

**A critical appraisal of “Impact of exercise programs among
helicopter pilots with transient LBP”**

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**In partial fulfillment of the
requirements for the course:
PT 7240 Evidence-Based Practice in Physical Therapy
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November, 2018**

Abstract

Introduction: Understanding the treatment options available for treating individuals with low back pain is applicable for clinicians and may have beneficial outcomes for a large percentage of the population. For this reason, this paper sought to examine evidence pertaining to the effectiveness of exercise in reducing the incidence of low back pain, specifically in helicopter pilots.

Methods: A systematic search was done of the available literature to examine evidence pertaining to the clinical question. An article by Andersen et.al. was collected and analyzed to determine the validity of the evidence. This group of researchers had performed several preceding studies, so their expertise could provide novel insight into the topic of interest.

Results: The article performed a quasi-experimental trial on the population of interest in order to add to the body of knowledge concerning exercise benefits and effectiveness in reducing low back pain, and provided support to the option of using physical activity in reducing low back pain associated with helicopter pilots. More evidence was supplied by the study, however the validity of the study methods hinders the application of the results.

Discussion: Exercise is effective in reducing the low back pain experienced by helicopter pilots. The novel exercises presented by the research group do not have enough support to warrant their implementation over traditional exercise techniques. There may be clinical applications for the movements performed, but the most effective treatment for low back pain in helicopter pilots still appears to be exercise in general.

Keywords: Low back pain, helicopter, exercise

Introduction

Low back pain (LBP) is a common condition reported by helicopter pilots. The long term sitting in a constrained environment is known to cause low back pain that often times resolves after flights but returns again with resuming the static seated posture. Helicopter pilots are needed for a variety of tasks within the armed forces from transport, offensive capabilities, and reconnaissance. Any level of pain or discomfort associated with the task of flying can cause a decrease in performance during flight missions. There are two main approaches to dealing with the LBP experienced by a large number of pilots. The task and environment are restricted by nature, though ergonomic improvements can be made in the cockpit to improve prolonged flight conditions to some degree. Adjustments directly to the pilot are the other avenue that can be explored in order to decrease LBP. For this reason, the question regarding the feasibility of daily exercise and physical activity to decrease the incidence of low back pain in professional pilots is explored by performing this literature review.

Methods

To formulate an answer to this question, a search was performed using the PubMed database. The keywords used in the performance of this search were “physical activity” “low back pain” and “pilots”. There were no limitations placed on this search. By using specific words and phrases the results were greatly narrowed down. Though helicopter pilots were the ideal population, “pilots” was not specified in the search due to uncertainty of research for that specific of a population. After running the search using the aforementioned terms, 30 results

were returned, and from those articles were screened for their relevance directly to helicopter pilots and low back pain.

The article selected came from the journal “BMC Musculoskeletal Disorders” in 2017. The researchers named in the study were Knut Andersen , Roald Baardsen, Ingvild Dalen and Jan Petter Larsen. The selected article was chosen because it very specifically addressed the posed question. The subjects in this study were randomized into their respective training groups, which was a positive for the study. Also, the researchers performing this study have performed similar research in the past. This was not the first study by this group of scientists in looking into musculoskeletal issues within pilot populations. Because of this, the clinicians/outcome assessors can be assumed to possess the competence to accurately perform the study.

Results

Summary of the study

The reviewed study sought to ameliorate LBP using lumbar strengthening exercises and to determine between two programs, which would be the most effective. Pilots from two different cities performed one of two possible programs over a period of 135 days and were reassessed at the completion of their training protocol. At the conclusion, the researchers noted improvements in both training groups, however the group that performed a new combination of exercises was shown to have greater improvements.

Appraisal of the study introduction

The introduction clearly moves through explaining the physical factors helicopter pilots face, pain that may develop as a result of their occupation, what may cause their pain, and what they (the researchers) believe can be done about correcting that pain. The literature review determined that strengthening exercises can be useful in decreasing low back pain, so the purpose of the article is to compare strengthening methods for the low back to determine which is more effective in decreasing back pain. The literature follows a good train of thought and builds the case for the study to be done. This study utilized two low back strengthening exercise programs as its independent variables while the incidence and severity of pain were the dependent variables measured.

The introduction does leave out some information that could be pertinent to the understanding of LBP in helicopter pilots. Statistics regarding the incidence of LBP in helicopter pilots is not stated in the introduction. The researchers stated that they intended to measure muscle function, but everything in the introduction was more geared towards the incidence of LBP. More clarity on what their primary goal is and what they believe will be seen would be beneficial additions to the introduction.

Appraisal of the study methods

The research design is quasi-experimental. However, as stated in the article, one of the groups was performing an accepted regimen for improving low back musculature. In some ways, this group acts as the control because the researchers are comparing to this accepted norm. 83 subjects were initially recruited for the study. 39 subjects completed the study, but those that

dropped out did so before the experimental condition was added. Their nonparticipation did not affect the results. The 39 subjects were divided into two groups for this between-subjects study.

However, a potential flaw in the research design is that the group assignment was not concealed from the researchers. The experiment took place at two different locations at two different times. One location performed one set of exercises and the other location performed a different set of exercises. Blinding did not occur for the researchers in any way. In fact, the treatment group was tested after the “control group” had performed their study. The other large issue with the study design centered around the control of the workout programs and the variation between them. With the subjects performing the training without supervision and a lack of standardization or matching between the protocols, the results obtained could be entirely invalid.

Appraisal of the study results

The results of the study were presented in a logical order, and the results addressed the improvements of the pilots muscle strength in those that had transient low back pain. At $p < .05$, 95% confidence interval, the researchers did show that both groups improved strength, while the “B” group improved in the other outcome measures.

In the results section, the tables were not clear, nor was the reasoning immediately clear behind the organization of the charts. One chart seemed to compare the subjects who completed the testing with those who did not adhere to the protocols, which seemed superfluous to include at research data. Because the comparisons were done between subjects and not between groups, it is more difficult to determine which training protocol is truly more effective.

Appraisal of the study discussion

During the discussion of the results, the authors went into detail explaining why their results are meaningful. They described the etiology of transient low back pain and how stronger lumbar extensors may have a positive impact on the pain. Literature related specifically to back pain in helicopter pilots was provided and explained regarding how the current research complimented and added to the existing body of knowledge.

Not mentioned by the researchers was the fact that all of group A was located in one place while all of group B took place in another location with group B undergoing the training after group A had completed their study. The findings were over concluded. The validity of the research, due to the lack of blinding and different testing conditions, does not warrant one approach being favored over another.

Discussion

Low back pain affects a large percentage of the population at some point in their life, so therapy interventions that might decrease the incidence in any population is a valuable tool that should be explored. Specifically, this study sought to decrease the occurrence and severity of LBP in helicopter pilots, which is in direct concordance with the clinical question posed initially.

The use of low back and core musculature exercises to alleviate pain from low back disorders is well studied and established. This article sought to expand the clinical options for treatment by examining a new grouping of exercises to by testing its efficacy. Due to the lack of

standardization and experimental rigor, it is not possible to say whether traditional approaches or the proposed training program would be more effective in reducing LBP. Both protocols were effective and no injuries were reported in the study, so there may not be a detrimental effect to utilizing the new approach if traditional exercises do not achieve the desired results. Had the experimental groups performed intensity and duration matched workouts, it would provide a more clear understanding of the pros and cons of the two approaches.

While the evidence is not strong in support of the novel approach, it could prove useful in application to reducing LBP in helicopter pilots. However, the exercises required specialized equipment in order to correctly perform them. As such, it would be difficult to warrant using this evidence in promoting a new plan of exercise for helicopter pilots. It would be most beneficial to have the pilots begin a more traditional program. The most appropriate place for the novel intervention at this time would be in a clinical setting where the special exercise table and professional expertise are present to ensure the correct completion of the movements.

The evidence presented and examined in this clinical appraisal support the continuation of exercises by helicopter pilots to aid in the reduction of occurrence and severity of LBP. Application of new techniques might be appropriate in a controlled clinical setting, but is not indicated strongly enough for implementation for general populations.

Works Cited

Andersen K, Baardsen R, Dalen I, Larsen JP. Impact of exercise programs among helicopter pilots with transient LBP. *BMC Musculoskeletal Disorders*. 2017;18(1).

doi:10.1186/s12891-017-1631-0.