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RESEARCH ARTICLE

ELECTROTHERAPY VERSUS EXERCISES IN LOWBACK PAIN REHABILITATION - AN EVIDENCE BASED STUDY

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ABSTRACT

Introduction: Demineralization of musculoskeletal system are much evidenced post hysterectomy and oophorectomy. Low back pain remains the common cause of disability restricting physical functioning.

Aims and Objectives of this original case study was to a) compare electrotherapy modalities and exercise therapy means on Oswestry subjective functional low back pain scale.

Materials and Methodology: This research study subject was treated from 2014 till December 2016 with frequent IFT and electronic pelvic traction else where, from January 2017 till March 2017 was treated by the author only with hot pac and specific exercises using inflatable Physioball. The results of electrotherapy treatment and outcome of specific exercises during 10 sessions and 20 sessions were recorded on Oswestry subjective rating scale.

Results: In 10 sessions of exercises $p < .05$ and 20 sessions $P < .001$ the subject has adequately improved as evidenced statistically and with functional means.

Conclusion: As major findings of this research spinal rehabilitation with specific exercises to be used once the subject is clinically fit to perform, and not to rely only on pain and symptom reducing electrotherapy modalities, as this will save time, confidence of the subject and goes well with evidenced physiotherapy.

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INTRODUCTION

Lowback pain is a common, costly medical condition and a major cause of pain, disability and social cost (Cassidy *et al.*, 1998). Lowback pain a leading disability contributor (Lim *et al.*, 2010) and cause reduction in the QOL (Gatchet *et al.*, 2007). An increase in lowback ache with prevalence, costs, investigations, treatments and disability (Deyo 2009) with US health care system spending on lumbar discectomy \$300 million annually (Schoenfield and Weiner 2010). Chronic lowback pain patient who don't have severe neurological deficits can be treated with exercises, education and self care (Weinstein *et al.*, 2006). Core exercises consists of the strengthening of abdominal, hip and back muscles including deep muscles along spine these muscles work with legs and arms to move body in different directions while maintain control of position and movement (Braddam 2007). Hayden *et al.*, 2005 have recorded that exercise therapy as an effective treatment to reduce self reported pain and improve the lowback pain specific functional status of participants with chronic lowback pain. Given the frequency of the problem, the variation in its evaluation and treatment and its generally good prognosis, improving the efficient care for patients with lowback pain is more needed (Bigos *et al.*, 1994)

Aims and Objectives of this original research was

- To analyse the impact of core strengthening exercises and to evaluate irradiation technique of PNF
- To study quality of life with exercises in a time frame of 10 and 20 sessions using Oswestry lowback pain index

MATERIALS AND METHODOLOGY

Background Information

Past History

Having undergone oophorectomy in 2008 and hysterectomy in 2010 this 52 year female subject has developed multiple degenerative of spine since 2014 as evidenced by NMRI with lesion in C3, C4, C5, L4, L5 lab reports of vitamin D shows 14.6 ng/ml. Wearing a Lumbosacral belt she was walking in her house for short distance with antalgic gait, previous treatments since 2014 includes frequent usages of NSAID, interferential therapy, intermittent electronic traction the subject is treated by the author, from January 2017 till today. Presently she is treated with T. Neurogaba, T. Tayo and T. Multivitamins, twice a week physiotherapy with physical exercises and hot pack applications

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Pain

Able to sit for few minutes with lumbar sacral support, stand and walk for few steps. Pain at rest and diffuse in the neck and lumbar spine with occasional posterior radiating of pain down the legs.

Provisional Diagnosis: Musculoskel *et al.*, degeneration of the spine following oophorectomy and hysterectomy, C3, C4 disc degeneration L5, L5 disc degeneration

Procedure: This original experimental case study, which was conducted during the period from January 2017 to March 2017. After obtaining her consent, she was treated with non pharmacological means of specific exercises to neck and lumbar spine, and Oswestry scale was used as tools to measure outcome of the study.

Treatment given to the subject were

- Core exercises to lumbar, pelvic girdle muscles
- Irradiation technique of PNF
- Physioball was used for core strengthening and closed kinematic chain exercises. A set of 15 exercises were used. Each exercises were repeated for 5-6 times which was increased gradually. Pain, heart rate, physical signs were kept as yard stick for each session duration, on an average she could perform 15-20 minutes with exercises, later sessions with 30 minutes duration.
- Set of exercises she was taught for home programme

RESULTS

Clinical Prognosis of the Subject

After 4 sessions of exercises, her duration level of exercising has increased and musculoskel *et al.*, system started responding. Hot pack application was used prior and after exercises. After 7 sessions of therapy she was able to perform house hold activities, increased level of walking and able to sit with LS belt for 30 minutes comfortably. Her self confidence has improved as she was suffering from nearly 3 years with lowback pain.

C/O

Pain in neck, lowback with fatigue and difficulty in sitting, walking and ADL

BMI – 25 kg/m²

Table 1. On Subjects motor power, ROM and deformities on evaluation prior to therapy

	Motor Power	ROM	Deformities
Hip	3+/5	Inner ranges of hip flexion extension and abduction mild restriction and painful	Hip flexor tightness
Knee	3+/5 Bilateral Vastus medialis lag	End ranges of flexion painful and restricted	Bilateral Hamstring Tightness
Ankle & Felt	3+/5	NAD	NAD
Upper Extremities	4/5	Full and free	-
Spine	Cervical, Spine lumbar	Cervical and lumbar movements painful and restricted	Exagrated lumbar lordosis and obliterated cervical lordosis.

ADL: Self care activities partially dependent

By 9th session, she was adviced to start walking for 10 minutes and a set of home programme was started prior to beginning, after 10 sessions were completed and after 20 sessions Oswestry lowback pain scoring were obtained and analyzed with statistical means as below. Pre and post, Oswestry lowback scale were recorded and analyzed

DISCUSSION

- Core strengthening among 48 subjects between 55-70 years thrice a week have recorded greater improvement in functional mobility (Majida *et al.*, 2015)
- A meta analysis have recorded that core exercises increase strength by 30%, balance and functional performance by 23% (Granacher *et al.*, 2013)
- Gatti *et al.*, 2011 have recorded that core muscle training can reduce disability among lowback pain subject
- Arya *et al.*, 2014 in a 10 year follow up having compared 280 lowback pain subjects treated surgically and conservatively found no appreciable differences in outcome.
- Another Indian based case study where conservatively treated subject with L4, L5 disc lesion sessions of recorded significant functional means (Subramanian 2017) when compared with similar condition treated with lumbar Microdiscectomy of L4 and L5 with residual great toe 2/5 (Subramanian 2017)
- Vern Gambelta 2002 and Matuscello 2013 in their systematic review have reported Physioball exercises were superior to traditional core exercises, and core strengthening forms the strong basis of human movement, prevents injury, improve posture balance and peripheral mobility. Hence in line with these studies, this research subject treated with Physioball based core exercise has an improved functions in 10 sessions and reached near normal functional status in 20 sessions as recorded with statistical evidence reported an table 2 is evident.

Uniqueness of this case study: was near total rehabilitation of the subjects to pre oophorectomy level including her spiritual activities, social, ADL, travelling, cooking etc, above all floor level activities with forward bending, lying on floor were added after due strengthening of core muscles, which normally, an ignored component of spine rehabilitation as also it adheres with Indian culture. As this subject having faith in Hinduism, was able to bend forward offer prayers on floor and pray from face down lying posture, as spiritual faith related

physical activities brings more confidence enabling the subjects recovery. Also 3 months of specific therapeutic exercise means were found to give reasonable results compared within 3 years of symptomatic electrotherapy modalities.

Table 2. of results of the subjects before increased treatment with Oswestry scale treatment after 10 sessions and 20 sessions using paired student 't' test

Duration	Test	Oswestry Lowback Score	SD	SE	t	p
0 sessions	Pre	67	17.89	10.33	3	<.05 X
10 Sessions	Post	36				
20 Sessions	Post	20	27	15.66	3.8	<.001 XX

X- Significant Statistically

XX – Highly Statistically Significant

Table 3. Electrotherapy Versus Exercise Therapy with Evidence on Lowback Ache Treatment Pro and Against With Evidenced Studies

Studies with evidence in favour of electrotherapy modalities in lowback ache	Other Modalities, Medicine	With Evidence Studies in favour of Exercises in Lowback Ache	Studies with no evidence for exercises
Heat application with low quality evidence in first 7-14 days (French etal 2003)	Moderate quality evidence with bed rest is less effective in reducing pain and improving function at 3-12 weeks than to stay active (Hagen etal 2004)	<ul style="list-style-type: none"> Moderate quality evidence post treatment exercises can prevent recurrence of back pain (Choi etal 2010) Moderate rate evidence are effective with spinal manipulation multidisciplinary treatment for sub acute pain relief (Van Tucker and Koes 2000) Resistance and flexibility exercises twice a week improves QOL strong evidence (Blair etal 2001) Mckenzie method with evidence have shown effective in lowback ache treatment (Machado etal 2010) Hidalgo etal 2014 in a systematic review evidence for spiral stabilization at a short term follow up Low level evidence for conservative treatment of sciatica (Valet etal 2010) but patient preference seems to an important factor in the clinical management (van Tulder etal 2010) 	Strong evidence shows bed rest and specific back exercises are not effective (Van Tucker and Joes 2000)
Studies with no evidence with electrotherapy There is no evidence for bed rest, tractions, manipulations, hot packs, muscle relaxant opioids (Luister Berg etal 2007)	NSAID and muscle relaxants show strong evidence (Vantucker and Koes 2000) but with side effects No evidence for effectiveness of lumbar support, Massage, Acupuncture in sub acute lowback ache (Van Tucker & Koes 2000) Acute or chronic back pain massage, lumbar support, traction have no quality evidence (Walker etal 2011) Despite weak evidence for chronic lowback pain promoting and self management programmes represent best way forward (May et al 2010)		

Critical Analysis

Failure to respond with electrotherapy modalities alone prior to this study, subjects daily functioning and level of confidence gets reduced over period of time ending up in surgical intervention quite often. This clinical information, physiotherapists should be ready to deploy various spinal rehabilitation techniques such as Mckenzie's protocol, stabilization, exercises, PNF, core strengthening exercises along with electrotherapy pain relieving means when ever possible.

Limitations of this Study

Being single study subject was treated, further larger sample size and longer duration, other techniques in spinal rehabilitation as variable can be compared with could be carried out.

Strength of this Original Research

Was in three months period with 20 sessions of conservative specific core exercises and PNF, the subject has shown good results as her physical functions have become near normal, where as for the last 3 years she was intermittently treated for symptomatic relief with electrotherapy modalities, elsewhere hence selection of specific exercise modality should be given priority wherever possible clinically, was the strength of this research was this subject was only treated with specific exercises and hot pac application.

Conclusion

The major outcome of this original research findings points at therapy for problem specific, functional oriented and not symptom relief be chosen, hence whenever possible therapeutic modality selected should be patient centric with shorter time frame of rehabilitation, hence functional restoration should be the goal of treatment. Spinal rehabilitation with exercises as a major tool was the key scientific information recorded in this study and physiotherapists should not only look for pain symptom, relieving modalities with electrotherapy means alone

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