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## Pilates Exercises on Obesity and Lumbar Disc Lesion on a Geriatric Subject – Evidence Based Study

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### Abstract

Lowback pain is a common clinical entity and such condition among geriatric subjects decreases the quality of life, increases dependency, hence proper rehabilitation with conservative means are needed. Aims & Objectives of this original case presentation was a) to analyse the impact of obesity on lumbar disc lesion with exercises b) to evaluate the efficacy of Pilate's exercises on lowback related functions. Materials & Methodology: Geriatric women with acute disc lesion of L4- L5 and L5- S1 was treated between July 2017 to Sep 2017 with 15 physiotherapy sessions using specific Pilates exercises with weekly twice frequency. Pre and post BMI, WC and Oswestry lowback pain functional scale were statistically analysed with results of  $P < .05$  Conclusion: A reduction in obesity and an increased functional activities with non-pharmacologic conservative means of only exercises and superficial heat modalities disc lesion can be rehabilitated to the maximum should be validated and can be extended to similar subjects.

**Keywords:** Stabilisation Exercises, Aerobic Exercises, manual Therapy, Obesity, Sciatica, Core Exercisesg

### Introduction

Lowback pain is neither a disease nor a diagnostic entity of any sort and is a common problem which affects the majority of adults at least once in a life time (Ehrlich 2003). Lowback pain was defined as pain and discomfort, localised below the costal margin and above the gluteal folds, with or without leg pain (Sciatica) (Oonokhodian et al 2002). Management of lowback pain is costly, accounting for a large and increasing proportion of health care expenditures without evidence of corresponding improvements in outcome (Martin et al 2008). Bar et al 2002 have recorded that lumbar stabilization where multifidi and transverse abdominous muscles more major stabilizers of spine. Lowback pain is a costly quality of life related health problem with complex multivariate problem that has been known to be resistant to simple solutions (Selkowitz 2006). Back pain is a major health issue (Gorden 2016) and is associated with increasing medical expenditure, work absence (Ricci et al 2005) and is the most common musculoskeletal condition (Huang et al 2008). Physical activity to increase aerobic capacity and muscular strength, especially of the lumbar extensor muscles is important for patients with chronic lowback pain (CLBP) in assisting them to complete activities of daily living (Smeets et al 2009). A variety of different types of exercises have been explored to treat CLBP including low to moderate intensity aerobic exercise (Chan et al 2011) high intensity aerobic exercise (Chatzitheodoran et al 2007) core stabilisation

(Kim et al 2013) and muscular strength exercises (You et al 2014) and flexibility exercises (Gladwell et al 2006). With different exercises have been found to result in varying levels of effectiveness in reducing lower back pain (Smith et al 2011) and suggesting that physical activities as an intervention for lowback pain is complex. Thus this original case presentation where the objective was to analyse impact of graded Pilates and physiotherapy exercises on this subject with lumbar disc lesion in improving her quality of life.

Van Tulder et al 2009 have suggested spinal manipulation for patients who are failing to return to normal activities. Li and Bambardier 2001 & Gracey et al 2002 have found rest,

using lumbar corsets, heat therapy, cold therapy, spinal manipulation and electro analgesia as therapy for low back pain. Franca et al 2010 reported superiority of segmental stabilization over strengthening exercises in combating muscle deactivation subsequent to episode of low back pain, as this prevents recurrence of lowback pain.

**Aims & Objective** of this case study was to analyse the impact of Pilates / core strengthening exercises on obesity and lumbar disc lesion

**Background Information**

Mrs. XXXX, aged 63, a known type II diabetic, hypertension and BMI of 37 kg/m<sup>2</sup> and WC of 105 cm

**C/O**

Lowback ache since 6 months restricting her daily activities NMRI has revealed diffuse disc bulge at L3-L4 and L5- S1 level with bilateral neural foraminal narrowing.

**O/E**

Obliterated lumbar lordosis, bilateral hamstring tightness left > right, tenderness over lumbo sacral and radicular symptoms increasing on sitting down the left lower

extremity. Pain increasing on sitting and while exerting for her daily physical routine activities ambulant unaided with antalgic gait was treated by physician with due medication for diabetic mellitus and hypertension.

She was complaining of severe cramps with mild exertion physically especially over left leg.

**Materials & Methodology**

This subject with disc lesion with radicular symptoms was treated during the period from 18.07.2017 to 15.09.2017 at Chennai with weekly twice frequency using non-pharmacological means of therapy. Specific core strengthening exercises were used for 25-30 minutes of exercises each session. Oswestry lowback pain subjective rating scale was used to evaluate before and after completion of study to analyse the efficacy of the treatment was recorded. The data were analysed using statistical methods.

**Procedure**

Electric heating pad was used by the subject, three four times daily in the beginning, which at the end of the study were stopped and she was advised to use only when required.

| Exercises Adopted  | Prognosis   |
|--|---|
| <b>1-5 sessions</b><br>I. Isometric abdominal constructions in crook lying<br>II. Pelvic bridging<br>III. Side lying hip and knee movements<br>IV. Prone spinal extension with fore arm resting position   | I. Pain over lumbar region has started decreasing<br>II. But radicular symptoms persists<br>III. Able to sit with lumbo sacral support for 10-15 minutes<br>IV. Home programme along with heating pad started   |
| <b>6-10 sessions</b><br>I. Core strengthening exercises using physioball was started in supine, side and prone positions with gradual increase in repetition   | I. Level of confidence has increased<br>II. Pain along with radicular symptoms has decreased<br>III. Advised to start walking for 10-15 minutes with LSS support  |
| <b>11-15 sessions</b><br>I. Subject was treated with above exercises on the floor with more intense means by increasing the leverage number of repetitions and longer holding (Isometric) periods<br>II. Prone kneeling and standing exercises using Physioball<br>III. Spiritual floor level activities were encouraged | I. Floor level daily activities which the subject was habituated was encouraged through physical exercises including regular walking up to 20-30 minutes<br>II. Started regular daily routines<br>III. She was able to prostrate and pray as she was a Hindu, hence spiritual part of rehabilitation was emphasised |

She was advised to continue home programme with a set of exercises, use heating pad when required and report to the author once in 15 days for review and monitoring Table of results of the subjects pre and post oswestry score, BMI and WC using student paired ‘t’ test

| Parameter | SD   | SE    | T    | p    |
|-----------|------|-------|------|------|
| Oswestry  | 25   | 14.43 | 3.12 | <.05 |
| BMI       | 2.31 | 1.33  | 3.01 | <.05 |
| WC        | 4.04 | 2.33  | 3.05 | <.05 |

**Discussion**

With inference from the evaluation, methodology and statistical results the following scientific questions needs to answer with evidence:

- a. Can lumbar lesion be treated conservatively?
- b. Geriatric patient reduction of obesity possible and does reduction of obesity influences spine rehabilitation?
- c. Superficial heat modalities core strengthening exercise how effective and quality of life lowback pain among geriatric subjects does it improve with core / Pilates/ resisted form of exercises and time frame for rehabilitation?

- a. Back pain is defined as chronic when the pain remains for longer than three months (Well et al 2014) and CBLP can have a debilitating effect on patients’ lives, resulting in disability and reducing their ability to carry out activities of daily living (Smith et al 2007). Hamstring muscle shortening reduces the hip flexion range of motion which impacts upon the lumbopelvic movement (Li et al 1996) and a decrease in the flexibility of the hip flexor and back extensor muscles can lead to lumbar lordosis, which can result in lowback pain (Nourbakhsh et al 2006). Also improving the flexibility of the lumbar spine and hamstrings can significantly reduce CLB pain by 18-85% (Mikkelsen et al 2006) and an improved lumbar spine range of motion, with reduced back pain and activities were recorded. 6 week Pilates programme on 34 lowback subjects 53% improved flexibility of lumbar spine, decrease in lowback pain (Glad Well et al 2006). Hayden 2005 in a systematic review on lowback pain that exercises are effective in reducing pain, supported by Liddle 2007. Hides et al 2001 have recorded that stabilization exercise prevented recurrence of the

lowback pain and biomechanical research may explain why it is important to focus on particular muscles for their stabilization functions in rehabilitation

- b. RCT among 60 patients with nonspecific lowback pain with Pilate's methods have an improved pain, function and quality of life in a 6 month period (Natour et al 2015). Pilates training resulted in increased abdominal strength, endurance and trunk flexibility (Sekendiz et al 2007) increased endurance in the trunk extensor and flexor (Moffroid et al 1993) improved dynamic balance (Johnson et al 2007). Also among geriatric subjects Pilates was effective in improving static and dynamic balance (Hyun et al 2014) and improving functions and strength in the lower extremities (Bird & Hill 2012). Pilates knowing exhibits positive effects such as core strength and flexibility in the elderly (Roogers et al 2009) muscle endurance (Emery et al 2010) improve autonomy and quality of life (Siqueira Redrigues et al 2010) and even improve QOL that had decreased due to chronic disorders over a long period (Carod et al 2000)
- c. Reduction BMI by 1.54 kg/ m<sup>2</sup> with resisted exercises has improved hba<sup>1</sup>cby .6% (Subramanian et al 2014), as this subject benefit with lowering of BMI and we benefit for an improved glycemic control possible reduction in obesity could be due to an improved muscle quality, decreased inflammation, increased adiponectin level (Brooks et al 2007) and an increased muscle mass an body composition (Dunstan et al 2002) Forsythe et al 2008 in a meta-analysis with 66 weight loss intervention studies found decreased inflammatory markers which have been associated with impaired physical function. Resistance training has been shown to be increasing skeletal muscle mass and strength in elderly subjects and improved health outcomes (Mangione et al 2010). An improved Oswestry score an a geriatric subject with core exercises was recorded lumbar degenerative condition (Subramanina et al 2017) with similar to this study findings where lumbar disc lesion has improved using Pilates based exercises.

#### Critical Analysis of this study Findings:

1. Does disc lesion resolves with exercises?
2. Reduction of obesity had an impact on disc lesion directly?
3. How much strength the core muscles, ligaments can gain in two months duration with physiotherapy?
4. Can the outcome of this study be extended to all lumbar disc lesions?
5. If this conservative, non-pharmacological means of therapy is effective then where does the need for other electrotherapy modalities or surgical innervations such as lumbar disectomy arises?

#### Conclusion

Rehabilitation of this study subject using specific core strengthening exercises have shown an improved quality of life along with reduction in obesity findings of this study could be extended with larger sample size with similar lumbar disc lesion of both sex using other means of measurable parameters including NMRI and long term follow up further validates and more scientifically established.

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