

Role of manual therapy with exercise regime versus exercise regime alone in the management of non-specific chronic neck pain

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Abstract: To evaluate the role of manual therapy with exercise regime versus exercise regime alone in the management of non-specific chronic neck pain. In this 62 subjects randomized controlled trial 31 subjects in group A received manual therapy (manipulation) with supervised exercise regime whilst 31 subjects in group B performed only supervised exercise regime for the period of 3 weeks. Both groups had a home exercise program consisted of strengthening exercises for neck/scapular stability, stretching and general range of motion exercises for neck with advice regarding posture awareness and correction for 3 months. The results suggested significant reduction in pain intensity level in both groups; over 3 weeks and 12 weeks' time period in relation to baseline on visual analog scale ($p=0.001$). Similarly, statistically significant improvements noticed in Neck Disability Index (NDI) ($p=0.0001$) in both groups while looking at baseline data with reference to 12 weeks' time period. On closer inspection, the manual therapy (manipulation) with exercise regime appeared as a favorable treatment preference compared with exercise regime alone.

Keywords: Exercise, Manipulation, Manual therapy, Non-specific chronic neck pain

INTRODUCTION

Neck pain is a major problem around the world and all age ranges population affected from neck pain dysfunction. Two most common reasons have been identified to visit health care providers including physiotherapists are the neck pain and low Back pain with huge amount financial burden per annum (Hogg-Johnson *et al*, 2008). Neck pain also appeared as a leading cause of disability and neck pain dysfunctions are getting higher in clinical practice and have come in ranked number 4 out of 291 health conditions list (Buchbinder *et al*, 2013). Many non-invasive treatment techniques are available for the management of neck pain; includes cervical collars, manipulation, mobilisation, exercise therapy, soft tissue work, acupuncture regime, pain medications, NSAIDS steroids and Electrotherapy including short wave diathermy, ice application and transcutaneous electrical nerve stimulation (D'Sylva, *et al*, 2010; Myśliwiec *et al*, 2012; Hurwitz *et al*, 2008). Manipulation and mobilisation of spinal segments are frequently applied in clinical practices in the management of non-specific neck pain (Carnes *et al*, 2010). Although some evidences suggests that spinal manipulative technique consist of high-velocity thrust with low amplitude hands-on application at spinal segment has positive outcome in short term (Guzman 2008) but overall the role of manual therapy (Manipulation) in the management of non-specific neck pain is still debatable in relation to acute, sub-acute and chronic stages.

With sample size of 74 patients, Li *et al*. (2007) concluded that manipulation has superior treatment

impact on chronic neck pain patients as compared with transcutaneous electrical nerve stimulation in intermediate, short-term and immediate follow up review. Research Data revealed that spinal manipulation technique is a useful option statistically as compared with acupuncture and medicine use in the management of chronic neck pain (Giles *et al*, 1999). Evan and co-workers (2002) found that spinal manipulation with two types of exercise regime (low intensity exercises and MedX exercise regime) had an advantage in relation to spinal manipulation alone in the management of chronic neck pain and therapists should include exercise regime with spinal manipulation technique. Bronfort and his team workers (2001) have suggested that spinal manipulation with strengthening exercises deemed better outcome to chronic neck pain patients as compared with spinal manipulation alone. In sub-acute and chronic mechanical neck disorders, the effectiveness of manipulation or mobilisation alone or with exercises or with any physical agents found to be not beneficial; much attention needed to improve methodological quality (Gross *et al*, 1992). Application of cervical stretching and strengthening exercises has low to moderate indications in the management of chronic neck pain (Kay *et al*, 2012). There is evidence that strengthening and stretching exercises are effective in the treatment of chronic neck pain (O'Riordan *et al*, 2014; Salo *et al*, 2012).

Many arguments persist in the literature regarding the use of manual therapy (manipulation) in different stages of non-specific neck pain with exercise or without exercise regime. Predominately application of manual therapy (manipulation) in acute stage of non-specific neck pain suggests positive short term outcomes in the literatures. Therefore, there is a need to explore the best effective

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management within broad band of treatment preferences in the context of evidence based practice. The main objective of this research was to explore whether manual therapy (manipulation) with exercise regime is more effective as compared with exercise regime alone in the management of chronic non-specific chronic neck pain.

MATERIALS AND METHODS

This randomized controlled trial was conducted at Alain Ploy Clinic Karachi and Institute of Physical Medicine and Rehabilitation, Dow University of Health Sciences Karachi between December 2012 and March 2013. All subjects were recruited after assessment by Rheumatologist, Orthopaedic and Neurophysician or Neurosurgeon to exclude any serious pathology and had all necessary investigations including MRI of the cervical spine. All subjects were diagnosed as non-specific chronic neck pain and were safe for high velocity trust manipulative technique. Subjects with history of more than 3 months neck pain with no related medical dysfunction were included. Exclusion criteria were Spinal instability, Whiplash injury, Osteoporosis, Fracture of cervical spine, tumor of spine, Unexplained headache, pain post cervical spine surgery, disc herniation, injection therapy application in cervical spine, Radiculopathy of cervical spine, Stenosis of cervical spine, rheumatoid arthritis, behaviour therapy rehabilitation and VBI symptoms (Dizziness, Drop attack, Double vision, Difficulty in swallowing, difficulty in finding words and patients who already had spinal manipulative session.

Repeated measure analysis of variance (RM-ANOVA) was used for sample calculation with confidence interval kept at 99% and power of test 99%. After written informed consent, 62 subjects were randomized into Group A and Group B using computer software. Group A (31 subjects) received manual therapy (Maitland's approach Grade V, High velocity thrust, low amplitude application, rotation/lateral flexion technique on painful and stiff cervical spinal segments in supine position, maximum 6 sessions in 3 weeks) with supervised exercise regime for 20 minutes. The exercise regime included a set of strengthening exercises consisted of isometric, concentric and eccentric exercises with rest in between and a set of stretching exercises of cervical spine; rotation side to side, lateral flexion side to side, Extension and Sternocleidomastoid stretches 10 repetitions each to the left and right, Levator scapulae and pectoralis muscles stretches 10 repetitions each to the left and right. Whilst Group B (31 subjects) only performed supervised exercise regime same as Group A for 3 weeks. After the end of 3 weeks intervention both groups taught and practiced a home exercise program. A printed exercise sheet was provided with frequency and repetition details: twice a day, 7 days a week, for 3 months. This home exercise program consisted of strengthening exercises for neck/

scapular stability, stretching exercises and general range of motion exercises for neck with advice regarding posture awareness and correction. Visual Analog Scale (VAS) for pain intensity level (0 to 10) and Neck Disability Index (NDI) were used as outcome measures of interventions; The Neck Disability Index (NDI) has a great level of reliability with internal consistency (Vernon, 1991). Measurements were taken at baseline, after 3 weeks and 12 weeks: Anova with repeated measures using SPSS version 16.0 statistical software was used to analysis data in this study.

RESULTS

This study included 62 patients, 31 patients in manual therapy with exercise regime group A and 31 patients in exercise regime group B. Overall (n=39) 63% females and (n=23) 37% males participated in the study table 1 for demographic details.

Two participants dropped out of the study because one subject had to travel out of the city and other reported episode of dizziness and they were excluded. Both manual therapy with exercise regime and exercise regime alone groups made significant improvements in pain ($p < 0.001$) and functional outcome measures (< 0.0001) over 3 weeks and 12 weeks' time period in relation to baseline. In manual therapy with exercise regime group mean VAS reduced to 2.4 ± 1.17 which was 7.3 ± 1.08 before the intervention. The NDI score improved to 16.83 ± 2.3 from 24.1 ± 3.2 . In neck Exercise regime group, mean VAS and NDI score reduced to 3.1 ± 1.13 and 19.13 ± 2.2 which was 7.6 ± 0.85 and 27.2 ± 3.1 respectively on base line. It was observed mean VAS and NDI scores had better trends of improvements in manual therapy with exercise regime group as compared to exercise regime only group but not statistically significant (table 2).

DISCUSSION

Management of non-specific neck pain is a common dysfunction in daily practice for health care providers. The effectiveness of manual therapy (manipulation) with or without exercise regime in the management of non-specific chronic neck pain remains unclear. Our data analysis suggests significant reduction in pain intensity level in both groups; manual therapy (manipulation) with exercise regime and exercise regime alone over 3 and 12 weeks' time period in relation to baseline on visual analog scale ($p = 0.001$). Similarly, statistically significant improvement noticed in NDI ($p = 0.0001$) in both groups while looking at baseline data with reference to 12 weeks' time period. Based on mean readings comparison, there

was positive trends to suggest that the manual therapy (manipulation) with exercise regime appeared as a favorable treatment preference compared with exercise

Table 1: Summary of demographic data

Measures	Manual therapy & exercise group A (n=31)	Exercise group B (n=31)
Mean Age (yrs)	38.1 (23-49)	39.5 (25-45)
Gender (Male/Female)	11/20	12/19
Mean Weight (Kg)	54.3 (45-74)	55.91 (44-76)
Mean Body mass index	20.82 (18-24)	21.10 (19-25)
Mean history of symptoms (months)	4.12 (1-6)	4.78 (1-6)

Table 2: Outcomes measures (VAS and NDI) analysis with standard deviations and P-Value- manual therapy with exercises regime versus exercise regime alone

		Manual therapy with exercise regime	exercise regime alone	P-value	P-value Between Groups
VAS	Baseline	7.3±1.08	7.6±0.85	< 0.001	0.129
VAS	3 Weeks	2.1±0.9	2.9±1.01		
VAS	12 Weeks	2.4±1.17	3.1±1.13		
NDI	Baseline	24.1±3.2	27.2±3.1	< 0.0001	0.186
NDI	3 Weeks	15.73±2.05	17.7±2.52		
NDI	12 Weeks	16.83±2.3	19.13±2.2		

VAS: Visual Analog Scale, NDI: Neck Disability Index, P-value < 0.05 significant

regime alone. The above findings are supported by many research papers; however it is hard to replicate extracts supportive findings with past studies due to methodological variation and many researchers looked at the short term outcome of manipulation whilst we explored intermediate level findings (after 3 months). Gross *et al.* (2004) has suggested that mobilisation and manipulation technique (single session to many sessions 3 weeks to 11 weeks) with exercises regime appeared beneficial in comparison with mobilisation and manipulation technique applied alone for persistent type mechanical neck disorders. A systematic review concluded spinal manipulative therapy and mobilisation technique as a viable choice for the management of both neck pain and low back pain but lack of long term follow up (Bronfort, 2004), whereas we did immediate level of follow up. Spinal manipulation technique was statistically important by reducing chronic neck pain; neck disability. Giles *et al.* (1999) study showed 25% and 33% reduction on the visual analogue scale and NDI in manual therapy group as compared with acupuncture and medicine use. Intervention period was 30 days in this study whilst in our study final measurements were taken at week 12 and we still observed similar trends of outcomes in our study. Another study supported our findings that spinal manipulation technique with strengthening exercises seems to be more useful in treating patients with chronic neck pain as compared with spinal manipulation technique alone (Bronfort, 2001). We used strengthening and stretching exercises in both groups, many researchers advocated using strengthening and stretching in the management of neck pain. With chronic neck pain patients, strengthening exercises shown effectiveness in the management of chronic neck pain and usefulness was

enhanced by adding stretching and aerobics exercises (O'Riordan *et al.*, 2014). Similarly, other study revealed that for the treatment of chronic neck pain, cervical stretching and strengthening exercises have low to moderate value (Kay *et al.*, 2012; Sihawong *et al.*, 2011). There are few potential limitations in this study. We collected outcome measures data at baseline, then compared baseline findings with data collected after 3 weeks (short-term level) and weeks 12 (intermediate level). Long term outcomes of this research area could have been done by increasing data collection period for up to one year as there is a need to explore long term benefits of manual therapy (manipulation) with or without exercise regime in the management of non-specific chronic neck pain. It was observed that there was some psychological fear amongst few patients regarding Grade V manipulation as the foreign trained authors introduced this technique in 2008, and only few therapists have been using this technique in their clinical practice in Pakistan, therefore lack of awareness about this technique amongst patients. Further research is needed to assess the long-term effectiveness of manual therapy (manipulation) with or without exercise regime by conducting researches to capture effectiveness at long term follow up review; 6 months or 1 year time period.

CONCLUSION

Both manual therapy (manipulation) with exercise regime and exercise regime alone made significant improvements in pain and functional outcome measures. Based on mean data findings, the manual therapy (manipulation) with exercise regime appeared as a favorable treatment preference compared with exercise regime alone.

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