



Physiotherapy

ASSESSMENT OF BACK EXTENSOR MUSCLE STRENGTH IN FINAL YEAR AND INTERNSHIP PHYSIOTHERAPY STUDENTS BY USING PRONE ISOMETRIC EXTENSOR TEST.

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ABSTRACT **BACKGROUND:** Physiotherapy students deal with various conditions wherein they are required to treat individuals with utmost care, however while doing so, many students tend to assume an incorrect posture which in turn leads to weakness of spinal musculature and pain. Low back pain is experienced in 60-80% of young adults at some point in their lifetime which may be a result of trunk weakness. The objective of our study was to assess the back extensor muscle strength in final year and internship physiotherapy students by using the prone isometric extensor test.

METHOD: For the study, a total of 96 final year and internship physiotherapy students were screened for the inclusion and exclusion criteria after which the strength of their back extensors was measured using the Prone Isometric Extensor Test. The grades of the muscle strength were then documented and the data obtained for the study was then analysed for the result.

RESULT: The result obtained through this observational study was as follows; out of 96 students, the percentage of students having back extensor muscle strength of grade 0 and grade 1 is 0%, percentage of students having grade 2 is 10%, grade 3 is 41% and grade 4 and grade 5 is 30% and 19% respectively.

CONCLUSION: Thus, this study concludes that majority of the final year and internship physiotherapy students had a back extensor muscle grade of 3 i.e. fair muscle strength hence proving that there exists back extensor muscle weakness in final year and internship physiotherapy students.

KEYWORDS : Back Extensor Muscle Strength, Prone Isometric Extensor Test, Physiotherapy Students.

INTRODUCTION

Physiotherapists are professionals trained to, among other services; provide rehabilitative care in a wide range of disabling conditions with the aim of restoring, maintaining, and promoting function¹. Physical therapy is the science of treating people with physical special needs, to help them minimize and/ or maintain basic functional abilities and minimize their condition from progressing. Interventions utilized by physiotherapists often entail a considerable amount of "hands-on" techniques that are characterized by repetitive movements, prolonged standing, and somewhat difficult postures. Transferring and lifting patients are also common work activities in physiotherapy². Physiotherapy students deal with various conditions wherein they are required to treat individuals with utmost care, however while doing so, many students tend to assume an incorrect posture which in turn leads to weakness of spinal musculature and pain. Low back pain is experienced in 60-80% of young adults at some point in their lifetime which may be a result of trunk weakness³. Static muscle load and flexion of the lumbar spine have been postulated as risk factors for LBP development; thus, prolonged sitting or sitting in an abnormal posture can aggravate LBP⁴. Occupational Low Back Pain (LBP) relates to exposure to workplace hazards and incurs high costs to society in terms of health care, loss of productivity, workplace and family stress, as well as individual pain and suffering. Thus prevention of occupational LBP in turn relies on strengthening of core muscles. Factors associated with occupational LBP are commonly cited as physical (workplace) and personal (individual). Physical factors are proposed as heavy physical work, lifting, bending, twisting and static postures, whilst personal factors are described as non-modifiable (age, gender, anthropometry etc) and potentially modifiable (physical fitness, motor control, strength etc.)⁵. Major muscles included are the pelvic floor muscles, transversus-abdominis, multifidus, internal and external obliques, rectus abdominis, erector spinae, especially the longissimus thoracis, and the diaphragm⁶. Minor core muscles include the latissimus dorsi, gluteus maximus, and trapezius⁷.

PROCEDURE

The study was conducted in the duration of September 2018 till February 2019. The study was approved by the relevant Research and Ethical Committee. Eligible students were approached during their free hours. All the participants were thoroughly explained about the procedure and informed written consent was taken from all the participating individuals. All 96 subjects were screened for the inclusion and exclusion criteria before the data collection. Inclusion Criteria- 1) Both males and females, aged (20-25 years). 2) Final year

and internship physiotherapy students. Exclusion Criteria- 1) Any neurological disorders or musculoskeletal conditions. 2) Acute infections. 3) Congenital deformities. 4) Menstruating females. 5) Unwilling individuals. 6) Professional and semi-professional sports players. 7) Regular gym going subjects. A complete explanation and demonstration of the Prone Isometric Extension Test and the different grades of muscle strength was given before the commencement of the study. The test was carried out on a firm examination table and the subjects were allowed to practice for the test once only. The subjects were informed about holding the position for a given time period according to the various grades of the test. Once the test was performed by the subjects, their grade of back extensor muscle strength was documented and the data obtained for the study was then analysed for the result. Outcome Measure was Prone Isometric Extensor Test which is a test designed to test the strength of back extensors i.e. iliocostalis lumborum (erector spinae and multifidus).

Prone Isometric Extensor Test⁸

The test is done with the patient beginning in prone lying and extending the spine. The examiner times how long the patient can hold the contraction without pelvic or spinal movement. The patient can start the test with the hands by the side, moving the hands by the side of the trunk, and finally moving the hands behind the head for increasing difficulty. The test is graded as follows: Normal (5): With hands clasped behind the head, extends the lumbar spine, lifting the head, chest and ribs from the floor (20 to 30 second hold). Good (4): With hands at the side, extends the lumbar spine, lifting the head, chest, and ribs from the floor (15 to 20 seconds hold). Fair (3): With hands at the side, extends the lumbar spine, lifting the sternum off the floor (10 to 15 seconds hold). Poor (2): With hands at the side, extends the lumbar spine, lifting the head off the floor (1 to 10 second hold). Trace (1): Only slight contraction of the muscle with no movement. Grade (0): No contraction.

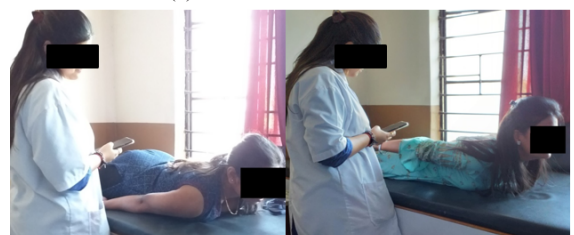


Fig. 1- Grade 2

Fig. 2- Grade 3

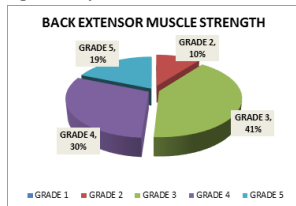


Fig. 3- Grade 4

Fig. 4- Grade 5

DATA ANALYSIS AND RESULT

Graph 1 shows the muscle grades of final year and internship physiotherapy students using prone isometric extension test. In the figure below, out of 96 students, the percentage of students having back extensor muscle strength of grade 0 and grade 1 is 0%, percentage of students having grade 2 is 10%, grade 3 is 41% and grade 4 and grade 5 is 30% and 19% respectively.



Thus, majority of students have back extensor muscle strength of Grade 3 hence proving that there exists back extensor muscle weakness in final year and internship physiotherapy students.

DISCUSSION

The purpose of the study was to find out the back extensor muscle strength in final year and internship physiotherapy students using prone isometric extension test. Out of a total sample size of 96 students, 90 females and 6 males were included in this study based on the inclusion and exclusion criteria. In our study, we found that when we assessed the physiotherapy students for back extensor muscle grade using prone isometric extension test, 10% of the students had grade 2, 41% had grade 3 and 30% and 19% of students had grade 4 and grade 5 respectively. The risk of physiotherapy students developing LBP may be similar to what obtains among physiotherapy practitioners, hence the need for adequate attention to their muscle strength. Physiotherapy interventions often entail repetitive movements, assuming awkward postures or working in static posture for prolonged periods, and manual handling, all of which have been implicated in the incidence and prevalence of LBP among physiotherapists². The result that was uncovered during this study was that out of 96 students, the students that did some exercise either under professional supervision or unsupervised home bound exercise had a higher muscle grade of grade 5 and 4. Whereas the students that had no exercise incorporated in their daily sedentary lifestyle had a muscle grade of 3 and 2. Thus, proving that final year physiotherapy students have a higher risk of developing and suffering from occupational low back pain which could result out of back extensor muscle weakness. Low back pain (LBP) is highly prevalent in our society and the multifidus muscle is the most important muscle for lumbar segment stability as per its relationship its atrophy and recurrences of low back pain¹⁴. Many studies have concluded that the occupational LBP affecting physiotherapy students is prevalent more in the students aged 20 to 21 years¹. However not many studies have tested and uncovered the reasons behind the LBP affecting physiotherapy students. The question is whether the low back pain ailing physiotherapy students is due to back extensor muscle weakness. Back extensor muscle group helps in maintaining an erect posture as well as assists in maintaining stability during movements³. Since physiotherapy students are required to be able to perform a number of manual and mechanical treatment techniques which require a correct and optimal static posture to be maintained for prolonged periods by the patient as well as the therapists, an error or incorrect posture during these tasks results in Low Back Pain². Thus, through our observational study we aimed at documenting the muscle strength in physiotherapy students and discovered that a majority of the physiotherapy student population had a muscle grade of 3 i.e. fair muscle strength as opposed to grade 5 which is considered normal muscle strength for healthy individuals. The majority of the students considered their back extensor muscle grade as normal for their age. The physical fitness level of students is

not satisfactory as compared to the physical demands of the profession¹⁰. The measured fitness levels are less than the perceived levels. Hence, it was observed that majority of the final year and internship physiotherapy students when assessed for their back extensor muscle strength using the prone isometric extension test, had muscle strength of grade 3 and 4. This back extensor muscle weakness discovered in physiotherapy students and internship students increases the risk of occupational low back pain and predicts a decline in the physical and functional capabilities of future physiotherapists.

CONCLUSION

The study concludes that majority i.e. 41% of the final year and internship physiotherapy students population had a back extensor muscle grade of 3 which according to the Prone Isometric Extensor Test is fair muscle strength.

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