

Paired Sample t-test worksheet

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 post-polio 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: Plenum 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

Patients experiencing post-polio pain syndrome were recruited. The experimenters recruited a sample of 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 pain killers 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 were supplied in equal numbers from Bioflex. The 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 0 to 10 (0 is the least pain, increasing to 10).

Following the initial pain assessment, 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.

The data were recorded and listed in the next page:

(This worksheet was created based on **Rice Virtual Lab in Statistics** managed by David Lane.)

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Subject ID	Before	After	
1	9	5	
2	8	7	
3	8	4	
4	9	7	
5	10	5	
6	9	6	

The researchers wish to see if there is statistically significant reduction in pain score, at 5% level of significance. (i.e., whether the average reduction in pain score is statistically significantly greater than 0.)

State Hypothesis:

Null:

Alternative:

Test statistic =

(Assumption check for using this test.)

Decision Rule:

Conclusion: