

THE EFFECTS OF A HAND HELD BUFFER WITH MAGNETS ON BLOOD FLOW



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Abstract

The ability to modify blood flow in specific regions of the body could be beneficial in a variety of situations. For example, the ability to increase flow would be particularly beneficial to facilitate repair of damaged tissues, deliver nutrients to tissues, or prevent clotting from stagnant blood. Tissue massage as well as magnetic therapy have both been promoted as methods to stimulate blood flow. **Purpose:** The purpose of this study was to determine the effect of a massage with a vibrating buffer (B) or buffer with magnets (B+M) on local blood flow. **Methods:** Seventeen college aged subjects were tested on 2 separate days, with both sessions at the same time in the afternoon. Subjects had baseline diameter and blood flow of the right brachial artery assessed via ultrasound (Acuson Sequoia 512, Siemens USA) on both days. Subjects were then given a one-minute treatment (B or B+M). The buffer was delivered via a car buffer (vibration frequency of 60 HZ) with one of the buffers having four magnets (13,200 gauss rating). Within one minute following the treatment, they were re-measured. The only difference on testing days was the treatment (B or B+M). A repeated measures ANOVA was used to statistically analyze the treatment effects with a significance of $p < 0.05$. **Results:** As expected, there was no difference in baseline flow or vessel diameter from day 1 to day 2. Buffer treatment resulted in a significant ($p < 0.05$) increase in both flow (pre B, 10.15 ± 0.82 cm/s to post B, 12.39 ± 1.84 cm/s) and vessel diameter (pre B, 4.25 ± 0.52 mm to post B, 4.25 ± 0.52 mm). Buffer with magnets also resulted in a significant increase in flow (pre B+M 10.14 ± 0.81 cm/s to post B+M 11.97 ± 1.94 cm/s) and vessel diameter (pre B+M, 4.2 ± 0.49 mm to post B+M, 4.26 ± 0.52 mm). However, there was no difference between the B and B+M trials. **Conclusion:** The application of a one minute buffer massage increases artery diameter and blood flow with no further effect from the addition of magnets.

Introduction

Massage in the form of a hand held buffer has been shown to have a short term benefit on minimizing symptoms of DOMS. These effects include an increase in range of motion, an increase in pressure tolerance, and a decrease in reported pain (Weigel, 2014). Additionally, benefits of massage via buffer could be enhancement of circulation as is done for some clinical populations. Magnetic therapy has also been proposed as a potential method to increase blood flow to targeted areas (Skalak, 2007). One potential mechanism of magnetic therapy is increased hemoglobin and blood cell motion. If it works, this type of therapy could help in a variety of situations. For example, a person bed ridden with deep vein thrombosis or an athlete looking for faster recovery. Combining these two techniques could potentially allow for even greater circulatory responses. Therefore, the purpose of this study was to determine the effects of combining a hand held buffer with magnetic therapy on blood flow.

Methods

Seventeen (Female $n=8$, male $n=9$) subjects took part in this study. Subjects ages were between 20-30 years old. This test occurred on 2 separate days. Each testing session was approximately 30 minutes. On the first day, subjects came in and first had their blood flow pattern, on their brachial artery, tested using an ultrasound. Subjects then received buffer treatment (without magnets attached), then were immediately re-measured after the treatment, with the ultrasound, for blood flow pattern analysis. On the second day subjects came in at the same time and were tested by a buffer (magnets attached). Treatment was then applied to the biceps and then again immediately re-measured after treatment for blood flow pattern analysis with the ultrasound. All subjects were pre-screened for any medications or supplementations that they might be taking, as well as, questioned for any metal in their body (screws, plates, etc.).

Procedures: Tools

Ultra Sound- Ultrasound is a safe and painless way to produce pictures of the inside of the body by using sound waves. In this study, it was used to look at blood flow and artery dimensions of the brachial artery (Figure 1).

Car Buffer (120v, 60Hz)- A car buffer was used to create a vibration/massage stimulus to the targeted area (right biceps). In this study the buffer was equipped with 4 neodymium disc magnets attached to the head of the buffer (Figure 2).

Neodymium Disc Magnets- Used to stimulate local blood flow to the targeted area. Magnets used had a gauss rating of 13,100 (Figure 2).



Figure 1. Left: Ultra Sound (Acuson Sequoia 512, Siemens USA), Right: Measurement Method

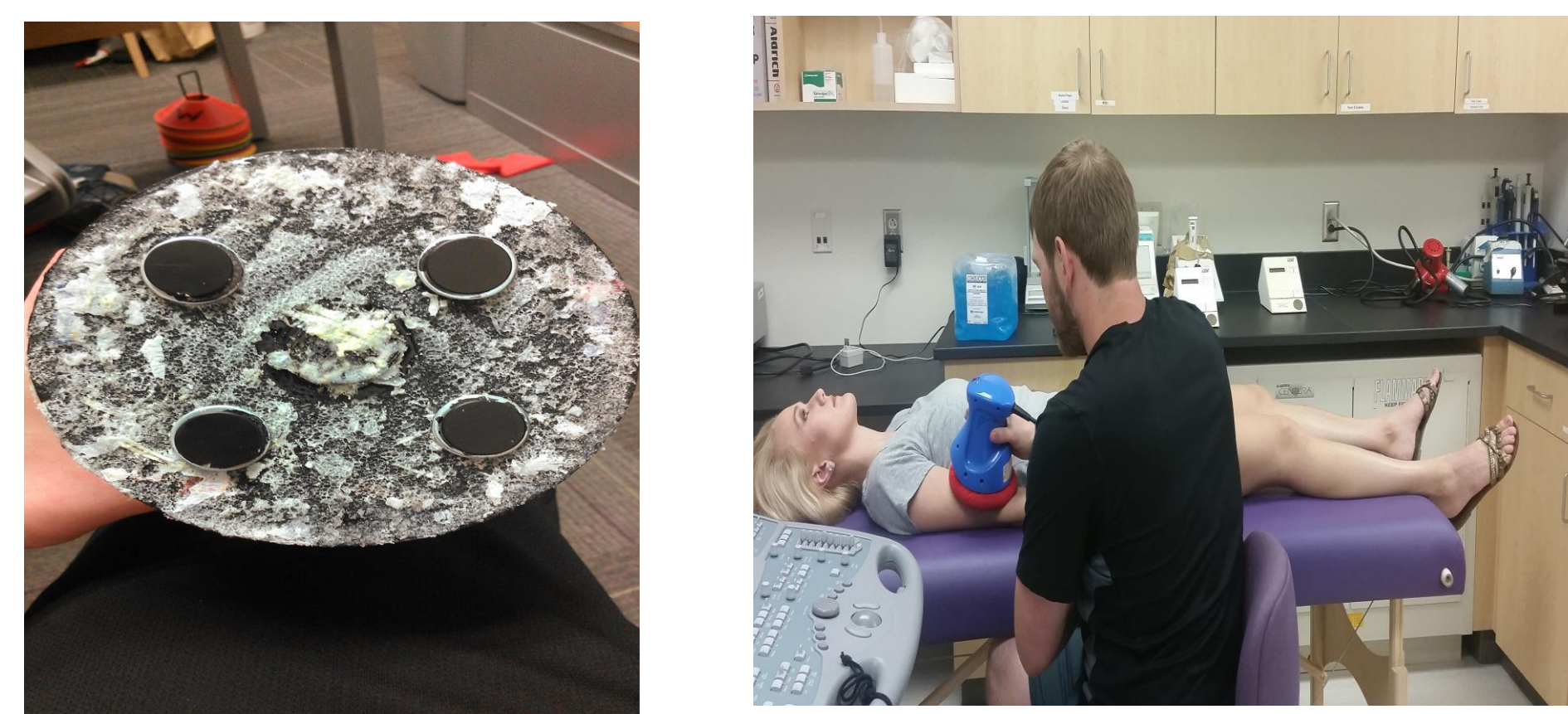


Figure 2. Left: Car Buffer with Magnets, Right: Treatment Application Method

Results

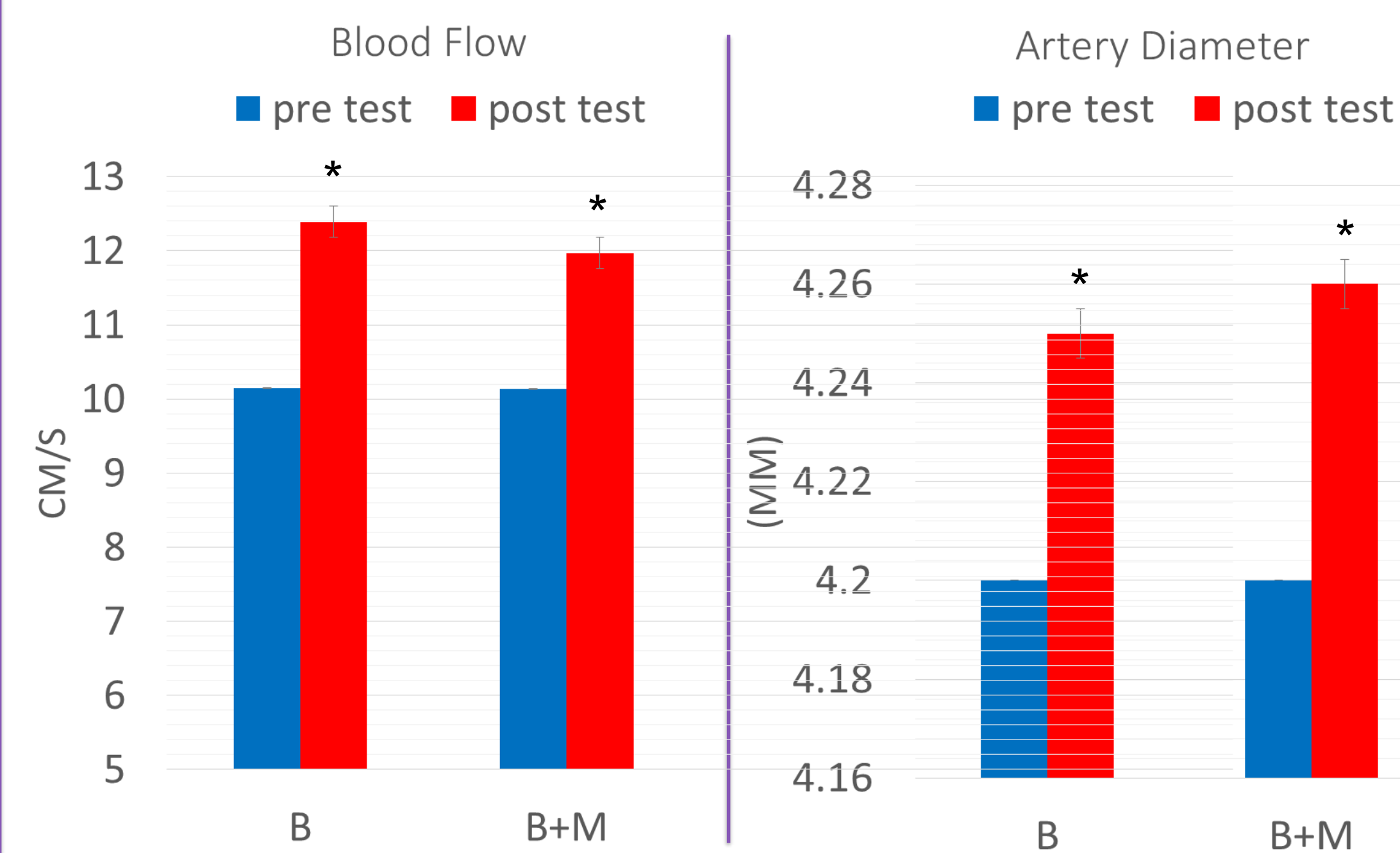


Figure 3: Average Blood Flow & Artery Diameter
B= Buffer B+M= Buffer with Magnets (* $p < 0.05$ compared to pre)

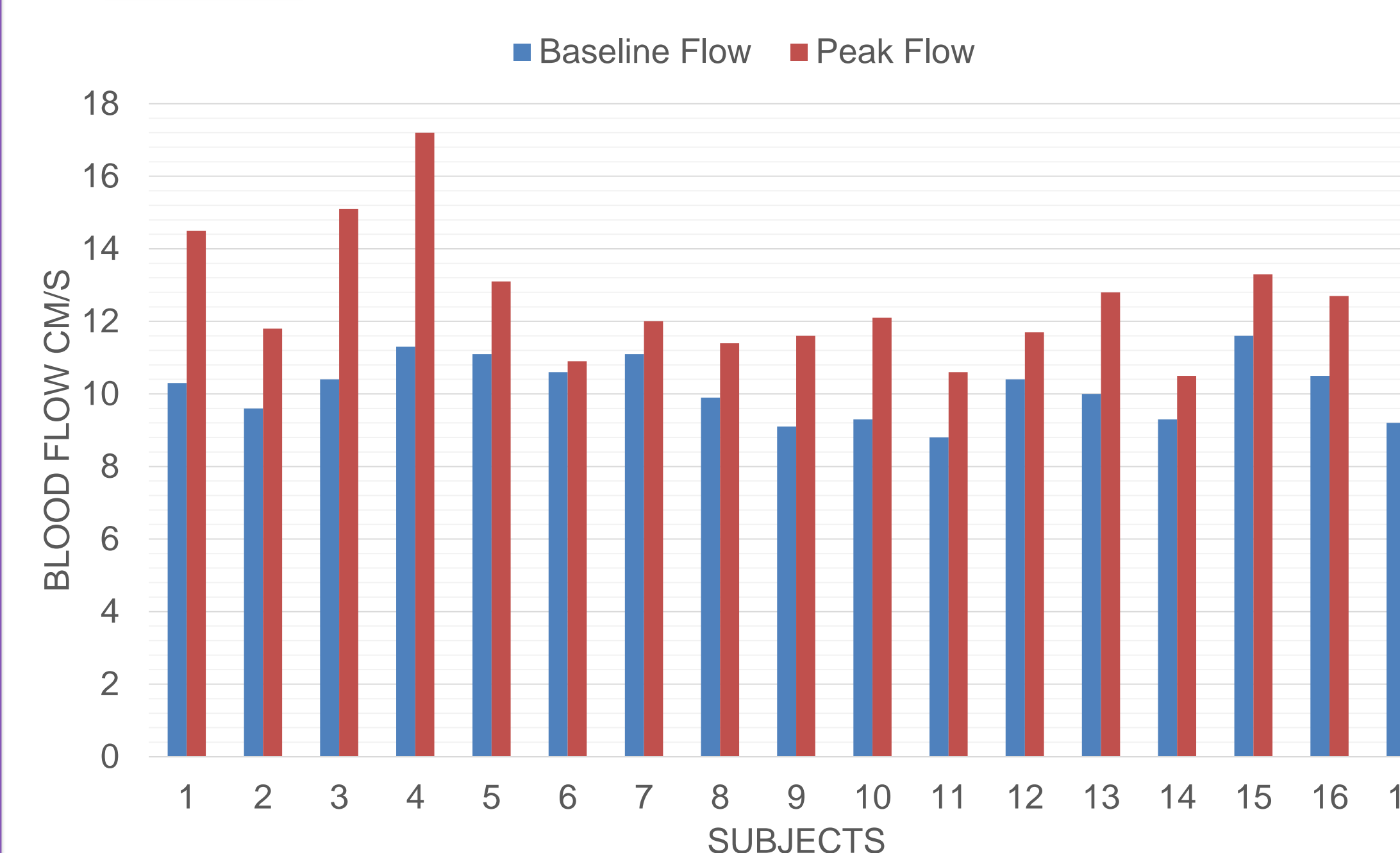


Figure 4: Buffer Without Magnets

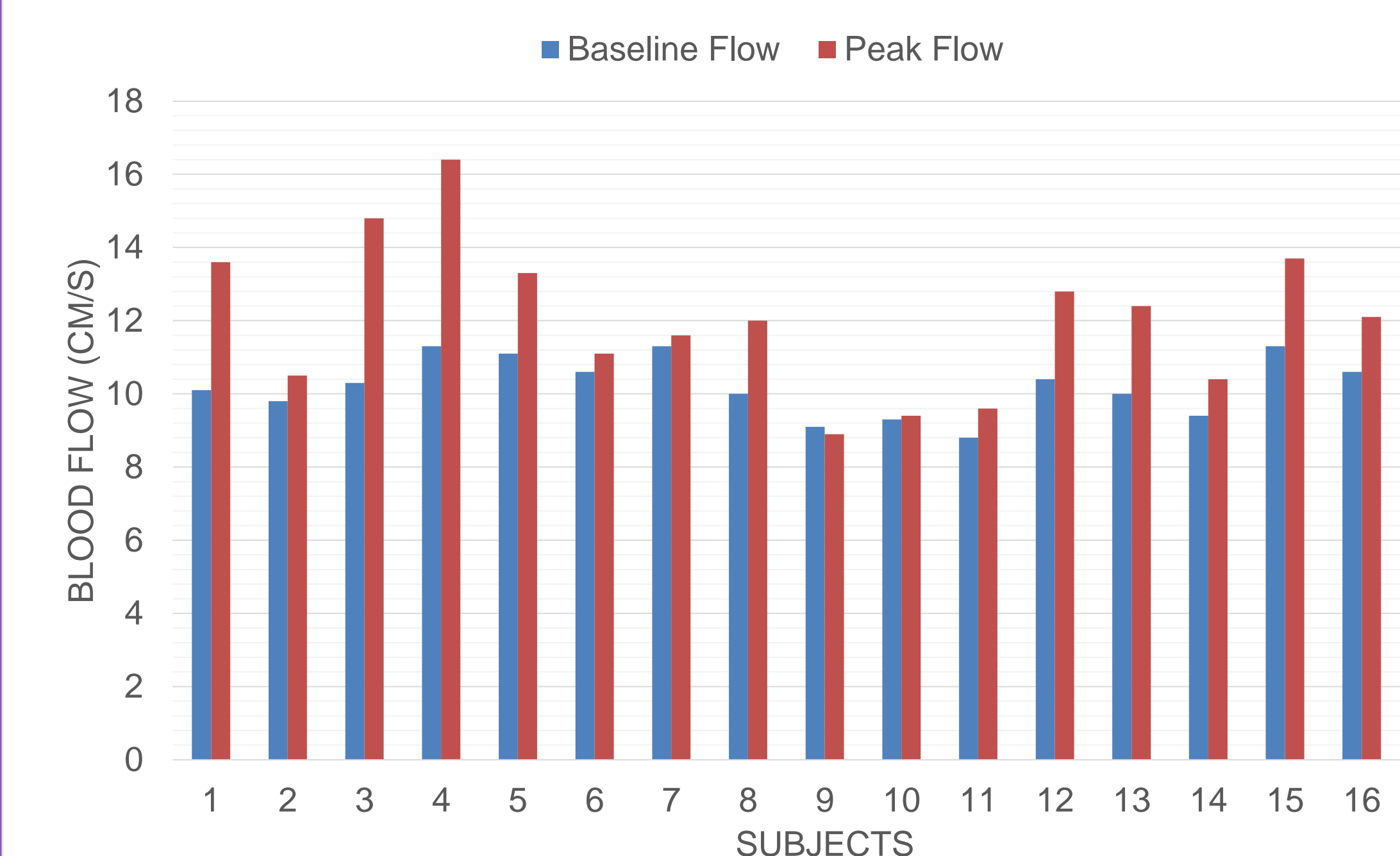


Figure 5: Buffer With Magnets

Summary

The Application of the hand held buffer improved blood flow and artery diameter supporting its use to enhance circulation. However, the addition of magnets did not. A potential reason for lack of a magnet effect could be due to the combination of oxygenated hemoglobin as well as the magnets used not having a strong enough response.

Another reason could be due to the brachial artery being tested was not superficial enough for the magnetic field to reach the artery or the size of the artery was too great. Therefore, having the exact same effects essentially as the regular buffer.

Future Research

The Effects of A Hand Held Buffer With Magnets on Blood Flow & Surface Temperature

- Preliminary data shows increases in skin temperature with buffer application

Conclusions

The application of a one minute buffer massage increases artery diameter and blood flow with no further effect from the addition of magnets.

PRACTICAL APPLICATIONS: Professionals can use a hand held buffer on their athletes/clients to reduce the effects of DOMS and increase local blood flow by using it pre and post-workout on their affected muscle groups.

References

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