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Comparison of Clinical Effectiveness of Conventional Physiotherapeutic Techniques versus Advanced Programmed Based Electrotherapeutic Interventions on Chronic Lumbar Discogenic Radiculitis

Vibhor Goel[1], Prof. (Dr.) Ajeet Kumar Saharan[2], Dr Manisha Saharan[3], Dr. Dhruv Taneja[4], Dr Shantanu Sharma[5]

[1]PhD (Scholar), Dept. of Physiotherapy, MVG University, Jaipur.
[2]Principal, Dept. of Physiotherapy. MVG University, Jaipur.
[3]Professor, JRNRV University, Udaipur
[4]Professor, Dept. of Physiotherapy. MVG University, Jaipur.
[5]Professor, UEM College of Physiotherapy

Corresponding Author: Vibhor Goel

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ABSTRACT

Objective: Purpose of this study is to compare the effect of Conventional Physiotherapy techniques and exercise therapeutic regime versus advanced programmed based electrotherapeutic interventions and exercise therapeutic regime on chronic lumbar discogenic radiculitis (unilateral or bilateral).
Subjects: In this study subjects are classified in two groups. One is control group and another is experimental group. 52 patients of age group between 25 to 34 years of age were randomly divided equally in control group (n=26) and experimental group (n=26).
Methods: Control group was treated with Conventional Physiotherapy and Experimental group is intervened by advanced programmed based electrotherapeutic interventions & exercise therapeutic regime. Treatment was given 6 times per week for three weeks and follow up was done after 4th week of initial evaluation of patients. Numeric Rating scale of pain (NRS) and Revised Oswestry Disability Index (ROLDI) was assessed in both the groups on the basis of pretreatment and post treatment scores.
Results: In both these groups exercise therapeutic plan or regime is same so it is clear that advanced programmed based electrotherapeutic interventions is more effective in giving good clinical prognosis not only in NRS scale but also in ROLDI scale. Clearly p value is less than 1% and it is almost equivalent to 0 level and rejection of null hypothesis is advocated strongly.
Conclusion: Advanced programmed based electrotherapeutic interventions and exercise therapeutic regime is better treatment approach as compared to conventional physiotherapeutic techniques and exercise therapeutic regime in treating chronic discogenic radiculitis.

Key Words: Chronic Discogenic Radiculitis, Revised Oswestry Disability Score, Numeric Pain Rating Scale (NPRS), Revised Oswestry Disability Index (ROLDI).

INTRODUCTION

Large number of populations all over the world suffers from chronic low back pain. It is obvious that normal and professional life of an individual is severely affected because of this debilitating medical condition.
In 2002, a reported was concluded by WHO that that LBP constituted 37% of all

occupational risk factors which occupies first rank among the disease complications caused by work.

The severity of LBP and its effect among effected population of entire world leads WHO to name the first decade of third millennium as the "decade of campaign against musculoskeletal disorder (as the silent epidemic)" WHO (2005) (1).

Manchikanti reviewed that low back pain ranks number 1 in musculoskeletal disorder & it is estimated that episodes of low back pain that are frequent or persistent have been reported in 15% of the US population with a life time prevalence of 65% to 80%. It is also stated that 28 % of the US industrial population will experience disabling low back pain at some time and 8% of entire working population will be disabled in any given year contributing to 40% of all lost work days (2).

Bindra et al, 2015 stated previous research articles highlighted lower prevalence rates of LBP amongst low- income countries compared with western countries especially amongst rural population. However, reports from Tibet, turkey, China, and Africa suggest that prevalence rates are not that dissimilar with Western countries & with one year prevalence in adults in these studies are between 36% and 64%.

This would suggest that back pain is likely to be an increasing health problem in non-western countries as well. This review also highlighted that thirty-one studies have reported the prevalence of LBP and it ranges from as low as 6.2% to as high as 9 % depending upon the population under study (3).

Sinha AP, 2017 stated that Chronic back pain is more serious problem and it affects seriously individual well-being and health. Low back pain is an important heath problem affecting all age group and it is responsible for great economic loss for country (4).

Common Causes of Low Back Pain

1. ***Sacralization of fifth lumbar vertebrae***: Fusion of entire fifth lumbar vertebrae or transverse process is fused with sacrum unilaterally or bilaterally with ala of sacrum or with the ilium.
2. ***Spina Bifida:*** It occurs when two halves of neural arch do not fuse and a gap is left in midline leading to spina bifida. It could be serious as meninges and spinal cord may come out through broken region.
3. ***Spondylolisthesis:*** Slipping of part of fifth lumbar vertebrae over sacrum is called Spondylolisthesis.
4. ***Fracture Dislocation:*** Fracture dislocation may lead to cauda equine syndrome. Cauda equine syndrome may have symptoms of flaccid paraplegia, saddle shaped anesthesia, incontinence of urine and stool because of sphincter disturbance. Impotence may also be reported by the patients.
5. ***Disc protrusion or herniation****:* It is very much common among lumbar vertebral region. Herniated disc may cause nerve root entrapments and this may lead to discogenic radiculitis. It may lead to severe low back muscle spasm called lumbago (5).

   Bogduk.N et al., 2013 reviewed that for chronic low back pain, internal disc disruption is extensively studied and best understood cause of chronic back pain. This is a pathological condition that can cause chronic disc pain. The condition can rule out in MRI and accounts for 40% of chronic low back pain (6).

Treatment of Low Back Pain

Manchikanti, 2000, concluded that there is continuous debate and difference in opinions among health professionals regarding treatment approach for chronic low back pain. Numerous modalities of therapeutic interventions are available for treatment of chronic low back pain like surgery, drugs, manipulation, physical therapy, behavior therapy, and neural blockade.

Aim of Study

Physiotherapist uses many physiotherapy techniques like exercise therapy, manipulations maneuvers, electrotherapy modalities conventional TENS, IFT, Ultrasonic Therapy, Short Wave Diathermy, Laser Therapy, &Hot Pack etc. to treat the chronic LBA. There is day to day advancement in the field of Physiotherapy and it is very important to do evidence-based practice to treat lumbar discogenic pains.

Major aim of this study is to find the clinical efficacy and compare the effect of conventional Physiotherapy maneuvers like continuous TENS and Hot pack versus programmed based low frequency Interferential current and Short-Wave Diathermy on Chronic lumbar discogenic pain.

METHODS AND METHODOLOGY

Subjects and Sampling:

This experimental study includes 52 patients suffering from chronic (more than 3 months) lumbar discogenic pain. These participants are divided in two groups. One is experimental group and another is control group. Random allocation of groups is done among 52 participants using envelope method. Patients representing age group between 25 to 34 years were randomly divided equally in control group (n=26) and experimental group (n=26). Control group was treated with Conventional Physiotherapy like continuous TENS, Ultrasonic Therapy, Moist Heat Pack and exercise therapeutic regime and experimental group is intervened by advanced programmed based electrotherapeutic interventions (programmed based transcutaneous electric nerve stimulation and interferential therapy, short wave diathermy) & exercise therapeutic regime. Treatment was given 6 times per week for three weeks and follow up was done after 4^{th} week of initial evaluation of patients.

Inclusion Criteria of Participants

- Participants fall in the age group of 25 to 34 years (both male and female genders are included).
- Participants suffering from clinically diagnosed lumbar discogenic radiculitis (unilateral or bilateral) for more than 3 months.
- Participants who sign the consent form, ready to take part in research trials, and are comfortable with follow ups

Exclusion Criteria of Participants

- Patients with chronic cardiovascular, gastroenterological, gynecological, uncontrolled diabetes, hyperuricaemia, hyper/hypothyroidism, hypertension, metastatic diseases, and psychiatric issues are excluded from this study.
- Patients with prior surgical intervention of lumbar spine like micro-discectomy, complete discectomy or spine fixation are excluded from study.
- Patients who were treated by nerve root blocker or spinal corticosteroid injection earlier 6 months back.
- Patients suffering from any infective pathology of spinal region.
- Patients who are not comfortable to be the participants of study.
- Pregnant females are excluded from this study.
- Participants who don't sign the consent form and are not willing to take part in research trials.
- Treatment was given 6 times per week for continuous three weeks.

Equipment's Used

HMS Medical System (An ISO Certified Company) equipment is used to deliver advanced programmed based electrotherapy treatment for selected individuals suffering from chronic lumbar discogenic radiculitis

- DIGITENS
- UNISTIM
- INDOMED
- SHORT WAVE DIATHERMY
- Ultrasound Therapy
- Moist Hot Pack

- Universal Goniometer to assess Straight Leg Raise test and other measurements as required. Programming of advanced electrical stimulations would be stored in Memory programs of equipment's for digital records.

Variables:

Independent variables for control group are continuous TENS, Ultrasonic therapy, moist heat pack and exercise therapeutic regime and for experimental group independent variable are programmed based transcutaneous electric nerve stimulation, interferential therapy, short wave diathermy & exercise therapeutic regime.

The effect or dependent variables are Numeric Rating Scale of Pain (NRS) and Revised Oswestry Low Back Disability Index (ROLDI).

Numeric Rating Scale for Pain

Numeric rating scale for pain is widely used to measure intensity of pain with numerical values of 0 to 10 points of scale. As per clinical practice, the categorization of pain screening in NRS score indicates that mild pain lies between numerical values 1 to3, moderate pain falls in three range of 4 to 6, severe pain is considered between7 to 10. Number 0 on scale is considered with no pain and 10 is considered with worst pain (7).

Revised Oswestry Low Back Disability Index (ROLDI)

Oswestry Disability Index questionnaire is frequently used as a measurement of results in patients suffering from low back pain. These questionnaires are divided in 10 sections to understand capabilities of doing daily living and functional activities. Each section is scored on scale 0 to 5 numerical values. Percentage of score is calculated by dividing summed score by total possible summation of score and its final resultant is multiplied by 100 (8,9).

Formula to find percentage of disability

(Summation of patient's score ÷ number of sections completed ×5) × 100 Interpretation of disability score (In terms of percentage)

A) Minimum Disability = 0% to 20%
B) Moderate Disability = 20% to 40%
C) Severe Disability = 40% to 60%
D) Crippled Patients = 60% to 80%
E) Non-Ambulatory Patients = 80% to 100%.

Treatment Approach for Control Group. (Table –1 &2)

Dosage of Physical Therapy treatment for control group (Treatment given 6 times per week for 3 continuous weeks)

Table – 1: Conventional Physiotherapy Chart

Application Mode	**Constant Tens**	**Ultrasonic Therapy**	**Moist Heat Pack**
Frequency	80 Hz	1 Mhz	Not Applicable
Pulse Width	100 Micro Seconds	Not Applicable	Not Applicable
Amplitude or Intensity	20 ma	2 W/cm^2	Not Applicable
Treatment Time	30 minutes	5 minutes each Part	8 -10 minutes Each Part
Treatment Region	Paravertebral Muscular Lumbar Spine.	Paravertebral Muscular Lumbar Spine	Lumbar, Paravertebral Muscular Region, Unilateral or Bilateral Gluteal and Affected Sciatic Nerve Root Course of Region

Exercise Therapeutic Regime during third week of treatment and follow up period for control group.

Table –2: Exercise Therapeutic Chart

Exercise 1	**Number of Repetitions**	**Frequency of Exercise per day**
Low Back Extension	10 repetitions with 10 seconds of hold.	3 times
Knee to Chest (Bilateral)	10 repetitions with 20-25 seconds of hold.	3 times
PVB lumbar Side Rotation (Bilateral)	10 repetitions with 30 seconds of hold.	3 times
Bridging exercise for low back	10 repetitions with 10 seconds of hold	3 times
Controlled Forward Flexion LS Spine	5 repetitions with 10 seconds of hold	3 times

Treatment Approach for Experimental Group

Dosage of Physical Therapy treatment for Experimental group (Treatment given 6 times per week for 3 continuous weeks): Advanced Programmed Based Electrotherapeutic approach. Tables – 3,4 &5.

Table 3: First week of treatment:

Application Mode	**Lumbago Stimulation Program (IFT)**	**Interferential 4 Pole Vector 4 PV 45 & Inbuilt Frequency 2 KHz)**	**Interferential 4 Pole Vector Classic (4PV 45 Frequency2 KHz)**	**Short Wave Diathermy (Wave Length: 11 Meter)**
Step1 Base Frequency	4 PV 90 (150 Hz)	4 PV 45 (50hz)	4 PV 45 (50hz)	27.12 Mhz (Standard Frequency)
Step 2 Base Frequency	4 PV 45 (143 Hz)	Sweep (25hz)	Sweep (25hz)	N/A
Treatment Time	14 mins	15 mins	15mins	8 mins each Part
Treatment Area	Lumbar Vertebral & PVB muscular Area	Unilateral or Bilateral Gluteal Area	Affected Sciatic Nerve Root Course Area	Lumbar Vertebral & muscular region

Table 4: Second week of treatment

Application Mode	**Constant (TENS) Pulse Width = 100 micro sec**	**Myalgia relieving IFT Program (4 PV 45 & Inbuilt Frequency 2 Khz)**	**Interferential 4 Pole Vector Classic (4 PV 45 & Inbuilt Frequency 4 KHz)**	**Short Wave Diathermy (Wave Length: 11 Meter)**
Step 1Base Frequency	100 Hz	100 Hz	4 PV 45 (50Hz)	27.12 Mhz (Standard Frequency)
Step 2 Base Frequency	N/A	N/A	Sweep (25Hz)	N/A
Treatment Time	15 mins	15 mins	15 mins	8 mins each part
Treatment Area	Lumbar Vertebral & PVB Muscular Area	Unilateral Or Bilateral Gluteal Area	Affected Sciatic Nerveroot course Area	Lumbar Vertebral And PVB muscular Area

Table 5: Third week of treatment

Application Mode	**Constant High-Rate Afferent Stimulation (TENS)**	**Strong Low-Rate Afferent Stimulation (Acupuncture TENS)**	**Burst Pulse Train TENS (1 To 4 Pps)**	**Short Wave Diathermy (Wave Length: 11 Meter)**
Frequency	80 Hz	1Hz	50Hz	27.12 MHz (Standard Frequency)
Pulse Width (Microseconds)	50	200	150	N/A
Amplitude or Intensity	20 ma	15ma	20 ma	N/A
Treatment Time	15 mins	15 mins	15 mins	8 mins Each Part
Treatment Area	Lumbar Vertebral PVB Muscular	Unilateral or Bilateral Gluteal Area	Affected Sciatic Nerve Root Course Area	Lumbar Vertebral & PVB Muscular Area

Clinical Analysis of Prognosis: In experimental group and control group, outcomes of all dependent variables Numeric Rating Scale for pain (NRS), Revised Oswestry Disability Index (ROLDI) is analyzed on 1st day, after 1st week, 2nd week, 3rd week of treatment and follow up is done after 4 weeks of initial evaluation of patients.

Data analysis and Statistics: Descriptive and Inferential Statistics Descriptive Statistics Data is analyzed by measuring mean, mode, median, range and standard deviations among variables of both groups.

Inferential Statistics. In this research study the statistical data determines the Test of Significance, Probability Level is analysed thoroughly.

Test of significance: This study determines the hypothesis analysis i.e. relationship between two variables. Rejection or acceptance of null hypothesis is analyzed and clear analysis of significant difference between independent and dependent variables of intervention is done on control and experimental group.

Probability level: Probability level α is set at .05 or .01. P value of 5% or less than 1%

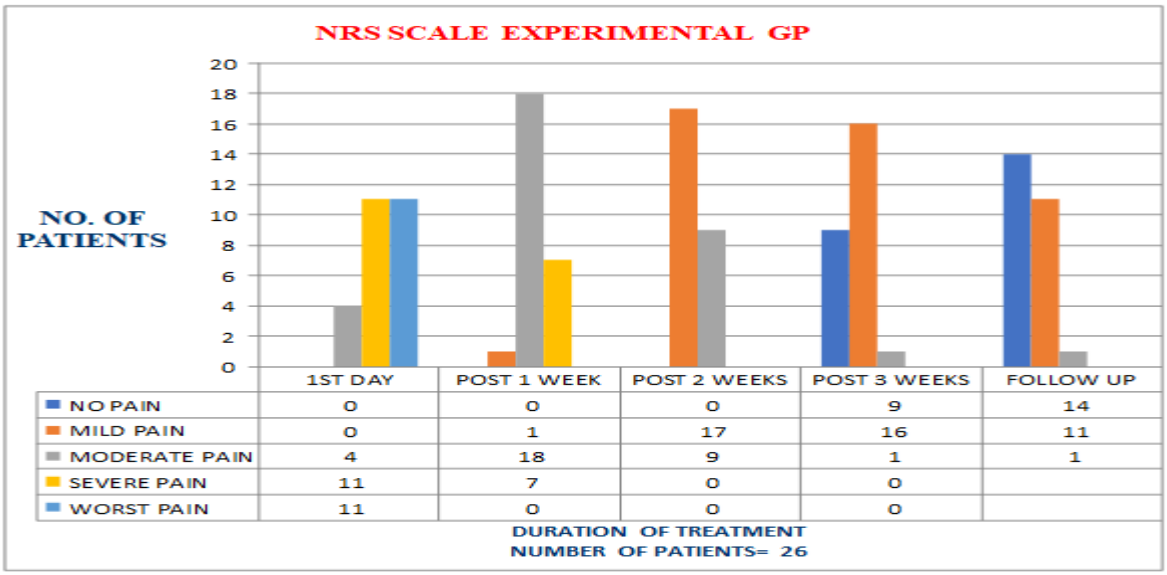
out of 100 would allow the rejection of null Hypothesis.

Parametric Statistics: This research study is based on population parameters and includes tests of significance based on interval and ratio data. **T Test:** T test for paired samples compares the difference between matched samples. In this study, two tailed T test for two samples with equal variance is used to depict group comparison of experimental and control group for dependent variables (10,11).

RESULTS

Clinical Analysis of Prognosis of Experimental Group Comparison of NRS scale (first day of assessment, post 1 week, post 2 weeks, post 3 weeks and after 4th week of initial evaluation).

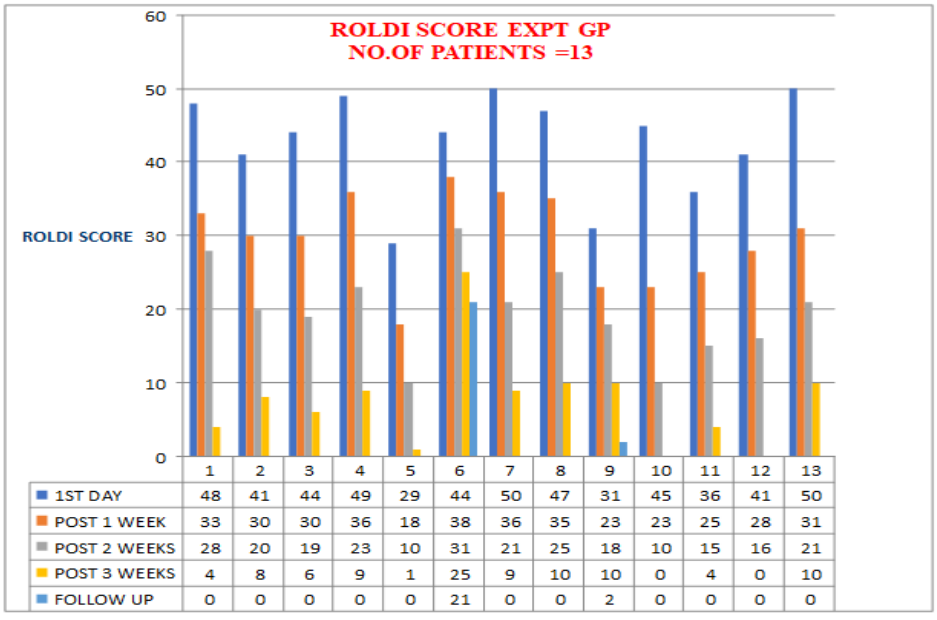
GRAPH -1



	1ST DAY	POST 1 WEEK	POST 2 WEEKS	POST 3 WEEKS	FOLLOW UP
NO PAIN	0	0	0	9	14
MILD PAIN	0	1	17	16	11
MODERATE PAIN	4	18	9	1	1
SEVERE PAIN	11	7	0	0	
WORST PAIN	11	0	0	0	

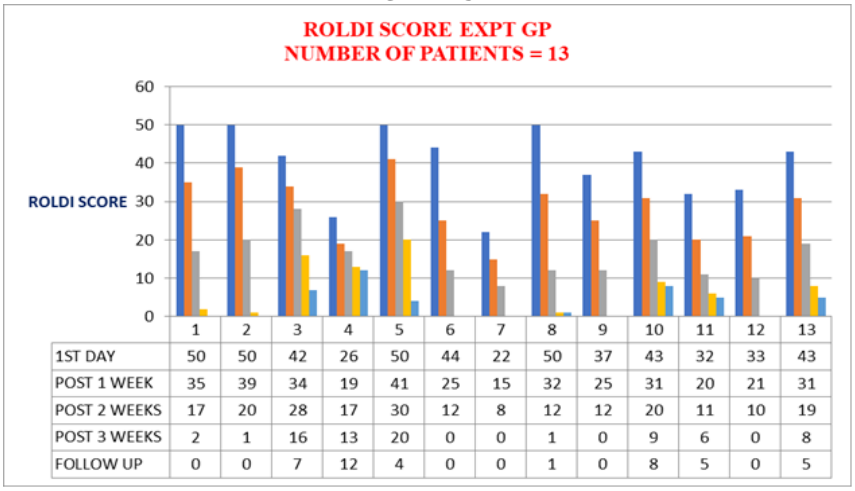
Comparison of ROLDI scale (first day of assessment, post 1 week, post 2 weeks, post 3 weeks and after 4th week of initial evaluation). GRAPH 2 & 3.

GRAPH - 2



	1	2	3	4	5	6	7	8	9	10	11	12	13
1ST DAY	48	41	44	49	29	44	50	47	31	45	36	41	50
POST 1 WEEK	33	30	30	36	18	38	36	35	23	23	25	28	31
POST 2 WEEKS	28	20	19	23	10	31	21	25	18	10	15	16	21
POST 3 WEEKS	4	8	6	9	1	25	9	10	10	0	4	0	10
FOLLOW UP	0	0	0	0	0	21	0	0	2	0	0	0	0

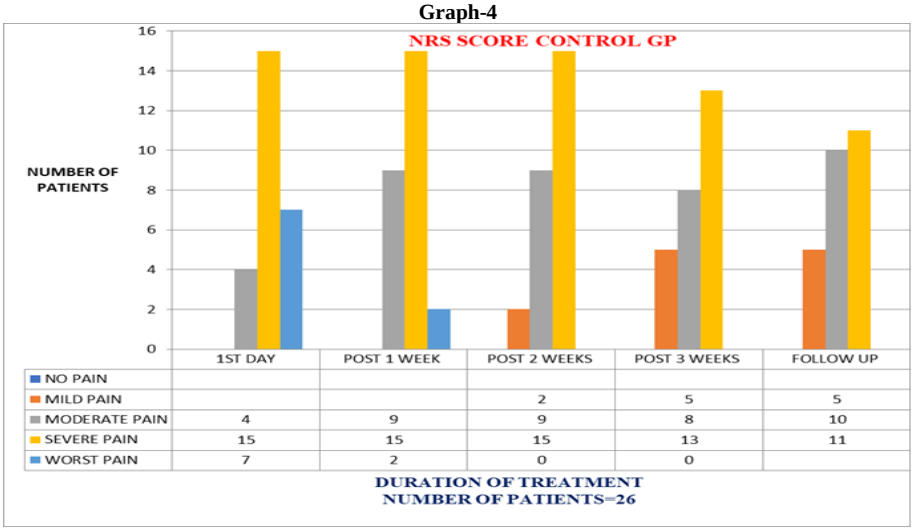
GRAPH 3



	1	2	3	4	5	6	7	8	9	10	11	12	13
1ST DAY	50	50	42	26	50	44	22	50	37	43	32	33	43
POST 1 WEEK	35	39	34	19	41	25	15	32	25	31	20	21	31
POST 2 WEEKS	17	20	28	17	30	12	8	12	12	20	11	10	19
POST 3 WEEKS	2	1	16	13	20	0	0	1	0	9	6	0	8
FOLLOW UP	0	0	7	12	4	0	0	1	0	8	5	0	5

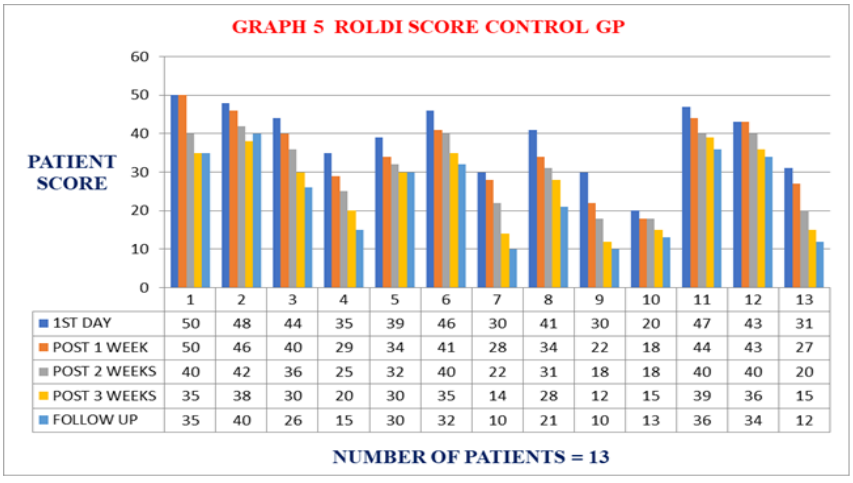
Clinical Analysis of Prognosis of Control Group Comparison of NRS scale (first day of assessment, post 1 week, post 2 weeks, post 3 weeks and after 4th week of initial evaluation).

Graph-4

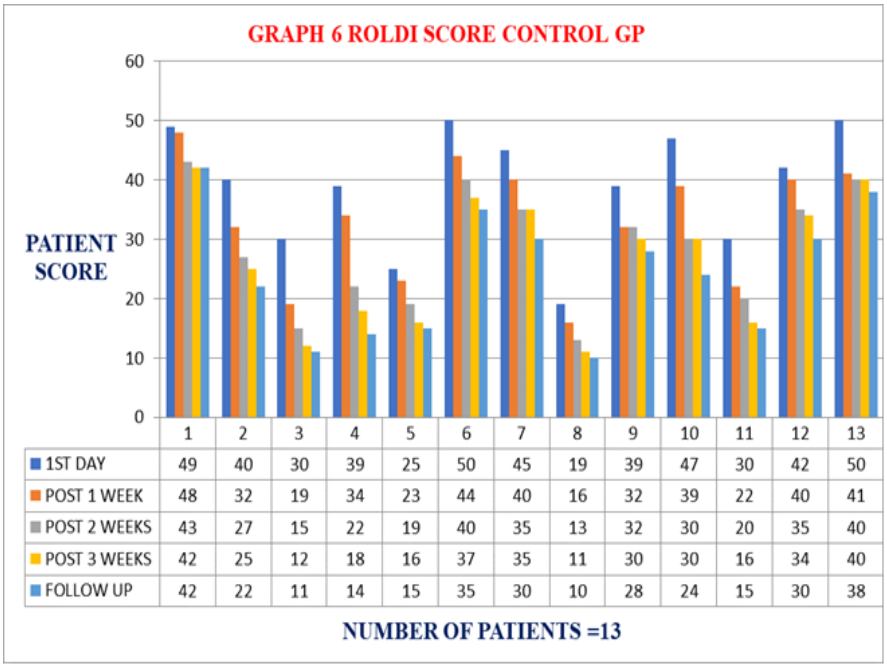


	1ST DAY	POST 1 WEEK	POST 2 WEEKS	POST 3 WEEKS	FOLLOW UP
NO PAIN					
MILD PAIN			2	5	5
MODERATE PAIN	4	9	9	8	10
SEVERE PAIN	15	15	15	13	11
WORST PAIN	7	2	0	0	

Graphical comparison of ROLDI scale (first day of assessment, post 1 week, post 2 weeks, post 3 weeks and after 4th week of initial evaluation): GRAPH-5,6



	1	2	3	4	5	6	7	8	9	10	11	12	13
1ST DAY	50	48	44	35	39	46	30	41	30	20	47	43	31
POST 1 WEEK	50	46	40	29	34	41	28	34	22	18	44	43	27
POST 2 WEEKS	40	42	36	25	32	40	22	31	18	18	40	40	20
POST 3 WEEKS	35	38	30	20	30	35	14	28	12	15	39	36	15
FOLLOW UP	35	40	26	15	30	32	10	21	10	13	36	34	12



Statistical Data analysis

TABLE – 6. Descriptive study of experimental group Comparison of NRS scale (first day of assessment, post 1 week, post 2 weeks, post 3 weeks and after 4th week of initial evaluation).

	NRS score at baseline	NRS score post 1st week	NRS score post 2nd week	NRS score post 3rd week	NRS score post 4th week
Mean	8.54	5.65	3.42	1.00	0.62
Median	9.0	5	3.0	1	0.00
Mode	10	5	3	1	0
Std. deviation	1.555	1.495	1.238	1.020	0.898
Range	4	5	4	4	4

TABLE -7. Comparison of ROLDI scale (first day of assessment, post 1 week, post 2 weeks, post 3 weeks and after 4th week of initial evaluation).

	ROLDI score at baseline	ROLDI score post 1st week	ROLDI score post 2nd week	ROLDI score post 3rd week	ROLDI score post 4th week
Mean	41.42	29	18.19	6.62	2.50
Median	43.50	30.50	18.50	6.00	0.0
Mode	50	25	10	0	0
Std. deviation	8.242	7.048	6.579	6.616	4.925
Range	28	26	23	25	21

TABLE -8. Descriptive study of Control group Comparison of NRS scale (first day of assessment, post 1 week, post 2 weeks, post 3 weeks and after 4th week of initial evaluation).

	NRS score at baseline	NRS score post 1st week	NRS score post 2nd week	NRS score post 3rd week	NRS score post 4th week
Mean	8.12	7.19	6.38	5.81	5.58
Median	8.00	7.00	7.00	6.50	6.00
Mode	10	7	7	7	7
Std. deviation	1.583	1.744	1.768	2.079	2.082
Range	5	6	6	7	7

TABLE-9. Comparison of ROLDI scale (first day of assessment, post 1 week, post 2 weeks, post 3 weeks and after 4th week of initial evaluation).

	ROLDI score at baseline	ROLDI score post 1st week	ROLDI score post 2nd week	ROLDI score post 3rd week	ROLDI score post 4th week
Mean	38.81	34.08	29.81	26.65	24.15
Median	40.50	34.00	31.50	30.00	25.00
Mode	30	34[a]	40	30	10
Std. deviation	9.321	9.879	9.575	10.303	10.642
Range	31	34	30	31	32

TABLE -10. Score Performance of Experimental and Control Group (Mean ± SD)

SCORES	Experimental GP	Control GP
NRS 1st Day	8.54 ± 1.555	8.12 ± 1.583
NRS post 1 Week	5.65±1.495	7.19 ± 1.744
NRS post 2 Week	3.42±1.238	6.38 ± 1.768
NRS post 3 Week	1±1.020	5.81 ± 2.079
NRS post 4 Week	0.62±0.898	5.58 ± 2.082
ROLDI 1st Day	41.2±8.242	38.81 ± 9.321
ROLDI post 1 Week	29± 7.048	34.08 ± 9.879
ROLDI post 2 Week	18.19±6.579	29.81± 9.575
ROLDI post 3 Week	6.62±6.616	26.65 ± 10.303
ROLDI post 4 Week	2.50±4.925	24.15 ±10.642

TABLE -11. Inferential Statistics: Two tailed T test assuming equal variance Table Depicting Group Comparison of Experimental and Control Group for dependent variables

AGE GP 25-34 YRS	Groups	N	Mean	Std Dev	Std error of mean
NRS Score Base Line	Experimental GP	26	8.54	1.555	0.305
	Control GP	26	8.12	1.583	0.310
NRS Score post 1 Week	Experimental GP	26	5.65	1.495	0.293
	Control GP	26	7.19	1.744	0.342
NRS Score post 2 Week	Experimental GP	26	3.42	1.238	0.243
	Control GP	26	6.38	1.768	0.347
NRS Score post 3 Week	Experimental GP	26	1.00	1.020	0.200
	Control GP	26	5.81	2.079	0.408
NRS Score post 4 Week	Experimental GP	26	0.62	0.898	0.176
	Control GP	26	5.58	2.082	0.408

TABLE -12. Table Depicting Group Comparison of Experimental and Control Group for dependent variables (F value, degree of freedom, Significance level or p value, Std error of difference and mean difference)

	F	Df	Sig. 2 Tailed	Std Error Difference	Mean Difference
NRS Score At Base Line	0.179	50	0.336	0.435	0.423
NRS Score Post 1 Weeks	0.652	50	.001	0.451	-1.538
NRS Score Post 2 Weeks	4.652	50	.000	0.423	-2.962
NRS Score Post 3 Weeks	18.082	50	.000	0.454	-4.808
NRS Score Post 4 Weeks	21.726	50	.0000	0.445	-4.962

TABLE -13. Inferential Statistics: Two tailed T test assuming equal variance Table Depicting Group Comparison of Experimental and Control Group for dependent variables

AGE GP 25-34 YRS	GROUPS	N	MEAN	Std Dev	Std error of mean
ROLDI Score Base Line	Experimental GP	26	41.42	8.242	1.616
	Control GP	26	38.81	9.321	1.828
ROLDI Score post 1 Week	Experimental GP	26	29.00	7.048	1.382
	Control GP	26	34.08	9.879	1.937
ROLDI Score post 2 Week	Experimental GP	26	18.19	6.579	1.290
	Control GP	26	29.81	9.575	1.878
ROLDI Score post 3 Week	Experimental GP	26	6.62	6.616	1.297
	Control GP	26	26.65	10.303	2.021
ROLDI Score post 4 Week	Experimental GP	26	2.50	4.925	0.966
	Control GP	26	24.15	10.642	2.087

TABLE-14. Table Depicting Group Comparison of Experimental and Control Group for dependent variables (F value, degree of freedom, Significance level or p value, Std error of difference and mean difference)

	F	df	Sig. 2 tailed	Std Error difference	Mean difference
ROLDI Score 1ST Day	0.540	50	0.289	2.440	2.615
ROLDI Score Post 1 Weeks	3.459	50	.038	2.380	-5.077
ROLDI Score Post 2 Weeks	7.574	50	0	2.278	-11.615
ROLDI Score Post 3 Weeks	11.911	50	0	2.401	-20.038
ROLDI Score Post 4 Weeks	27.391	50	.0	2.30	-21.654

DISCUSSION

Clinical Findings of Experimental Group

NRS SCALE: On day 1 that is during assessment day out of 26 subjects, 22 patients were suffering from worst to severe and 4 patients were suffering from moderate level of lumbar discogenic radiculitis. (unilateral or bilateral). After 4th week i.e post treatment during follow ups patient were assessed thoroughly. 14 patients reported no pain at all, 11 patients were suffering from mild pain and only 1 patient was suffering from moderate pain.

ROLDI SCALE: During day 1 or assessment day, out of 26 patients, 18 patients were non ambulatory, 5 patients were crippled, and 3 patients were severely disabled. After 4th week i.e. post treatment during follow ups. Out of 26 patients 17 were without disability, 1 patient was suffering from severe disability, 1 more patient suffered from moderate disability and 7 patients reported with minimum disability.

Clinical Findings of Control Group NRS SCALE: On day 1 that is during assessment day out of 26 subjects, 22 patients were suffering from worst to severe and 4 patients were suffering from moderate level of lumbar discogenic radiculitis. (unilateral or bilateral). After 4th week i.e. post treatment during follow ups patient were assessed thoroughly. 11 patients reported severe pain, 10 patients were suffering from moderate pain and 5 patients was suffering from mild pain

ROLDI SCALE: During day 1 or assessment day, out of 26 patients, 14 patients were non ambulatory, 8 patients were crippled, 3 patients were severely disabled and 1 patient was moderately disabled. After 4th week i.e. post treatment during follow ups. Out of 26 patients, 1 patient was non ambulatory, 9 patients were crippled, 5 patients were severely disabled, 9 patients reported moderate level of disability and 2 patients were minimally disabled. It is very much interesting to compare clinical findings of dependent variables among control and experimental group. In both these groups exercise therapeutic plan or regime is same so it is clear that advanced programmed based electrotherapeutic interventions is more effective to give good clinical prognosis not only in NRS scale but also in ROLDI scale.

Statistical Values: Descriptive Analysis: It is done by comparing dependent variables of both the groups. Mean, Mode Median, Range and Standard Deviation is calculated using SPSS software. Score Performance of Experimental and Control Group (Mean ± SD) of NRS and ROLDI as per pretreatment that is day 1 to 4th week of follow up day is also calculated.

Inferential Statistics: It is done by using two tailed T test assuming equal variance of Experimental and Control Group for dependent variables. Among all 26 subjects mean, standard deviation and standard error of mean is calculated. Finally, F value, degree of freedom, Significance level or p value, Std error of difference and mean difference are calculated. Comparing p value in NRS variables of both the groups, p value is much less than 1% out of 100 from day 1 to 4th week of follow up. This is enough evidence to reject the null Hypothesis as variables are definitely related with each other after treating subjects with independent variables. Comparing p value in ROLDI variables of both the groups, p value is much less than 1% out of 100 from day 1 to 4th week of follow up. This is enough evidence to reject the null Hypothesis as variables are definitely related with each other after treating subjects with independent variables. During this discussion, it is very much interesting to compare statistical findings of dependent variables among control and experimental group. In both these groups exercise therapeutic plan or regime is same so it is again clear that advanced programmed based electrotherapeutic interventions is more effective to give good clinical prognosis not only in NRS scale but also in ROLDI scale. Clearly p value is very much less than 1% and it is almost equivalent to 0 levels and rejection of null hypothesis is advocated strongly.

Hahne AJ, et al., 2010 described in paper that micro discectomy is equally effective in short term and long term in patients with lumbar disc herniation radiculopathy. There was no difference among traction, laser, and ultrasound. Adverse effects were associated with traction and ibuprofen, and additional high-quality trials are required for efficacy (12).

Lulu Wang et al., 2018 concluded electrical stimulation therapy reduces the degree of pain and clinical symptoms in lumbar disc herniation-induced sciatica (13).

Chenot J.F et al., 2017 concluded in a research paper that a physician should be in charge of the treatment of nonspecific low back pain (14).

Koes BW et al., 1992 concluded that manipulation therapy and physiotherapy are better than general practitioner and placebo treatment (15).

Going through different research papers, it is found that researchers and health professional are of different views in diagnosing and treating the chronic low back pain.

This study clarifies clinical prognosis and statistical findings of dependent variables among control and experimental group. In both these groups exercise therapeutic plan or regime is same so it is evidenced that advanced programmed based electrotherapeutic interventions is more effective to give good clinical

Limitation of this study:

Only 52 subjects are studied in this study, in future large sample should be used to achieve better outcomes and statistical more sound results. In this study covariance is not considered. It should also be used in future studies. Further this study depicts age group between 25 to 34 years only. Wide range of age group should be used to demarcate results in other age groups too.

CONCLUSION

Advanced programmed based electrotherapeutic interventions and exercise therapeutic regime is better treatment approach as compared to conventional physiotherapeutic techniques and exercise therapeutic regime in treating chronic discogenic radiculitis.

Declaration by Authors

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REFERENCES

1. Gupta S, Darokhan M A, Singh O, Muzaffar J (2016). LBA as an Increasing Health Problem in India. *JK SCIENCE*; 18(3) :172-176
2. Manchikanti L. Epidemiology of Low Back Pain. *Pain Physician* 2000; 3 (2) : 167-192.
3. Bindra S, Sinha A.G.K, Benjamin A.I (2015). Epidemiology of Low Back Pain In Indian Population: A Review. *International Journal of Basic and Applied Medical Sciences;* 5 (1): 166-179
4. Sinha A P (2017). Age Specific Prevalence of Low Back Pain: A Hospital Based Cross-sectional Study. *Int. J. Life. Sci. Scienti. Res*; 3(2): 932-935
5. BD Chaurasia. Human Anatomy, Regional and Applied Dissection and Clinical, Lower Limb Abdomen and Pelvis. 6th ed. CBS Publishers & Distributors Pvt Ltd, New Delhi; 2020: Pg 186-200.
6. Bogduk N, Aprill C, Derby R (2013). Lumbar Discogenic Pain: State-of-the-Art Review. *Pain Medicine* 14 (6) : 813–836
7. Krebs E.E, Carey T.S, and Weinberger M. Accuracy of the Pain Numeric Rating Scale as a Screening Test in Primary Care. *J Gen Intern Med.* 2007 Oct; 22(10): 1453–1458. doi: 10.1007/s11606-007- 0321-2.
8. Fairbank J.C.T and Pynsent P.B. Oswestry Disability Index. *Spine Volume 25, 2000/11/15.2940- 2953 https://scholar.google.com/citations?view_op=view_citation&hl=en&user=vEnFMZ0AAAAJ & citation_for_view=vEnFMZ0AAAAJ:Y5dfb0dijaUC*
9. Mehra A, Baker D, Disney S, and Pynsent PB. Oswestry Disability Index Scoring Made Easy. *Ann R Coll Surg Engl.* 2008 Sep; 90(6): 497–499. doi: 10.1308/003588408X300984
10. O' Sullivan SB, Siegelman RP (2009). IER'S National Physical Therapy Examination Review & Study Guide. *Research & Evidence Based Practice,* International Education Resources, Illinois, pp.398-407.
11. O' Sullivan SB, Siegelman RP (2009). IER'S National Physical Therapy Examination Review & Study Guide.

Therapeutic Modalities, International Education Resources, Illinois, pp.301- 326.
12. Hahne AJ, Ford JJ, McMeeken JM (2010). Conservative management of lumbar disc herniation with associated radiculopathy: a systematic review [with consumer summary]. *Spine (Phila Pa 1976);* 35 (11): E 488-504.
13. Wang L, Fan W, Yu C, Lang M, Sun G (2018). Clinical effects of electrical stimulation therapy on lumbar disc herniation-induced sciatica and its influence on peripheral ROS level. *J Musculoskeletal and Neuronal Interact* ; 18(3): 393–398.
14. Chenot JF, Greitemann B, Kladny B, Petzke F, Pfingsten M, Schorr S G (2017).Non-Specific Low Back Pain. *Dtsch Arztebl Int* ; 114(51-52): 883–890.
15. Koes B W, Bouter L M, Mameren H V, Essers A H M, Verstegen G M J R, Hofhuizen D M, Houben J P and Knipschild P G (1992) . *BMJ: British Medical Journal;* 304 (6827): 601-605.
16. Jain, P., Saharan, A K., Vishnoi, C S., Bhati, MPS., Sharma, P. Single IASTM and cupping therapy session improves pain and disability in patients with non-specific low back pain. GSC Advanced Research and Reviews; 2022, 11(3): 45-50.
17. Pallewar, M., Kumar Saharan, A., & Gouru, V. (2021). The Effect Of Neural Mobilization With Cervical Traction In Cervical Radiculopathy Patients. International Journal of Development Research, 11(4), 45913–45917. https://doi.org/10.37118/ijdr.21497.04.2021
18. Sriram Nelakurthy, Manisha Saharan et.al. A Comparative Study to Evaluate the Effectiveness of Mulligan's BLR Versus Traction SLR Technique in Non-Specific Low Back Pain. Journal of Shanghai Jiaotong University. September 2020, Volume 16.
19. Nelakurthy, S., Saharan, M., Kushmal, P., & Saharan, A. K. (2020). A comparative study to evaluate the effectiveness of conventional therapy alone and combined with neural 62 mobilization in patients with cervicobrachial pain. Pramana Research Journal, 10(3), 116-127. Retrieved 4 2020.
20. G. Nagasumanth, Ajeet Kumar Saharan, Balal Murali Rashmi et.al. InterRater reliability of pain provocation tests for sacroiliac joint dysfunction with low back ache in Indian population. Int J Health Sci Res. 2023; 13(7):307-312. DOI: https://doi.org/10.52403/ijhsr.20230742.

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