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STUDY OF PROBLEMS OF LOWER BACK PAIN OF TWO WHEELER RIDERS- A CRITICAL REVIEW

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Abstract

Millions of vehicle rider throughout the world is exposed to transmit mechanical vibrations to the whole body through seats of vehicles. The most frequently reported adverse effects of Whole Body Vibration are Lower Back Bone Pain (LBBP), early degeneration of the spine and herniated inter vertebral discs. This study will focus to whole-body vibration and especially Lower back bone pain among operators of two wheelers. There have been only few studies that have specifically examined the effect of exposure by developing models. Almost all findings, in the different studies showed a strong tendency that long term exposure to WBV and LBBP are deleterious to the spinal system. This project or dissertation includes critical study and some investigations of current seat designs of two wheelers. Future scope includes analysis of old designs of two wheeler seats for the prevention of harmful exposure to vibrations and shocks which strongly affects the back bone and spinal cord.

INTRODUCTION

It is found that exposure to multiple mechanical shocks have either been found or hypothesized in a variety of industries (Andersen, J.H., *et al.*, 2007). These shocks are considered to be of higher amplitude, occurring sporadically for a short duration within the daily WBV exposure, and are associated with excessive speed, uneven terrain or obstacles (Hoy *et al.*, 2005), (Waters *et al.*, 2007). The optimal lumbar support design for driver seats has been hot topic in the automobile industry over the past decade. Better support designs still need to be developed and this has been reflected in a summary of quality surveys consistently reporting inadequate or uncomfortable lumbar supports as one of the top ten two wheelers issues in India. (Haland, Y., *et al.*, 1996). The objective of the study is to critical study of current seats design, a seat to protect lower back bone of two wheeler operator from mechanical vibrations and impact of a during riding through seat of two wheelers. (Palmer, K.T., *et al.*, 2003) Back pain is a common complaint of many vehicle operators and individuals exposed to occupational whole

body vibration (WBV) and specially Lower Back Bone Pain (LBBP). After observation scenario of Indian road and its dissimilarities in regional surface of different area, it is found that most of rural roads as well as urban roads and some highway are not proper in construction or they get damage due to different reasons. Hence there is an evidence suggests that long-term exposure to WBV containing multiple shocks can lead to adverse effects on the lumbar spine. (Cook J., *et al.*, 1993). Various structures in the low back including the inter-vertebral discs, paraspinal ligaments and muscles are at risk of injury in WBV & LBBP environments containing multiple shocks for several reasons (International Organization for Standardization, 2004). Due to this disturbance to the nutrition pathways of spinal particular segments, leading to increased degenerative and pathological processes in the lumbar spine are also speculated. (Method for Evaluation of Vibration Containing Multiple Shocks, ISO, Geneva, Switzerland. International Organization for Standardization, ISO 2631-5, 2004).

Sitting on motorcycle for hours and daily travelling at the end can be problematic to many. Stock seats from the motorcycle and two wheeler manufacturers are rarely comfortable, unless you ride something like higher range two wheelers like Honda, Dukaty, FZC20 (Highly expensive bikes). After study various problems are identified for whole body vibration and lower back bone pain (LBBP) are:-

- (1) [Lumbar disc hernia-ion](#),
- (2) Increased mechanical stress caused by seated postures,
- (3) Changes to the way the body responds to multiple loads caused by various postures,
- (4) Pressure changes, tearing, buckling, or softening of the inter-vertebral disc with exposure to multiple loads,
- (5) Potential changes to the neuromuscular control system which will effect passive and active stabilization,
- (6) Unexpected sudden loading can lead to overcompensation in the trunk muscles' response,

(7) Buckling events can occur due to an inability of the neuromuscular control system to respond in a quick and coordinated fashion to sudden loading and,

(8) Muscular trigger points or myofascial pain in the buttocks or the Para-vertebral muscles.

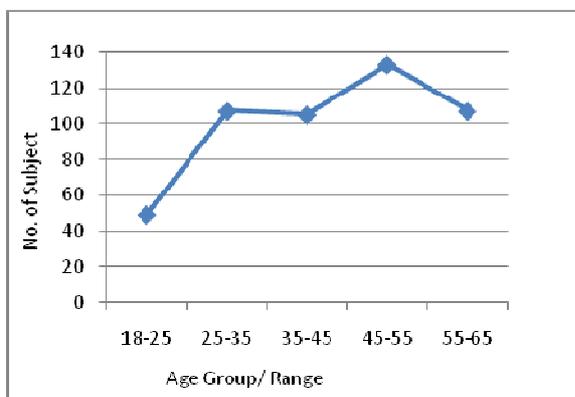
Materials & Methods:-

A survey of two wheeler riders was carried out to find out the reasons of back pain. The scope of survey was limited to Amravati city and riders of two wheelers of various age groups were interrogated. For this survey total 550 subjects were interrogated for lower back bone pain study and from this survey different numerical data analysis obtain which is given below express intensity of two wheeler operators problem according to age group wise as,

Table 1:-Overall contribution of riders (subjects) according to age wise,

Sr. No.	Age Group	No. of Subjects
1	18 – 25	49
2	25 – 35	107
3	35 – 45	105
4	45 – 55	133
5	55 – 65	107

Following graph no.1 shows critical study of intensity of lower back bone pain as per age group or age range wise in total 550 subjects,



Graph 1. Age group wise subject data

In this survey questionnaire was prepared and data was collected from Orthopedic surgeons, Ayurvedic and Homeopathy

Specialists from Amravati (India) city about number of patients in a day, a week and per month about lower back bone pain (LBBP). After this survey and discussion with doctors lower back bone pain is the common and serious problem of maximum automobile operators especially two wheeler operators.

Table 2:- Complaints by riders (Age Group wise)

Age Group (Years)	E. P.	Med. P.	Mil. Pain	N. P.
18 – 25	2	9	17	12
25 – 35	19	36	33	13
35 – 45	31	37	15	15
45 – 65	12 2	65	47	3
T. I. P.	17 4	147	112	43

(Notation:-

E.P. – Extreme Pain;

Med. P. – Medium pain;

Mil. P. – Mild Pain;

N. P. – No. Pain)

Table 3:- Complaints of riders (Usage wise)

Daily run(Km)	E. P.	Med. P.	Mil. Pain	N. P.
15 - 30	15	12	26	25
25 - 45	29	58	43	14
45 - 65	56	67	42	5
65 - 100	70	54	31	3
T. I. P.	170	191	142	47

(Notation:- as per table no. 2)

Result & Discussion:-

Analysis for Problem Identification in lower back bone pain (LBBP) is given below as per different classification,

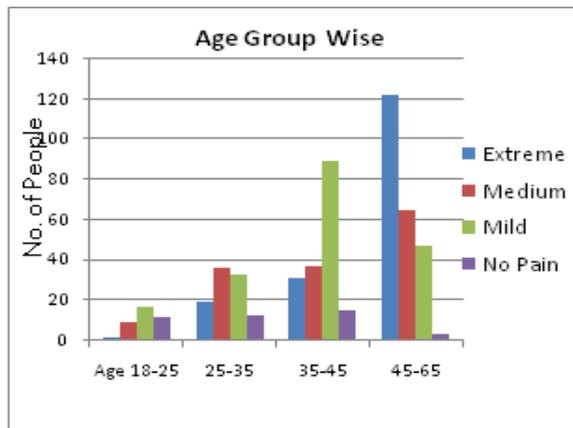


Figure 1: Intensity of Lower back pain (Age group wise)

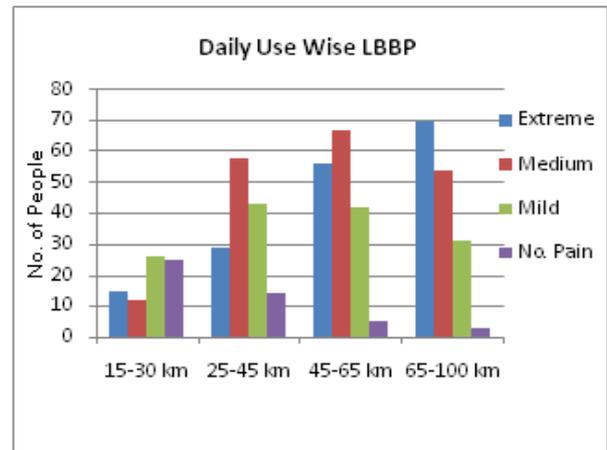


Figure 2. Intensity of lower back pain (Usage wise)

Almost all findings, show a strong relationship of long term exposure of two wheeler riders to Lower Back Bone Pain (LBBP) which is harmful to the spinal system and vertebra of human being. Thus this information will assist in redesigning of two wheeler seats which will enhance their health and well-being, productivity, morale and efficiency in performing their jobs. Work modifications and adequate seats would be advantageous for primary prevention of unnecessary exposure to vibration and shocks. Hence, there is a current need to do research focusing on redesigning and analysis using ergonomic approach that might contribute to the

knowledge of the development of lumbago among these operators.

Conclusion:-

After this survey and data collection about lower back bone problem of two wheeler operators it is found that most of the lower back bone pain is due to lack of lumbar support of two wheeler seat. Hence providing an adequate lumbar support in a two wheeler seat directly affects the lumbar spine and vertebral joint rotations to minimize backbone disaster among vehicle operators.

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