

Effect of Exercise Training Program in Pain, Muscle Strength and Functional Mobility in Post Cervical Decompression Surgeries

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Abstract

Background: Cervical disease is caused by various factors like degeneration, disc protrusion.

According to previous studies, there are 20 – 30% patients with cervical disc disease. There are various complications according to the level of lesions. Cervical disc diseases are the condition which affects the motor and sensory components of the body. This study specially emphasis on the sensory and motor components. This study focuses on the stage wise progression of the patient. The patients also have reduced functional ability. This study emphasis on the increasing the functional ability of the patients. Greater efficacy of rehabilitation can be brought about by early intervention for improving strength and increase sensory integration which might achieve activities of daily living goals.

Aim: To find the effect of exercise training program in patients with cervical decompression surgeries.

Methodology: There were 35 participants in the study. The type of study is experimental. The participants involved were assessed for strength, pain and functional mobility. The participants are treated for pain, strength and functional mobility.

Result: There is improvement seen in participants. The results of the participants are calculated by mean and standard deviation. The pre assessment is 56% and post assessment is 38% percentage for pain. The pre assessment is 1.74% and post assessment is 3.31% percentage for functional mobility. The pre assessment is 23.4% and post assessment is 50.8% percentage for right upper limb strength. The pre assessment is 23.2% and post assessment is 42.8% percentage for right lower limb strength. The pre assessment is 23.4% and post assessment is 48% percentage for left upper limb strength. The pre assessment is 23.4% and post assessment is 41.7% percentage for left lower limb strength. The pre assessment is 13.7% and post assessment is 42.8% percentage for trunk strength.

Conclusion: Structured exercises program is effective in reducing pain and improving muscle strength and functional mobility in patients with post cervical decompression surgeries.

Keywords: Cervical decompression surgeries, physiotherapy, pain, strength, functional mobility

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Introduction

Spinal cord diseases are the conditions were it actually affects the entire body in one or the other way. There is a classification of spinal cord diseases. Diseases are classified on the basis of compressive, vascular, inflammatory, infective, inflammatory, developmental, metabolic, congenital, degenerative, traumatic¹. Spinal

cord diseases can either cause quadriplegia or paraplegia. Complete lesion is in which all sensations and motor fibers below the level of lesions is lacking¹.

According to a survey it has been reported that cervical spine is injured in 2.4% of blunt trauma victims². Classification systems have been developed in an attempt to predict instability, standardize the discussion of injury types and provide a means for applying a consistent approach to these injuries². These are divided into upper cervical spine and sub axial cervical spine^{1,2}. Cervical injury includes cervical disc degeneration, fracture at the cervical region, any neurological problems with nerve compression².

Cervical decompression surgery is a procedure that removes any structure compressing the nerves in neck³. There are various sub types in cervical decompression surgeries^{3,4}. ACDF includes removal of cervical disc from an anterior approach and then decompresses the nerve^{24,21}. Posterior cervical decompression surgery enlarges spinal canal area, allowing the spinal canal to drift away from ventral compression, however, while doing this it also destabilizes the dorsal structures and can lead to progressive kyphotic deformity^{4,12}. Anterior decompression includes anterior cervical corpectomy^{16,17}. Posterior decompression includes laminoplasty and laminectomy^{3,4}.

Secondary complications are pain, weakness, loss of mobility, reduced range of motion, loss of doing functional activities etc⁴. Strength of the patient is the most important and the basic requirement for the recovery of the patient²⁶. Strength in turn takes further part in improving range of motion and also to improve the functional mobility⁵. Functional capacity is to act on, influence or change the surrounding environment has been studied as one important aspect of late adulthood and elderly life¹⁴. The functional mobility is related to the physical activity⁵. Joint range of motion and soft tissue flexibility are important elements of motor function⁵. Limitation restricts the normal coordinated action of muscles and alter biomechanical alignment of body segments and posture⁶. The resultant compensatory movement patterns are frequently dysfunctional, producing additional stresses and strain on musculoskeletal system^{6,7}. They do cost more energy consumption and can limit functional mobility⁸. These are the problems which are to be treated for the betterment of the people. So that the individual should regain their mobility, increases range of motion,

increases their strength, activities of daily living and return to the normal living¹⁰.

Improvements in performance results from an understanding the task and practice and a frequently used measure of learning⁷. Resistance exercise has been shown to be safe and effective method for improving strength and additional it improves cardiovascular endurance. A detailed, accurate, and specific determination of functional skills is usually delayed until the active rehabilitation stage when the patient is medically stable and cleared for activity. There are certain exercises given for the patients with pain, muscle weakness and less functional mobility^{8,22}.

In the project there are exercises which focuses on improving pain, muscle and functional mobility. For pain, the patient is treated with transcutaneous electrical stimulation and also ice^{9,25}. Active exercises for neck to reduce pain^{13,20}. Before starting the exercise the patient is started with stimulation. After this the patient is started with passive movement⁹. This improves the range of motion. As the patient starts the regaining the range, the patient is started with strength training with the weight cuffs, elastic band¹⁸. As the patient starts regaining the range and improving strength, the patient also starts get trained for functional mobility²³.

There are various studies on cervical decompression surgeries, where there has been treated with pain, muscle strength, range of motion, functional mobility¹⁵. But these are treated with the separate aspect¹¹. And many times, the condition does not emphasis on functional training as soon as the muscle strength is gained. But to emphasis on the functional mobility is as important as training muscle strength. Specific trunk exercises including strengthening and conventional have been found to improve strength in paraplegia individuals²⁷. There is no combined structured exercises for treatment. There is a need to emphasis on the complication as a whole and a need to have structured exercise program for the improvement so that the patient gets back to the work as soon as possible¹⁹. So the study focuses on the structured exercise program for cervical decompression surgeries. This study is to evaluate the effect of these structured exercise has improvement on pain, muscle strength and functional mobility.

Material and Method

There were 35 participants in the study. The study was taken place in Krishna institute of medical sciences.

The study is effect of exercises training program on pain, muscle strength and functional mobility in post cervical decompression surgeries. The treatment protocol was of 6 weeks. The participants were assessed for pain, strength and functional mobility at first. The type of the study is experimental study. Sample size was calculated by the formula $4pq/l^2$. Inclusion criteria is post-operative cervical decompression surgery patients, patients with sensory and motor impairments, age group above 40-60 years. Exclusion criteria is history of previous fracture, spinal infections, post-operative infection and previous spondylodiscitis. Outcome measure used for pain is visual analogue scale, for strength is manual muscle testing and for functional mobility is functional independence measure scale.

Findings

The study was taken place in Krishna institute of medical sciences. The results were calculated by the pre and post assessment. The mean and SD were calculated. The significance of the study was calculated. The instat software was used to calculate all the results. The values are calculated by paired 't' test. The P value for pain, muscle strength and functional mobility is <0.0001 which is extremely significant.

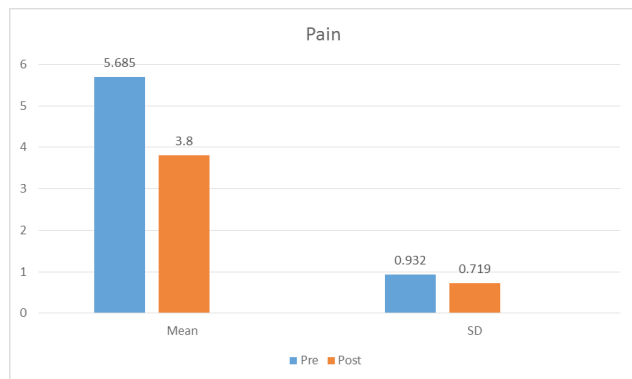


Chart no. 1: Pre and post changes in pain after cervical decompression surgeries.

Interpretation: the mean and SD of pre pain is less than post pain.

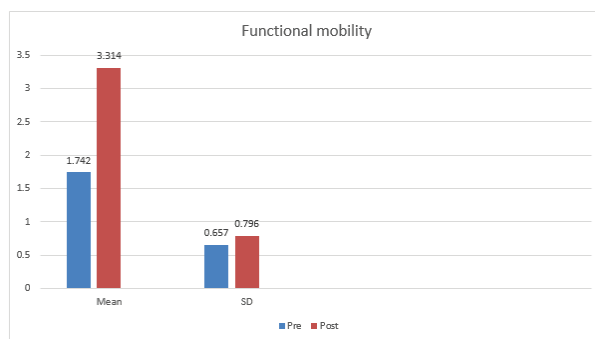


Chart no. 2: Pre and post changes in functional mobility after cervical decompression surgeries.

Interpretation: the mean and SD of pre functional mobility is more than post functional mobility.

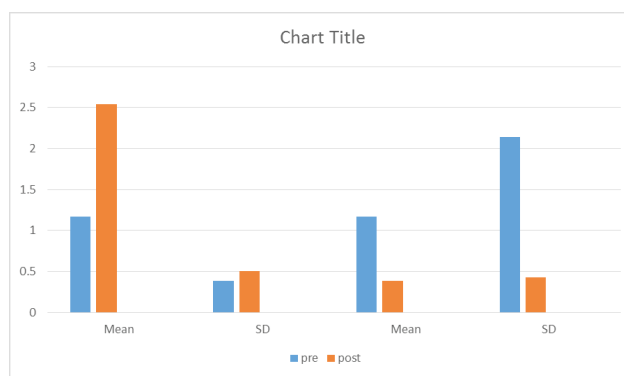


Chart no. 3: Pre and post changes in strength of right upper and lower limb after cervical decompression surgeries.

Interpretation: the mean and SD of pre strength is more than post strength of right upper and lower limb.



Chart no.4: Pre and post changes in left upper and lower limb after cervical decompression surgeries.

Interpretation: the mean and SD of pre strength is more than post strength of left upper and lower limb

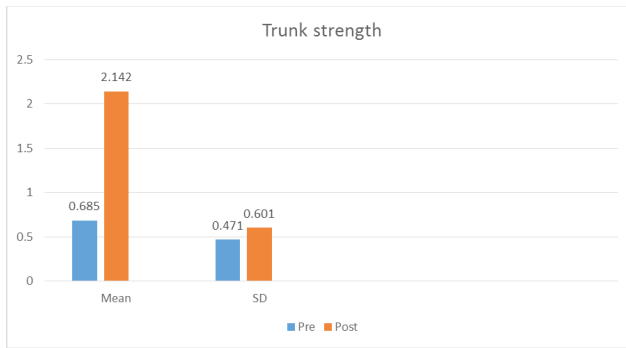


Chart no. 5: Pre and post changes of trunk strength after cervical decompression surgeries.

Interpretation: the mean and SD of pre-strength is more than post strength of trunk.

Discussion

The study topic is on effect of exercise training program on pain, muscle strength and functional mobility in post cervical decompression surgeries. The aim of the study is to determine effect of exercise training program on pain, muscle strength and functional mobility in post cervical decompression surgeries. The treatment was given by a fixed protocol. The study was taken place in Krishna institute of medical sciences. The number of participants included were 35. Female included in the study were 15 in number and male included were 20. The participants were taken according to the inclusion and exclusion criteria. The participants were assessed for pain, strength and functional mobility before the treatment. The appropriate treatment for improving pain, strength and functional mobility is given. Treatment protocol was for 6 weeks. A consent was taken by the participants before the treatment. After the treatment again the assessment is taken.

There are various studies on the cervical decompression surgeries. According to a study by author Anneli Peolsson, which was on outcome of physiotherapy on cervical disc disease stated that there are better results of physiotherapy. This study supports the study as the outcome of the study is beneficial for the participants.¹

To reduce pain icing is applied⁹. To initiate movements of limbs passive movements are given, followed by active assisted movements then active movements along with electrical stimulation is given⁹. To strengthen the limb, weights and elastic bands are used. And to improve functional mobility bed mobility and gait training is given.

In patients with cervical decompression patients, the intervention strategies selected is largely based on amount of preserved motor function. The pain of the participants is reduced by using ice. Ice is used to reduce pain, as it involves stimulation of cold receptors which passes into the spinal cord via posterior root and effectively blocks pain⁹. Electrical stimulation stimulates the motor nerve. As the muscle contracts due to stimulation, the changes take place similar to those associated with voluntary contraction⁹. The strength of the participants is improved by strength training program¹⁰. It increases the production of maximal force due to changes in neural drive, increases connective tissue tensile strength, bone mineral density and improve functional performance and activity level¹⁰.

Functional mobility of the participants is improved. For functional mobility bed mobility was included. This is because functional mobility training represents a shift away from some conventional rehabilitation approaches that utilize an extensive hand on approach to promote recovery¹⁰. As the strength of the lower limb is regained, gait of the participants is improved. Gait is improved by using parallel bars progressing to the without support of walking. Then followed by stair climbing.

Conclusion

Structured exercises program is effective in reducing pain and improving muscle strength and functional mobility in patients with post cervical decompressionsurgeries.

Conflict of Interest: There are no conflicts of interest.

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Ethical Clearance: Ethical clearance was taken from institutional committee of Krishna institute of medical sciences, deemed to be university, Karad.

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