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# ADVOCATES' GATEWAY

Occupational Health Clinics for Ontario Workers (OHCOW), Sudbury

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## ADVOCATE INQUIRY—DO ORTHOTICS HELP DECREASE BACK PAIN?

**Inquiry Description:** An advocate asked OHCOW for literature supporting the use of orthotics to decrease back pain. Their client had a previous back injury and WSIB had previously paid for orthotics related to a foot condition. The orthotics helped the worker to continue working while providing relief for back pain. The worker is now retired and WSIB decided it would stop payment since the worker was no longer employed. The following is a very brief review of the literature.

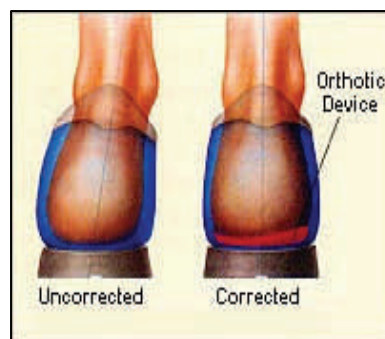
Back pain is one of the most problematic occupational health problems in the workforce. It plagues workers both young and old and accounts for a huge expense on the health care and worker's compensation systems.

There is still very little scientific evidence to support the use of orthotics to reduce back pain. However, orthotics have been used for many years to help alleviate foot, ankle and knee, hip and back pain. Several studies have implied that using orthotics, particularly those that are custom-made, can relieve weight bearing-induced back pain. This is done by increasing the shock-absorbing capacity of the foot. Orthoses are also thought to secondarily cushion the spine.

Several studies have examined worker discomfort when using and not using orthotics. One study examined military recruits attending boot camp. Recruits used either a custom-fit rigid orthotic, a custom-fit soft orthotic or a basic shoe insert. The study found that the soft-orthotic was utilized most often, however, back discomfort was not decreased by wearing either of the orthotic appliances.

The problem with many of these studies is that they are based on worker discomfort surveys, as opposed to actual biomechanical measure-

ments. Studies have shown that the ability of an orthotic to decrease forces on the foot can help decrease foot pain. Furthermore, the fact that weight-bearing carries the forces from the feet, up through the ankles, into the knees, and finally into the hips, implies that there would be some effect on the back musculature that supports the hips. This would certainly affect the alignment of the spine, as well as the biomechanical loading. There were no studies reviewed that examined muscle activity or changes in gait when using orthoses or not using them. These types of studies may be able to shed some light on the topic of orthotics and their effects on decreasing back pain.



Source: www.docfoot.com

There were no studies reviewed that examined muscle activity or changes in gait when using orthoses or not using them. These types of studies may be able to shed some light on the topic of orthotics and their effects on decreasing back pain.

In conclusion, there is no strong evidence to support that orthotics can or cannot decrease back pain, but by asking workers who utilize orthoses, they will tell you how their pain has decreased. Individuals who wear orthotics can immediately feel changes with back pain once they begin using them.

The advocate who asked this question provided the decision on the case – payment for orthotics by WSIB will continue on a yearly basis – CASE WON.

(Summary of literature review done by Steve MacDonald, Ergonomist) ■

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## TRENDS—WHAT WE ARE SEEING!

In the Clinic's everyday routine of searching the literature for answers to questions and situations presented to us by Advocates, we are able to identify trends in the information requested or issues in the files referred.

In this issue we are providing you with articles on Carbon Monoxide and Plantar Fasciitis. These two topics have been identified by us in our trend analysis. ■

## CARBON MONOXIDE & THE WORK PLACE

**What is Carbon Monoxide?** Carbon Monoxide (CO) is a major product of incomplete combustion of carbon-containing compounds. Many of us know that substances such as oil, kerosene, gasoline, coal and wood are carbon-containing substances. Carbon monoxide is a colourless, odourless, tasteless gas that has many harmful effects on humans when levels reach between 50-2000 parts per million (ppm).

**Occupational Exposures:** Work related CO exposures are caused from internal combustion engines, kilns, furnaces, boilers, coke heaters, space heaters, improperly adjusted oil or gas burners, fires, explosions, welding, moulding of plastics and cigarette smoking. Typical industries that utilize procedures and substances that can release CO are forging, ceramic, petroleum, steel and waste management.

**Dangers of CO:** Mixtures between 12 to 75 percent of CO in the air can catch on fire and cause severe explosions. Furthermore, when heated at high temperatures, CO reacts violently with oxidizing agents such as peroxides and chlorines.

**CO Exposure:** When CO is inhaled, it binds to hemoglobin, the component of the blood that delivers oxygen to structures and organs in the body. Hemoglobin easily absorbs carbon which then decreases the oxygen supply to the body. Table 1 below describes the effects related to carboxyhemoglobin levels.

**Health Effects:** CO can cause physical and neurological health effects from acute and long term exposures. Table 2 summarizes the acute effects of carbon monoxide exposure. Even chronic exposure to low levels of CO may result in long term effects. These include: loss of memory, increased irritability, impulsiveness, mood changes, violent behaviour, verbal aggression, personality changes, learning disabilities, mental deterioration, instability when walking, loss of muscular strength, auditory nerve damage and myocardial changes in individuals with coronary heart disease. Recent studies have shown that many of these long term effects are related to profound changes in myelin basic protein (a major protein constituent of myelin, the smooth sheet protecting the neurons). This is related to an autoimmune response from CO where lymphocytes not only attack altered myelin basic protein from CO exposure but attack normal ones as well. This is significant in causing neurological changes.

**Prevention:** There are many effective strategies in preventing CO exposure. The primary prevention is engineering controls such as ventilation, regular furnace inspections and maintenance, administrative controls such as implementing policy and procedures and personal protective equipment such as a respiratory apparatus. It is important to inform individuals of sources that release CO, acute effects from exposure, long term effects from exposure and first aid treatment.

*(Continued on page 3)*

Carboxyhemoglobin (%)	Signs and Symptoms
0-10	No symptoms
10-20	Slight headache, dilation of cutaneous blood vessels
20-40	Severe headache, weakness, dizziness, dimness of vision, nausea, vomiting, fainting
40-50	Same as above, including syncope, increased pulse and respiration
50-60	Syncope, increased respiration and pulse, with intermittent convulsions, Cheyenne-stokes respiration
60-70	Coma with intermittent convulsions, depressed heart rate and respirations, possible death
70-80	Weak pulse, slow respiration, death

## CARBON MONOXIDE—CONTINUED

(Continued from page 2)

Workplaces should regularly inspect equipment that are a high risk for releasing CO. Some examples include furnaces, stoves and gas ranges, vented gas heaters, and motor vehicles. Workplaces should also be implementing CO detectors and have a fire marshal ensure that they are in the appropriate areas and that there is the appropriate amount of CO detectors.

**Regulation:** The Occupational Health and Safety Act of Ontario allows a maximum of 25ppm of air volume, based on an eight hour time-weighted average exposure of CO and a 100ppm short-term exposure value (STEV). The maximum airborne concentration to which a worker is exposed in any 15 minute period.

**If Acute Exposure Occurs?** In the event of an acute exposure, workers should be informed to evacuate the building and if overexposure has occurred to contact emergency services immediately.

Workers have the right to a safe working environment. Therefore, it is the responsibility of the workplace to implement safe practices to avoid injury and possible death of employees. This begins with prevention through education and contacting the appropriate resources. For more information on carbon monoxide please contact OHCOW.

**Table 2: Acute Effects of Carbon Monoxide Exposure**

Concentration (ppm)	Signs and Symptoms
> 50	Mild headache
20-200	Severe headache
200-400	Weakness, dizziness, nausea, vomiting, fainting
400-1200	Increased/irregular heartbeat
1200-2000	Loss of consciousness, death
> 2000	Coma, death

(Summary of a Literature Review done by Gabriella Parrotta, LUSN IV) ■

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## PLANTAR FASCIITIS—IS IT WORK RELATED?

**What is Plantar Fasciitis?** Plantar fasciitis is one of the most common causes of heel pain for which professional care is sought and accounts for more than 10% of adult patients who have heel problems. It is a serious, painful, and progressing injury that occurs when the plantar fascia, the long, flat ligament along the bottom of the foot develops tears and becomes inflamed (See Figure 1 on the next page).

**What is the Plantar Fascia?** The plantar fascia is a band of dense collagenous connective tissue that runs from the front of the heel bone (calcaneus) to the ball of the foot. The plantar fascia provides support to the arch of the foot and has an important role in normal foot mechanics during walking. Tension or stress in the plantar fascia increases when one places weight on the foot (i.e. standing) and as one pushes off on the ball of the foot and toes (motions which occur during normal walking or running). Injury results from repetitive use such as continuous walking or standing, excessive loading (which occurs with running or obesity), tight calf muscles, and several foot abnormalities.

**Risk Factors:** Possible risk factors include obesity, prolonged standing, heel spurs, pes planus (flat foot), and pes cavus (over arch). Anyone, from those who live non-active lifestyles to those who lead active lifestyles can be affected. It has been found that occupations requiring prolonged weight bearing have been considered at risk for plantar fasciitis. This is due to the repetitive tensile load placed on the fascia.

**Who is at Risk?** Workers at risk include nurses, factory workers, and retail workers. Generally, onset of this injury occurs in individuals in their mid-40's, and it tends to occur more in women than men at a rate of 3:1. Approximately 65% of patients are overweight.

**Signs and Symptoms:** Plantar fasciitis has a gradual onset and is characterized by a burning sensation and pain in the heel. Generally, the pain is caused from repetitive microtrauma to the plantar fascia ligament as the heel strikes the ground. Inflammation and pain start in the fascia either as a

(Continued on page 4)

## PLANTAR FASCIITIS— CONTINUED

(Continued from page 3)

result of an increase in activity level (as in initiating a walking or running program), or in association with the normal aging process. With aging, the fascia loses some of its normal elasticity or resilience and can become irritated with routine activities. Less commonly, plantar fasciitis can develop in association with general medical conditions such as lupus or rheumatoid arthritis. The classic sign of plantar fasciitis is pain that is worse when first getting out of bed in the morning, or when walking after sitting for a long time.

**Treatment:** There are a number of treatment options for this form of injury including rest, ice, non-steroidal anti-inflammatory drugs, stretching, orthotics, night splints, proper footwear, and weight loss. Other treatment options include ultrasound and interferential current therapy, deep massage, acupuncture, corticosteroid injections, extracorporeal shock wave therapy, casting, and surgery.

**Prevention:** There are three basic ways that employers can attempt to prevent inflammation of the plantar fascia and minimize the occupational injury costs. Employers can add anti-fatigue matting to standing workstations, employees can wear anti-fatigue insoles in their shoes, and employees can perform preventative stretching, icing and elevation of the feet before and after work.

(Summary of a Literature Review done by Heather McLean , LUSN IV) ■

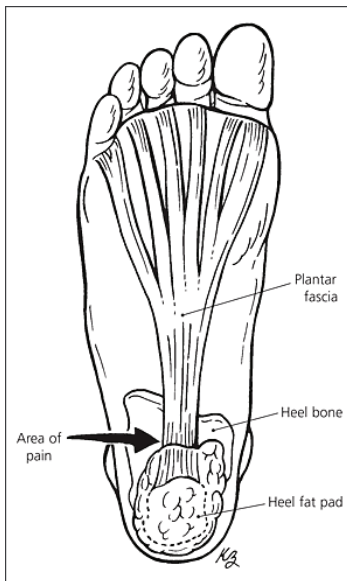


Figure 1: Plantar Fascia

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## WHAT DO YOU THINK?

We welcome feedback for generating topics that would be of interest to advocates. Please forward any questions or suggested topics to be covered in future issues either by e-mail, phone or fax by using the contact information below. ■

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