Short communication

Association of lumbar spine mobility and hamstring tightness in dental practitioners

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ABSTRACT

Introduction and Aim: The decrease in lumbar spine mobility and hamstring tightness can be caused due to the lack of regular exercise and awkward postures exposed at the workplace due to an individual's occupation. It can be expressed due to the awkward posture during dental practice as well and this can be controlled by doing regular exercises. The aim of the present study is to analyze the association of lumbar spine mobility and hamstring tightness in dental practitioners.

Materials and Methods: The study is conducted in a Private dental college and hospital for the dental practitioners who work for more than 4 hours in a day. The hamstring tightness is measured using the goniometer and lumbar spine flexibility is measured using an inch tape. The measurements are tabulated and analyzed statistically for the correlation of lumbar spine flexibility with hamstring tightness using the SPSS tool.

Results: The collected data are analyzed statistically using correlation coefficient and the findings concluded that they have a low positive correlation. The mean value of lumbar flexion range is 19.37 cm and mean value of the hamstring tightness is 27.8°, the correlation coefficient r is 0.473. Majority of female participants have increased hamstring tightness with a maximum range of 30° and around 11% of male participants have a restriction range of 25°. Similarly, around 8% of female participants have a lumbar flexion range of around 21cm, However, there is no significant difference between the gender in both the variables with p value equals 0.35 and 0.53 ($p > 0.05$) respectively.

Conclusion: From the obtained results it can be concluded that there is a low positive correlation between hamstring tightness and the lumbar flexion range. The findings suggest that the dental practitioners are prone to hamstring tightness which in turn can induce reduced lumbar spine mobility and impacts stress on the lumbar spine leading to low back pain.

Keywords: Hamstring tightness; lumbar spine mobility; low back pain.

INTRODUCTION

The decrease in lumbar spine mobility and hamstring tightness can be caused due to the lack of regular exercise and awkward postures exposed at the workplace due to an individual's occupation. It can be expressed due to the awkward posture during dental practice as well and this can be controlled by doing regular exercises. Increased hamstring stiffness could be a possible contributing factor to low back injuries. The hamstring tightness leads to reduced lumbar spine mobility, which can be an inducing factor for low back pain and lumbar degeneration.

Several clinical investigations reported that hamstring tightness has higher impact on lumbar pelvic rhythm. The restriction of movement of lumbar spine due to hamstring tightness or due to postural asymmetry can lead to compensatory movement patterns of lumbar spine. This impacts more stress on the lumbar spinal soft tissues and elevates the risk of low back pain. The other examination does not have a precise investigation about lumbar spine mobility and hamstring tightness among the dental practitioners (1).

Due to stress factor symptomatic spondylosis can occur which causes low back pain, hamstring tightness in the adults during treatment (2). Hamstring tightness causes posterior pelvic tilt and decreased lumbar lordosis or flattening of lumbar spine. Standing workers will have effects on hamstring stretch with pelvic control on pain (3). Improvement in hamstring flexibility measured by the active knee-extension test was achieved by both stretching techniques and passive stretching was more effective than active stretching at achieving an immediate increase in hamstring flexibility (4). The present study is attempted to analyze the correlation between lumbar spine mobility and hamstring tightness among dental practitioners who work more than 4 hours in a day.

MATERIALS AND METHODS

This study is conducted in a private dental college and hospital at Chennai for the dental practitioners. The study is approved by the institutional review board. The participants are well explained about the study and their willingness is obtained through informed consent. The hamstring tightness and lumbar spine flexion range are measured using goniometer and inch

tape respectively and the resulting ranges are analyzed statistically for its correlation. The study involves 35 dental practitioners of which 27 are female and 8 are male participants, who work for more than four hours a day. The hamstring tightness is measured using a goniometer with the participant in supine lying, hip and knee flexed to 90°, the participant are instructed to perform active knee extension, the degree of knee flexion in this position is measured as the degree of hamstring tightness. The lumbar flexion range is measured by instructing the participant to position in long sitting and attempt to touch their great toe with fingers by flexing their lumbar spine with knees extended. The distance between the tip of the middle finger and the great toe is measured as lumbar flexion range. The demographic details are gathered as part of study. The collected data is analyzed statistically using the SPSS (Statistical Package of the Social Sciences) tool for descriptive statistics and correlation coefficient.

RESULTS

The results of the study (fig.1) shows the low positive correlation between hamstring tightness and lumbar

spine mobility. The mean value of lumbar spine flexion range is 19.37cm and mean value of hamstring tightness is 27.8° as shown in (fig.1) the collected data is analyzed statistically using SPSS for correlation coefficient. The correlation coefficient of lumbar spine mobility and hamstring tightness is analyzed to be $r = 0.474$. The fig. 2 represents the association between gender and degree of hamstring tightness and fig.3 represents the association between gender and lumbar spine mobility. The majority of around 11% of female participants have increased hamstring tightness with a maximum restriction range of 30° and around 11% of male participants have a restriction range of 25°. Similarly, around 8% of female participants have a lumbar flexion range of around 21cm that infers more lumbar stiffness than males who account for around 2.9%. However, there is no significant difference between the gender in both the hamstring tightness and lumbar flexion range with p value equals 0.35 and 0.53 ($p > 0.05$) respectively.

Fig. 1: The scatter plot with fit line of correlation between lumbar spine flexion range and degree of hamstring tightness.

Fig. 2: The association between gender and the degree of hamstring tightness.

Fig. 3: The association between gender and percentage of participants on lumbar spine flexion range.

DISCUSSION

The findings of the study considering the limitations suggest the existence of low positive correlation between the hamstring tightness and lumbar spine flexion range. The prevalence of hamstring tightness and decreased lumbar flexion range is more among female dental practitioners than the male. However, there is no statistically significant difference between the male and female participants. The findings suggest the considerable observation of hamstring tightness and lumbar spine flexion range in dental practitioners which can act as an alarm to indicate the need for their low back care.

A study reported that hamstring tightness increases the possibility of getting low back pain. Clinical investigation incorporates the lumbar pelvic rhythm when correlating hamstring tightness and lumbar spine motion (1). The past research clarifies that hamstring tightness causes spine injury because of the extension of the hamstring muscles (1). In a study the author reported the association between hamstring flexibility and excursion of lumbar spine to perform forward bowing back in people who have chronic low back pain(5). In this the investigation the author has clarified progressively about the components influencing the hamstring wounds and reported the variables with the image pictorial portrayal and demonstrates the wounds of the hamstring (6). In a study the author analyzes the connection between hamstring length and lumbar spine derangement and observed in examination that there is no distinction in hamstring muscle length among skilled workers without ceaseless lower back pain. In this it is essential to observe the relationship of adaptability of muscles over low back pain (7). In another study the author has reported that the spine movement and diminished

hamstring in patients with vague low back pain is caused because of the expanded muscle of the hamstring (8). Furthermore, the author discloses how to treat the hamstring muscles from the hamstring tightness by doing normal regular exercises (9). The author suggested that this investigation proposes there is no connection between hamstring muscle length and motion (10). In an examination the author of a study reasoned that the past research had inspected the impact of back pain on spinal movements, but data with regard to the association between the lumbar spine and hip was constrained and in this examination he disclosed. The clinical appraisal and treatment should consider the impact of back pain on the connection with spine and hip movements (11). In a study the author relates between hamstring muscle length and pelvic tilt during forward twisting in sound people (12). In a study the author reported limitation in lumbar flexion and hamstring tightness, a movement just as lumbar spine, and hamstring adaptability predicts the advancement where related in an expanded impact of growing low back pain (13). The lumbar spine arrangement with deformation adjustment and they felt about the level of movement in the lumbar spine (14). The working manners in the Dental practice related to awkward spinal postures and muscle movement, the dental administrator stool can be modified to improve posture, diminishing the pain and spine related disorder (15). The past writings reported about the spine arrangement with bone deformations, about the components influencing the hamstring wounds, the relationship between hamstring flexibility and spine mobility and discovered the task of hamstring adaptability.

The dental stool improves the posture and decreases the muscle related disorder and in the current study hamstring tightness is reported to decrease the lumbar

spine mobility. The reduced lumbar spine motion can lead to lumbar spine derangement, disturbances in lumbar pelvic rhythm, flattening of curvature of lumbar spine, alteration in the lumbosacral angle and can lead to irreversible degenerative changes of lumbar vertebrae. Appropriate preventive measures should be adopted by developing the practice of regular flexibility exercises, avoiding awkward postures while performing dental procedures can help to prevent or reduce the impact of stress on the lumbar spine.

CONCLUSION

From the obtained results, it can be concluded that low positive correlation exists between the hamstring tightness and lumbar flexion range of motion. The findings of the hamstring flexibility and lumbar spine mobility suggest that the dental practitioners are prone to hamstring tightness, which in turn can have stress impact on lumbar spine mobility and can induce degenerative changes. Avoiding awkward postures during practice and developing the practice of regular flexibility exercises can aid in preventing the incidence of low back pain in dental practitioners.

CONFLICT OF INTEREST

All the authors declare no conflict of interest.

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