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**Cervical Spine Motion in Manual Turning vs. Jackson Table Turning Methods in a Cadaveric Global Instability Model**

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**INTRODUCTION:** Patients with an unstable cervical spine (UCS) remain at high risk for further secondary structural and neurological injury until their spine is adequately surgically stabilized. The transfer of the patient with an UCS from the bed to the operating table may induce potentially undesirable cervical motion. Previous studies have revealed that collars have significant but limited benefit[1, 2] in preventing cervical motion when patients are transferred manually. The literature proposes multiple methods of patient transfer, though no one method is universally adopted. The ideal transfer method would eliminate cervical motion, prevent secondary injury, and be universally applicable. To date no study has effectively evaluated the spine motion experienced by a patient being moved to an operating room table by the various transfer methods.

**METHODS:** For this study, five lightly embalmed cadavers with no previous history of cervical spine pathology were used. A global instability was surgically created at the C5-6 level. All cadavers were tested both with and without a rigid cervical collar. In addition, three headrest permutations were evaluated (Mayfield, Prone View, or foam headrest). A trained group of medical staff performed each of the transfer methods: the “Manual” and the “Jackson table” transfer. The Manual technique entailed performing a standard rotation of the supine patient on a stretcher to the prone position on the OR table with in-line manual cervical stabilization. The Jackson technique involved sliding the supine patient to the Jackson table with manual in-line cervical stabilization, securing them to the table, then initiating the table’s lock and turn mechanism and rotating them into a prone position. An electromagnetic tracking device (Liberty, Polhemus Inc., Colchester VT) captured angular movements (flexion, extension, rotation, lateral bending and) between the C5-6 vertebral segments. Repeated measures statistical analysis was performed to evaluate the following conditions: collar use (2 levels), headrest (3 levels) and turning technique (2 levels).
RESULTS: For all measures (angulation and translation) there was significantly more cervical spine motion during manual prone positioning compared to using the Jackson table (Figure 1). Using a collar provided a slight reduction in motion in all planes of movement, but was only significantly different from the no collar condition in axial rotation. Differences between the headrest type (Figure 2) were observed in lateral bending (Foam Pillow<Prone View, p=0.045), medial lateral translation (Foam Pillow<Mayfield, p=0.032), and anterior posterior translation (Prone View<Mayfield, p=0.030).

CONCLUSION: The data suggest that the manual transfer technique produces 2-3 times more cervical spine angular motion than the Jackson table method of transfer (Figure 1). Using a collar provides significant benefit in limiting spine motion that is only observed in axial rotation. Choice of headrest does have a significant effect on the amount of motion allowed during turning, with the Foam Pillow and Prone View generally providing more effective stabilization compared to the Mayfield.

REFERENCES:
Figure 2: Cervical spine angular motion during prone positioning (headrest type)

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