

# The use of Mechanical and Manual lumbar Traction in the Management of Prolapsed Inter-vertebral Disc (PIVD). A Survey of Physical Therapists in Pakistan

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## ABSTRACT

**Objective:** To evaluate the use of mechanical and manual traction in the management of lumbar spine prolapsed inter-vertebral disc and its time and cost effectiveness.

**Study Design:** Observational / Analytical study

**Place and duration of study:** Alain physiotherapy clinic Karachi and musculoskeletal outpatient Physiotherapy departments (public sector and non public sectors) across Karachi, Lahore, Rawalpindi and Peshawar between October 2012 and January 2013.

**Materials and Methods:** Participants were selected from Alain physiotherapy clinic Karachi and various physiotherapy departments who offer musculoskeletal assessment and treatment services across Pakistan. Information were gathered on the use of mechanical and manual traction with their effectiveness and its cost and time effectiveness. Descriptive data analysis of information on the use of mechanical and manual traction was done with its time and cost effectiveness in clinical practice.

**Results:** The overall response rate of 82% in which 79% use mechanical and manual lumbar traction in Patients with prolapsed inter vertebral disc and nerve root symptoms. The effectiveness of traction was reported by 98% of physical therapists. Time effectiveness was reported by 78% and overall the physical therapists reported that both mechanical and manual tractions were cost effective treatments.

**Conclusions:** Study results show that traction continued to be used in prolapsed inter-vertebral disc of the lumbar spine. The results also clarify the clinical, time and cost effectiveness of the traction treatment.

**Key Words:** Low back pain; Physical therapy techniques; traction, prolapsed inter-vertebral disc.

## INTRODUCTION

Back pain is a very common problem which has serious impact on people working capacity and life style. There are many causes of back pain amongst which lumbar spine vertebral disc bulge is very common. In disc bulge annulus fibrosis becomes weakened and nuclear fluid bulges into the annulus postero-laterally or laterally. This causes a split between annulus fibrosis and nucleus palposus squeezing into vertebral canal commonly known as Prolapsed inter-vertebral disc (PIVD).<sup>1,2</sup> The causes of this bulge are herniation of inter-vertebral disc, degeneration of the disc, obesity, sudden jerk, sprain, trauma to spine and heavy weight lifting. The nucleus can extrude out in three directions i.e. centrally, postero-laterally and upward into the vertebral body. The posterior longitudinal ligament is narrowest over L4-5 and L5-S1 level in the central backward direction which is the most common site of PIVD. Pain is the primary symptom of PIVD which can radiate to the lower back, buttocks, thighs and anal/genital regions. Pain may also radiate into the foot and can be dull, poorly defined or sharp shooting pain.<sup>3,4,5</sup> The femoral and sciatic nerves are mostly affected,

causing thigh pain, numbness and symptoms of sciatica in one or both legs<sup>5</sup>. Due to compression of nerve roots muscular weakness, abnormal tendon reflexes leading to postural changes, scoliosis, antalgic gait and limited spinal movement especially flexion in later stages.<sup>6,7</sup> Physical Therapists use variety of conservative treatment methods in the management of PIVD. These include patient education on proper body mechanics, mobilization and manipulation of lumbar spine, electrotherapy modalities, traction (mechanical or manual). Other treatments applied are lumbosacral supports and the medications example Non-steroidal anti-inflammatory drugs (NSAIDs), steroids and Epidural injection and life style changes like weight control, tobacco cessation etc.<sup>8,9</sup>

In severe nerve compression and disc bulges surgical interventions such as laminectomy and discectomy could be applied for immediate relive of pressure on nerves.<sup>10</sup>

Amongst all these interventions lumbar traction is a commonly used treatment applied by Physical Therapists in clinical practice. Several studies have reported favorable results using traction to treat herniated disc and radiculopathy in lumbar spine. In

most of these studies traction was applied in combination with an extension-oriented treatment approach in patients with nerve root compression.<sup>11,12,13</sup> When the aim is to separate vertebrae for the therapeutic purpose, a relatively high force (40-50% of the body weight) and low treatment time (8-12 minutes) are recommended.<sup>14,15</sup> In contrast the literature does not support the continued use of mechanical and manual traction in the treatment of PIVD.<sup>16,17</sup> Despite little evidence, still many studies have revealed its continuous use with back pain patients: United Kingdom and Republic of Ireland 7%,<sup>18</sup> Northern Ireland 13.7,<sup>19</sup> Netherlands 7%<sup>20</sup>, United States 21%,<sup>21</sup> and in Canada up to 30%.<sup>22</sup> Other studies have concluded that methodologic quality of trials on the use of traction is poor.<sup>23,24</sup> therefore, clinical guidelines for traction has not been produced<sup>25</sup>. The literature did not recommended mode of traction (mechanical and manual) and other important clinical parameters. There is a gap in the area to guide type of traction, it is necessary to explore which traction method (mechanical or manual) has been used in clinical practice. This descriptive cross sectional survey of physical therapists in Pakistan was conducted to look at the use of traction modality in the treatment of PIVD. This study explored the type of traction (mechanical or manual) used by physical therapists.(2) Experience of use of manual and mechanical traction and (3) The effects of manual and mechanical traction.

**MATERIALS AND METHODS**

**Survey Design:** The study design was a cross-sectional (self-reported) postal questionnaire survey of qualified Physical herapists in various cities of Pakistan including Karachi, Lahore, Rawalpindi and Peshawar.

**Sampling Frame:** A random selection of physiotherapy departments who offer musculoskeletal physiotherapy assessment and treatment services (40 departments) in Pakistan were identified. The managers and head of departments were contacted for consent to conduct this survey in their departments and provision of qualified physiotherapists list. Sample (N = 153) physiotherapists working in musculoskeletal physiotherapy were identified. The study was done between October 2012 and January 2013.

**Questionnaire Design:** The contents of the questionnaire were discussed with expert manual physiotherapists and were based on lumbar traction literature. Before the distribution of questionnaire feedback of 3 physical therapists specialized in manual therapy was collected, questions were modified according to feedback. The modified version of questionnaire consists of 5 closed questions, with a comment section for each question and seeking information about experience of using traction techniques in disc problem, type of traction applied

(manual or mechanical), time and cost effectiveness of traction techniques and response of traction techniques. A self addressed prepaid envelop, covering letter and questionnaire were sent to the participants. A postcard and reminder letter was sent to all non respondents after 4 and weeks 8 weeks of the first distribution, asking the therapists to indicate the reason for non response by ticking the appropriate box on the postcard. Options available were “I do not work with LBP patients,” “I do not use traction with LBP patients. “I am not interested to participate.”

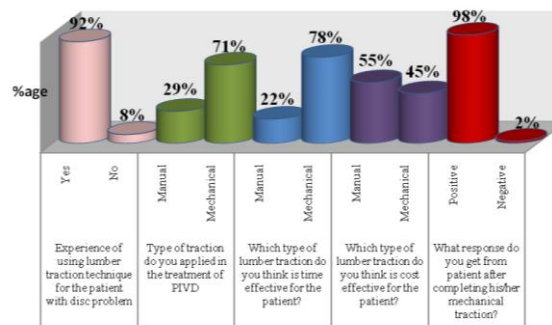
**Statistical Analysis:** Data was analyzed using statistical package for social sciences (SPSS) version 11by collated response of close questions. Descriptive analysis of each question was done and expressed in the form of table and graph.

**RESULTS**

**Survey response:** Questionnaires received back were 126 of the 153 questionnaire sent; the response rate was 82.2%. Of respondents, 79% (n=100) returned fully completed questionnaires, 14.2% (n =18) did not use traction with low back pain patients. A further 6.3 % (N=8) returned the questionnaire and were not interested to participate. Overall 17.8% (N=27) physiotherapists not responded without mentioning any reason, this may not affect this study results as the overall response rate was 82.2%. See table 1.

**Table No.1: Survey Response**

Questionnaires sent out	153	%age
Questionnaires received back	126	82.2%
Non Respondents	27	17.8%
Questionnaire included in the study and fully completed	100	79%
Respondents did not use traction	18	14.2%
Respondents did not want to participate	8	6.3%



**Graph 1: Analysis of various parameters.**

**Experience of using traction:** The responses showed 92% Physical therapists had experience of using lumbar traction technique for the patients with disc problem

and 8% had no experience but have used traction in supervision. Graph 1.

**Type of traction:** In the treatment of PIVD 71% Physical therapists had used mechanical lumbar traction while only 29% used manual traction.

**Time and cost effectiveness of traction:** Overall 78% (78 out of 100) Physical therapists believed that mechanical lumbar traction was time effective. At the first session patient were treated for less than 15mins. Overall 55% Physical therapists who fully filled and returned the questionnaire believed that manual lumbar traction was cost effective for PIVD treatment as compared to 45% who thought mechanical lumbar traction was more cost effective for patient.

**Response to traction use:** In terms of effectiveness of traction 98% Physical therapists reported positive response from traction in PIVD patients while only 2% reported no response from traction use.

## DISCUSSION

To our knowledge this survey was the first in Pakistan looking at the use of traction in current physical Therapy clinical practice to treat patients with PIVD. The collected information contains clinician experiences of using traction, types of traction applied in PIVD patients, time and cost effectiveness of mechanical and manual traction and response from traction use. No survey has been found exploring the specific use of mechanical and manual traction in clinical practice and results of this study provides clinically relevant information on the use of mechanical and manual traction in the treatment of lumbar PIVD. Previous studies produced inconclusive results for the use of traction because of poor quality trials.<sup>24</sup> This study could be used to guide the clinician in selection of appropriate traction method especially in today's health care services where time and cost has been considered as an important factors.

The results revealed that 79% of Physical Therapists still use mechanical and manual traction in the treatment of PIVD. This is consistent with the findings of a study conducted in the United Kingdom which showed that 76% of Physical Therapists used traction for low back pain patients<sup>26</sup>. Several other studies conducted in the United Kingdom and Ireland,<sup>18,19</sup> have indicated traction is still commonly used despite poor evidence for its use and widespread promotion of guidelines.<sup>16,17</sup> Another survey conducted in Canada revealed that 30% of low back patients were treated with traction by the physical therapists. The reason for not using traction was lack of knowledge of the Physical Therapists and limited post graduate training in manual therapy<sup>27</sup>. This survey showed that 98% of the respondents believed that tractions has positive outcome with PIVD patients. This is in agreement with another study revealed that the traction is still commonly used because "it seemed to work clinically,"

and only 5% of the respondents reported that there is poor quality research in this area.<sup>26</sup> The author has concluded that in Pakistan like other developed countries physical therapists are reluctant to follow guidelines and still using traction despite poor evidence. For Guideline production it is important to consider high quality research which may improve compliance with the Guidelines.

In the treatment of PIVD 71% Physical therapists had used mechanical lumbar traction while only 29% used manual traction. This could be explained by the fact that only small number of Physical Therapists are trained to perform manual spinal traction in Pakistan. The author did not collect the data about participants trainings which is an area where physical therapy practice can improve in the future. This is supported by another study in which 79% respondents used mechanical traction and 53% preferred to use manual traction.<sup>26</sup> In this study 92% of the respondents reported they have experience to use traction while 8% reported they had no experience. This is interesting to note that despite having no experience they still preferred to use traction under supervision which shows strong believe in traction use for pain management.

Further 74% Physical therapists gave first preference to traction use for pain relief in sciatica, 15% to decrease size of herniation, 8% to muscle spasm and 4 % gave opinion that lumbar traction decrease recurrence of prolapsed disc. This is in agreement with another survey where nerve root pain was treated with traction modality by 77.5% Physical Therapists.<sup>2</sup> Overall 78% (78 out of 100) Physical therapists believed that mechanical lumbar traction was time effective. At the first session patient were treated for less than 15mins. A study conducted in the UK reported that on the first session patients were treated for less than 10 minutes with "nerve root" irritation or "pain" whereas 11 to 20 minutes session was applied for stiffness.<sup>26</sup>

This statement is supported by study of Saunders et al,<sup>28</sup> suggested that 8-10 minutes treatment session is required in treating disc protrusion whereas Hickling<sup>29</sup> advocates 20-40 minutes. Both of these authors recommended shorter treatment duration and force in the initial treatment session. Several other studies have suggested that for first traction treatment, or painful conditions, it is recommended to start at less than 50% of the body weight and gradually increase the force over several sessions.<sup>30,31,32</sup> This survey does not explore the time period for subsequent therapy sessions and in future trials this could be explored further. In addition this survey did not include questions about frequency of traction treatments sessions.

Another study explored this further and concluded that patients with "nerve root" pain were likely to receive treatment two or three times per week whereas patients with stiffness and pain were commonly treated 2 time per week.<sup>26</sup> Further, 55% Physical therapists who fully

filled and returned the questionnaire believed that manual lumbar traction was cost effective for PIVD treatment as compared to 45% who thought mechanical lumbar traction was more cost effective for patient. This could be explained by the fact that mechanical traction machines involved cost and not all smaller scale departments can afford to provide the facility of mechanical traction.

## CONCLUSION

The results of this survey showed that Mechanical and Manual traction widely continued to be used in Pakistan despite limited evidence. In addition, the results clarify that majority of physical Therapists believed that traction is an effective treatment technique for lumbar nerve root pain. Furthermore traction was reported to be time and cost effective modality for patients with prolapsed inter-vertebral Disc (PIVD) in lumbar spine.

**Limitations of the study:** In this survey Physical Therapists of selected departments in Pakistan were included without randomization. This survey was more focused on mechanical and manual traction treatment methods therefore; the results may not be applicable to other countries where various types of traction (auto-traction, positional traction) could be applied. This survey contained only five closed ended questions limited to time and cost effectiveness information gathering along with response the therapist get from traction. However, it does not explore other important parameters such as Respondents profile, traction modalities, patient selection for traction, traction position, frequency traction treatment, selection of traction weights and training of therapists who applied traction. Further studies with inclusion of all these parameters and random sampling with a larger sample size is required in future trials.

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