Chapter V
SUMMERY AND CONCLUSION

In this chapter, the study is summarized by including the purpose of this investigation, background, the method used to collect data and major findings. In addition to this from findings of this study, conclusions are put forward and future investigations are suggested.

5.1 Summary

Musculoskeletal disorders, of which back pain accounts for more than half the number of cases, are the most common cause of chronic incapacity in industrialized countries. Approximately 10–20 percent of patients with low back pain (LBP) develop chronic pain, defined as LBP persisting more than 3 months. LBP represents a particularly costly sociomedical problem. These patients use more than 80% of health care resources. Thus, the development of effective interventions aimed at management of the chronic problems is urgently required.

Chronic LBP is a multifactorial phenomenon and it is not surprising that many therapeutic approaches exist. There are ample evidences that active approaches, such as exercise therapy, are beneficial for patients with sub acute and chronic LBP. Positive results have been documented with different types of exercise, suggesting there are few evidences that a particular “type” of exercise is any better than another. The effectiveness of classic trunk exercises, that they activates the abdominal and paraspinal muscles, were reported on the several randomized controlled trials (RCTs). While some trials of exercise therapy have reported clinically important effects of treatment others have not. Many factors contributed to the inconsistent results across trials. Importantly, interpretation of the results of exercise trials is difficult because most trials have been pragmatic trials. Secondly, the quality of exercises was not controlled. Lastly, methodological quality varies greatly across previous exercise trials.

Increasing attention recently has been paid to the preferential retraining of the local stabilizing muscles of the spine. Lumbar multifidus (LM), transversus abdominis (TA), and internal oblique muscles with intervertebral attachments are better suited for providing intersegmental stability, opposed to the longer trunk muscles, dedicated to generating movement. Morton found that stabilization training of LM was less effective than when combined with a course of manipulative therapy in nonspecific LBP. Some evidences support the role of stabilization exercises in LBP with respect to symptom recurrence, but the 2 relevant RCTs have been conducted in specific subgroups of
patients with LBP.\textsuperscript{12,15} The first study compared stabilization exercise against standardized medical care in acute first-episode unilateral LBP.\textsuperscript{12} A 3-year follow up showed a link between improvement in LM cross sectional area (CSA) and reduced LBP recurrence in the group that received stabilization exercise.\textsuperscript{19} The second study, comparing stabilization exercise against general exercise in patients with lumbar spondylolysis or spondylolisthesis, indicated large short-term and long term improvement in favor of the stabilization exercise group on pain and disability.\textsuperscript{13} However, in these 2 trials, the specific effect of the stabilization exercise was not compared to stretching back and abdominal exercises. A RCT on 160 patients demonstrated that either stabilization or general exercises were accompanied by large improvements in pain and disability. However, stabilization exercises produced significantly better outcomes in the short term and at 6 month follow up.\textsuperscript{20} A more recent study in patients with nonspecific chronic LBP, in contrast with two previous studies, demonstrated positive results for LM muscle CSA increase in favor of general exercise.\textsuperscript{21} This finding contradicts the theory that general exercise would not be as effective for restoration of LM size.\textsuperscript{22} Koumantakis also showed that general exercises reduced disability in the short term to a greater extent than stabilization-enhanced exercises in these patients.\textsuperscript{23}

In clinical trials that reported improvement after stabilization exercise, other interventions also accompanied. The results of the studies also are different. On the other hand, the primary aim of stabilization exercise, which is to re-establish normal control of the deep spinal muscles, reducing the activity of more superficial muscles, and then maintain normal control during progressively more demanding physical and functional tasks.\textsuperscript{22} For these reasons, we decided to determine the efficacy of stabilization exercises usually considered as motor control exercises versus stretching exercises, through a RCT in chronic LBP. For this, before and after stabilization and stretching exercises, we determined LM thickness, lumbar range of flexion, activity limitation and intensity of pain.

This study consists of one control group it was chosen from the population they don’t have any kind of back pain, and the two experimental groups were chosen from population with low back pain. One experimental group received core stabilization exercises, and the other experimental group received stretching exercises. Pretest was taken of all groups in the baseline and the posttest was taken from experimental groups after the intervention (12 weeks). We followed the hypothesizes in three steps; in the first step, we compared the people without any kind of low back pain with the patients in the
baseline. In the second step, we investigated the effect of exercise interventions on the experimental groups. We have done within and between competitions in the experimental groups with the 0.05 meaningful level. And in the final step, we compared the variations of the dependent variables in the experimental groups with the healthy group.

5.2 Major Findings

1) Review of statistical data has shown that there are significant differences in the amount of Lumbar flexion between all groups in the baseline. This difference was occurred between the control group and experimental groups. It means the patients groups have a less range of the flexion in the lumbar than the healthy people. Therefore, the null hypothesis is rejected.

2) Review of statistical data has shown that there are significant differences in Multifidus thickness between all groups in the baseline. This difference was occurred between the control group and experimental groups. It means the multifidus muscle atrophy happened to the patients with nonspecific chronic low back pain. Therefore, the null hypothesis is rejected.

3) Review of statistical data has shown that there are significant differences between pretest and posttest of Functional disability in the stabilization group. It means stabilization exercises have had an effect on Functional disability, and this effect was positive because the amount of functional disability was decreased. Therefore, the null hypothesis is rejected.

4) Review of statistical data has shown that there are significant differences between pretest and posttest of pain intensity in the stabilization group. It means stabilization exercises have had an effect on pain intensity, and this effect was positive because the amount of intensity of pain decreased. Therefore, the null hypothesis is rejected.

5) Review of statistical data has shown that there are significant differences between pretest and posttest of Lumbar Range of flexion in stabilization group. It means stabilization exercises have had effect on Lumbar flexion, and this effect was positive because the amount of intensity of pain increased. Therefore the null hypothesis is rejected.

6) Review of statistical data has shown that there are significant differences between pretest and posttest of Multifidus thickness in stabilization group. It means stabilization exercises have had effect on Multifidus thickness, and this
effect was positive because the thickness of Multifidus muscle increased. Therefore the null hypothesis is rejected.

7) Review of statistical data has shown that there are significant differences between pretest and posttest of Functional disability in stretching group. It means stretching exercises have had effect on Functional disability, and this effect was positive because the amount of functional disability decreased. Therefore the null hypothesis is rejected.

8) Review of statistical data has shown that there are significant differences between pretest and post test of intensity of pain in stretching group. It means stretching exercises have had an effect on intensity of pain, and this effect was positive because the amount of intensity of pain decreased. Therefore, the null hypothesis is rejected.

9) Review of statistical data has shown that there are significant differences between pretest and posttest of Lumbar Range of flexion in stabilization group. It means stretching exercises have had effect on Lumbar flexion, and this effect was positive because the amount of intensity of pain increased. Therefore the null hypothesis is rejected.

10) Review of statistical data has shown that there are significant differences between pretest and posttest of Multifidus thickness in stretching group. It means stretching exercises have had an effect on Multifidus thickness, and this effect was positive because the thickness of Multifidus muscle increased. Therefore, the null hypothesis is rejected.

11) Review of statistical data has shown that there are significant differences in the Lumbar Range of flexion between all groups after intervention. This difference was occurred between the control and stretching groups relative to stabilization groups. It means the stretching exercises had a better effect on improvement of lumbar flexion than the stabilization exercises. Therefore, the null hypothesis is rejected.

12) Review of statistical data has shown that there are significant differences in Multifidus thickness between all groups after intervention. This difference was occurred between the control and stabilization groups relative to stretching groups. It means the stabilization exercises had a better effect on improvement of thickness of the Multifidus muscle than the stretching exercises. Therefore, the null hypothesis is rejected.
13) Review of statistical data has shown that there are significant differences in mean difference of functional disability between stabilization group and stretching group after intervention. It means the mean difference (pretest-posttest) of functional disability was more than mean difference of functional disability in stretching group, and stabilization exercises had a better effect on decreasing the functional disability than the stretching exercises in the patients. Therefore, the null hypothesis is rejected.

14) Review of statistical data has shown that there are significant differences in mean difference of pain intensity between stabilization group and stretching group after intervention. It means the mean difference (pretest-posttest) of pain intensity was more than mean difference of pain intensity in stretching group, and stabilization exercises had a better effect on decreasing the pain intensity than the stretching exercises in the patients. Therefore, the null hypothesis is rejected.

5.3 Conclusions

The results of this study answer for this question that in patients who are suffering from nonspecific chronic low back pain, which of functional weakness of muscles – instability or inflexibility- has a more important role in creation of chronic low back pain? The findings support the stabilization exercise as an effective intervention than the stretching exercises in treatment of nonspecific chronic low back pain. Although in the both protocols we found an increase in Multifidus Lumbar (ML) thickness and lumbar range of flexion and decrease pain and activity limitation. There was significant difference between two groups in terms of study variables, the stabilization exercise decreased pain and activity limitation more than the stretching exercises. Finally, the increase of thickness of LM in the stabilization group was greater than the stretching group.

Without any definitive proof from a relevant RCT, some authors believe that all patients with LBP may benefit from spinal stabilization exercise retraining on the premise that deconditioning of trunk muscles leads to instability symptoms,1,21,22 Because of parameters variability, there are some controversies among recent studies and their results. So, a suitable comparison is not probable between studies. França FR et al.25 found both techniques improved pain and reduced disability. Furthermore, stabilization exercises were superior to muscular stretching for the measured variables associated with chronic low back pain. Although in this studied the parameters which
investigated were more than the parameters França FR investigated in his study. Our study In contrast with Koumantakis et al., we found that pain and activity limitation significantly decreased in the stabilization group compared with the stretching group. However, that LM thickness, lumbar range of flexion increasing and activity limitations and intensity of pain decreasing were in both groups, and these changes occurred immediately after both protocol. On the other hand, and in line with França FR et al., we also believe that stabilization exercises do provide additional benefits than stretching exercises to patients with chronic LBP. This finding also supported by O'Sullivan et al. demonstrated that stabilization exercises are more efficient in reduction of pain and disability than general exercises.\textsuperscript{12} It Furthermore, Hides et al. reported that specific exercise therapy in addition to medical management may be more effective in reducing LBP recurrences than medical management and normal activity alone in acute, first-episode LBP patients.\textsuperscript{19} There several opinions regarding the effectiveness of lumbar local stabilizing muscles exercises in chronic LBP patients in some researches and present study,\textsuperscript{21,23,25} in line with our results, other studies also have emphasized on the effectiveness of this exercise in LBP patients who have lumbar instability.\textsuperscript{23,25} Probably, these views can be the reason of pain relief and more thickening of LM in the stabilization group in our study. Moreover, because of difference between the post-treatment results of both groups, we can rely on this improvement, so, it has importance.

The stabilization function of any antigravity trunk muscle is likely to be affected in LBP patients. Their tonic fibers have an important antigravity, postural supportive role.\textsuperscript{26} These fibers can be affected by disuse\textsuperscript{27} and by the reflex and pain inhibition\textsuperscript{28} associated with lumbar pain and injury. The nature of this dysfunction impacts on the type of exercise required restoring this stabilizing or supporting role.\textsuperscript{26} On this basis and other reasons that will be explained, antigravity trunk muscle training can be one of the most common causes of pain reduction. So, we should find the reasons of controversy in other aspects of study. Several researchers such as Wallwork et al., Julie Hides et al. and Eythor Kristjansson have demonstrated dysfunctions and atrophy in LM of back pain patients than to the healthy asymptomatic subjects.\textsuperscript{29,30,31} Rantanen et al. demonstrated ‘moth eaten’ type I muscle fibers in the multifidus muscle of patients with chronic back pain.\textsuperscript{32} Biederman et al. found that LM demonstrates greater fatigability relative to other parts of the erector spine in chronic back pain patients compared with a normal population.\textsuperscript{33}

Overall, the findings support that exercise programs are effective in increasing LM thickness and lumbar range of flexion and reducing pain and activity limitation in patients
with nonspecific chronic LBP. Because in both of them directly or indirectly stimulated the muscles and the reduced the deconditioning in the back structure. Although in the stabilization group, we saw the more thickening in LM than the stretching group, and also we saw the more improvement in the lumbar range of flexion in stretching group than the stabilization exercises, but the findings supported the stabilization exercise as a better kind of the exercise treatment for the patients with nonspecific chronic low back pain. And this finding emphasis on this opinion that in the patients with nonspecific chronic low back pain, the instability of the back muscles had an important role than inflexibility of the muscles to create nonspecific chronic low back pain. However, the certainty of this deduction needs more focus and research.

5.4 Contribution to the Knowledge

- The knowledge as evolved of this research could contribute a new direction for enriching the literature of exercise therapy in Physical Education and Medical Sports and Rehabilitation field.
- It will contribute education with the knowledge of stabilization and stretching exercises as a physical therapy for treatment of low back pain and it will be helpful to experts, trainers, and patients. And can provide a guideline to adjust a Stabilization and Stretching exercises programs for a patients.
- With regard to the medical test which is used in this research, the result of this study could be used as a source for experts in this field.

5.5 Recommendations

- The comparison group for this study consisted of a limited number of patients. The results from this study need to be reproduced in a larger sample of patients with nonspecific chronic LBP.
- A researcher recommends that the same research to be carry out with the follow-up patients after 6, 9 and 12 months, for studying the effect of exercise therapy on them after treatment.
- It is highly recommended to all experts that before working with low back pain patients, studied the mental mode of these patients.
- Another benefit of exercise is to improve the mental health, so Researcher recommends that the same study should be done and investigates the mental situation in these patients.
• It is recommended before starting any type of exercise therapy for the patient consult with an expert doctor who knows about the situation of the patient.
• Controlling medications and other alternative therapies should be considered for future research.
Reference


