Math 1030

Magnets and Pain Relief Statistical Project

Is it possible that magnetic fields can reduce pain? A fascinating study by Dr. Carlos Vallbona suggests it is.

Background

Magnetic fields have been shown to have an effect on living tissue as early as the 1930's. Plants have been shown to have an improved growth rate when raised in a magnetic field (Mericle et al., 1964). More recently, doctors and physical therapists have used either static or fluctuating magnetic fields to aid in pain management, most commonly for broken bones. In the case study presented here, Carlos Vallbona and his colleagues sought to answer the question "Can the chronic pain experienced by postpolio patients be relieved by magnetic fields applied directly over an identified pain trigger point?"

Mericle, R. P. et al. "Plant Growth Responses" in: *Biological effects of magnetic fields.* New York: Plenium Press 1964. p183-195.

Vallbona, Carlos et. al., "Response of pain to static Magnetic fields in postpolio patients, a double blind Pilot study" *Archives of Physical Medicine and Rehabilitation.* Vol 78, American congress of rehabilitation medicine, p 1200-1203.

Experimental Design

Summary

Patients experiencing post-polio pain syndrome were recruited. Half of the patients were treated with an active magnetic device and half were treated with an inactive device. All patients rated their pain before and after application of the device

Details

The experimenters recruited 50 patients who not only had post-polio syndrome but also reported muscular or arthritic pain. These patients had significant pain for at least 4 weeks and had not taken any painkillers or anti-inflammatories for at least 3 hours before the study. The subjects all had a trigger point or painful region and had a body weight of less than 140% of the predicted weight for their age and height, and had a trigger point or circumscribed painful area.

The magnets and placebos (described below) were supplied in equal numbers from Bioflex. Each magnet or placebo was placed in number coded envelopes and delivered according to its shape. The code for placebos and magnets was not broken until the end of the study.

One site of reported pain was evaluated and a trigger point for this pain was found by palpitation. The patient was asked to subjectively grade pain at the trigger point under palpitation on a scale from 1 to 10 (1 is the least pain, increasing to 10).

Following the initial pain assessment, an envelope containing a device was randomly selected from the box containing both active and inactive devices. This device was applied to the pain area for 45 minutes and then removed. The patient then evaluated his or her pain again at the region or trigger point. This second pain rating is the score analyzed here.

Materials

The magnets used in the study were Bioflex magnets. The magnetic field consists of concentrically arranged circles of alternating magnetic polarity. Seventy active devices and seventy identical inactive devices were used.

Data

Active Magnets

Pre	Post	Change
10	0	10
10	4	6
8	7	1
10	0	10
10	4	6
10	2	8
10	5	5
10	5	5
9	3	6
10	2	8
9	2	7
10	2	8
10	3	7
10	5	5
10	6	4
8	4	4
10	3	7
10	0	10
8	2	6
10	0	10
10	4	6
9	4	5
10	5	5
10	9	1
10	10	0
10	10	0
10	10	0
10	10	0
8	7	1

Placebos

Pre	Post	Change
8	4	4
10	7	3
10	5	5
10	8	2
9	8	1
10	6	4
9	8	1
10	10	0
10	10	0
7	6	1
10	10	0
8	8	0
10	10	0
10	10	0
10	10	0
10	10	0
9	9	0
10	9	1
10	10	0
10	10	0
10	9	1

Math 1030 Project 2
Magnets & Pain Relief

(Work in groups of two to four.)

Names XANDER HANSEN

section _____

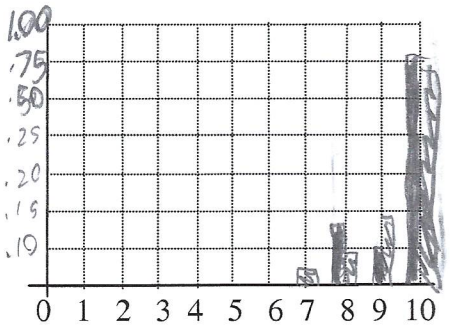
date _____

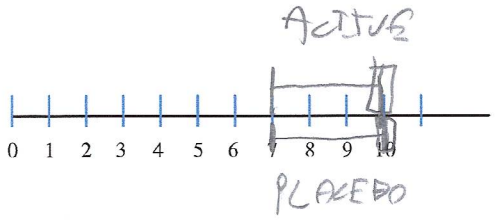
Compare the mean, range, and distribution (graphing both a double histogram using **relative frequency** and box plots) of the **pretest** for the active magnet group and the placebo group. Tell why you think the groups appear to be similar or different.

Placebo: mean = 9.52 range = 3

Active Magnet: mean = 9.62 range = 2

= PLACEBO
= A.M.





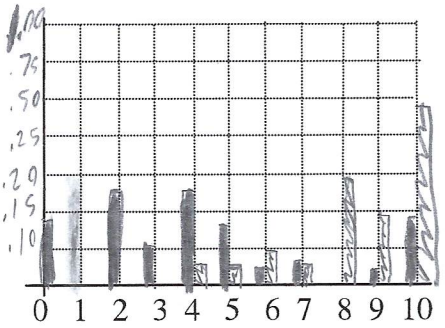
GROUPS ARE SIMILAR BECAUSE THE PRETEST HAS NO CHANGE IN GROUPS

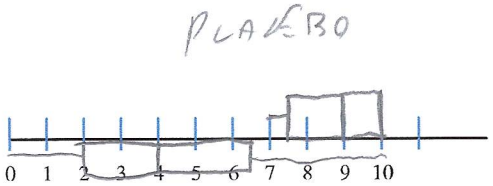
Compare the mean, range, and distribution (using both histograms and box plots) of the **post-test** for the active magnet group and the placebo group. Tell why you think the outcomes appear to be similar or different.

Placebo: mean = 8.43 range = 6

Active Magnet: mean = 5.97 range = 10

= PLACEBO
= AM

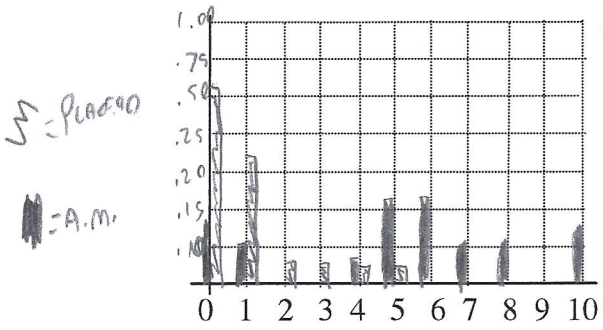




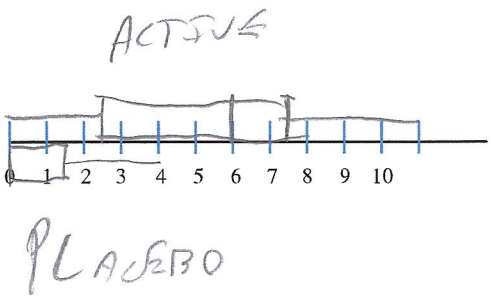
POST TEST IS DIFFERENT BECAUSE THE GROUPS ARE RECIEVING DIFFERENT TREATMENT

Calculate the "**pain relief,**" i.e. the **change between the initial pain and that reported after the treatment.** Explain how you calculated the difference and what the numbers mean. Compare the mean, range, and distribution (using both histograms and box plots) of the **change** for the active magnet group and the placebo group. Tell why you think the outcomes appear to be similar or different.

Placebo: mean = 2.8
range = 10



Active Magnet: mean = 5.2
range = 10



OUTCOME IS DIFFERENT BECAUSE ACTIVE GROUP SEES MORE CHANGE

Write a or two paragraph reflecting how these statistics either support, refute, or are irrelevant to the claim that magnets can help relieve some types of pain. Discuss the limits for which the data can be used and why you think this is, or is not, a good study.

THE STATISTICS SUPPORT THE CLAIM. THE ACTIVE GROUP HAD MORE CHANGE THAN PLACEBO. THIS IS AN UNFAIR STUDY BECAUSE GROUPS ARE UNEVEN