Electrotherapy Versus Pelvic Tilt Related Exercises Therapy– An Evidence based Cross over Study in Multiple Lumbar Disc Degeneration

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Abstract:
Physiotherapy with patient evaluation and biomechanical based therapy needs more to be focused among subjects with lowback ache. This original cross over study aims to evaluate the efficacy of conventional treatment versus of specific exercises among a lowback ache subject with anteriorly tilted pelvis. This original research was done in Chennai, India between July 2018 – August 2018. The subjects was treated elsewhere with IFT and electronic IPT for ten sessions, subsequently he was treated by the author with ten sessions of specific exercises to stretch and strengthen muscles associated with anterior pelvic tilt were done, each session lasts for 25-30 minutes. Results Using oswestry scale was used prior and after 10 sessions with conventional treatment (P<.1) and after 10 sessions of specific exercises which has shown P<.05 with exercises alone. ***Conclusion:*** *Physiotherapy with patient specific problems and addressing biomechanical causes are more effective and it's a mean of treating subjects actual problem rather than symptoms based electrotherapeutic means as evidenced in this study.*
Keywords: *QOL –Quality of Life, IFT – Interferential Therapy, Oswestry Scale, NMRI – Nuclear Magnetic Resource Imaging, CLBP – Chronic Lowback Ache, IPT – Intermittent Pelvic Traction*

Introduction:

- Chronic lowback pain is complex and causes of several such are unknown (Lee etal 2014) one of the major cause involves weakening of the shallow trunk and abdominal muscles (Chang etal 2013). While strengthening of these muscles improves mobility and mitigate CLBP (Lee etal 2014). Another cause of CLBP is the insufficient control of deep trunk muscles (Multifedus and TA) (Roozenberg etal 2008) as with physical activities, trunk muscle tissues ensure of mobility and stability of lumbo pelvic region, which are observed with changes in patients with lowback ache (Kumar etal 2011). Core strength training is directed at training the deep trunk muscles (Schilling etal 2013)
- Chronic lowback pain is a significant issue resulting in costs, lost productivity and morbidity (Driessen etal 2010). Therefore even small improvements in treatment efficacy can have a meaningful impact on improving lowback pain (Martell etal 2007). Core strengthening is more easier to learn although challenging (Gatti etal 2011) and can be used as have based exercise programme as compared with typical exercise training which can cause injuries among CLBP patients (Akbari etal 2008)

Pelvic Tilt Based Exercises:

- Anterior pelvic tilt where excessive lumbar lordosis of the spine (Gajdosik & Lusim etal 1983) can be due to weak anterior abdominal muscles, tight hip flexors tight lowback musculature and weak hip extensor muscles (Kendal etal 2005). Posterior pelvic tilt where rounding or slouching of the lumbar region of the spine (Alviso etal 1988)

When the pelvis is aligned in the neutral position weight is distributed and balanced evenly up on the vertebras and discs of the spine, as a result injury is less likely to happen (Grossman etal 1982) if the pelvis is titled forwards or backwards, the spine is placed in a mechanically disadvantaged position, then subjects are likely to experience back pain due to excessive pressure and muscle imbalances that occur with pelvic abnormalities (Arrason etal 2004)

Aims & Objectives of this original research was to compare and analyse the impact of electrotherapy versus pelvic tilt based exercise therapy on a subject with chronic lumbar degeneration

Background Information:

38 year old Male, subject's occupation involves lifting of heavy objects daily with repeated movements and he developed lowback ache NMRI of lumbar spine on June 2018 revealed L2, L3, L4, L5 disc degenerative changes

C/O

- Ambulant unaided, forward bending, chronic lowback ache with prolonged period of sitting increases pain and difficulty in ADL.

O/e

- Obliterated lumbar lordosis
- SLR left > right, with bilateral hamstring tightness
- Bilateral hip flexor tightness was recorded

Materials & Methodology:

Phase I

Materials:

Tools used to measure study outcome with Oswestry disability of 10 items on a 6 point scale was used twice, on first July 2018 and again on 15th July 2018. During this period the subject was treated with 15 minutes of IFT and 15 minutes of IPT for 10 sessions with moderate symptomatic relief.

Phase II

1. Hamstring strengthening were done in side, standing position
2. Isometric abdominal and strengthening of core muscles manually and using physioball

- Hip abductors and extensors were 3/5
- Peripheral joints of both upper extremities nil abnormal findings
- No known systemic illness

3. Side lying hip abductors isometric concentric and eccentric contractions were done using physioball
4. Strengthening of quadriceps in supine, prone, quadripend and high sitting postures.
5. Strengthening of hip extensors in prone knealing with physioball support

This study subject was treated with specific exercises using physioball and manual strengthening of soft tissues during the period from 23rd July 2018. 3rd August 2018 with a frequency of weekly thrice.

Each exercises were gradually progressed with number of repetition, holding period and postures where gravity can be influenced. Each session lasted for 20-25 minutes, with a weekly thrice frequency. The subjects Oswestry disability scale was evaluated once prior to the study and after 10 sessions of physiotherapy with specific exercises alone.

Results:

The results were tabulated, analyzed and using paired 't' test displayed as below:

Pre and post oswestry scores of phase I and phase II were statistically evaluated

Table: 1

Paired 't' test results of phase I

	Mean	SD	SE	t	p
Pre	58	-	-	-	-
Post	50	7.81	4.50	1.69	<.10

Note: P<.1 statistically in Significant

Table: 2

Paired 't' test results of phase II

	Mean	SD	SE	t	p
Pre	50	-	-	-	-
Post	22	27	15.59	3	<.05

Note: P<.05 statistically in Significant

Major Findings of this Study

1. Patient problem specific exercises are effective in chronic lowback ache
2. Biomechanic based exercise therapy are effective in treating the cause and not the symptoms
3. Electrotherapy can address subjects symptoms only and lacks evidence
4. This new approach based on rehabilitation of pelvic tilt by exercise therapy is discussed with evidence

However larger sample size long duration follow up with RCTS and other measurable variables such as EMG, NMRI can further validate findings of this study

Discussion:

1. Efficacy of exercises related to pelvic tilt in lowback ache

Myriad treatment were described for chronic lowback ache, but quality RCTS for treatment efficacy is limited (Kamper etal 2010)
A recent evidence based review revealed only 47 to 148 RCTS have quality treatment interventions for chronic lowback ache (Hegmann etal 2008)
Chronic lowback ache is associated with significant co-morbidity and direct health care cost due to increased health care utilization (Gore etal 2012)
Anterior pelvic tilt exercises for lowback pain with flat back in lying, sitting, quadriceps and standing positions (Sharmann etal 2006 & Neumann etal 2013)
Yoo etal 2013 have recorded lowering of lowback pain and increased lumbar range of motion among a subject with flat back syndrome using resisted exercises for erector spine, iliopsoas and rectus femoris
Pelvic tilting exercises increase or decrease the degree of lumbar lordosis, at lease for the duration of the exercise (Levine etal 1996) and are designed to strengthen or increase the flexibility of the muscles needed to compensate for increased abdominal mass and thereby maintaining normal posture (Levean etal 1984 & Lee etal 2014)

Kuszewski and Gnant etal 2018 have revealed negative correlation with hamstrings extensity and pelvic inclination

This study subject with CLBP has shown positive prognosis clinically functionally and statistically as evidenced with exercise alone as treatment among subjects with low back ache as shown in results of Phase II

2. Efficacy of exercises alone in chronic LBA

I. In lowback pain rehabilitation, patient centered exercises as therapy are more effective than symptom based electrotherapy modalities as evidenced (Subramanian etal 2017)
II. Multi model therapy with pilates PNF and physiotherapy exercises in a female subject post micro discectomy of L4, L5 has shown clinical and functional improvement in 21 sessions ((Subramanian etal 2017)
III. Pilates and physiotherapy in 5 sessions on a female with lowback ache and sciatica has recorded an improved functional activities (Subramanian etal 2017)
IV. Core strengthening along with PNF were shown to be effective in subject with lumbar spine degeneration in 10 sessions with a decrease in obesity and physical functioning (Subramanian etal 2017)
V. Core muscle strengthening among a geriatric subject with sciatica has an improved quality of life in 16 sessions (Subramanian etal 2017)

As supported by the above studies exercises based on patients problem were more effective, a major outcome of this study

3. Electrotherapy Modalities in lowback ache

- TENS and wave among chronic lowback ache for 12 week period by (Mathew Thies etal 2013), a double blinded RCT, with moderate evidence
- Few moderate and low quality trials have demonstrated evidence of TENS among chronic lowback ache (Furlan etal 2011)
- Also insufficient quality evidence for or against the use of high voltage galvanic therapy, TENS, IFT, electrical muscle stimulation, ultrasound and thermotherapy (Poitras etal 2008). With weak evidence for rehabilitation of chronic lowback ache subjects, this research findings are similar with lesser clinical and functional improvement with electrotherapy on this study subject with chronic LBA as shown in results of phase I.

Critical Analysis of this Research:

1. This research report only discuss on pelvic tilt on a lowback ache subject
2. Qualitative means of outcome such as NMRI, EMG were not used for efficacy of study outcome
3. Study was of shorter duration of few months
4. Long term follow up with subjects ability with work was not analysed
5. Variables such as BMI, Waist Circumference, individual muscles joints around hip, lumbar spine were not evaluated

Conclusion:

Rehabilitation of a subject using the best physiotherapy practice with evidence and individual patient based therapeutic approach is economical and time conserving. The outcome of this study findings can be further strengthened with RCTS of larger sample size and longer duration.

Limitations of this research were being a case control study, shorter duration and only subjective evaluation was used to measure study outcome.

The author declares no conflicts of interest

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