

## Performance of Spinal Supporting Muscles under Different Angles of Spinal Flexion for 4 Combination of Flexion/Extension and Sitting / Standing Positions.

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Low back pain is a common problem throughout the world. To provide, or evaluate, a preventive, or therapeutic, exercise program, a physiotherapist should be familiar with the functional biomechanics of spine and muscles supporting it. This study was designed, as an explanatory research, to provide necessary information about the performance of spinal supporting muscles, when the lumbar spine flexes at angles of 0, 20, 40 and 60 degrees in four combination of flexion/extension and sitting/standing positions. To measure the performance of the muscles, a modified ISO-Station 200 – B instrument was used . This instrument measures the performance via maximun and average torques.

Behavior of max.torques was the same as ave.torques; hence the latter was selected as the response variable of the study.

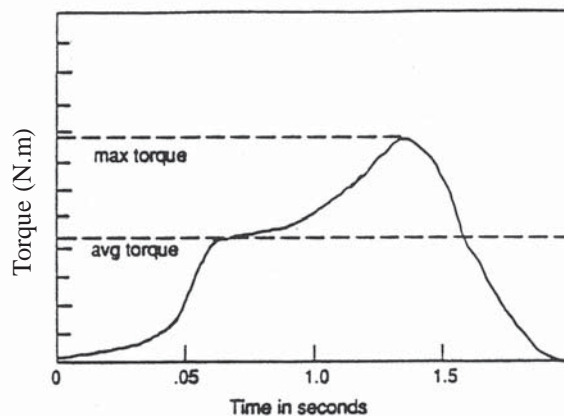
Explanatory variables of the study are:

- (1) Flexion.Angle of the lumbar spine having values of 0, 20, 40 & 60 degree.
- (2) Standing position with values: 1 = Standing , 0 = Sitting.
- (3) Extension position with values: 1=Extension, 0 = Flexion.
- (4) COMBINATION with values: Ext.Sit, Flex.Sit, Ext.Stand, Flex.Stand.

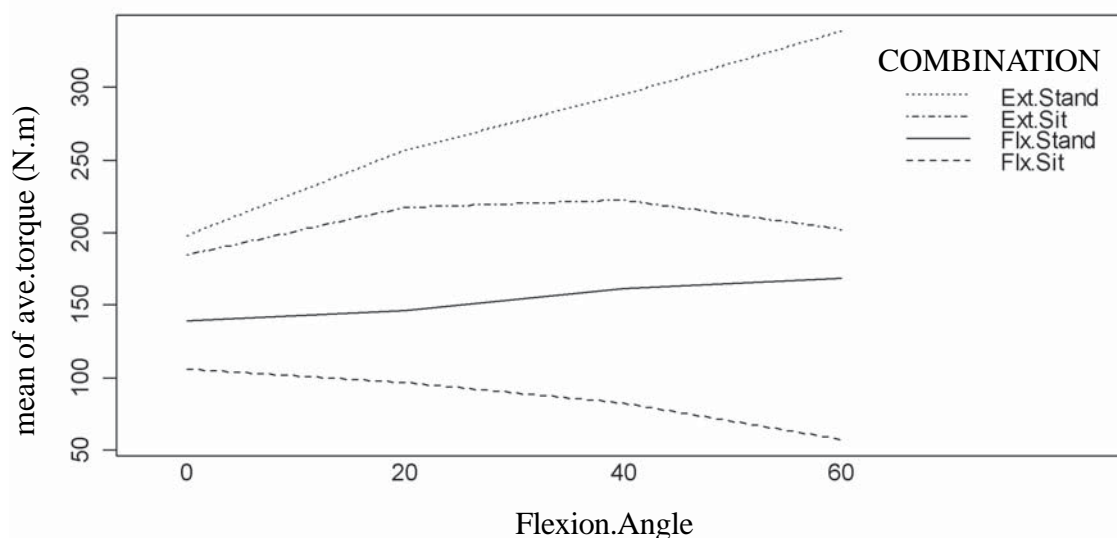
This is a repeated measure problem where the response variable is measured at 16 different conditions for each participant. Participants were 30 healthy male students with age range of 20-30 years.

Besides various summary statistics & graphs, basically we can explain the whole picture of the study, by using three R- functions:

- (1) interaction.plot (Flexion.Angle, COMBINATION, ave.torque)
- (2) summary (ao (ave.torque~ (Flexion.Angle + Stand + Ext)^2 + Error(participant)))



max. torque & avg.torque are calculated by ISO-Station 200-B



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