

Is It Safe to Use Kinetic Bed Therapy During ICU Management of the Trauma Patient With an Unstable Cervical Spine Injury?

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Background/Purpose: Polytrauma patients with spinal injuries are often too unstable physiologically for early surgery and must be managed in the ICU prior to surgical stabilization. During their stays in the ICU they must be removed from the spine board and managed for skin breakdown. This is typically accomplished by manually turning the patient with log-rolling by the nursing staff. We sought to evaluate whether a kinetic therapy bed would result in less spinal motion at an unstable cervical injury as occurs during manual log-rolling on a standard ICU bed.

Methods: Unstable C5-C6 ligamentous injuries were created in 15 fresh, whole cadavers. Sensors were rigidly affixed to C5 and C6 posteriorly and electromagnetic motion tracking analysis performed (Liberty device; Polhemus, Colchester, VT). Cervical collars were placed by a certified orthotist. The amount of angular motion and linear displacement that occurred at this injured level was measured during manual log-rolling and patient turning using a kinetic therapy bed. The maximum setting of 40° was used on the TotalCare Sp02RT bed (Hill-Rom, Batesville, IN). Log-rolling was done by turning the cadaver and placing two pillows underneath as is typical in the ICU setting. For statistical analysis, the range of motion for angles about each axis and displacement in each direction were analyzed by multivariate analysis of variance with repeated measures. Significance was set at a *P* value of 0.05 or less.

Results: When comparing manual log-rolling and kinetic bed therapy, significantly more angular motion was created by the log-roll maneuver in flexion-extension (*P* = 0.03) and lateral bending (*P* = 0.01). There was no significant difference in axial rotation between the two methods (*P* = 0.80). There were no significant differences demonstrated in medial-lateral and anterior-posterior translation. There was almost two times the axial displacement between manual log-rolling and the kinetic therapy bed and this reached statistical significance (*P* = 0.05).

Conclusion: There is less motion at an unstable cervical injury in flexion-extension, lateral bending, and axial displacement when turning a cadaver using a kinetic therapy bed as opposed to traditional manual log-rolling. It may be advantageous to use a kinetic therapy bed rather than manual log-rolling for patients with cervical spine injuries as it results in less motion at the injured segment and there is less physical exertion on the ICU staff.

- The FDA has not cleared this drug and/or medical device for the use described in this presentation (i.e., the drug or medical device is being discussed for an "off label" use). For full information, refer to page 600.