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Research Proposal; Healing Methods for Acute Ankle Sprains

Abstract

With my research, I will compare two separate healing methods in order to determine the best mechanism for healing acute ankle sprains: rest and ice versus heat and controlled movements. Ankle sprains are caused by overstretched ligaments and most people that experience this injury will immediately begin to ice their ankle and abstain from activity. According to numerous studies on the effects of ice therapy of tissue injuries, there is no statistical evidence that proves whether or not ice can actually help heal these injuries.(Hubbard, 2004) (Michel, 2012). What is known is that according to basic physiology, ice actually slows down the body's natural healing processes so it should simply delay inflammation and recovery (Chen 2017). In contrast to this, heat will increase the body's metabolic pathways and could possibly speed up recovery. I will go about comparing heat and ice by taking a sample of 18-24 people (within the same age group) that have all sprained their ankle recently and I will use these people to compare their healing processes and determine who has a faster and more efficient recovery.

Intro:

Physical therapists and athletic trainers have always told people to put ice on their acute tissue injuries and to rest the area of injury in order to induce recovery. What most people do not

know is that there is actually no significant evidence as to whether or not these mechanisms will actually help recovery (Hubbard, 2004) (Michel, 2012). The only known fact about these mechanisms is that rest helps prevent further injury and ice helps reduce swelling and pain. Pain is caused by the swelling that then pushes on nerves, and this swelling is caused by a rush of blood and lymph fluids to the injured area (Bellew, 2016). Human physiology suggests that ice and rest are two mechanisms that may actually delay or prevent recovery, but there is no conclusive evidence as to whether or not this is actually true (Hubbard, 2004) (Michel, 2012). Many studies have been done either to test ice therapy or to review other studies of ice treatments, but each one either has no statistically significant evidence to back their findings or they disagree with one another. In my research, I plan to compare ice and heat therapy for the treatment of acute ankle sprains and to also compare rest and controlled movements in order to see which methods are more effective in ankle recovery. By comparing each of these mechanisms, I will be able to determine if ice and rest are actually more effective than heat therapy or not. I will use these comparisons to avoid the possibility of having the same inconclusive results as most other studies. This will allow me to hopefully have a definitive answer as to what the best healing method is for acute ankle sprains.

Background

Without any movement of the injured site, there is no way for fluids to clear out of the swollen area. Blood flow through veins back to the heart and lymph flow through its specified vessels are both very slow. With the help of moving the area of swelling, these fluids are able to clear out faster (Chen 2017). This is why completely resting the injured area may not be the best option. Ice also hinders the ability for these fluids to flow through the body, but it does so in a

very different process. Ice is a vasoconstrictor, so it causes your blood and lymph vessels to decrease in diameter. This mechanism reduces swelling because fluids are no longer able to penetrate through these vessels into the injured tissue site. This lack of fluids seems like it is helping recovery because the pain is reduced and there are less physical signs of the injury, but simple physiology shows us that it may actually delay recovery and cause atrophy of muscles and ligaments (Bellew, 2016) (Chen, 2017). This is significant to point out because ankle sprains are simply overstretched ligaments, so ice may be hurting these ligaments more than it is helping them.

Lymph is your body's natural healer, and blood flow is needed in an area of injury in order to help the recovery process proceed. Because of this, scientists have been doing more research on ice therapy and rest during recovery because the science does not completely match up with the healing mechanisms (Thornton, 2017). This need for blood and lymph flow to an injured area suggests that icing may actually prevent, or simply delay, healing. This lymph that is directed towards an injured area helps get rid of pathogens and reduce the risk of infection, and the oxygen supply from blood flow is needed to help the tissue rebuild itself. Ice and rest slow down these natural healers (Saladin, 2017).

Many physical therapists and athletic trainers have been moving away from what is known as the R.I.C.E. healing method, and have been trying to come up with a new acronym for their "more effective" methods. R.I.C.E. stands for: rest, ice, compression, and elevation (Thornton, 2017). Most of these therapists have been observing their clients over recovery periods with the use of these new methods, but there is little research as to the actual effectiveness of these treatments. One new method that is starting to catch on is the M.E.T.H.

method. This stands for: movement, elevation, traction, and heat. In this case movement and traction basically account for the same thing, elevation is kept in the acronym, and heat is preferred over ice. In line with the basic physiology of healing, heat and movements should be compared to the R.I.C.E method to determine which of the two should be used to heal acute ankle sprains (Loreto, 2014).

Methods

In order to go about testing my question, I will collect a group of 18-24 people between the ages of 20-40 that have all recently sprained an ankle. I do not need to come in contact with each person or study them all at the same time. I will have to start testing people very soon after the injury occurs, preferably within 24 hour of the sprain, to ensure controlled methods. Also, I will have to determine whether or not these people have already taken any measures to try to start off the healing process. When comparing patients, the severity of each sprain will be taken into account right away in order to compare each recovery process correctly.

Each person will be studied for six weeks. They will be given their specific treatment needs right away and will be checked once a week. One-third of the participants will be a control group. This group will not use ice or heat therapy in their recovery process and they will be very limited as to how much they are allowed to move their ankle. Another third of the participants will be treated with ice therapy and they will rest their ankles. The final third will perform heat therapy and will be helped to perform specific controlled movements of their ankles 3 times a day. Heat and ice will both be applied for one hour twice a day in order to keep the treatment methods controlled.

In order to compare each of these methods, I will collect the same data from each group within this study. I will study each group's range of motion in both ankles and their changes in circumference of each ankle. I will compare each of these to their healthy ankle. I will also assess the pain in each ankle (relative to the subjects' pain from the start), and analyze the differences between the ankles by looking at X-rays of each one. Each of these areas can help me determine which group is recovering most efficiently (Sloan, 1989).

Expected Results

When my data collection is finished I will compile my results and discoveries into a scientific paper. This will show clear evidence as to whether or not people should still treat muscle sprains with ice and rest. It is expected that this will not be the case, and people will be able to learn that heat is really the best way to increase healing of acute ankle sprains. I will be able to share this paper online so that whoever wants to see the results and learn the science behind these healing processes can have access to it. This paper would be specifically geared towards physical therapists and athletic trainers since they are the people that deal with helping people with injuries like this most often. This paper will also leave an open opportunity for more possible research on other healing methods to compare to.

Conclusion:

With my research, I hope to discover the most effective healing process for acute ankle sprains. Whether or not the results end up being what I expect, they will still be able to help people with their recoveries. By comparing these two methods I will be able to prove whether or not the physiological thought actually matches the correct healing mechanism. No matter what, this experiment will open up opportunities for more future research. If my expected results are

correct then there is an opportunity to research whether or not there is another healing method that is better than heat. If my expected results are not proven to be true, a new research project could examine why these results did not come out as planned.

Budget:

For my research I will not need much money, I will simply need access to a lot of resources. The only money I will need will be for transportation to and from the clinic where I can come in contact with my subjects each week. Since I will only meet with them once a week, I will most likely only need around \$10-20 a week for this transportation (depending on how far I need to travel). I will study each person for 6 weeks but I will not be studying them all at the same time so this research could go on for much longer than 6 weeks. Resources I will need include: clearance to use human subjects, access to these people at a specified location once a week, and access to their Xrays throughout the weeks.

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