

Literature Review on Effectiveness of Butler's Neural Tissue Mobilisation for Radiculopathy

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Abstract: ***Purpose:** To review the effectiveness of Butler's neural mobilisation for Radiculopathy conditions. **Search Method:** Articles were selected from Pub med, Google scholar, Pedro, Research gate, Science direct by using key words. **Selection Criteria:** Selection criteria includes focusing on Butler neural mobilisation, radiculopathy patients treated with various techniques along with neural mobilisation. **RESULTS:** n these 18 articles, Butler's Neural mobilisation improves pain, disability, ROM for Radiculopathy. **Conclusion:** Our study concluded that effectiveness of butler neural mobilisation provides reduces pain, disability, improves range of motion, grip strength.*

Keywords: Butler neural mobilisation, Cervical radiculopathy, Lumbar radiculopathy, pain, disability, ROM, Grip strength.

1. Introduction

Neural mobilization is a techniques to restore plasticity of the nervous system, and ability of the nerve (1) . Neural mobilization is to increase the flexibility of collagen, maintains the integrity of the nerve and improving movement or excursion of the nerve. Some studies with specific inclusion criteria have utilized neural tissue mobilization, reduction in pain with improved functional outcomes. Neural mobilisation focuses on passive mobilization of mechanically sensitized neural tissue structures with primary objective of restoring appropriate neurodynamic.

Neural tissue mobilization improve neurophysiological and neuromechanical functions of the peripheral nervous system. This technique is based on the sliding principle of neural tissue excursion, it consists of an alteration of combined movements of at least two joints, in which one movement causes elongation of the nerve bed, accelerating tension in the nerve, the second movement reduces length of the nerve bed that unloads the nerve, maintaining it in relaxed position, diminishing intra neural pressure. The technique aim to mobilize a nerve with a minimal increase in tension. (2)

Radiculopathy is defined as pain/ neurological deficit in a specific nerve root distribution, including motor loss sensory changes, and depression of reflexes. Pain radiates from the spine in the affected nerve root. Spinal tenderness and restriction of movement are common but are nonspecific, occur in mechanical back pain without radiculopathy. Weakness and reflex changes, Sensory loss or altered sensation in the distribution of the affected nerve root.

Types of Radiculopathy includes Cervical radiculopathy, Lumbar radiculopathy.

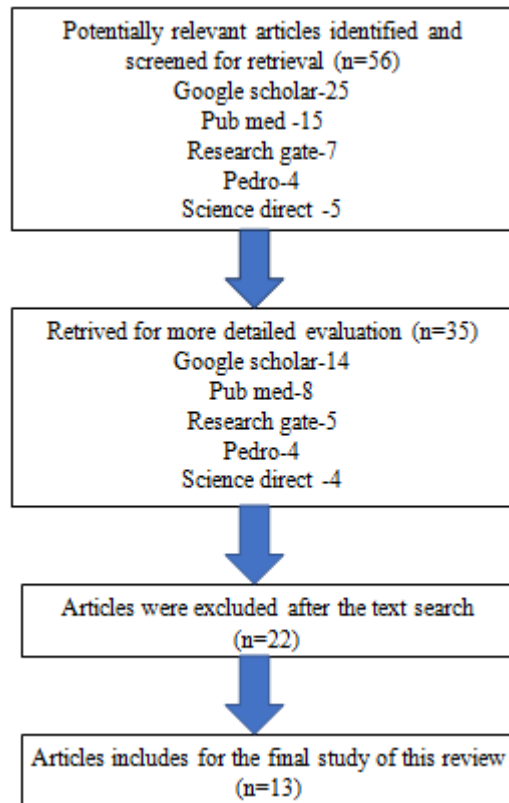
Cervical Radiculopathy, most commonly occurs in the cervical spine, is a degenerative disease caused by a space occupying lesion occurs from pathological problems of the cervical nerve root. The most commonly involved nerve roots are the c5 and c6 nerve roots, caused by c5 - c6 or c6 - c7 disc herniation or spondylosis. (3)

Prevalence of cervical radiculopathy has been estimated at 3.3 cases per 1000 people, and incidence rate of 0.8 cases per 1000 persons. Peak incidence of cervical radiculopathy is frequently reported in the fourth or fifth decade of life (4)

Common causes of cervical radiculopathy are herniation of intervertebral disc, spondylosis, cervical spine instability, trauma, osteophytosis, oncological problems, result in narrowing of space in the vertebral foramen is leads to inflammation of the nerve root, other causes like neuritis, hypoxia, ischemia, fibrosis and decreasing in nerve mobility. (3)

Lumbar radiculopathy most commonly occurs. Its prevalence is 3% - 5% of the population affecting both genders. Age is primary risk factor, secondary to the degenerative process within the spinal column. Symptoms occurs in midlife, men are affected in the 40s and women are affected in the 50s and 60s. Females have a higher risk in certain populations, males have in general population. (5)

2. Methodology



3. Review of Literature

Title	Author & Year	Type	Inclusion & Exclusion Criteria	Methodology	Conclusion
Effects of neural mobilisation on cervical radiculopathy patients pain, ROM, and deep flexor endurance. (6)	Dong - Guy Kim, 2017.	Randomised controlled trial study.	Inclusion Criteria: Age b/n 25 - 60 yrs. Patient with cervical radiculopathy since 3 months, Radiating pain in upper extremity positive test - foraminal compression test, ULTT - 1 median nerve bias	Participants included were 30 divided into 2 groups – for one group Neural Mobilisation with manual cervical traction and another group Manual Cervical Traction given. OUTCOMES: NDI, NPRS, Bonferroni test. Intervention: 3 times /week for 8weeks.	Neural Mobilisation with Manual cervical traction is more effective than Cervical manual traction.
Effect of neural mobilisation on Nerve related Neck and Arm Pain. (7)	Cato Annalie Basson, (2020).	Randomised controlled trial	INCLUSION CRITERIA: Active and passive movement dysfunction, Pain present often 12 weeks, ULNT1 positive. EXCLUSION CRITERIA: Any surgery or fractures of cervical spine, neurological signs, Rheumatoid arthritis, Cerebral palsy, Carcinoma.	Participants 86 were included all were aged older than 18yrs. One group (26) - usual care and another group (60) - cervical and thoracic mobilisation with an advice usual care neural mobilisation. Outcomes: NPRS, PSFS, QOL - Primary outcomes. Neuropathic Diagnostic Questionnaire, Pain Catastrophising Scale - secondary outcomes. Intervention: 12 months, and follow up.	Both groups are had similar improvements in function and QOL, for pain both groups have different significant in 12 months and follow up.
Effect of neural mobilisation on grip strength in patients with cervical radiculopathy. (8)	Roopa Nair, (2017)	Cohort study	INCLUSION CRITERIA: Cervical pain radiating to upper limb unilaterally, decreased grip strength, Positive test - compression, spurling Test, ULTT. Deep tendon reflex unilaterally diminished. EXCLUSION CRITERIA: Cervical myelopathy,	Participants were 40, they conducted pre and post test. All participants taken neural mobilisation for affected limb. Outcomes - Hand held dynamometer. Intervention: Maximum 5 sets at slow speed and progression set last for 30 secto 2mins with 15 - 30 repetitions for each set.	Neural mobilisation showed immediate improvement on grip strength in patients with cervical radiculopathy.

			Neurological deficits in cervical surgery, Thoracic outlet syndrome, Inflammatory arthritis		
Effect of Butlers neural tissue mobilisation and Mulligans bent leg raise on pain and straight leg raise in patients of Low back pain. (9)	Neha Tambekar, (2015) August.	Randomised Controlled trial	INCLUSION CRITERIA: Patient with LBP radiating to lower limb (knee). Unilateral SLR positive Onset pain within 1 month. EXCLUSION CRITERIA: Bilateral SLR positive. Malignant condition. Sensory motor deficit. Fractures Articular pathology.	Participants were included 31 with radiculopathy LBA, divided into 2 groups one group - (16 pts) - treated with Mulligan bent leg raise and another group – (15 pts) - treated with Neural mobilisation. Outcomes: VAS Scale, Universal Goniometer for measuring SLR ROM.	Both techniques showed immediate effect on pain and SLR ROM but this was not maintained during follow up period.
Effects of two Neural Mobilisation Techniques in Sciatica. (10)	Kruti Bhatt, Yagna Shukla (2020).	Experimental study.	INCLUSION CRITERIA: Patient with sciatica acute and chronic, Age b/n 20 - 50 years, Patient willing to participate. EXCLUSION CRITERIA: Patient having prolapsed IVDP (3 &4), Pt having spinal instability and infection. Osteoporosis, Congenital anomaly of the spinal column, Pregnancy, Benign paroxysmal, Vertigo, Vestibular dysfunction.	Participants were included 30 divided into 2 groups - 1 group treated with IFT, ILT and Exercises, Neural mobilisation for sciatic nerve using SLR and 2 group treated with IFT, ILT and exercises, flexion extension movements of head and cervical spine. Outcomes: Modified Oswestry Disability Index Questionnaire, Goniometer for ROM of SLR Intervention: 1 year and pts were treated for 6 days, one session daily	Both techniques are effective improving neural mobility and physical disability in sciatica, local sciatica nerve mobilisation is more effective of two sciatic nerve.
Comparison of Mulligan SNAG'S and neural mobilisation in patients with lumbar radiculopathy. (11)	Sufian Ahmed (2021).	Randomised controlled trial.	INCLUSION CRITERIA: Age b/n 25 - 55 years Pain radiates to lumbar area to lower limb. In VAS pain at 4. EXCLUSION CRITERIA: Fractures, Tumors, Arthritis, Osteoporosis, Pregnancy, Lumbar spondylolisthesis	48 Patients male (16) and females (32). Group a were treated - Mulligans SNAGS techniques, ultrasound and SWD and group b were treated - Neural mobilisation, ultrasound and SWD. Outcomes: NPRS, MODI, lumbar ROM. Intervention: 1 month Duration 3 sessions per week.	Neural mobilisation was more effective as compared to mulligans mobilisation technique in reducing pain and mulligans mobilisation is beneficial for Disability.
Comparing Mulligan Mobilisation and Neural mobilisation effect in patients with Cervical Radiculopathy. (12)	Srinivasulu Mandia, (2021).	Comparative study.	INCLUSION CRITERIA: Age b/n 20 - 50 years, Neck pain radiating to arm Positive test - spurling test, compression, ULTT - 1, Patient willing to participate. EXCLUSION CRITERIA: Systemic disease affecting musculoskeletal, Patient having upper extremity problem in local origin, Patient with cardiovascular and respiratory disorders. Vertebrobasilar insufficiency,, Osteophyte in vertebra Hypermobility joints in cervical spine, Cervical fractures.	Participants were included 30 Group A - 15 were treated with Mulligan mobilisation and Group B - 15 were treated with neural mobilisation. Outcomes: NDI questionnaire, PSFS, and Goniometer. Intervention: one week	Neural mobilisation showed more effect than mulligan mobilisation for cervical radiculopathy. there was significant improvement
Butler's neural Mobilisation versus Maitland spinal Mobilisation Technique in C5 - C8 cervical radiculopathy. (13)	Noureen Fatima (2018)	Experimental comparative study	INCLUSION CRITERIA: Pt having neck pain with arm radiating pain. EXCLUSION CRITERIA: Cervical myelopathy, Neoplastic conditions, Upper cervical ligamentous instability, Inflammatory or systemic disease.	30 participants were included two groups - one group 15 received hot pack, manual traction + butler neural mobilisation and 2 group 15 received maitland spinal mobilisation. Outcomes: VAS, NDI, ROM goniometer Intervention: 9 sessions 10 days, 3 sets of 30 sec/15 min	In this Both techniques (BNM+MSM) were showed hypoalgesic effect.
Effect of Neural			INCLUSION CRITERIA:	60 Participants were included. It	Simultaneous

Mobilisation with cervical traction in cervical radiculopathy (14)	Suneel Kumar (2017)	Experimental study	Age b/n 22 - 55 years, Neck radiating pain, Positive test - spurling test, compression test Valsavamanuevr, ULTT, Distraction test EXCLUSION CRITERIA: Sensory or motor loss weakness of cervical radiculopathy, Trauma, Arthritis, cervical instability, Cord myelopathy, Bilateral radiculopathy	divided into 3 groups - 1 group received cervical traction +neural mobilisation, 2 group received only manual cervical traction and 3 group received – only neural mobilisation Outcomes: NPRS, Global rating of change scale, NDI. Intervention: 3 treatment session /week for 4 weeks	application of manual cervi - cal traction with butler neural mobilisation is more effective.
Effect of combined Neural mobilisation and Intermittent traction in patients with cervical radiculopathy. (15)	Abhilash Dhuriya (2021)	Experimental study design	INCLUSION CRITERIA: Age b/n 18 - 70 years, Unilateral pain, Numbness and paraesthesia. Positive test - spurling test, distraction test, ULTT, Ipsilateral rotation 60 EXCLUSION CRITERIA: Previouscervical and thoracic spine surgery, Bilateralupper extremity radiating pain, Upper motor neuron disease, Tumors, fractures, rheumatoid arthritis, Osteoporosis.	30 Participants were included. It divided into 2 groups - one group 15 pts received conventional +BNM and 2 group 15 pts received only conventional (ICT+ Isometric traction). Outcomes: VAS, NDI INTERVENTION: 3 sets, 10 repetitions/set with 3 sec hold.5 times/week for 4 weeks.	It showed effective after NMT with conservative.
Effectiveness of neural mobilisation with intermittent in the management of cervical radiculopathy. (16)	ChristasSauva (2016)	Randomised controlled trial	INCLUSION CRITERIA: Unilateral sensory and motor neurological deficits, Positive spurling test, compression test, Distraction test, ULTT and ipsilateral rotation 60. EXCLUSION CRITERIA: Cervical myelopathy, Motor neuron disease, Bilateral cervical radiculopathy.	42 participants were included. It divided into 2 groups - one 21 pts received ICT+NM and 2 group 21 are wait list control group. Outcomes: NPRS, PSFS, grip dynamometer Intervention: 12 treatment sessions, 3 sessions/week for 4 weeks (15 min).	Neural mobilis - ation with simultaneousICT is improve pain, function , disability, and grip strength.
The combined efficacy of neural mobilisation with TENS versus neural mobilisation for the management of cervical radiculopathy. (17)	Pratim Deka (2016)	Comparative study	INCLUSION CRITERIA: Age b/n 25 - 68 years, Unilateral radiating pain diagnosed through positive test - spurling test, distraction test, ULTT. EXCLUSION CRITERIA: Upper extremity symptoms due to cord compression, Thoracic outlet syndrome.	30 participants - two groups, one group - received neural mobilisation and TENS and other group received only neural mobilisation. Outcomes: VAS, NDI Intervention: 14 days treatment.	Group one is neural mobilisation and tens more significant reduction in pain and disability.
Comparison of neural mobilisation and conservative treatment on pain, ROM and disability in cervical radiculopathy. (18)	Shazia Rafiq (2022)	Randomly controlled trail.	INCLUSION CRITERIA: Age b/n 35 - 50 years, Cervical radiculopathy symptoms from 2 - 6 months, Patient with positive spurling test, compression test, ULTT, and ipsilateral rotation, Patient willing to participate. EXCLUSION CRITERIA: Traumatic history, Osteoporosis, Hypermobility, Circulatory disturbances, tumors.	88 Patients were included. It is divided into 2 groups for one group received Neural mobilisation and 2 group received conventional treatment. Outcome measures: NPRS, NDI INTERVENTION: 12 sessions, 3 times /week for 4 weeks.	Both neural Mobilisation and conservative management were effective as an exercise program for cervical radiculopathy patients and Neural mobilisation is more effective in reducing pain and neck disability.

4. Discussion

The study aimed to review that there is an evidence of butler neural mobilisation shows improvement in Radiculopathy conditions, In cervical radiculopathy, lumbar radiculopathy

shows reduction of pain, disability and improves range of motion and grip strength. Other treatment also shows improvement like conservative management, Mulligan mobilisation, cervical traction but neural mobilisation shows more effectiveness. These were assessed by NPRS, PSFS for

pain, QOL, Universal goniometer for SLR, NDI for neck disability, Grip dynamometer for grip strength were analysed. Total number of patients were included in the mentioned articles and proven null hypothesis.

5. Conclusion

The study concluded that Butler neural mobilisation can reduce the pain, disability, increase ROM and grip strength were shown more improvement in radiculopathy.

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