

**UNIVERSITI TEKNOLOGI MARA**

**RELATIONSHIP OF PIRIFORMIS  
THICKNESS WITH HIP MUSCLE  
STRENGTH AND ACTIVATION IN  
PATIENTS WITH LOW BACK PAIN**

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## AUTHOR'S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

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## ABSTRACT

Piriformis thickness is strongly related to Piriformis Syndrome (PS), presented as spasm and hypertrophy of the muscle. The association between piriformis thickness as well as morphological and functional of gluteal muscles changes in PS has yet to be elucidated. This study aimed to determine the relationship between the piriformis, gluteus maximus and gluteus medius thickness, strength and activation among Low Back Pain (LBP) participants with and without PS. A total number of 91 participants, LBP and PS ( $n=36$ ), LBP without PS ( $n=24$ ) and healthy ( $n=31$ ), were screened for inclusion and exclusion criterias. PS distinguished by negative radiography, specific signs and symptoms and a positive PS test. Piriformis and gluteus muscle thickness, strength and activation were measured using ultrasonography (USG) and surface electromyogram, respectively. One-way ANOVA test demonstrated no significant difference in piriformis thickness between LBP with PS and LBP without PS ( $p>0.01$ ). Piriformis thickness was inversely correlated with gluteus maximus strength ( $r= -0.4$ ,  $p <0.05$ ) and positively correlated with gluteus medius activation ( $r= 0.48$ ,  $p<0.01$ ) in LBP with PS. In LBP with PS, stepwise linear regression showed significant association between piriformis thickness with gluteus maximus strength ( $R= -0.34$ , accounted for 11% of the variance) and gluteus medius activation in prone lying with hip externally rotated, abducted and extended (ERABEX) position ( $R= 0.43$ , accounted for 23% of the variance). With age and gender adjusted, piriformis thickness, gluteus maximus strength and gluteus medius activation in prone lying with hip ERABEX showed significant association, however no independent effect of age and gender within the range. Meanwhile, in LBP without PS, a significant association between piriformis thickness and gluteus maximus thickness was observed ( $R= 0.44$ , accounted for 19% of the variance). Information on this relationship may provide a better understanding of the piriformis and gluteus muscle actions and functions in LBP with and without PS.

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