

## Evaluation Outcome of the Regional Approach of Physiotherapy, Conventional Approach of Physiotherapy and Non-Steroidal Anti-Inflammatory Drugs (NSAID) on Pain and Disability for Chronic Mechanical Spinal Pain Disorder - A Repeated Measure Clinical Trial Design

Nasirul Islam<sup>1\*</sup>, M Mazibar Rahman<sup>2</sup> and Mohammad Habibur Rahman<sup>3</sup>

<sup>1</sup>Associate Professor and Vice Principal, Bangladesh Health Professions Institute (BHPI), CRP, Dhaka, Bangladesh

<sup>2</sup>Professor, Department of Statistics, Jahangirnagar University, Dhaka, Bangladesh

<sup>3</sup>Associate Professor, Department of Physiotherapy, Bangladesh Health Professions Institute (BHPI), CRP, Dhaka, Bangladesh

\*Corresponding Author: Nasirul Islam, Associate Professor and Vice Principal, Bangladesh Health Professions Institute (BHPI), CRP, Dhaka, Bangladesh.

Received: June 20, 2018; Published: August 22, 2018

### Abstract

**Introduction:** Physiotherapy approaches for ensuring a comprehensive clinical outcome are attaining growing concentration among physiotherapists treating spinal pain disorder (SPD). The purpose of the study is to compare effectiveness of the regional approach (new approach) of physiotherapy treatment, NSAID and conventional physiotherapy approach on pain and disability status for chronic mechanical spinal pain disorder.

**Materials and Method:** A repeated measurement ANOVA clinical trial design was carried out to test the hypothesis. 104 patients between 20 - 65 years old with chronic mechanical spinal pain were randomly assigned into 3 different groups. Measurements were taken before starting of intervention, middle of the intervention and at the end of the intervention. The regional group (30 patients) received 8 sessions of regional approach of Physiotherapy, conventional group (35 patients) received 8 sessions of conventional approach of physiotherapy treatment and drug group (39 patients) received 21 to 30 days NSAID as per prescription of an orthopedic Professor. To eliminate bias, clinical physiotherapists were also randomly allocated into either for regional approach physiotherapy group or as usual physiotherapy group. A treatment protocol of regional approach was developed and handed over to clinical physiotherapists for regional approach group to deliver treatment. Outcomes were monitored by Numeric Pain Rating Scale and Oswestry Disability Index (ODI)/Neck Disability Index (NDI).

**Results:** The results of the study show that the regional approach of physiotherapy treatment, NSAID and conventional physiotherapy approach are differentially effective on pain and disability status ( $P < 0.05$ ). The outcomes of pain and disability status are differently effective over different occasions of treatment (pretest, mid-test and posttest) for chronic mechanical spinal pain ( $P < 0.05$ ). Although the effect of time and treatment interaction on pain was not found to be statistically significant but disability status was shown to be statistically significant ( $P < 0.05$ ). Greater improvement (on pain and disability) has been shown in regional group in comparison to conventional and NSAID group.

**Conclusion:** Regional approach of treatment has been found to be a new evidence of treatment for chronic mechanical spinal pain which also indicate that chronic pain is multi-structural phenomena and therefore physiotherapy treatment should cover regionally. The study demonstrates short term outcome of the treatment methods. However, a further study is required to see the long term effect of those treatments.

**Keywords:** Regional Approach of Physiotherapy; Conventional Approach of Physiotherapy; Non-Steroidal Anti-Inflammatory Drugs (NSAID); Chronic Mechanical Spinal Pain Disorder

## **Introduction**

Spinal pain is an extremely common symptom in general population across the world. Neck pain (NP) and low back pain (LBP) are seemed to be massive public health problems because of multiple aspects including their high incidence, long duration, and social and economic impact [1].

According to a global review, the one-year prevalence of neck pain ranges between 16.7% and 75.1% (mean 37.2%) [2]. Another study shows that the overall occurrence of neck pain in the general population is estimated between 0.4% and 86.8% and one-year prevalence ranges from 4.8% to 79.5% [3].

The prevalence of neck pain has been growing up over last 2 decades [4] and is now second to back pain, the most common musculo-skeletal disorder [5]. More than half of all adults are found to be experienced neck pain during the past 6 months, and women are particularly more vulnerable than men to develop and suffer from persistent neck pain [6].

Spinal pain is from 2<sup>nd</sup> to 5<sup>th</sup> chief complaint seeing primary care specialists in US. Chronic LBP accounts for 75 - 85% of total worker absenteeism in US [7]. To determine Global Burden of Disease in 2010, 291 conditions were studied where LBP was considered to be ranked the highest in terms of disability and sixth in terms of overall burden. The fact is the prevalence and burden increased with age [8]. Subsequently, in another recent study, it is found that overall, 20.1 million adults in US (10.4%) (95% CI = 10.1 - 10.8) of the working-age population reported work disability. The top three most commonly reported causes of work disability were back/neck problems 30.3% (95% CI = 29.1 - 31.5), depression/anxiety/emotional problems 21.0% (19.9 - 22.0), and arthritis/rheumatism 18.6 (17.6 - 19.6) [9].

The direct cost of back pain is insignificant but the indirect cost is enormous which include the production losses related to back pain [10].

The guideline for the management of lower back pain gives less importance on pharmacological care [11], which recommends non-pharmacological care should be the first treatment option and reserves pharmacological care for patients for whom non-pharmacological care has not worked but there is still far gap between guideline and clinical practice.

The fact is, diagnosis is not known for 85% chronic low back pain (CLBP) disorders. Specific radiological diagnosis cannot always determine underlying pain mechanism in case of chronic pain [12]. So it is created diagnosis and management gap. CLBP disorders are multi-factorial in nature [13,14]. However, the presence and dominance of the patho-anatomical, physical, neuro-physiological, psychological and social factors that can influence the disorder for each individual [15]. Patho-anatomical model of pain explains spinal pain as traditional medical problem [16] and according to this model, pain and disability is poorly understood. Neuro-physiological model explains hypersensitivity of the nervous system. Some studies have found the changes in nervous system due to chronic pain [17-19]. Persistent chronic spinal pain causes some secondary problems. These include muscle spasm, poor mobility and disability. Poor cervical or lumbar spinal movement affect in alteration of biomechanics of respectively pectoral girdle and pelvic girdle and thoracic spine. These are causing weakness of one group of muscles and tightness of other group of muscle. Tight muscles are vulnerable and cause injury and can develop different trigger points. Therefore, our investigation will be carried to find out effectiveness of two different approaches of Physiotherapy and NSAID. Regional physiotherapy approach cover not only affects pathological part but also adjacent tissues/structures/muscles. Adjacent tissues/structures/muscles are seemed to be secondary problem that arise from initial source of pain. The regional approach is thought to be effective and active or passive techniques will be applied to correct the problem initially.

Although there are no effective treatment options for chronic LBP, it needs to be agreed that the problem of chronic LBP is far from solved. Though treatments can provide marked improvements in the patient's condition, the available evidence suggests that the typical chronic LBP patient is left with some residual pain and disability. Developing new, cost effective and robust treatments and refining the current group of known effective treatments is the challenge for the future. There is no study done showing effectiveness of the regional approach which relief symptoms faster in relation to contemporary approaches.

## Materials and Methods

Following mechanical diagnosis and therapy approach a total 104- patient with chronic mechanical spinal pain disorder were included in the study (30 in Regional Approach of Physiotherapy (RAP) group, 35 in Conventional Approach of Physiotherapy (CAP) group and 39 in NSAID group. One study [20] found that each arm minimum sample size was 28 that would give 5% significant and 80% power of the study for this repeated measures design.

## Statistical methods

A repeated-measure ANOVA demonstrates the outcome change with alternative treatments over time. When the measurements are taken more than two times repeatedly over a period of time on the same dependent variable repeated measure ANOVA should be used [21]. Repeated measure design was carried out in which three different subject's groups (Regional, conventional and NSAID) were observed several times (Pretest, mid-test and posttest). The subjects were observed at successive occasions to see how the treatment effects on outcome. Treatment providers (clinical physiotherapists) were not involved in data collection. Physiotherapists from RAP group and CAP groups were also randomized so that the skills and experiences don't influence outcome.

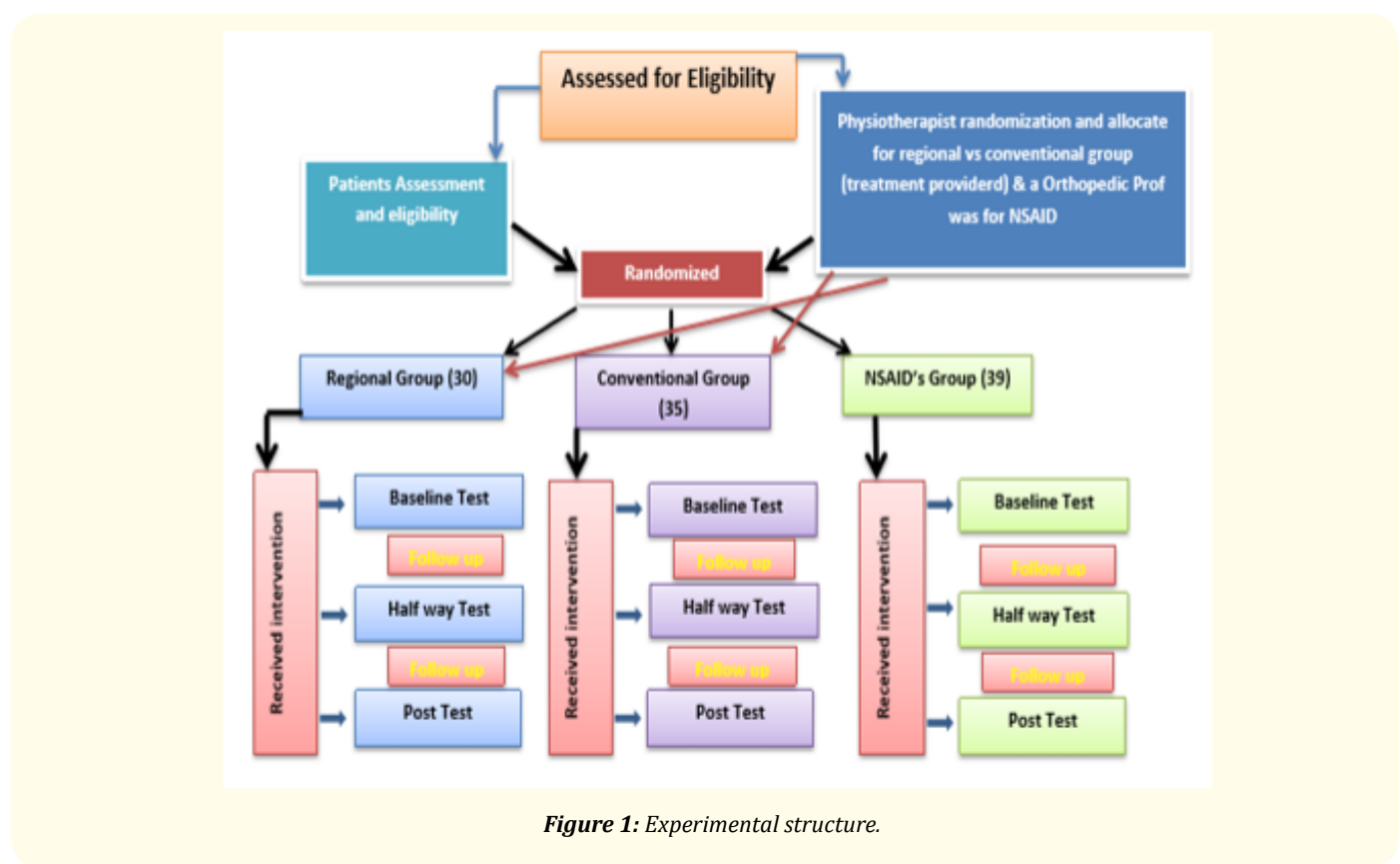


Figure 1: Experimental structure.

## **Treatment methods**

### **Conventional approach of physiotherapy (CAP)**

Conventional or contemporary Physiotherapy treatments include the different types of treatment that are applied for chronic spinal pain patients.

There is lack of published data showing different types of conventional treatments that Physiotherapists apply globally or locally for spinal pain disorder. However observational data reveals that conventional Physiotherapy for low back pain patients include Mckenzie approach, spinal mobilization, back muscles strengthening exercise, electrotherapeutic modalities including IRR and TENS, pelvic floor strengthening exercise, home exercise, Cyriax manipulation, Maitland mobilization, Mulligan mobilization, Neural mobilization and exercise therapy including leg muscle strengthening. Similarly, the conventional approach for neck pain patients are recognized as multimodal treatments such as McKenzie exercises in combination with manual therapy, exercise therapy, superficial and deep heating agents as well as traction. Most of the conventional approaches of Physiotherapy are found to be merely local. Treatments integrating peripheral joint or muscles are rarely applied.

### **Regional Approach of Physiotherapy (RAP)**

There is no simple, defined, time effective and robust effective physiotherapy interventional package for the chronic mechanical spinal pain. Therefore, the researcher developed a new protocol of physiotherapy treatment called the regional approach. The regional approach includes treatment addressing adjacent structures (muscles or joint). The literature reviews show that the chronic pain is multi factorial and this affect peripheral structure due to secondary changes or plastic changes of the nervous system. Myo-fascial release, stretching and strengthening targeting adjacent joint and muscles are fundamental components of regional approach. The basic different of regional approach from conventional one is, regional approach covers a whole area. For example, for neck pain, regional approach covers muscles and joints pectoral girdle and upper thoracic spine along with neck. In contrast for lower back pain, regional approach covers joints and muscles of pelvic girdle.

The regional approach evaluates mal orientation of joints and muscles and correct those with active/manual therapy illustrated in the protocol. The concept of the treatment is to create window by adjusting peripheral components so that local impact can be eased.

### **Protocol of regional approach**

1. Subjective assessment: personal history, past medical history, drug history
2. Objective assessment:
  - a. Observation: Local/regional asymmetrical to be noted.
  - b. Palpation area (local, neck/thorax/back): tenderness/muscle spasm/hypertrophied/atrophied muscles and their distribution.
  - c. Palpation area (regional, shoulder, scapula, pectoralis for neck and buttock, iliotibial band, Sacroiliac, piriformis, hamstring and leg): tenderness/muscle spasm/hypertrophied/tightness of adjacent peripheral muscles/atrophied muscles/trigger point/adhesions and their distribution.

Analysis of movement: Hyper mobile/hypo mobile/ local limitation/ regional limitation/evaluation of shoulder/hip joint

Treatment concept for regional approach

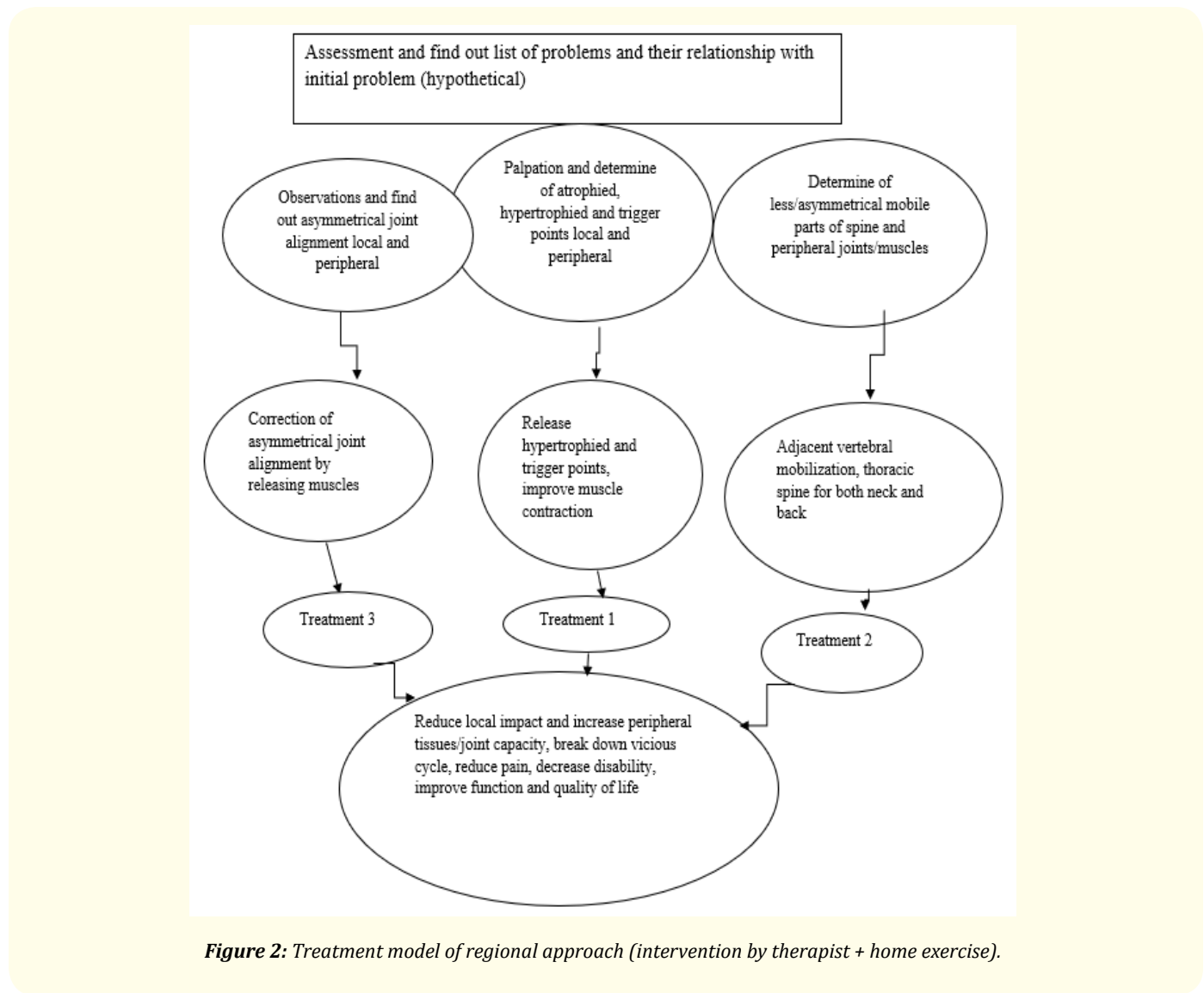


Figure 2: Treatment model of regional approach (intervention by therapist + home exercise).

**Back exercise includes:** Multifidus muscle stretching/strengthening, Quadratus lumborum stretching, Quadriceps muscle stretching, Hamstring stretching, Erector spine and Letismus Dorsi muscles stretching, Piriformis muscle stretching, iliotibial band stretching, Drilling stretching of hip rotators and myofascial release.

**For neck:** Manual release of pectoralis (muscles and tendon), Trapezius muscles stretching, Splenius Muscles stretching, Scalene Muscles stretching, Sternocleido mastoid Muscle, Suboccipital muscle stretching, Rhomboid Muscles stretching, Driling stretching for shoulder rotators.

Strengthening weak muscles as per requirement of the patients in the form of isometric/isotonic/concentric/eccentric (dosages are given in protocol). Manual therapy includes mobilization of thoracic spine for both cervical and lower back disorders.

### **Non-Steroidal Anti-inflammatory Drugs (NSAIDs)**

NSAIDs are a group of drugs for pain, fever and inflammation. This group of drug is very common prescribed medicine. An Orthopedic Professor prescribed this drug for 39 chronic Mechanical spinal pain disorder patients. Data collector who was blind to the study objectives took written permission from the eligible patients. Treatment providers were not engaged in data collection.

Data collector maintained follow up with all listed patients under the study. Photocopy of each prescription was taken with the verbal consent from patients and Doctor. Tablet tenoxicam 20 mg was the most common NSAID that orthopedic consultant used for the patients under this study. In addition, another H2 blocker was given along with NSAID to prevent side effect associated with NSAID's intake. The dosage of the drug is once a day (20 mg). However, the patients under this group used drugs from 21 to 30 days. It is because, chronicity of the problem.

A systematic review results shows that the effect of NSAIDs is significantly different in relation to placebo for back pain disorder. But qualitative analysis showed that there is conflicting evidence (level 3) that NSAIDs are more effective than paracetamol for acute low back pain and moderate evidence (level 2) that NSAIDs are not more effective than other drugs for acute low back pain and there is strong evidence (level 1) that various types of NSAIDs are equally effective for acute low back pain [22].

A RCT was conducted to see the effect of trunk exercise combined with spinal manipulative or NSAID therapy for chronic low back pain. Two comparisons group were made including (a) Spinal manipulative therapy plus trunk strengthening exercises vs. Spinal manipulative therapy plus trunk stretching exercises, and (b) Spinal manipulative therapy combined with trunk strengthening exercises vs. non-steroidal anti-inflammatory drug therapy combined with trunk strengthening exercises. The result of the study shows that each of the three therapeutic programs was associated with similar and clinically important improvement over time that was considered superior to the expected natural history of CLBP. The study findings reveal that, trunk exercise in combination with SMT or NSAID therapy was found to be beneficial and worthwhile. Although extend of nonspecific therapeutic outcome, side effect associated with treatments and cost-effectiveness were not included in this study [23].

### **Inclusion criterion**

Persistent cervical or lumbar pain for more than 3 months, pain of mechanical origin, radiating or local pain, age group up to 65 years and patients were willing to receive minimum 8 sessions of treatment under physiotherapy group and complete course of NSAID therapy.

### **Exclusion criteria**

Pathological source of pain including TB spine, spinal tumor, cervical and back problem presented simultaneously, abscess, early spinal fracture, red flags syndrome and patients were excluded in case of having any double treatment exposure.

### **Data collection tools and measurement**

- Numerical Pain Rating Scale for rating pain- the scale was considered as quasi interval scale which was expressed from 0 to 100% pain.
- Neck disability scale and Oswestry disability index for measurement of disability- It is proved to be a robust, practical clinical and research instrument with good responsiveness and acceptability for assessment of disability caused by impairment of common motor functions [24] and had transformed scored from 0 to 100.

**Participants**

104 patients with chronic mechanical spinal pain were randomly assigned into three groups. 30 patients were assigned in regional, 35 in conventional group and 39 in NSAIDs group. Physiotherapists having similar qualification, skills and experience are also randomly assigned in regional and conventional group. A base line assessment was taken before the starting of the treatment. A half way evaluation was done at the middle of the treatment for regional, conventional group and NSAID group. Finally, 3<sup>rd</sup> measurement was taken at the end of the treatment.

**Data Analysis**

SPSS version 25, Genstat version 5 and Microsoft excel were used to analyze data. ODI/NDI = sum score of all domain/50\*100 = % of score and present pain = % of present pain, from 0 to 100%.

**Results**

In base line characteristics, all three groups of participants were almost similar in gender distribution, age range and mean duration of pain. The demographic results of the study show that out of 30 participants in regional group, n = 18 (60%) were male and n = 12 (40%) were female. Whereas in conventional group out of 35 patients, n = 16 (46%) were male and n = 19 (54%) were female and in NSAID group out of 39 patients, n = 16 (41%) were male in comparison to n = 23 (59%) female. Overall out of 104 participants n = 50 (48%) were male and n = 54 (52%) were female. The mean age of the participants of the both regional group and conventional group was 40 years in comparison to 37 years in NSAID group. The mean duration of suffering from pain is respectively 30 months, 35 months and 30 months for regional, conventional and NSAID group (Table 1).

		<b>Regional Group N = 30</b>	<b>Conventional Group N = 35</b>	<b>NSAID Group N = 39</b>
Sex	Male	N = 18 (60%)	N = 16 (46)	N = 16 (41%)
	Female	N = 12 (40%)	N = 19 (54%)	N = 23 (59%)
Age Range in years		21 - 65	21 - 60	22 - 58
Mean suffering from pain in month		30	35	30

**Table 1:** Demographic information of the participants.

Table 2a Shows mean pain level among 3 treatment groups in three different situations. The mean pain reduction in regional, conventional and NSAID groups respectively 37, 35 and 22 units. The tendency of pain reduction is much higher (56%) which is substantial improvement in regional group comparing to conventional (49.20% or moderate improvement) and (37.13%, minimum improvement) respectively in conventional and NSAID group. Table 2b the repeated measure ANOVA demonstrates that there is a significant main effect of the type of treatment (Regional, conventional and NSAID) on the effectiveness of pain, F = 3.544, P < 0.05. There was also a significant main effect of time (Pretest, midway test and post intervention) on the effectiveness of pain, F = 86, P < 0.01. There was not significant interaction between the types of treatment and time on the effectiveness of pain, P > 0.05. Table 2c the post hoc LSD tests for multiple comparisons illustrates that the mean effect of pain in all pairs of times (Pretest and posttest, pretest and mid test, mid test and posttest) are found to be statistically significant P < 0.01. In converse table 2d demonstrates the mean effect of pain in one pair of treatment (Regional and Conventional) is found to be statistically significant P < 0.05 despite Regional-NSAID, Conventional and NSAID pairs are not found to be statistically significant P > 0.05. Table 2e shows the effect of time and treatment interaction. Mid test Conventional and mid test NSAID have similar effect. In contrast Posttest Conventional and Post Test NSAID have similar effect. The outcomes of all rest of the pairs are different.

Descriptive Statistics				
Dependent Variable: Outcome_Pain				
Treatment	Time	Mean	Std. Deviation	N
Conventional	Pre test	72.0000	17.11552	35
	Mid test	51.7143	15.43215	35
	Post test	36.5714	14.33688	35
	Grand Total	53.4286	21.29593	105
NSAIDs	Pre test	60.7692	18.26481	39
	Mid test	54.1026	13.90152	39
	Post test	38.4615	18.57254	39
	Grand Total	51.1111	19.33274	117
Regional	Pre test	66.6667	21.86689	30
	Mid test	49.6667	15.42129	30
	Post test	29.3333	11.12107	30
	Grand Total	48.5556	22.56382	90

**Table 2a:** Descriptive Statistics of within group mean pain score of Regional, Conventional and NSAIDs.

SV	DF	SS	MSS	F	Sig
Time	2	47160.741	23580.37	86.024	.000**
ERROR (a)	101	36470.001	295.314		
Treatment	2	1942.963	971.481	3.544	.030*
Time*Treatment	4	1812.593	453.148	1.653	0.061
ERROR (b)	202	71543.333	354.17492		
TOTAL	311	122459.63	393.76087		

**Table 2b:** Analysis of Variance (ANOVA) for the parameter of pain.  
DF: Degree of Freedom

	(I) Time	(J) Time	Mean Difference (I-J)	Sig.
LSD	Pretest	Midtest	14.7778*	.000**
		Post test	32.3333*	.000**
	Midtest	Pretest	-14.7778*	.000**
		Post test	17.5556*	.000**
	Posttest	Pretest	-32.3333*	.000**
		Midtest	-17.5556*	.000**

**Table 2c:** Multiple Comparisons of means of different pairs of time.  
\*\*: The mean difference is significant at the .01 level.  
LSD: Least Significance Difference



	(I) Treatment	(J) Treatment	Mean Difference (I-J)	Sig.
LSD	Regional	Conventional	-6.5556*	.008**
		NSAID	-3.6667	.139 (NS)
	Conventional	Regional	6.5556*	.008**
		NSAID	2.8889	.243 (NS)
	NSAID	Regional	3.6667	.139 (NS)
		Conventional	-2.8889	.243 (NS)

**Table 2d:** Multiple Comparisons of means of different pairs of treatment.

\*\* : The mean difference is significant at the .01 level and NS: No Significant Different.

Time	Treatment	Mean
Pre test	Regional	66.665(b)
	Conventional	73.333(a)
	NSAID	63.003(c)
Mid test	Regional	49.667(e)
	Conventional	54.002 (d)
	NSAID	55.010 (d)
Post test	Regional	29.332(g)
	Conventional	38.001(f)
	NSAID	38.667(f)
SE		3.023
LSD (5%)		7.739

**Table 2e:** Multiple comparison test mean time and treatment interaction difference (Time \* Treatment).

Note: \*\* denote the significant different at 5% level

Table 3a Shows mean disability level among 3 treatment groups in three different situations. The mean disability score changed in regional, conventional and NSAID respectively 14, 26 and 13 units. Regional group shows more improvement in disability 47.54% comparing 44.47% in conventional group and 25.31% in NSAID group. Table 3b the repeated measure ANOVA illustrates that there is a significant main effect of the type of treatment (Regional, conventional and NSAID) on the effectiveness of the disability,  $F = 72.9, P < 0.01$ . There was a significant main effect of time (Pretest, midway test and post intervention) on the effectiveness of the disability,  $F = 33.17, P < 0.01$ . There was also a significant interaction between the types of treatment and time on the effectiveness of the disability,  $F = 2.41, P < 0.05$ . Table 3c the post hoc LSD tests for multiple comparison depicts that the mean effect of disability in all pairs of times (Pretest and posttest, pretest and mid test, mid test and posttest) are found to be statistically significant  $P < 0.01$ . Table 3d demonstrates the mean effect of disability in two pairs of treatment (Regional and Conventional, Regional and NSAID) are found to be statistically significant  $P < 0.01$  despite Conventional and NSAID pair is not found to be statistically significant  $P > 0.05$ . The table 3e shows that the mean effect of disability in pretest- NSAID, Midtest - NSAID are same and posttest-conventional, posttest-NSAID are found to be equal whereas other time and treatment interaction are found to be different.

Descriptive Statistics Disability				
Dependent Variable: Outcome				
Treatment	Time	Mean	Std. Deviation	N
Conventional	Pretest	58.62	19.841	35
	Midway test	44.89	18.118	35
	Posttest	32.55	16.999	35
	Grand Total	45.35	21.094	105
NSAIDs	Pretest	50.77	16.862	39
	Midway test	50.97	18.706	39
	Posttest	37.92	15.610	39
	Grand Total	46.55	18.033	117
Regional	Pretest	29.55	10.666	30
	Midway test	22.23	9.544	30
	Posttest	15.50	8.875	30
	Grand Total	22.43	11.212	90

**Table 3a:** Descriptive Statistics of within group mean disability score of Regional, Conventional and NSAIDs on 3 occasions of measurement.

SV	DF	SS	MSS	F	Sig
Time	2	16305.919	8152.959	33.170	.000**
Error (a)	101	16309.400	161.479		
Treatment	2	35848.985	17924.493	72.924	.000**
Time*Treatment	4	2378.015	594.504	2.419	.049*
Error (b)	202	64152.567	317.587		
Total	311	118685.485	381.625		

**Table 3b:** Analysis of Variance (ANOVA) for the parameter of disability.  
 Note: '\*\*' denote the significant different at 1% level and '\*' denote the significant different at 5% level.

	(I) Time	(J) Time	Mean Difference (I-J)	Sig.
LSD	Pre test	Mid test	6.50*	.006**
		Post test	18.74*	.000**
	Mid test	Pre test	-6.50*	.006**
		Post test	12.24*	.000**
	Post test	Pre test	-18.74*	.000**
		Mid test	-12.24*	.000**

**Table 3c:** Multiple Comparisons of means disability of different pairs of time.  
 \*\*: The mean difference is significant at the .01.

	(I) Treatment	(J) Treatment	Mean Difference (I-J)	Sig.
LSD	Regional	Conventional	-24.93*	.000*
		NSAIDs	-23.92*	.000*
	Conventional	Regional	24.93*	.000*
		NSAIDs	1.01	.666 (NS)
	NSAIDs	Regional	23.92*	.000*
		Conventional	-1.01	.666 (NS)

**Table 3d:** Multiple Comparisons of the mean of different pairs of treatment.

\*\* : The mean difference is significant at the .01 level and NS: No Significant Different

Time	Treatment	Mean
Pretest	Regional	28.967(e)
	Conventional	60.333(a)
	NSAID	51.467(b)
Mid-test	Regional	22.233(f)
	Conventional	47.033(c)
	NSAID	52.000(b)
Post test	Regional	15.467(g)
	Conventional	34.100(d)
	NSAID	34.967(d)
SE		2.86
LSD (5%)		7.322

**Table 3e:** Multiple comparison test (Time \* Treatment).

Note: \*\* denote the significant different at 5% level.

## Discussion

The study was conducted to accomplish several objectives including to determine effectiveness of three types of treatment including regional, conventional and NSAID’s for chronic mechanical spinal pain. There is no simple, defined, time effective and robust effective physiotherapy interventional package for the chronic mechanical spinal pain. Therefore, the researcher developed a new protocol of physiotherapy treatment called regional. The regional approach includes treatment addressing adjacent structures (muscles or joint).

### Evaluation of changes of pain during experiment

The results of the study under core domain of pain shows that frequency of severity of pain has been reduced more frequently in the regional group, n = 20 (69%) had severe pain during pretest which became less n = 6 (21%) during mid-test and n = 0 at the end of the treatment. In contrast n = 22 (63%) had severe pain during pretest, n = 4 (11%) had severe pain during mid-test and n = 1 (3%) had severe pain during posttest in conventional group. The frequency of improvement seems to be less in NSAID group, n = 14 (38%) had severe pain during pretest, n = 10 (26%) during mid-test and n = 3 (8%) during posttest. However, the results of descriptive statistics show that mean pain reduction in regional, conventional and NSAID groups respectively 37, 35 and 22 unit took place within group.

Moreover, the repeated measure ANOVA showed that there was a significant main effect of the type of treatment (Regional, conventional and NSAID) on the effectiveness of pain,  $F = 3.544$ ,  $P < 0.05$ . There was also a significant main effect of time (Pretest, midway test and post intervention) on the effectiveness of pain,  $F = 86$ ,  $P < 0.01$ . There was not significant interaction between the types of treatment and time on the effectiveness of pain,  $P > 0.05$ .

The post hoc LSD tests for multiple comparison showed that the mean effect of pain in all pairs of times (Pretest and posttest, pretest and mid test, mid test and posttest) are found to be statistically significant  $P < 0.01$ . Similarly, the post hoc LSD tests for multiple comparison showed that the mean effect of pain in one pair of treatment (Regional and Conventional) is found to be statistically significant  $P < 0.05$  despite Regional-NSAID, Conventional and NSAID pairs are not found to be statistically significant  $P > 0.05$ .

Multiple comparison of time and treatment interaction shows that mid test- conventional and mid test- NSAID have similar effect. In contrast posttest- conventional and posttest- NSAID have similar effect. The outcomes of all rest of the pairs are different.

The tendency of pain reduction is much higher (56%) which is substantial improvement in regional group comparing to conventional (49.20% or moderate improvement) and (37.13%, minimum improvement) respectively in conventional and NSAID group.

A 5-year prospective study identified that trunk muscle imbalance (lower extensor muscles strength than flexor strength) is a risk factor for low back pain [25]. However it was hypothesized in one study [26] that multifidus muscle recovery is not natural in patients with low back pain despite normal levels of activity. Multifidus muscle recovery takes place rapidly in a group who received exercise therapy ( $P = 0.001$ ). Regional physiotherapy includes a list of exercise including strengthening exercise of multifidus.

Exercise therapy have been found to be effective in reduction of pain and improvement of function in systematic review conducted [27]. In a systematic review it was found that most studies of exercise have noted overall 10% to 50% pain reduction took place after exercise treatment [28].

Soft tissue manipulation in regional group may help to reduce pain. Several studies found that soft tissue manipulation can break down excessive cross links of collagen or adhesive tissues and thus can encourage tissue healing and reduce pain [29].

#### **Evaluation of changes of disability during experiment:**

The mean disability score changed in regional, conventional and NSAID respectively 14, 26 and 13 units. The repeated measure ANOVA showed that there was a significant main effect of the type of treatment (Regional, conventional and NSAID) on the effectiveness of the disability,  $F = 72.92$ ,  $P < 0.01$ . There was a significant main effect of time (Pretest, midway test and post intervention) on the effectiveness of the disability,  $F = 33.17$ ,  $P < 0.01$ . There was also a significant interaction between the types of treatment and time on the effectiveness of the disability,  $F = 2.41$ ,  $P < 0.05$ . The post hoc LSD tests for multiple comparison showed that the mean effect of disability in all pairs of times (Pretest and posttest, pretest and mid test, mid test and posttest) are found to be statistically significant  $P < 0.01$ .

The mean effect of disability in two pairs of treatment (Regional and Conventional, Regional and NSAID) are found to be statistically significant  $P < 0.01$  despite Conventional and NSAID pair is not found to be statistically significant  $P > 0.05$ . The mean effect of disability in pretest- NSAID, midtest - NSAID are same and posttest-conventional, posttest-NSAID are found to be equal whereas other time and treatment interaction are found to be different. Regional group shows more improvement in disability 47.54% comparing 44.47% in conventional group and 25.31% in NSAID group.

Over the last decade, many additional studies were conducted advising exercise as the primary mode of treatment has found significant reduction of disability after treatment.

One study recruited 156 adults with recurrent or chronic back pain and continued 12-week progressive exercise program. The result of the study shows that 38% reduction in physical impairment score [30].

Another study [31,32] conducted a study with 116 disabled workers with chronic back pain. A 3-week functional restoration program was undertaken. The result of the study shows that 8% reduction of Million Visual Analog program disability scores.

In contrast, again a study [33] with 137 adults with chronic back pain. A 6-week general conditioning program was given. The result shows that 33% reduction of Oswestry disability scores.

Another authors conducted a study with 59 disabled workers with chronic back pain. A 6-week functional restoration program was undertaken. The result of the study shows that 41% reduction in Oswestry disability scores back pain program at 1 year follow up [34].

A study with 59 adults with chronic back pain was also investigated with 12-week active exercise program was undertaken. The result shows 56% reduction in Pain Disability Index [35].

A 4-week fitness program was undertaken using 81 adults with chronic back pain. However, the result shows 25% reduction in Oswestry disability scores in fitness group versus 7% reduction in control group [36].

Most importantly one study was conducted to observe three different approaches of physiotherapy treatment (as usual out patient, spinal stabilization classes or physiotherapists-led pain management) for reduction of disability. The result of the study shows that all form of Physiotherapy is effective for reduction of disability [37].

The reasons for improvement in disability are thought due to alteration of fear avoidance behavior and break down of vicious cycle of pain.

## **Conclusion**

Overall the study was carried out to test the hypothesis which is regional approach of physiotherapy treatment; NSAID's and conventional physiotherapy approach are differentially effective on pain and disability for chronic mechanical spinal pain disorder. The second hypothesis was the outcome of pain and disability is differently effective over different occasions of treatment (pretest, mid-test and post-test) for chronic mechanical spinal pain.

The result of the study accepts hypothesis that regional approach of physiotherapy treatment, NSAID's and conventional physiotherapy approach are differentially effective on pain and disability for chronic mechanical spinal pain disorder. The study result also accepts the second hypothesis that the outcome of pain and disability are differently effective over different occasions of treatment (pretest, mid-test and posttest) for chronic mechanical spinal pain disorder.

Regional approach of treatment has been found to be a new evidence of treatment for chronic mechanical spinal pain which also indicate that chronic pain is multi-structural phenomena and therefore physiotherapy treatment should cover regionally. The study demonstrates short term outcome of the treatment methods. However, a further study is required to see the long term effect of those treatments.

## **Bibliography**

1. Vos T, *et al.* "Global, regional, and national incidence, prevalence, and years lived with disability for 301 acute and chronic diseases and injuries in 188 countries, 1990-2013: a systematic analysis for the Global Burden of Disease Study 2013". *The Lancet* 386.9995 (2015): 743-800.
2. Fejer R, *et al.* "The prevalence of neck pain in the world population: a systematic critical review of the literature". *European Spine Journal* 15.6 (2006): 834-848.

---

**Citation:** Nasirul Islam, *et al.* "Evaluation Outcome of the Regional Approach of Physiotherapy, Conventional Approach of Physiotherapy and Non-Steroidal Anti-Inflammatory Drugs (NSAID) on Pain and Disability for Chronic Mechanical Spinal Pain Disorder - A Repeated Measure Clinical Trial Design". *EC Orthopaedics* 9.9 (2018): 648-662.

3. Hoy D., *et al.* "The epidemiology of low back pain". *Best Practice and Research Clinical Rheumatology* 24.6 (2010): 769-781.
4. Hakala P., *et al.* "Back, neck, and shoulder pain in Finnish adolescents: national cross sectional surveys". *British Medical Journal* 325.7367 (2002): 743.
5. Ferrari R and Russell AS. "Regional musculoskeletal conditions: Neck pain". *Best Practice and Research Clinical Rheumatology* 17.1 (2003): 57-70.
6. Cote P., *et al.* "The annual incidence and course of neck pain in the general population: a population-based cohort study". *Pain* 112.3 (2004): 267-273.
7. Sauver JLS., *et al.* "Why patients visit their doctors: assessing the most prevalent conditions in a defined American population". In *Mayo Clinic Proceedings* 88.1 (2013): 56-67.
8. Hoy D., *et al.* "The global burden of low back pain: estimates from the Global Burden of Disease 2010 study". *Annals of the Rheumatic Diseases* 73.6 (2014): 968-974.
9. Theis KA., *et al.* "Prevalence and causes of work disability among working-age U.S. adults, 2011-2013, NHIS". *Disability and Health Journal* 11.1 (2018): 108-115.
10. Maniadakis N and Gray A. "The economic burden of back pain in the UK". *Pain* 84.1 (2000): 95-103.
11. Qaseem A., *et al.* "Noninvasive treatments for acute, subacute, and chronic low back pain: a clinical practice guideline from the American College of Physicians". *Annals of Internal Medicine* 166.7 (2017): 514-530.
12. Dillingham TR and De Lateur BJ. "Exercise for Low Back Pain: What Really Works?" *Spine-Philadelphia-Hanley and Belfus* 9 (1995): 649-660.
13. Borkan J., *et al.* "Advances in the field of low back pain in primary care: a report from the fourth international forum". *Spine* 27.5 (2002): E128-E132.
14. McCarthy CJ., *et al.* "The biopsychosocial classification of non-specific low back pain: a systematic review". *Physical Therapy Reviews* 9.1 (2004): 17-30.
15. O'Sullivan P. "Diagnosis and classification of chronic low back pain disorders: maladaptive movement and motor control impairments as underlying mechanism". *Manual Therapy* 10.4 (2005): 242-255.
16. Nachevson A. "Back pain: delimiting the problem in the next millennium". *International Journal of Law and Psychiatry* 22.5-6 (1999): 473-490.
17. Flor H and Turk DC. "Etiological theories and treatments for chronic back pain. I. Somatic models and interventions". *Pain* 19.2 (1984): 105-121.
18. Flor H., *et al.* "Extensive reorganization of primary somatosensory cortex in chronic back pain patients". *Neuroscience Letters* 224.1 (1997): 5-8.
19. Moseley GL. "A pain neuromatrix approach to patients with chronic pain". *Manual therapy* 8.3 (2003): 130-140.
20. Frison L and Pocock SJ. "Repeated measures in clinical trials: analysis using mean summary statistics and its implications for design". *Statistics in Medicine* 11.13 (1992): 1685-1704.

21. Singh V, *et al.* "Analysis of repeated measurement data in the clinical trials". *Journal of Ayurveda and integrative Medicine* 4.2 (2013): 77-81.
22. Van Tulder MW, *et al.* "Non-steroidal anti-inflammatory drugs for low back pain". *Cochrane Database Systematic Review* 2 (2000): CD000396.
23. Bronfort G, *et al.* 1996. "Trunk exercise combined with spinal manipulative or NSAID therapy for chronic low back pain: a randomized, observer-blinded clinical trial". *Journal of Manipulative and Physiological Therapeutics* 19.9 (1996): 570-582.
24. Grotle M, *et al.* "Cross-cultural adaptation of the Norwegian versions of the Roland-Morris Disability Questionnaire and the Oswestry Disability Index". *Journal of Rehabilitation Medicine* 35.5 (2003): 241-247.
25. Lee JH, *et al.* "Trunk Muscle Weakness as a Risk Factor for Low Back Pain: A 5 Year Prospective Study". *Spine* 24.1 (1999): 54-57.
26. Hides JA, *et al.* "Multifidus muscle recovery is not automatic after resolution of acute, First Episode low back pain". *Spine* 21.23 (1996): 2763-2769.
27. Van Middelkoop M, *et al.* "Exercise therapy for chronic nonspecific low-back pain". *Best Practice and Research Clinical Rheumatology* 24.2 (2010): 193-204.
28. Rainville J, *et al.* "Comparison of short-and long-term outcomes for aggressive spine rehabilitation delivered two versus three times per week". *The Spine Journal* 2.6 (2002): 402-407.
29. Chamberlain GJ. 1982. "Cyriax's friction massage: a review". *Journal of Orthopaedic and Sports Physical Therapy* 4.1 (1982): 16-22.
30. Taimela S, *et al.* "The role of physical exercise and inactivity in pain recurrence and absenteeism from work after active outpatient rehabilitation for recurrent or chronic low back pain: a follow-up study". *Spine* 25.14 (2000): 1809-1816.
31. Mayer TG, *et al.* "A prospective two-year study of functional restoration in industrial low back injury: an objective assessment procedure". *Journal of the American Medical Association* 258.13 (1987): 1763-1767.
32. Walker JM. "Deep transverse frictions in ligament healing". *Journal of Orthopaedic and Sports Physical Therapy* 6.2 (1984): 89-94.
33. van der Velde G and Mierau D. "The effect of exercise on percentile rank aerobic capacity, pain, and self-rated disability in patients with chronic low-back pain: a retrospective chart review". *Archives of Physical Medicine and Rehabilitation* 81.11 (2000): 1457-1463.
34. Hazard RG, *et al.* "Functional restoration with behavioral support. A one-year prospective study of patients with chronic low-back pain". *Spine* 14.2 (1989): 157-161.
35. Kankaanpaa M, *et al.* "The Efficacy of Active Rehabilitation in Chronic Low Back Pain: Effect on Pain Intensity, Self Experienced Disability, and Lumbar Fatigability". *Spine* 24.10 (1999): 1034-1042.
36. Frost H, *et al.* "Randomised controlled trial for evaluation of fitness programme for patients with chronic low back pain". *British Medical Journal* 310.6973 (1995): 151-154.
37. Critchley DJ, *et al.* "Effectiveness and cost-effectiveness of three types of physiotherapy used to reduce chronic low back pain disability: a pragmatic randomized trial with economic evaluation". *Spine* 32.14 (2007): 1474-1481.

**Volume 9 Issue 9 September 2018**

**©All rights reserved by Nasirul Islam, *et al.***

---

**Citation:** Nasirul Islam, *et al.* "Evaluation Outcome of the Regional Approach of Physiotherapy, Conventional Approach of Physiotherapy and Non-Steroidal Anti-Inflammatory Drugs (NSAID) on Pain and Disability for Chronic Mechanical Spinal Pain Disorder - A Repeated Measure Clinical Trial Design". *EC Orthopaedics* 9.9 (2018): 648-662.