DOI: https://doi.org/10.54393/pbmj.v9i4.1363

PAKISTAN BIOMEDICAL JOURNAL
https://www.pakistanbmj.com/journal/index.php/pbmj/index
ISSN (E): 2709-2798, (P): 2709-278X
Volume 9, Issue 04 (April 2026)

Original Article

OPEN ACCESS

Association of Prolonged Sitting and Postural Imbalance with Piriformis Syndrome in Physiotherapists

Zoya Naseer[1*] and Sana Touqeer[1]

[1]University Institute of Physical Therapy, The University of Lahore, Lahore, Pakistan

ARTICLE INFO

Keywords:
Postural Imbalance, Piriformis Syndrome, Time of Sitting, Physiotherapists, Ergonomics, Reedco Posture

How to Cite:
Naseer, Z., & Touqeer, S. (2026). Association of Prolonged Sitting and Postural Imbalance with Piriformis Syndrome in Physiotherapists: Prolonged Sitting and Postural Imbalance with Piriformis Syndrome in Physiotherapists. Pakistan BioMedical Journal, 9(4), 22-27. https://doi.org/10.54393/pbmj.v9i4.1363

***Corresponding Author:**
Zoya Naseer
University Institute of Physical Therapy, The University of Lahore, Lahore, Pakistan
zoyanaseer239@gmail.com

Received Date: 17th February, 2026
1st Revision Received: 31st March, 2026
Acceptance Date: 18th April, 2026
Published Date: 30th April, 2026

ABSTRACT

Piriformis Syndrome can be a frequent yet underdiagnosed issue in the entrapment of the sciatic nerve, typically related to long sitting durations and inappropriate posture. Physiotherapists are a vulnerable group as they have long hours of sitting while treating patients; however, there is very little information available about them, especially in Pakistan. **Objective:** To assess the correlation between sitting time, postural imbalance, and piriformis syndrome among physiotherapists in Lahore, Pakistan. **Methods:** Convenience sampling was used for the cross-sectional study, with 158 physiotherapists selected from public hospitals of Lahore. A standard questionnaire was administered, as well as three provocation tests for piriformis syndrome (FAIR test, Freiberg's sign, and Pace's test), and the Reedco Posture Assessment Scale. Age, gender, Body Mass Index (BMI), and work experience were controlled for using binary logistic regression. **Results:** The mean age was 40.12 years, SD = 12.04 years; and 53.2% of the participants were positive for piriformis syndrome. Forty-five. 6 percent of physiotherapists reported sitting for >8 hours daily, and 35.4 percent had poor sitting posture. Prolonged sitting was still significantly associated with piriformis syndrome after adjustment for the confounders (OR = 2.4, 95 percent CI: 1.2 to 4.8, p=0.01). A borderline association was seen with postural imbalance (odds ratio = 1.9, 95 percent confidence interval: 0.9 to 3.8, p=0.06). **Conclusions:** After controlling for the potential confounders, the results revealed that prolonged sitting is significantly associated with piriformis syndrome in physiotherapists. This is considered an occupational risk and can be reduced through ergonomic interventions and frequent postural training.

INTRODUCTION

Piriformis syndrome (PS) is a known but sometimes overlooked cause of entrapment of the sciatic nerve, manifesting as pain that runs from the buttocks to the back of the thigh. It is responsible for 5–36% of lower back pain and is more common among women [1, 2]. The disease is caused by compression of the sciatic nerve by the piriformis muscle, which can be due to anatomical abnormalities, trauma, or overuse of the muscle [3]. No universally accepted diagnostic criteria, as diagnosis is mainly clinical, supported by provocative maneuvers: FAIR test (flexion, adduction, internal rotation), Freiberg's sign, and Pace's test [4]. Although PS has been widely researched in sports and wider populations, there is a lack of research among health workers, especially physiotherapists. Physiotherapists tend to suffer from postural abnormalities as they sit for a prolonged period to assess patients, make notes, and provide therapy. These abnormalities may be further accentuated by repetitive movements [5]. Physiotherapists are ergonomics experts, but there is a high prevalence of work-related musculoskeletal disorders [6], and physiotherapists neglect their own health to care for others. There is a biological link between extended sitting, postural dysfunction, and PS. The prolonged sitting position causes the piriformis muscle to become compressed and circulatory flow is lowered, which can cause inflammation

DOI: https://doi.org/10.54393/pbmj.v9i4.1363

of the sciatic nerve [7]. Muscular imbalances are further accentuated by poor posture (e.g., rounded back, uneven weight distribution) and raise PS risk [8]. The few studies that have been conducted on physiotherapists, however, have centred on general populations or office workers, and there is a lack of research on physiotherapists' specific occupational exposures [9]. Workplace changes in developing countries such as Pakistan are neglected, and psychological stress among physiotherapists can be higher than that of developed countries. This is not only a problem with respect to productivity, but also to the quality of patient care. Conservative measures such as stretching, ergonomic adjustments, and postural training are the main treatments used in current management [10]. The prevalence of piriformis syndrome in patients with low back pain has been estimated to be 18.3% among patients with low back pain in Pakistan; 36.9% among female physiotherapy students in Gujranwala and 61.1% among university health sciences students [1-3]. This variation is attributable to the differences in the diagnostic criteria and/or study population. The most common causes of piriformis syndrome in Pakistan involve sitting for long durations on hard surfaces, sitting cross-legged (which is a popular sitting position in the country), inadequate workstation setups, and repetitive bending or twisting while performing manual activities. Also, among the local population, direct trauma due to falls and sports injuries were contributing factors, along with weak hip abductor muscles. The poor sitting posture and higher prevalence of PS would be correlated to spending more time sitting per day among physiotherapists. This study is able to offer quantitative correlations and emphasize the importance of physiotherapists' self-care regimes in their working environment. This study makes a small contribution to the existing knowledge on occupational health risks of healthcare workers, which is limited in low and middle-income countries.

But at present, there is no evidence to show that there is a link between any specific occupational exposures of physiotherapists and PS, and so preventive measures are still underdeveloped. This study aimed to investigate the relationship between prolonged sitting time, postural imbalance, and piriformis syndrome among physiotherapists of Lahore, Pakistan.

METHODS

The Methodology used was a cross-sectional study of physiotherapists in Lahore, Pakistan, for 6 months from August 2025 to January 2026. They were sampled using non-probability convenience sampling from the University of Lahore Teaching Hospital and Sir Ganga Ram Hospital, both Public and Private Hospitals. This study was done under the principles outlined in the Declaration of Helsinki and approved by the University of Lahore. Voluntary participation, anonymity, and data confidentiality were explained and emphasized to all participants. After the study, participants were informed of no physical risk and information regarding postural ergonomics was provided. Written informed consent was taken. A sample size was determined using Cochran's formula with a 95% confidence level (Z=1.96), 5% margin of error, and an estimated PS prevalence of 10% based on previous literature [11] and a pilot study (n=20). A 10% non-response was added to attain the desired sample size of 158 for chi-square analysis. The study comprised physiotherapists aged 20-60 years and with a body mass index (BMI) range of 20-30 kg/m2 [12] and had been working 4+ hours per day for 1+ years [13] and had a diagnosis of nonspecific low back pain (LBP) or piriformis muscle dysfunction (PMD) [11]. Patients were excluded if they had a history of back or lower limb surgery, if there had been acute low back pain in the previous six months, if they had an abnormality of the spine (e.g., scoliosis), if they had neurological disorders, if they were pregnant, or if they could not participate [14]. The data were gathered by a standardized questionnaire that included questions on demographic data, amount of daily sitting time, and self-reported postural habits. According to published diagnostic criteria [15], piriformis syndrome was diagnosed when two or more of the provocation tests were positive (FAIR, Freiberg's, Pace). If the results were discordant, a positive FAIR test plus another positive test was regarded as a positive result. Freiberg's sign included a passive internal rotation of the extended thigh to test piriformis tightness [16], and Pace's test was the resistance to abduction and external rotation in a seated position [17]. Two independent raters assessed interrater reliability of the Reedco Posture Assessment Scale by testing 20 randomly selected participants with an intraclass correlation coefficient (ICC) of 0.85 (95% CI: 0.72 – 0.93), which shows good interrater reliability. To achieve uniformity, all major tests were conducted by rater 1 [8].

IBM SPSS software version 25.0 (IBM Corp., Armonk, NY, USA) was used to analyze the data. The continuous variables (e.g., age, BMI) were reported as mean ± SD; and the categorical variables (e.g., prevalence of PS, posture ratings) as frequencies and percentages. Potential confounders such as age, gender, BMI, and years of experience were controlled for using binary logistic regression. After adjustment, prolonged sitting (>8 hours/day) remained significantly associated with PS (OR = 2.4, 95% CI: 1.2–4.8, p=0.01), while posture retained borderline significance (OR = 1.9, 95% CI: 0.9–3.8, p=0.06).

RESULTS

The study included 158 physiotherapists (mean age: 40.12 ± 12.04 years; 53.8% male). Mean BMI was 24.91 ± 2.86 kg/m^2,

DOI: https://doi.org/10.54393/pbmj.v9i4.1363

indicating a normal weight cohort. Participants were recruited from six hospitals in Lahore, with the highest representation from the University of Lahore Teaching Hospital (20.3%) and Sir Ganga Ram Hospital (17.7%) (Table 1).

Table 1: Demographic and Anthropometric Characteristics of Study Participants

Variables	n (%)
Age (years)	40.12 ± 12.036
Height (cm)	171.29 ± 11.291
Weight (kg)	70.32 ± 11.548
Body Mass Index (kg/m^2)	24.91 ± 2.859

A majority (45.6%) reported sitting >8 hours daily, while 53.8% did not take regular breaks. Among those who took breaks, only 30.4% did so every 30 minutes. Cross-legged sitting (23.4%) and forward head posture (17.7%) were commonly reported (Table 2).

Table 2: Frequency Distribution of Occupational Factors, Sitting Habits, and Clinical Test Results among Physiotherapists

Variables	Construct	n (%)
Gender	Male	85 (53.8%)
	Female	73 (46.2%)
Hospital	University of Lahore Teaching Hospital	32 (20.3%)
	Sir Ganga Ram Hospital	28 (17.7%)
	PESSI Hospital Multan	24 (15.2%)
	PESSI Hospital Kot Lakhpat Road	22 (13.9%)
	Sehat Medical Complex – Hanjarwal	26 (16.5%)
	Sehat Medical Complex – Lake City	26 (16.5%)
Hours Spent Sitting at Work Every Day	6 Hours	35 (22.2%)
	8 Hours	51 (32.3%)
	>8 Hours	72 (45.6%)
Takes Regular Breaks	No	85 (53.8%)
	Yes	73 (46.2%)
Break Frequency While Sitting	30 Minutes	48 (30.4%)
	1 Hour	38 (24.1%)
	2 Hours	39 (24.7%)
	Rarely	33 (20.9%)
Sitting Posture Description	Straight	35 (22.2%)
	Slightly Slouched	31 (19.6%)
	Forward Head	28 (17.7%)
	Cross-Legged	37 (23.4%)
	Shifting	27 (17.1%)
Pain scale (0–10)	Mild	48 (30.4%)
	Moderate	65 (41.1%)
	Severe	45 (28.5%)
FAIR Test Pain in Buttock/Leg	No	74 (46.8%)
	Yes	84 (53.2%)
Freiberg's Test Pain/Tightness	No	74 (46.8%)
	Yes	84 (53.2%)
Pace's Test Pain in Buttock	No	74 (46.8%)
	Yes	84 (53.2%)

The highest proportion of poor posture was observed in the spine (44.9%) and upper back (40.5%), indicating that these regions are most affected among physiotherapists. In contrast, shoulders (37.3% good) and ankles (38% good) showed relatively better alignment, suggesting region-specific postural imbalances that may be linked to prolonged sitting and work-related tasks (Table 3).

Table 3: Regional Postural Alignment Scores Assessed by Reedco Posture Assessment Scale

Posture Area	Score Category	n (%)
Head	Poor	50 (31.6%)
	Fair	56 (35.4%)
	Good	52 (32.9%)
Shoulders	Poor	48 (30.4%)
	Fair	51 (32.3%)
	Good	59 (37.3%)
Spine	Poor	71 (44.9%)
	Fair	42 (26.6%)
	Good	45 (28.5%)
Hips	Poor	50 (31.6%)
	Fair	52 (32.9%)
	Good	56 (35.4%)
Ankles	Poor	54 (34.2%)
	Fair	44 (27.8%)
	Good	60 (38.0%)
Neck	Poor	53 (33.5%)
	Fair	51 (32.3%)
	Good	54 (34.2%)
Upper Back	Poor	64 (40.5%)
	Fair	49 (31.0%)
	Good	45 (28.5%)
Trunk	Poor	52 (32.9%)
	Fair	57 (36.1%)
	Good	49 (31.0%)
Abdomen	Poor	59 (37.3%)
	Fair	43 (27.2%)
	Good	56 (35.4%)
Lower Back	Poor	55 (34.8%)
	Fair	50 (31.6%)
	Good	53 (33.5%)

Poor posture (35.4%) or moderate postural deviations (39.9%) were found in the majority of physiotherapists (75.3%), with only 24.7% having good posture. This suggests that there was a higher incidence of postural imbalance in this occupational group, which may be related to the nature of sitting for a long time and the ergonomic problems associated with the work performed (Table 4).

Table 4: Overall Postural Classification of Participants Based on Reedco Posture Assessment

Score Category	n (%)
Poor Posture	56 (35.4%)

DOI: https://doi.org/10.54393/pbmj.v9i4.1363

Moderate Postural Deviation	63 (39.9%)
Good Posture	39 (24.7%)

There was a statistically significant association between daily sitting duration and postural classification based on the chi-square test (χ^2 = 8.77, p=0.03). Physiotherapists sitting for over 8 hours daily had the maximum percentage of moderate postural deviations (48.6%), and physiotherapists sitting for 6 hours daily had more poor posture (40.0%) (Table 5).

Table 5: Association Between Daily Sitting Duration and Postural Classification

Hours Spent Sitting at Work Per Day	Poor Posture	Moderate	Good	Total	χ^2	p-value
6 Hours	14	9	12	35	8.77	0.06
8 Hours	23	19	9	51		
>8 Hours	19	35	18	72		
Total	56	63	39	158		

DISCUSSION

Despite being highly skilled at ergonomics, this study has shown significant correlations between extended sitting, postural misalignment, and PS among physiotherapists. Results showed that 53.2% of the participants had positive provocation tests for PS, 35.4% had poor posture, and 45.6% sat for more than 8 hours a day. The findings highlight a major difference between theory and practice of how this is being implemented. The findings were consistent with those previously reported of musculoskeletal diseases among healthcare staff, and the ergonomic principles applied in clinical settings [17]. The observed prevalence of PS exceeds general population estimates, which indicate that targeted interventions are needed to address the vulnerabilities of people in these occupations [18]. Interestingly, while the majority of the physiotherapists were found to have worse posture with longer sitting time, a small proportion (25%) were sitting for more than 8 hours a day but had better posture, suggesting adaptive ergonomic practices [19]. This is in contrast to the 6-8- hour cohort, where more people were found to have suboptimal posture, suggesting a lack of postural corrections during moderate sedentary periods. These results are consistent with a study, which pointed out the significance of posture management for active sitting rather than passive sitting length [20]. The lack of regular breaks (53.8%), particularly by the minority (30.4%) who take 30-minute breaks, indicates the "knowledge-behavior gap" found in ergonomic studies [21]. This highlights the need for institutions to have policies and procedures for microbreaks, as it appears that this is not being done voluntarily. Regional postural abnormalities were marked, with the spine (44.9%) and upper back (40.5%) being the most common, which may be due to leaning forward for extended periods during patient care [21]. Conversely, better alignment of the ankle and shoulder can be a sign of task-specific movements during therapeutic activity. These discrepancies suggest that a general recommendation on posture is not enough and specific interventions to the body region are needed. The significant correlation between sitting time and posture ratings (p=0.03) also reinforces work on lumbopelvic strain, although our results indicate that there is the potential to decrease risks of hazards with prolonged sitting through ergonomic changes [22]. The majority of participants (69.6%) experienced moderate to severe pain, and the PS-associated symptoms were assessed by FAIR, Freiberg's and Pace's assessments. The results are consistent with the reporting of gluteal pain in sedentary occupations [23], but do not match their estimates of prevalence, which may be due to different exposures during physiotherapy work. Asymmetries of the pelvis were frequent, with cross-legged sitting (23.4%) and forward head postures (17.7%) being common, as in dentistry populations [24], where even professionals adopt postures that are detrimental due to work-related stress [25].

The limitations of the study include the cross-sectional design, which precludes causal conclusions, and the sample of one profession, which limits the generalizability of the results. There is potential for bias because there are no non-medical controls and reliance on self-reported sitting behaviors. This was done by convenience sampling to address logistical challenges with this study, which might result in selection bias and reduce generalizability. This constraint is recognized, and future studies are needed to use random sampling of cities to achieve greater representativeness. Future studies ought to include longitudinal designs with objective activity monitoring and juxtapose physiotherapists with other sedentary occupations. The results of the current study emphasize the importance of ergonomic training as an element in the continuing education and in the safety measures of institutions. To overcome the gap between knowledge and practice, practical solutions like regular micro breaks, ergonomic seating, and targeted strengthening exercises for weak points (spine/upper back) should be emphasized.

CONCLUSIONS

After adjusting for age, gender, body mass index, and work experience, the current work concluded that prolonged sitting (>8 hours per day) is a significant risk factor for the development of piriformis syndrome among physiotherapists. The borderline association was with postural imbalance. The results indicate the following recommendations: Ergonomic interventions, frequent micro-breaks, and postural training programs to minimize the musculoskeletal risks at work for this professional group.

DOI: https://doi.org/10.54393/pbmj.v9i4.1363

Acknowledgement

We express our profound appreciation to the physiotherapists who engaged in this study for their time and significant contributions. We express gratitude to the administrative and clinical personnel at the participating hospitals in Lahore for their assistance in data collection. Gratitude is extended to all writers for their technical assistance and guidance. We value the critical criticism from our peer reviewers, which significantly enhanced the work. This study was undertaken as a component of the Doctor of Physical Therapy degree at the University of Lahore.

Authors' Contribution

Conceptualization: ZN
Methodology: ZN
Formal analysis: ZN
Writing and Drafting: ZN, ST
Review and Editing: ZN, ST

All authors approved the final manuscript and take responsibility for the integrity of the work

Conflicts of Interest

The authors declare no conflict of interest.

Source of Funding

The author received no financial support for the research, authorship and/or publication of this article.

REFERENCES

[1] Nazir S, Asmat G, Ashfaq U, Saeed T. Frequency of Piriformis Syndrome among Female Physiotherapy Students of Gujranwala, Pakistan: Piriformis Syndrome among Female Physiotherapy Students. Pakistan Biomedical Journal. 2022 Jan: 103-7. doi: 10.54393/pbmj.v5i1.175.

[2] Siahaan YM, Tiffani P, Tanasia A. Ultrasound-Guided Measurement of Piriformis Muscle Thickness to Diagnose Piriformis Syndrome. Frontiers in Neurology. 2021 Sep; 12: 721966. doi: 10.3389/fneur.2021.721966.

[3] Pande A, Gopinath RA, Ali S, Adithyan R, Pandian S, Ghosh S. Piriformis Syndrome and Variants–A Comprehensive Review on Diagnosis and Treatment. Journal of Spinal Surgery. 2021 Oct; 8(4): 7-14. doi: 10.4103/joss.joss_19_21.

[4] Yan K, Xi Y, Hlis R, Chhabra A. Piriformis Syndrome: Pain Response Outcomes Following CT-Guided Injection and Incremental Value of Botulinum Toxin Injection. Diagnostic and Interventional Radiology. 2020 Nov; 27(1): 126. doi: 10.5152/dir.2020.19444.

[5] Du SH, Zhang YH, Yang QH, Wang YC, Fang Y, Wang XQ. Spinal posture Assessment and Low Back Pain. EFORT Open Reviews. 2023 Sep; 8(9): 708-18. doi: 10.1530/EOR-23-0025.

[6] Hooker DN and Prentice WE. Rehabilitation of Injuries to the Spine. In Rehabilitation Techniques for Sports Medicine and Athletic Training. 2024 Jun: 785-840. doi: 10.4324/9781003526308-28.

[7] Vij N, Kiernan H, Bisht R, Singleton I, Cornett EM, Kaye AD *et al.* Surgical and Non-Surgical Treatment Options for Piriformis Syndrome: A Literature Review. Anesthesiology and Pain Medicine. 2021 Feb; 11(1): e112825. doi: 10.5812/aapm.112825.

[8] Rybski MF. Kinesiology for Occupational Therapy. Taylor and Francis. 2024 Jun. doi: 10.4324/9781003524724.

[9] Guner D and Ozcete ZA. Evaluation of the Efficacy of Ultrasound-Guided Dry Needling Therapy and Exercise in Piriformis Muscle Syndrome. Cureus. 2023 Aug; 15(8). doi: 10.7759/cureus.43804.

[10] Doosti IR, Golpayegani M, Faraji F. The Effect of Core Stability Exercises on Pain and Inflammation of Patients with Piriformis Syndrome. Journal of Arak University of Medical Sciences. 2022; 25(2): 310-23. doi: 10.32598/jams.25.2.6890.1.

[11] Carmona-Barrientos I, Gala-León FJ, Lupiani-Giménez M, Cruz-Barrientos A, Lucena-Anton D, Moral-Munoz JA. Occupational Stress and Burnout Among Physiotherapists: A Cross-Sectional Survey in Cadiz (Spain). Human Resources for Health. 2020 Nov; 18(1): 91. doi: 10.1186/s12960-020-00537-0.

[12] Kinaci E and Ataoğlu S. Work-Related Musculoskeletal Disorders Among the Physiotherapists: Sample of a Region in Turkey. Türkiye Klinikleri Journal of Health Sciences. 2020 Sep; 5(3). doi: 10.5336/healthsci.2019-71762.

[13] Othman IK, Raj NB, Siew Kuan C, Sidek S, Wong LS, Djearamane S *et al.* Association of Piriformis Thickness, Hip Muscle Strength, and Low Back Pain Patients with and Without Piriformis Syndrome in Malaysia. Life. 2023 May; 13(5): 1208. doi: 10.3390/life13051208.

[14] Fishman LM, Dombi GW, Michaelsen C, Ringel S, Rozbruch J, Rosner B *et al.* Piriformis Syndrome: Diagnosis, Treatment, And Outcome—A 10-Year Study. Archives of Physical Medicine and Rehabilitation. 2002 Mar; 83(3): 295-301. doi: 10.1053/apmr.2002.30622.

[15] Robinson LR. Is the FAIR - Test A Fair Method of Detecting Piriformis Syndrome? Muscle and Nerve. 2019 Sep; 60(3): E20. doi: 10.1002/mus.26634.

[16] Wu YY, Guo XY, Chen K, He FD, Quan JR. Feasibility and Reliability of an Ultrasound Examination to Diagnose Piriformis Syndrome. World Neurosurgery. 2020 Feb; 134: e1085-92. doi: 10.1016/j.wneu.2019.11.

DOI: https://doi.org/10.54393/pbmj.v9i4.1363

098.

[17] Vitoulas S, Konstantis V, Drizi I, Vrouva S, Koumantakis GA, Sakellari V. The Effect of Physiotherapy Interventions in the Workplace Through Active Micro-Break Activities for Employees with Standing and Sedentary Work. In Healthcare. 2022 Oct; 10(10): 2073. doi: 10.3390/healthcare10102073.

[18] Miller M. Exploring Body Image Through the Injury and Rehabilitation Process of Female Intercollegiate Gymnasts: A Multi-Case Study. 2021.

[19] Jacquier-Bret J and Gorce P. Prevalence of Body Area Work-Related Musculoskeletal Disorders among Healthcare Professionals: A Systematic Review. International Journal of Environmental Research and Public Health. 2023 Jan; 20(1): 841. doi: 10.3390/ijerph20010841.

[20] Alshehri MA, Alzahrani H, van den Hoorn W, Klyne DM, Vette AH, Hendershot BD *et al.* Trunk Postural Control During Unstable Sitting Among Individuals with and Without Low Back Pain: A Systematic Review with an Individual Participant Data Meta-Analysis. PLoS One. 2024 Jan; 19(1): e0296968. doi: 10.1371/journal.pone.0296968.

[21] Hargreaves EA, Hayr KT, Jenkins M, Perry T, Peddie M. Interrupting Sedentary Time in the Workplace Using Regular Short Activity Breaks: Practicality from an Employee Perspective. Journal of Occupational and Environmental Medicine. 2020 Apr; 62(4): 317-24. doi: 10.1097/JOM.0000000000001832.

[22] Elkefi S, Sabra R, Marie Hajjar J, Idriss-Wheeler D, Aref E. The Role of Participatory Ergonomics in Supporting the Safety of Healthcare Workers; A Systematic Review. Theoretical Issues in Ergonomics Science. 2025 May; 26(3): 257-303. doi: 10.1080/1463922X.2024.2373439.

[23] Kanumuri S, Andrew D, Kumar S, Chhabra A. Piriformis Syndrome and Deep Gluteal Syndrome: Presentation, Diagnostic Imaging, and Management. In Imaging of the Hip and Bony Pelvis: Techniques and Applications. Cham: Springer Nature Switzerland. 2024 Mar: 369-384. doi: 10.1007/174_2024_481.

[24] Liyew WA. Clinical Presentations of Lumbar Disc Degeneration and Lumbosacral Nerve Lesions. International Journal of Rheumatology. 2020; 2020(1): 2919625. doi: 10.1155/2020/2919625.

[25] Dulhani O and Mukherjee M. Musculoskeletal Disorders in Dentists and Relearning the Ergonomics. Journal of Dentistry Defense Section. 2022 Jan; 16(1): 72-6. doi: 10.4103/jodd.jodd_15_21.