

Physiotherapy Rehabilitation in Post Lumbar Spine Surgery in Adults: Balance and Coordination Exercise with the Mirror Therapy

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ABSTRACT

Background: The role of physiotherapy after surgery is beneficial for adult patient low back pain is recognised pre surgery and the post surgery the aim of this review is to summarise and the fear of movement disability in activities of daily living posture related problems existing evidence according to type of condition and rehabilitation .

Method: he effectiveness of rehabilitation post surgery for lumbar herniation , spinal stenosis , and spondylolisthesis. In laminectomy remove the part of bone of lamina and after successful surgery many times brain have amnesia or cognitive impairment then mirror therapy helps that body is comfortable for safe mobility .

Results: The result demonstrate an improvement in fear of movement after rehabilitation without discomfort. In addition , incorporation of postural awareness training, balance and coordination training, home based exercise plans and breathing efficiency to improvement in activity daily living life. The mirror therapy and the biofeedback loop that accelerate neuroplasticity force and the quality of life improve progressively day by day and phobia is reduced after physiotherapy treatment.

Conclusion: My research suggest that supervised exercise may be affective in improving the patient discomfort and phobia after lumbar surgery but RCTs regarding lumbar spine stenosis and lumbar spondylolisthesis are still scarce with significant heterogeneity of proposed intervention.

Keywords: Low backpain surgery, disc herniation , spondylolisthesis, stenosis, mirror therapy and bio feedback loop.

Scope of study

The scope of study for lumbar laminectomy covers the clinical an bio mechanical and surgical aspects of removing the bony lamina an to decompressed the spinal canal .

Studies often focus on patient with leg pain and neurogenic claudication and weakness due to nerve compression .

incorporating mirror and bio feedback therapy into the physiotherapy scope for lumbar laminectomy focus on inhancing neuro muscular control and reducing fear of fall avoid by providing real time visual or sensory data about the spines position and muscle activity .

Additionally they should have proper knowledge about exercise that help in maintaining and correcting posture, so that they can live their daily lives smoothly and healthy without phobia.

Background

In today's modern lifestyle and diverse occupational demand specially prolonged sitting and various problems are increasing rapidly pain and discomfort caused by lumbar disc herniation spondylolisthesis and stenosis are most reasons for lumbar surgery. Surgical treatment itself may provoke fear of movement, muscle atrophy, stiffness, muscle weakness, complication and discomfort in activity of daily living.

Therefore post operative physical and mental health affected over than expected.

Different rehabilitation programs have been proposed with the aim to promoting functional recovery and return to work.

Lumbar vertebrae consist of the five lumbar vertebrae L1 to L5. They are designed for weightbearing. In a case study focus is only on the posterior aspect of the vertebra. The elements are lamina, facet joints, ligamentum flavum, nerve roots. They divide into two parts: transversing and exiting nerve roots. Intervertebral discs are divided into two parts: annulus fibrosus and nucleus pulposus.

Surgery is usually performed on the posterior aspect of the spine. Muscles affected by damage include the multifidus, rotators, semispinalis, and intermediate layers of the erector spinae (iliocostalis, longissimus, and spinalis). Superficial muscles include the trapezius, latissimus dorsi, rhomboid, serratus anterior, and core muscles like the psoas major and quadratus lumborum. Spinal nerves are also affected.

Region	No. of pairs	Function
C1-C8	8	Head neck diaphragm and arms
T1- T12	12	Chest upper back and abdominal muscles
L1-L5	5	Hip thigh and front of leg
S1-S5	5	Lower legs and feet and pelvis organs
Co1	1	Tailbone area

Myotomes and dermatomes are highly affected after post surgery. The case study is a patient suffering from discomfort and pain in mobilisation. Post surgery patients are complaining of progressive bilateral pain, lifestyle affected, heavy limb and numbness, and the most common is fear of movement. My treatment protocol is in the first stage pain management, wound healing and mobility with spine safe. In the second phase I considered function restoration with the help of functional restoration, then neutral spine awareness and precautions. In the third phase we work on the return to work and ergonomic advice. I focused only on fear of movement with the help of mirror therapy including balance coordination exercises. Finally, assess the patient is feeling comfortable and back in the daily routine with the help of X-Ray and MRI and diagnose the protocol of the management strictly according to the precaution of the post surgery. The patient reported 95% reduction in the fear of movement.

In conclusion, we aimed to collect the occurrence and severity of adverse events or complications related to post surgical rehabilitation. The rehabilitation phase is what restores the patient's quality of life progressively loading the core musculature back muscles. The patient successfully transitioned from near mobility to full occupational function.

The aim of the study was evaluate the effectiveness of the balance and coordination , exercise with the mirror therapy and bio feedback therapy , these technique of fall of risk and improving the gait ad strength of muscles . The intervention was carried out over a period of 2 to 3 months through regular therapeutic session .

Case description and assessment

A 45 years old woman working as a tailor is suffering from lower back pain for which she has undergone lumbar surgery and is currently undergoing physiotherapy.

The pain tends to persists after work and another activity of daily living. She was reported gradual onset of discomfort , pain and fear of movement.

On taking history , the symptoms has been present for the past first second month . the patient experiences increased phobia during activity of daily living that indicating fall of risk in functional movement.

When observed she was found to fear of movement in forward bending and tandom walking in short duration and gait are also affected.

On examination , NPRS [numerical pain rating scale] was used to know the rating of pain in which the rating was found to be 6/7/10. Single leg stance test was used to know balance , stability and the power of muscles. After assessment, we knew about that perspiration, increase heart rate, gaits changes , activity avoidness. Falls efficacy scale international (FES-I) this is the gold standard you are asked about 16 questions about activities like walking on a slippery surface or going up/down stairs . You score each from 1 (not concerned) to 4 (very concerned).

After this entire process , the tandom walking is the most valuable reason of fall of movement and the muscles are in lack of power and decrease endurance . Through this complete assessment assessed that she had fear of movement during walking.

Uniqueness of the study

The uniqueness of studying fear of falling with balance and coordination lies in moving purely biological assessment to a multi dimentional model. Traditional test focus only physical capacity but the research highlights that psychological barriers can be just as physical historically studies described fear of falling with low confidence. Unique modern studies now difference between falls efficacy and fear of falling that exist regardless of your actual physical strength .

Uniqueness allow clinicians to identify incogurent individual that are physically capable but restricted by an irrational fear or at high risk but lack the necessary protective fear . The aim of study was assest to Tailored Interventions

because these studies identify fear as a separate variable, they lead to unique Cognitive Physical Therapies. These combine traditional muscle strengthening with mirror bio feedback therapy , proving more effective for high-fear individuals than physical exercise.

Procedure

Rehabilitation following the procedure of mobility strengthening the core and improving balance and coordination often using mirror therapy to retrain the brain and reduce pain.

Techniques -

Balance and coordination exercise : Ankle pump promotes circulation and nerve mobilization pelvic tilting

the pelvis to stabilize the lower back. Core strengthening is prone press ups lying on the stomach and gently lifting the upper body to improve lumbar mobility isometric exercises perform upto the patience to improve the MMT . The balance training are such as heel to toe walking with the mirror therapy single leg stance progressing from holding a parallel bar to standing unsupported including the mirror therapy . Swiss ball exercises are sitting or lying on a stability ball to engage stabilizing muscle.

The role of mirror therapy is used to re-educate the sensory motor cortex if the patient has fear of movement and weakness in muscles the patient moves their affected legs watching its reflection comparatively unaffected legs in the mirror which tricks the brain into perceiving that is moving smoothly without fear or fall of risk it helps over come the fear of moving spine and limbs it activates the mirror neuron for motor input and improving coordination it enhances proprioception and stability it improves gait patterns .

If the phase wise given approach

Phase I (0-6 weeks) : Focus on bed mobility , nerve glides, pelvic tits, and walking with the mirror therapy.

Phase II (6-9 weeks) : Introduce core stabilization and early balance training with mirror therapy.

Phase III (9-12 weeks) : Advanced balance training and resumption of normal daily activities.

Home based exercised are strengthening the surrounding muscles without putting excessive strain on the healing spine.

At the beginner level 10 repetations of each exercise are sufficient gradually increase the repetation of each exercise day by day .

Advice - Patient must adhere to strict restrictions are bending , lifting , twisting (BLTs).

Avoid sitting fore too long in one position approximately 30 to 40 minutes in half an hour change your position frequently. Avoid driving for first 2 to 4 weeks . Avoid longer taking narcotic pain medication . Avoid high impact activities like jumping or contact sports. Avoid undue stress . Do not use hot tubs , swimming pools atleast 4 to 6 weeks .

Therapist advice to the patient that sleep on your stomach it is better to sleep on your back with the pillow under your knees on your side with the pillow between your legs to recovery of surgery initially.

Result

The results demonstrated a noticable improvement in fear of movement without discomfort . In addition , in corporation of balance and coordination training , mirror therapy , functional training along with home based program and bio feedback therapy contributed to significant improvement in balance and coordination and phobia.

Scale	Pre treatment	Post treatment
NPRS (Numerical pain rating scale)	6-7	2-3
FES-1 (False efficacy scale)	1.5- 2	3-4

Discussion

The aim of this review was to investigate the effectiveness post operative physiotherapy treatment only one study on lumbar stenosis could be included in this review reporting the effectiveness of active exercise

with the mirror therapy in patient operated for lumbar stenosis.

Concerning lumbar stenosis the article by Chen et al. showed that a supervised active exercise program brings some improvement in pain, disability, and quality of life (mental health) in both the short and medium term while no significant improvement were observed in functional testing. The result of this study are consistent with a Cochrane review.

Kinesiophobia and activity levels assessed by Ilves et al. did not significantly change between the two groups despite the presence of educational sessions in the intervention group compared to the control one like disability the greatest improvement of kinesiophobia seems to occur in the first months after surgery.

These results could suggests to investigate the best timing of rehabilitation program as

Oestergaard et al. found that early rehabilitation had no significant ineffective on pain disability and quality of life and it was more expensive.

Education as an intervention has been studied in many articles according to Ostelo et al. different educational intervention (cognitive behavioural therapy and standard education) produce similar effects, while the combination of supervised exercise with education can produce superior results compared to instruction alone a limitation in this review may be the exclusion of grey literature consistently with our protocol.

Conclusion

In the conclusion, post surgery rehabilitation is the beneficial for the patient. The post surgery the aim of this review is to summarise and the fear of movement disability in activities of daily living posture related problems existing evidence according to type of condition and rehabilitation.

The effectiveness of rehabilitation post surgery for lumbar herniation, spinal stenosis, and spondylolisthesis.

In laminectomy remove the part of bone of lamina and after successful surgery many times brain have amnesia or cognitive impairment then mirror therapy helps that body is comfortable for safe mobility. The result demonstrate an improvement in fear of movement after rehabilitation without discomfort.

In addition, incorporation of postural awareness training, balance and coordination training, home based exercise plans and breathing efficiency to improvement in activity daily living life.

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