immune suppressing drugs may be counter-productive and may minimize the beneficial effects of laser and light therapy. Laser and light therapy can stimulate the normal functioning of the immune system.

(c) Anti-inflammatory medications

Laser and light therapy stimulates cellular activities to expedite the natural inflammatory phase of healing. Anti-inflammatory medications taken by mouth may potentially decrease the effectiveness of the laser and light therapy. Therefore, the reduction or discontinuation of anti-inflammatory medications may need to be considered once the benefits of laser and light therapy are evident.

(d) Over-the-counter medications

Some clinical evidence suggests that certain remedies, such as St. John's Wort may elicit hypersensitivity to laser and light therapy. Therefore smaller doses should be used initially with a gradual increase in the laser and light therapy energy delivered. Iodine based products may also make tissue more sensitive to light when treating wounds, requiring a lower dose.

14. ***Can laser and light therapy be used simultaneously with other modalities?***

Stimulating the cells with more than one type of energy (eg; ultrasound, electrical stim or light) may over activate the cells. Often one to two modalities are used in each treatment session. If cold therapy is one of the modalities, apply the cold before the laser or light therapy. Cold causes superficial vasoconstriction resulting in a decrease in light absorbing hemoglobin from superficial tissues, aiding penetration to deeper tissue. It is not recommended that all patients undergo cold therapy prior to laser or light therapy, but this may be very useful when patients have an acute joint or soft tissue injury. Heat based modalities such as ultrasound should be applied after laser or light therapy, which results in an increased vasodilatation and potential build-up of heat in the tissue. In these cases, laser or light therapy may be used beforehand to treat pain and followed by ultrasound to heat tissue in order to enhance muscle stretching.

15. ***Can laser or light therapy be used over the spine?***

Yes, it is safe to use laser or light devices over the spine and the back of the neck.

16. ***Can laser or light therapy be used over growth plates in children?***

Yes, it is safe to use laser or light devices over the growth plates in children.

17. ***Can laser or light therapy be used on acute injuries?***

Yes, this is an important advantage of using laser or light therapy over other types of modalities. Sports injuries or other acute injuries heal more rapidly by accelerating the inflammatory process and decreasing swelling if treated immediately after the injury. Larger doses and more frequent treatments can be done with 4 hours between treatments. Similar benefits can also be seen with chronic conditions.

Athletes need to be cautioned to not return prematurely to active sports. Although a dramatic reduction in pain and swelling can be achieved within just a few sessions, sufficient time is still required for complete healing. Preliminary research suggests that preventive laser or light therapy (i.e. treatment before training or competition) has been useful to prevent injury or increase healing time if injured. (Tuner & Hode, 2002) Additional research suggests that laser or light therapy before and/or physical activities may also increase exercise tolerance.

18. ***Is laser or light therapy delivered only to the injured area?***

Generally, laser or light therapy is delivered in a segmental approach resulting in several steps of treatment. The following treatment techniques should be considered for each condition, treat depending upon the underlying pathology:

- The entire injured or diseased area
- Any trigger or tender points
- Any referred areas
- Nerve root or superficial nerve trunks
- Related acupuncture/auricular points

A comprehensive approach using both the laser and SLD clusters will lead to faster results and significantly increase the likelihood of success. If profuse swelling exists, then Oshiro's proximal priority principle should be also used (e.g. start proximally or centrally and work distally or outwards towards the extremities). This opens up the lymphatic pathway for drainage and decreases the pain.

19. ***What are the contraindications?***

Do not:

- direct irradiation of the eye
- use over pregnant uterus
- use over any suspicious or cancerous lesions, or active carcinoma
- use over the thyroid gland
- use over areas recently injected with steroids or anti-inflammatories

20. ***What is the difference between low level laser diodes and superluminous diodes (SLDs) or light emitting diodes (LEDs)?***

Laser diodes have higher power outputs and more focused light beams, making them ideal for targeted applications. Only lasers produce coherent energy, where photons of light are well-ordered and build light waves that are synchronized with each other over distance. Coherence is not lost when the light enters the tissue. This focused light makes them ideal for targeted, deeper applications.

The SLD is newer version of LED. The term SLD is used to distinguish it as a higher grade diode for medical technology. SLDs and LEDs have wider angles or beams of light and greater light scattering effects, which provide an even distribution of light energy over broader areas of treatment.

21. ***How does the clinician determine when to use the MedX laser and the SLD MedX accessory?***

The selection of the specific device to be used is influenced by a number of considerations; the location and size of the treatment area, the depth of the target tissue and whether the clinician wishes to use a hand-held or the hands-free accessories. The MedX 200 hand held laser provides 200 mW of total power (3 x 66 mW) 785 nm infrared low level laser diodes.

The 200 mW laser device is available as a portable, battery operated model or as a laser device that is attached and powered by the console. Each MedX SLD cluster can be hand held or strapped in position providing 500 mW of total power. The SLD clusters combine visible red (633 nm) and infrared (870 nm) diodes. The higher powered laser devices deliver energy in a shorter period of time than the SLD. Both devices are appropriate for treating a range of conditions, from superficial to deeper target tissues.

The MedX Treatment Manual outlines the specific sites, number of joules and time for treatment for both the low level laser and the SLD clusters. For smaller, deeper target tissue, such as trigger points (TP), the laser cluster is used. The larger SLD cluster covers a more generalized area of discomfort and is used to decrease muscle spasms and increase muscle relaxation. Alternatively, the clinician may have the SLD accessory strapped into position over a site, while simultaneously treating an associated nerve or TP with the hand-held devices.

22. *When should Pulsing vs Continuous Wave be used?*

The literature supports the use of Continuous Wave energy for most treatments. Pulsing may be used when a patient does not respond to a few sessions with Continuous Wave, or may choose to use Pulsing immediately especially for chronic conditions. It is also helpful if treatment results have reached a plateau, then use Pulsing or reverse to Continuous mode. Listed below are the three Pulsing options and guidelines selected by Tuner & Hode's 2002 book for the MedX 1100 Console System. As research evolves, other Pulse frequencies may be included in future devices:

- Pain, Neuralgia – Option 1 8 Hz
- General Stimulation, Trigger points – Option 2 146 Hz
- Edema, Inflammation – Option 3 1000 Hz

23. *How much heat does the laser or light equipment generate?*

The heat generated by the super luminous diode cluster is approximately 40 degrees Celsius at the site of direct skin contact after the first 5-10 minutes of treatment. The temperature with the laser accessory is approximately 1 or 2 degrees above body temperature at the skin contact surface. Heat sinks are used to draw any additional heat away from the skin. Therefore, there is no chance of burning the patient.

24. *Is laser or light therapy safer than other modalities?*

Laser or light therapy is a very safe modality. Cavitation, a potential negative side effect of ultrasound can occur when tissue cells continue to enlarge in size to the point of rupture, due to built up acoustical vibration over a site. Ultrasound poses several risks to patients, such as overheating and burning tissue (even when the heating frequency is not being used), damage to blood vessels and tissues and cavitation. Electrical stimulation can burn or cause pain when over stimulation occurs. It should not be used on patients that do not have sensation in the area of treatment. Unlike the other modalities, laser or light therapy can be used with patients who have pacemakers and directly over metal or plastic implants.

25. *Phototherapy Reference Websites*

- www.laser.nu
  Swedish Laser Association (LaserWorld)
- www.walt.org
  World Association of Laser Therapy
- www.naalt.org
  North American Association for Laser Therapy