

Evaluation the Influence of Trunk Bracing in Joint Contact Forces in Subjects with Scoliosis

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Abstract : Background: Scoliosis is the lateral curvature of the spine which may influence the abilities of the subjects during standing and walking. Most of the scoliotic subjects use orthosis to reduce the curve and to decrease the risk of curve progression. There was lack of information regarding the effects of orthosis on kinematic and joint contact force. Therefore, this research was done to highlight the effects of orthosis on the aforementioned parameters. Method: 5 scoliotic subjects were recruited in this study, with single curve less than 40 (females with age 13.2 ± 1.7). They were asked to walk with and without orthosis. The kinematic of the joints, force applied on the legs, moments transmitted through the joints and joint contact forces were evaluated in this study. Moreover, the lengths of muscles were determined by use of computer muscle control approach in OpenSim. Results: There was a significant difference between the second peak of vertical ground reaction force while walking with and without orthosis ($p\text{-value} < 0.05$). There was no difference between spatiotemporal gait parameters while walking with and without orthosis ($P\text{-value} > 0.05$). The mean values of joint contact forces (vertical component) increased by the use of orthosis, but the difference was not significant ($p\text{-value} > 0.05$). Conclusion: Although the kinematic of most of the body joints was not influenced by the use of orthosis, the joint contact force may be increased by orthosis. The increase in joint contact force may be due to the performance of orthosis which restricts the motions of pelvic and increases compensatory mechanism used by the subjects to decrease the side effects of the orthosis.

Keywords : scoliosis, joint contact force, kinetic, kinematic

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