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Is exercise safe and effective at decreasing the incidence of tension-type headaches?

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A SELECTIVE EVIDENCE BASED MEDICINE REVIEW

In Partial Fulfillment of the Requirements For

The Degree of Master of Science

In

Health Sciences – Physician Assistant

Department of Physician Assistant Studies
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ABSTRACT

OBJECTIVE: To determine whether exercise is safe and effective at lowering the incidence of tension-type headaches

STUDY DESIGN: Review of three English language primary studies published in 2006 and 2009.

DATA SOURCES: Randomized, Double Blind, Cross Sectional Studies comparing the incidence of tension-type headaches in patients that exercised to those who did not exercise using PubMed, OVID Medline and Cochrane databases

OUTCOME MEASURED: Each trial measured the intensity and severity of tension-type headaches. Patients with tension-type headaches were evaluated and the incidences of headaches were recorded along with the intensity of the headache. Patients were also instructed to keep track of the use of medication via a headache diary. In the final study questionnaires were given out to patients to see if there was a correlation between patients who had tension-type headaches and their level of daily activity

RESULTS: All three articles found an inverse association between exercise and the incidence of tension-type headaches. In both RCT the results demonstrated a statistically significant trend towards an association. In the cross sectional study the men group showed a statistically significant trend where the women's group demonstrated a trend towards an association, but it was not statistically significant. The results were limited by the subjectivity of recording the severity of a tension-type headache. There were no adverse reactions found in any of the three studies.

CONCLUSION: All three trials indicated a negative correlation between exercise and tension-type headaches. Further research is needed, but in the future this correlation may be taken into account when treating patients with tension-type headaches

KEY WORDS: tension-type headaches, exercise, manual therapy, physiotherapy and craniocervical training program

INTRODUCTION

Tension-type headaches are the most common type of headache, almost 80% of the population will suffer from a tension headache at some point in their lives. Patients of all ages can be affected, but they are most common in the adult population. Tension-type headaches can affect a person's functional and emotional ability on many levels. People who suffer from these headaches can have sleep disturbances, inability to perform daily activities, work productivity and as a result this impacts their quality of life. The 1-year prevalence of chronic tension-type headaches is 2-5% in the general population and unfortunately a very small percentage of these patients seek medical care.^{1,2}

Most patients fail to seek medical help for their tension-type headaches due to insufficient information, failure of previous treatments or excessive use of over-the-counter products. Studies estimate the amount of patients who seek medical help for their tension-type headaches is 15%. This is extremely low considering the options available to treat patients that suffer from these headaches. Several medications have been successful such as Excedrin, Ibuprofen and Fioricet but unfortunately some medications overtime cause rebound headaches and therefore many patients would benefit from conservative treatment.²

Tension-type headaches have been treated with medications for many years, but now studies are looking at manual therapy as a reasonable option. The pathogenesis of tension-type headaches is still unclear due to the complexity and multifactorial stimulants. These headaches are debilitating and persistent, 47% of patients who visit their primary care physician for the complaint of "headache," suffer from tension-type headaches. Since headaches are the most common medical complaint of the general population it is important to consider other treatment

alternatives. Studies have begun to investigate the option of physical exercise to reduce the incidence of tension-type headaches in the general population.^{1,2}

OBJECTIVE

The objective of this systematic review is to determine whether exercise is safe and effective at lowering the incidence of tension-type headaches. Previous randomized control studies have indicated a negative correlation between the amount of exercise and the incidence of tension-type headaches.

METHODS

A detailed search was conducted using MEDLINE and Cochrane Databases to find articles that investigated the use of exercise to lower the incidence of tension-type headaches. The key words used to search these databases were, “tension-type headaches and exercise,” the search was limited to English written articles and human beings as subjects. Each Article was selected based on relativity, patient oriented evidence that matters and publication dates. Two of the three studies were randomized controlled trials and the third study was a cross sectional study of 12,988 subjects. All three studies were published in peer reviewed journals and subjects were 18 years of age or older. The statistics reported in these studies include p-value, confidence interval (CI), absolute risk reduction (ARR), numbers needed to treat (NNT), numbers needed to harm (NNH) and relative risk reduction (RRR).

The two randomized controlled trials looked at patients older than 18, who suffered from tension-type headaches and randomly split them into the experimental group and the control group (Table 1). These articles compared the experimental group that was treated with manual therapy exercise and only given medication if asked for, to the control group who was not treated with any manual therapy nor any medication unless asked for.^{1,2}

The third article was a cross sectional study that consisted of 12,988 subjects from Japan. Patients ranging from 18-80 and were given a questionnaire to evaluate physical condition, stress, exercise, sleep and co-morbidities of each patient (Table 1). Each factor was compared in those patients that suffered from tension-type headaches to look for any trends or correlations. The demographics and criteria for each study are shown in Table 1. The inclusion criteria included POEM's, RCT's, being over the age of 18, suffering from tension type headaches and studies published no later than 2006. ³ The exclusion criteria included patients over the age of 80, other headache types, physiotherapy within 6 months of the study, any comorbidities such as pregnancy, malignancy, RA and any use of triptans, ergotamines or opioids >10days/ month.

OUTCOMES MEASURED

The outcome measured in all three studies was the incidence of tension-type headaches in those who exercised compared to those who did not exercise. The severity of each headache was also measured in all three studies. In both randomized control studies headache journals were used to keep track of each headache and the severity. In the study by Castien RF, van der Windt DA, Dekker J, Mutsaers B, Grooten A., Effectiveness of manual therapy; they measured the frequency of days with headaches and the use of pain control as primary outcomes. The secondary outcomes measured were pain intensity (0= no pain, 10= most severe pain), the impact of the headache on daily life scored using the Headache Disability Inventory and the Headache Impact Test-6. ¹

The second randomized control study by H van Etekenoven H, Lucas C. Efficacy of physiotherapy including a craniocervical training programme for tension-type headache measured the outcomes of pain (0= no pain, 10 =worst pain), the Short-Form General Health

Survey (to assess the quality of life) and the Multidimensional Headache Locus of Control was used to determine whether the patients headaches were influenced by interventions.²

Table 1- Demographics and Characteristics of each study

Study	Type	Number of pts	Age (years)	Inclusion Criteria	Exclusion Criteria	W/D	Interventions
Castien 2009 (1)	Randomized Control Trial- (pragmatic, multicentre, randomized control trial)	42	18-65	18-65 years old that suffer from tension type headaches at least 15 days / month for 3 months or more	malignancy, pregnancy, RA, intake of either triptans, ergotamines or opioids on >10 days per month, analgesics >15 days/month for 3 months, manual therapy within 2 months	2	Exercises and postural corrections were compared to a group of individuals treated with medications
H van Etteken 2006 (2)	Randomized control trial with blinded outcome assessment (multicentre, RCT) Analyzed	81	18+	Pts who suffered from tension type headaches lasting minutes to days and <15 month (episodic) <15 (chronic)	Other headache types, cervical function problems, previous physiotherapy within 6 months of study	0	Western massage techniques, oscillation techniques and instructions on postural correction

Yokoyama 2009 (3)	Cross- Sectional Study	12,988	20-79	Pts who came into Mitsukoshi Clinic 01/2004- 12/2004 aged 20-79	Patients 80 or older	0	Patients were analyzed based on their answers on the questionnaire they were given
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RESULTS

Two of the studies were randomized control trials that looked at the incidence of tension-type headaches in patients who exercised vs. those who did not. In the study Castien RF, van der Windt DA, Dekker J, Mutsaers B, Grooten A. Effectiveness of manual therapy compared to usual care by the general practitioner for chronic tension-type headache: design of a randomized clinical trial, researchers looked at the efficacy and safety of treating patients with manual therapy. The results showed manual therapy to be more effective at decreasing the incidence of tension-type headaches. The experimental group was given manual therapy and on average had less tension-type headaches than the control group (Table 2). The confidence interval was very narrow indicating high precision and indicates a correlation (Table 2).^{2,3}

The second randomized control trial conducted by H van Ettehoven H, Lucas C. examined patients referred by general practitioners and split them into two groups. The experimental group participated in physiotherapy and craniocervical training and the control group only participated in physiotherapy. Researchers found that the combination of physiotherapy and craniocervical therapy significantly decreased the incidence of headaches (Table 3). Once the data was collected the researchers determined $p=0.081$. Since the p-value fell into the range of 0.05-1.10, it can be determined that the data demonstrates a statistically

significant trend towards an association. More studies need to be conducted with a larger number of subjects to get a more accurate p-value (Table 3).²

The cross sectional study done by Yokoyama M, Yokoyama T, Funazu K, et al showed the correlation between the incidence of tension-type headaches and exercise. They found an inverse association between the amount of exercise and the incidence of headaches in these patients (Table 4). This study surveyed 12,988 subjects and evaluated the stimulus or trigger that instigated their headaches. Each patient that suffered from tension-type headaches was asked how often they exercise and data was separated out into males and females and then evaluated (Table 4). The research was statistically significant in the male population with a p-value of 0.020 and marginally significant in the female population with a p-value of 0.063.³

In all 3 studies the data indicated that exercise is effective at decreasing the incidence of tension-type headaches. In order to have a more valid statistical analysis more subjects are needed and more research needs to be conducted. Each of the studies evaluated used subjects over the age of 18 and all 3 were randomly selected subjects to increase the validity of the study. Each study illustrated the correlation between exercise and the effect it had on decreasing the incidence of tension-type headaches. The safety of each patient was considered when the patient was first enrolled into the study. Exercise was the treatment being assessed and therefore each patient was evaluated to ensure they could participate in any physical activity needed.¹⁻³

Table 2- Efficacy of Exercise in preventing tension-type headaches

Study	Incidence of Headache in Experimental Group	Incidence of headache in control group	p-value	Odds Ratio (95% CI)

Castien 2009	3/14 days	7/14 days		(0.2-0.5)- small (0.5-0.8)- med (0.8 <)- large
Van Ettehoven 2006	2/7 days	4/7 days	0.081	N/A

Table 3-Statistical Significance and Efficacy

Study	CER	EER	RR	RRR	ARR	NNT
Van Ettehoven 2006	35%	85%	2.4	1.4	0.5	2

Table 4- Efficacy and Safety of Cross-Sectional Data

Walking and Exercising	Subjects	Proportion of Headache sufferers	Age- adjusted OR	95% CI	Subjects	Proportion of Headache sufferers	Age- Adjusted OR	95% CI
Gender	MEN	MEN	MEN	MEN	WOMEN	WOMEN	WOMEN	WOME N
5 day/ week or more	2,042	4.9	0.68	0.50- 0.92	2,297	14.7%	0.85	0.72- 1.01
3-4 days/ week	1,069	5.2	0.77	0.54- 01.10	1,658	15.4%	0.93	0.77- 1.13
2 days/week	859	3.7	0.53	0.35- 0.81	889	12.5%	0.71	0.56- 0.90

1 day/ week	745	6.3	0.88	0.61- 1.28	665	15.5%	0.88	0.68- 1.12
Seldom	1,193	7.2	1.00	Referen t	1,579	17.7%	1.00	referent

DISCUSSION

This systematic review looked at all three articles and analyzed them for efficacy and safety. The efficacy of each article was either statistically significant or marginally significant which indicates a negative correlation between the incidence if tension-type headaches and exercising. The safety in each study was extremely important and therefore researchers evaluated each patient and their past medical history. Since the experimental group would be exercising and participating in manual therapy, every patient in the study needed to be cleared for any serious medical conditions before conducting the study. The cross-sectional study was a questionnaire so safety was not applicable to this study.¹⁻³

In three studies discussed there were some unavoidable limitations. Headache occurrence could not be measured objectively and therefore the research was based on the patient reporting the incidence. Also the severity of a tension-type headache is a subjective matter and depending on the patients pain tolerance these numbers may change from person to person. In the study conducted by Castien RF, van der Windt DA, Dekker J, Mutsaers B, Grooten A., patients were allowed to take medication when asked which could have affected the data collected. The sample size in both randomized control trials was not large enough to make an impact on the choice of therapy in patients suffering from tension-type headaches, but once more studies are conducted doctors will be able to see a clear association between the level of exercise and the incidence of tension-type headaches.

The studies reviewed showed exercise does lower the incidence of tension-type headaches. Most patients who participated in manual therapy found they had less tension-type headaches and as a result they felt better. The data illustrated gives doctors another option when treating patients with tension-type headaches.

CONCLUSION

Exercise does decrease the incidence of tension-type headaches. After reviewing each article researchers have found that patients who exercise have decreased their headaches tremendously. More research needs to be conducted before this is an option for therapy. Studies that use a larger amount of subjects would increase the validity of the study and as a result be more intriguing to medical professionals. Since headaches are a subjective matter tight controls need to be administered on the study conducted to ensure accuracy.

Exercise has many benefits on the body and when used as therapy can decrease the incidence of tension-type headaches, therefore increasing their quality of life. The studies reviewed determined that exercise does lower the incidence of headaches and as a result these patients improved in their functioning and emotional stability. The US is always ready to push another medication, but instead of always moving towards a pharmacologic standpoint exercise may be a valid option without the negative side effects in treating patients who suffer from tension-type headaches.

References

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