



Clinical Case Report Competition

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Kelly G. Tick

The effects of myofascial release on the symptoms of
Buerger's disease

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Abstract

Thromboangiitis Obliterans, also known as Buerger's Disease, is a vascular occlusive condition affecting medium and small blood vessels, particularly of the distal extremities. Prevalence of the disease is found mostly in young males, ages 20 to 40 years of age, who are or recently have been smokers. Highest numbers of cases are in middle eastern and Asian countries. Symptoms of the condition are extreme daytime and nocturnal pain in the hands and fingers or feet, or both peripheral areas, local ischemia, sometimes leading to ulcers or necrotic tissue on the fingertips or toes. This study was conducted on a 37 year old male who was a smoker for 20 years and completely stopped smoking in January 2012, just 21 days before the first treatment. The patients hands and fingers were the areas affected most. The goal and plan for treatment was to decrease the pain and symptoms of Buerger's Disease by using myofascial release techniques once per week, from the neck down the arms to the hands and fingertips, bilaterally. The treatment results showed a decrease in daytime symptoms with lessened frequency, intensity and duration of pain. There was a complete absence of nocturnal pain, an improvement in fingertip ulcers, and a significant decrease in the amounts of medications necessary.

Introduction to Medical Condition

Thromboangiitis Obliterans, also known as Buerger's Disease, is “a chronic, recurring, inflammatory, but nonatheromatous vascular occlusive disease, chiefly of the peripheral small and medium sized arteries of the extremities causing decreased blood flow of the feet and legs. Occasionally the hands are also affected, causing painful ulceration of the fingertips. The disease is seen most commonly in males 20-40 years of age who smoke cigarettes or chew tobacco.” (Taber's Medical Dictionary, 2005, p.325) The disease appears to be most common in the Orient, Southeast Asia, India and the Middle East. (John Hopkins Vasculitis Center, 2011)

The disease was first reported by Buerger in 1908. Symptoms, caused by insufficient blood flow, have been described as pain in the extremities, ulceration of the fingers and/or toes, cold hands and feet, burning or tingling sensation, nocturnal pain. Patients often have pain at rest and in cold weather. Claudication in the hands or feet, pain induced by lack of blood flow during exercise, can often be an initial symptom. The pain typically starts in the extremities and can radiate to other parts of the body. Pain can be extremely intense in the areas affected. Buerger's typically does not involve organs as in other forms of vasculitis, despite severe ischemia in the distal extremities. The reason for this is unknown. (John Hopkins Vasculitis Center, 2011)

Physiology

To understand how Buerger's Disease affects the body, knowledge of the structure of a blood vessel is important. In most cases, blood vessel walls consist of 3 layers of tissue. An epithelial lining is the innermost layer, called *tunica interna*. The middle layer, made of smooth muscle, is called *tunica media*. The outermost layer, made of elastic connective tissue, is called *tunica externa*. The inside of blood vessels, where blood flows is called the lumen. The primary function of the smooth muscle in the

tunica media is to regulate the size of the lumen by contracting (called vasoconstriction) and relaxing (called vasodilation) the fibers of circular muscle surrounding the vessel. The diameter of the blood vessel affects the rate of blood flow in the area and regulates blood pressure. When there is damage to a vessel, the smooth muscle will contract to limit blood loss. This process is called vascular spasm, and it is one of the protective mechanisms of the body to prevent life threatening situations. (Tortora & Derrickson, 2009)

Pathology

“Three phases of Thromboangiitis Obliterans have been described pathologically:

1. The acute phase involves development of inflammatory thrombi in both arteries and veins, typically of the distal extremities. The thrombus is occlusive and polymorphonuclear leukocytes, micro-abscesses, and multinucleated giant cells may be present, while there is no evidence of fibrinoid necrosis and the internal elastic lamina is intact.
2. The intermediate phase is characterized by progressive organization of the thrombus.
3. In the chronic phase, inflammation is no longer present and only organized thrombus and vascular fibrosis remains. The pathological appearance in the chronic phase is indistinguishable from all other types of arterial disease.” (Mohler & Olin, 2007, p.10,11)

Image of restricted blood vessel with ischemic and necrotic fingertips (www.mayoclinic.org, 2012, images/buergers).

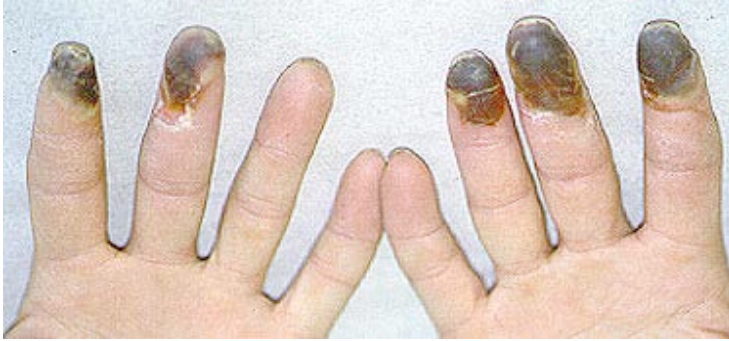
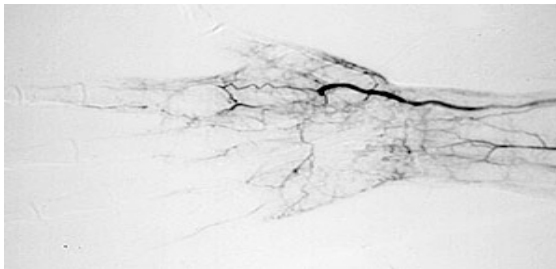
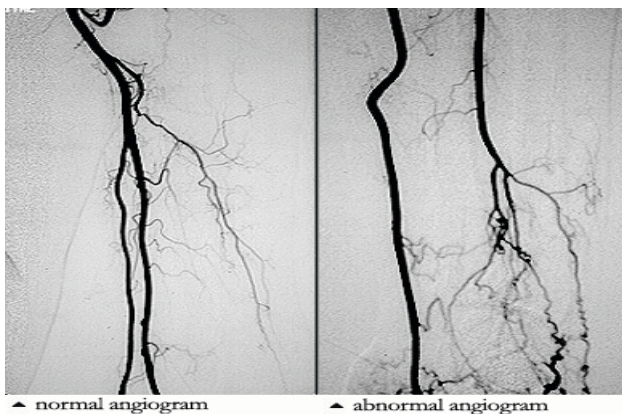


Photo of ischemic and necrotic fingertips due to Buerger's Disease (www.hopkinsvasculitis.org, 2012, types-vasculitis/buergers-disease).



Angiogram showing severe lack of blood flow to distal extremities (www.hopkinsvasculitis.org, 2012, types-vasculitis/buergers-disease).



Normal angiogram on the left, abnormal angiogram of ulnar artery on the right, presenting with a “corkscrew” appearance of the blood vessels (www.hopkinsvasculitis.org, 2012, types-vasculitis/buergers-disease).

Hypothesis

In this study, the effects of manual therapy, most notably myofascial release therapy, on the symptoms of ischemic fingertips in a patient with Buerger's Disease will be examined. Also being considered is the positive effects of myofascial therapy on compromised distal arteries. By using Myofascial Release on the shoulders, arms and hands, the symptoms of Buerger's Disease can be decreased.

Common Medical Intervention

Many treatments have been studied to try to decrease symptoms of Buerger's Disease. The most common treatments are drug therapy for pain control, surgical interventions ranging from sympathectomies to partial or complete amputation, injection of stem cells to regenerate new blood vessels, and the encouragement of complete cessation of smoking.

The most common drugs given for treatment and management of Buerger's Disease are vasodilators, antiplatelets and prostaglandins, however the most important factor to stabilize and stop the progression of the disease is to completely stop smoking (Laohapensang, MD, 2011)

Diagnosis

Buerger's Disease has many symptoms that resemble other conditions, therefore differential diagnosis could be thought of as atherosclerosis (build up of cholesterol plaques in the arteries), endocarditis (infection of lining of the heart), other types of vasculitis, Raynaud's phenomenon, and clotting disorders, for example. (John Hopkins Vasculitis Center, 2011)

A radiographic picture of the blood vessels, called an angiogram can be helpful in diagnosis based on the presence of a “corkscrew” appearance of arteries, which are collateral vessels that result from vascular damage, as well as showing occlusions in the extremities. (John Hopkins Vasculitis Center, 2011)

A positive Allen Test, which examines the time it takes for the ulnar artery to refill the hand and

fingers with blood supply, can contribute to a positive diagnosis. (Magee, 2008)

Diagnostic Criteria

The typical patient meets a number of criteria for a positive diagnosis: 45 years of age or less, is a smoker or has recent history of tobacco use, and are experiencing distal extremity ischemia. (Taber's Medical Dictionary, 2005)

Research Findings

No studies were found to reference on the effects of manual therapy on the symptoms of Buerger's Disease. There were many studies, however on the effects of drug therapy, surgical intervention and injection of vascular endothelial growth factor, called “therapeutic angiogenesis” (Mohler & Olin, c/o www.uptodate.com, 2008, thromboangiitis obliterans p.1).

In a study on treatment of Thromboangiitis Obliterans, authors Joviliano, Dellalibera-Joviliano, Dali, Evora and Piccinato stated that only smoking cessation has proved effective, whereas studies on other treatments, such as drug therapy or surgery had inconclusive results (Joviliano, et al. 2010).

Another study by Kim, Oh, Hong and Kang, which used stem cell injections into ischemic limbs of patients with Buerger's Disease resulting in increased angiogenic factors 8 weeks and 6 months after treatments. Further studies are needed, however, to determine efficacy of stem cell transplants (Kim, et al. 2011).

Similar to the research by Kim, et al, are experimental studies to regenerate bone in order to improve circulation to the extremities. This research is currently ongoing and has no conclusive results as of yet (Shevtsov, Popkov & Bunov, 2009).

Further exploration of researched treatments were studied by Azam Ansari, stating that treatments such

as vasodilators, corticosteroids and anti-coagulants have not been given enough attention and deserve more investigation (Anzari, 1990).

A statement made in a study by authors Sandner, Degenhart, Becker-Lienau, Resier and Treitl, is the importance of using amputation of an ischemic limb should be a last resort until necrosis is clearly marked (Sandner, et al. 2010).

In addition to studies on conventional treatments, there have been some investigation on alternative methods. Hong, He, Liu, Tu, Guo and Yang concluded that Shenfu, a traditional Chinese formulation produces protective influences on organs and limbs during ischemic and reperfusion injury in rats.

However, effects on symptoms of Thromboangiitis Obliterans remain unclear, though the treatments significantly improved pathological signs of lesions (Hong, et al. 2011).

Though many treatments have been studied, clinical research suggests further investigation is necessary in order to increase efficacy for patients with this condition.

Introduction to Case Study

This case study was conducted over a 3 month period from January to March 2012, 10 treatments in all. Each treatment consisted of an interview and pain questionnaire, range of motion testing, special tests, a systemic pre-heat in the steam room and a 45 min myofascial release from the neck to fingertips bilaterally, with some effleurage and petrissage.

Anatomy

The most relevant anatomy to this study are the blood vessels of the arm and hand.

The main artery of the upper limb is the subclavian artery, which passes through the clavicle and extends toward the axilla, becoming the axillary artery. The latter crosses the hollow of the armpit and

heads down the upper arm, there it becomes the brachial artery.. This artery flows along the humerus and supplies the flexor muscles of the arm, dividing into the radial and ulnar arteries as it passes the bend in the elbow. The radial and ulnar arteries supply the hands and fingers by branching into the deep and superficial palmar arch arteries, and the common and proper palmar digital arteries. (Tortora & Derrickson, 2009, p.786-790)

The other structures that can be affected in the area are the muscles of the hand, such as thenar and hypothenar muscles, lumbricals and interossei of the hand, as well as the nerves that supply the hand, median and ulnar nerves. The skin also is an area that can be greatly affected, due to lack of blood flow and the possibility of necrosis in the fingertips. These structures could be compromised due to compression, fascial adhesions and most importantly distal ischemia.

Specific Data from Treatment:

Patient History

The 37 year old patient had been a smoker for 22 years, and had quit smoking in January of 2012.

Occupation of the patient as a boat and car mechanic, requires flexion of hips and torso in cramped spaces for much of the day. This daily posture contributes to hypertonicity of neck flexors, pectoralis muscles, diaphragm, abdominal muscles, hip flexors and quadriceps, as well as related trigger points in forearm flexors and extensors, iliopsoas, rhomboids, upper and middle trapezius, sternocleidomastoid and levator scapula.

The patients history of injury includes a broken left clavicle at 3 years old, patella femoral syndrome of both knees at 10 years old due to trauma, and fracture of the right radius at 12 years old.

Symptoms of Buerger's Disease began 5 years ago, in 2007. Initial symptoms in April of 2007 were muscular pains throughout the body, then headaches and dizziness, tenderness and numbness of right

pinky that would fade and return. Coldness began in May 2007 and numbness increased and spread to the fingertips of most other digits of the hand, as well as to the toes on both feet. Also in May, the numbness turned into extreme pain and tenderness, which worsened when laying down.

Residual effects were crankiness, lack of motivation, mild depression, no appetite, sleeplessness, lethargy, lack of concentration, and frustration among other emotional concerns.

The doctor prescribed many different types of medications, but nothing seemed to help the pain until approximately 8 months later. The diagnosis of Buerger's Disease took a full year after symptoms began.

When treatments started, the patients medications were 150mg Lyrica, a nerve suppressant, twice a day, and 10mg Oxycocet, a pain killer, twice a day. Also, smoking cessation medications were Champix and Nortriptalene, each twice per day.

During the initial interview, the patient stated tenderness in fingers and web between the thumb and index finger while moving and at rest. There was soreness and muscle pain in the interscapular area, pectoralis muscles, upper and middle trapezius, and forearm extensors. The patient discussed very high stress levels, lack of exercise and stretching, as well as a desire to eat a healthier diet.

Observations

Patient posture initially showed left shoulder slightly lower than the right, both arms internally rotated at the elbows, a slight lumbar hypolordosis and slight hyperextension of both knees. Fingers on both hands were cool in temperature and the right thumb and index finger had small ulcerations on fingertips, with a tiny spot of necrotic tissue on tip of right index finger.

Palpation

Palpation findings were hypertoned and firm rotator cuff muscles, upper trapezius and pectoralis muscles that were sore and tender with moderate pressure. The patient also had hypertoned and ropey forearm extensors that were painful upon palpation. There was also tenderness when palpating the web of the right hand.

Movement

Functional testing showed an even amount of active range of motion (“AROM”) of the shoulder at the glenohumeral joint, with slight restriction of internal rotation on both sides, compared to average degrees of motion. Grip strength was very strong in both hands.

The peripheral joint exams of the glenohumeral (“GH”), elbow and wrist joints, showed active and passive range of motion within normal limits, except slight restriction and pain with active internal rotation of the GH joint. There was slight pain during internal rotation of the GH with restricted range of motion (RRROM) testing also. There was no pain with passive range of motion (PRROM).

Neurological

There was no numbness, tingling or weakness of the affected areas at the time of initial interview. The patient experienced what was described as numbness and pain at the same time in both hands a few nights per week, waking him from sleep. Usually the pain was experienced when the patient's hands were above his heart. Sitting up with hands hanging down below the body was required to reduce pain and numbness.

Referred Pain

The patient had several trigger points in a number of muscles, causing referred pain in varying

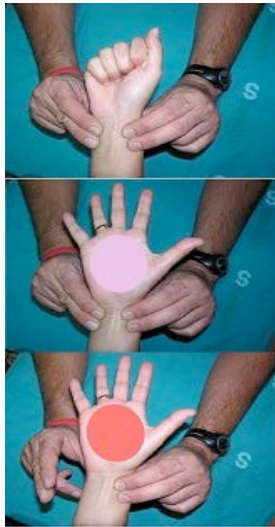
predictable patterns. The condition itself was not causing any pain referral, the pain of Buerger's Disease is quite localized.

Special Tests

There were two special tests conducted before each treatment, the Allen Test and the Capillary Refill Test.

The Allen Test is for determining the competency of the arteries from the forearm to the hand, the radial and ulnar arteries. The test is performed by asking the patient to open and close their fist several times, then to keep fist closed while the examiner puts pressure on both the radial and ulnar arteries to stop blood flow. The patient would then open their hand wide, as the examiner releases pressure on only one of the arteries. The time it takes for blood flow to return to the entire hand is timed to determine a positive or negative test. The highest amount of time to receive a negative test is 10 seconds. (Magee, 2008)

Allen Test Sequence (<http://personal.telefonica.terra.es/web/respiradores/allen.htm>).



The Capillary Refill Test , also known as the Blanch Test (Taber`s Medical Dictionary, 2005, p.276), and the Digit Blood Flow Test (Magee, 2008, p.448) is for assessing the refill rate of the blood capillaries in the distal fingers, under the fingernail. The test is conducted by squeezing each fingertip to find the rate of blood return. Blood should return within three seconds, if not then the test is positive for arterial insufficiency. (Magee, 2008).

Through the duration of treatment, the Allen Test was positive for both hands each time.

Before the first treatment, the Allen Test results showed the blood refilling the hand through the left ulnar artery took 2 minutes, and through the right ulnar artery took 1 minute. The results of the Allen Test on the ulnar artery in treatments 2 thru 10, consecutively, were; left 2 minutes 20 seconds, right 1 minute 35 seconds; left 2 minutes 19 seconds, right 1 minute; left 1 minute 30 seconds, right 45 seconds; left 1 minute 55 seconds, right 50 seconds; left 1 minute 20 seconds, right 1 minute; left 2 minutes 5 seconds, right 40 seconds; left 1 minute 30 seconds, right 1 minute 25 seconds; left 1 min 17 seconds, right 1 minute; left 1 minute 4 seconds, right 59 seconds.

The left and right radial arteries ranged between 3 and 12 seconds to completely refill, both hands for

every treatment.

The Capillary Refill Test was positive for the second and third digit of the right hand only at the first visit, then negative every other time in all digits.

Treatment Goals

The goals for each treatment were to decrease fascial restrictions in forearms, hands and pectoral region, to decrease hypertonicity in forearms, hands and pectoralis muscles, and to increase micro-circulation in hands and fingers.

The long-term goal was to decrease pain and other symptoms of Buerger's Disease.

Treatment Given

The treatment was almost exactly the same each time. The patient was positioned in supine on the table. The following will explain the order of treatment.

Most often, treatment began with myofascial release (MFR) of the pectoralis muscles, a long lever stretch of pectoralis major and direct release of pectoralis minor attachments.

The deltoid then was picked up and rolled and kneaded.

Shearing between biceps brachii and brachialis was next.

The bellies of the two biceps heads were picked up and kneaded.

Cross hands shearing was done next, mobilizing the biceps and blocking on the forearm flexors with elbow in extension.

Then treatment moved into the forearm with picking up, bowing, wringing, stripping, fascial skin rolling and kneading of the forearm flexors and extensors. As well as active MFR on the forearm

extensors, namely extensor carpi radialis longus and brevis.

The wrist and carpals on the flexor and extensor sides were treated with thumb kneading and PROM.

Then in the hand, treatment was compression and passive stretch of the thenar and hypothenar areas, thumb kneading, effleurage and PROM of the entire hand and fingers.

Once MFR was finished, treatment turned to effleurage and petrissage of the arm, forearm, wrist, hands and fingers, as well as to upper trapezius, levator scapula, longus colli, scalene muscles and suboccipital region.

Remedial Exercise

Home care given to the patient was stretches for both pectoralis major and minor, two different positions.

The patient was shown the appropriate stretches, and asked to show therapist for accuracy.

Patient was advised that the frequency of the stretches was to be 3 times per day, 5 days per week and to hold each stretch for a minimum of 30-60 seconds.

Patient was advised to sink in to the stretch without creating pain, and to ease off if pain was present.

Also, strengthening exercises were advised. Patient was shown exercises for the rhomboid muscles and middle trapezius.

The frequency of exercises were 12 repetitions or until muscles fatigues, rest for 30 seconds, then repeat. Sets were to be 3 times in a row. Patient was asked to do this strengthening 3 days per week.

Hydrotherapy

Before each treatment the patient went into a medicated steam room for 20 min, so as to create a systemic pre-heat for the body.

Application of Research to Treatments

Since there was no research found specifically about manual treatments or therapy for Buerger's Disease, what is being applied to this study is the anatomy and physiology of the areas affected, and what effects manual therapy has on these structures.

Fiona Rattray states in her book, *Clinical Massage Therapy*, “Massage can result in circulatory changes due to reflex responses of the autonomic nervous system. Superficial or deep massage may cause changes in vascular tone through the sympathetic efferents. This may explain why areas, such as the hands and feet, experience increased blood flow and temperature after application of fascial techniques to other parts of the body. The autonomic nervous is also involved as the client relaxes. There is a decrease in sympathetic nervous system firing that can lead to generalized vasodilation of peripheral vasculature and an increase in peripheral circulation.” (Rattray, 2000, p.12)

Rattray references numerous studies to concur with the above statement, and is a good foundation on which to base the topic of this study.

Management Plan

The active issues for this patient were symptoms of Buerger's Disease such as pain in the hands and fingertips, and compromised microcirculation, fascial adhesions in the pectoralis muscles and forearm flexors and extensors, hypertoned pectorals and forearms, as well as a very taut common extensor tendon (CET). The other non-physical issue was very high stress.

Long term treatment goals were to increase microcirculation, to decrease fascial restrictions in the pectoral region and forearms, and to decrease hypertonicity in the forearms and pectoralis muscles, all

the while decreasing stress levels.

Through a combination of massage and fascial treatments, therapeutic exercise and stretching, this management plan seemed reasonable and likely to be effective.

Treatment Results and Prognosis

There was definitely an improvement in the patients' condition throughout the duration of the treatments. Notable changes were observed from first to last treatment; such as improvement in the Allen Test, the highest amount of time for the left ulnar artery to refill the hand with blood was 2 minutes and 20 seconds in the second week, slowly declining as treatments continued, dropping to 1 minute 4 seconds by the last week. The capillary refill test was positive in the 2nd and 3rd digits of the right hand the first week, and tested negative for the remainder of the study.



Patient 2nd and 3rd fingertips on right hand first day of treatment.



Patient fingertips on the last day of treatment.

The amount of medications that the patient was taking daily greatly decreased. At the outset of treatment, the patient was taking two 10mg doses of oxycocet per day, two 150mg doses of lyrica per day, one nortriptalene pill and one champix pill per day. By the end of the study, after consult with the family doctor, the patient decreased medications down to two 5mg doses of oxycocet, two 75mg doses of lyrica, one nortriptalene and zero champix.

Also noted was the decrease in painful symptoms of Buerger's Disease.

Every week the patient filled out a pain and hand function questionnaire to gauge the frequency, intensity and duration of pain, if there was any nocturnal pain, the effectiveness of hand and finger function at work and in other daily activities, and what effect cold temperature had on pain.

Nocturnal pain decreased from one or two nights per week to none at all.

Pain during the day went from mild/moderate to very mild.

When hands were cold, pain went from moderate/severe to mild.

The frequency of pain went from sometimes to rarely.

Low grade pain that was always present with varying degrees of intensity decreased to non-existent by the last day of treatment.

Grip strength went from mostly strong to very strong.

Prognosis for this patient is very good based on decrease in pain and general improvement in pathological condition.

The combination of the recommended therapeutic exercise, monthly massage treatments and continued cessation of smoking can be effective maintenance, improved health and decrease of symptoms for this patient. Based on these recommendations and findings of this study, the outlook is very positive.

Conclusion

This study shows the positive effects of myofascial massage treatments on the symptoms of Buerger's Disease. The treatment overall, combined with the cessation of smoking, decreased daytime and nocturnal pain, improved microcirculation, improved the state of ischemic fingertips, and decreased the amount of medication necessary to manage symptoms.

More research is needed to identify effectiveness of manual therapy in different stages of Buerger's Disease, and also how much symptomatic relief can be attributed to cessation of smoking.

Bibliography

Tortora, G. Derrickson, B. (2009) Principles of Anatomy and Physiology. Hoboken, NJ: John Wiley & Sons, Inc.

Rattray, F. Ludwig, L. (2000) Clinical Massage Therapy. Toronto, ON: Talus Incorporated.

Magee, D. (2008) Orthopedic Physical Assessment. St. Louis, MO: Saunders Elsevier.

Davis, F.A. (2005) Taber's Cyclopedic Medical Dictionary, 21st ed. Philadelphia, PA: F.A. Davis Company.

Laohapensang, K. MD. (2011) Decreased Incidence and Seasonal Variation of Buerger's Disease. (para.3)

Retrieved from <http://www.avidsymposium.net/pdf/vei/4653.pdf>

Johns Hopkins Vasculitis Center (2011) Buerger's Disease. Johns Hopkins Medicine. Retrieved from

<http://www.hopkinsvasculitis.org/types-vasculitis/buergers-disease/>

Mohler, E. Olin, J. (2007) Thromboangiitis Obliterans (Buerger's Disease). (p.1-4) Retrieved from

<http://www.uptodate.com/home/index.html>

Harms, R. (2010) Buerger Disease (Thromboangiitis Obliterans) Treatment & Management. Retrieved from

<http://www.mayoclinic.org/images/buergers-2col.jpg>

Joviliano, E. Dellalibera-Joviliano, R. Dalio, M. Evora, P. Piccinato, C. (2009) [Etiopathogenesis, clinical diagnosis and treatment of Thromboangiitis Obliterans - current practices](#). Retrieved from

<http://www.ncbi.nlm.nih.gov/pubmed?term=joviliano%20buerger%27s%20disease>

Kim, S. Oh, W. Hong, H. Kang, K. (2011) Stem cell therapy for peripheral arterial occlusive disease. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed?term=kim%20buerger%27s%20disease>

Shevtsov, V. Popkov, A. Bunov, V. (2009) Nonreconstructive revascularizing operations in limb ischemia.

Retrieved by <http://www.ncbi.nlm.nih.gov/pubmed?term=shevtsov%20buerger%27s%20disease>

Ansari, A. (1990) Thromboangiitis Obliterans: current perspectives and future directions. Retrieved from

<http://www.ncbi.nlm.nih.gov/pubmed?term=ansari%20buerger%27s%20disease>