Range-of-Motion Restriction and Craniofacial Tissue-Interface Pressure From Four Cervical Collars

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Abstract

Background: Occipital pressure ulcers are well-known complications for trauma patients wearing cervical collars. We assessed the effects of four commercial cervical collars (Aspen, Philadelphia, Miami J, and Miami J with Occian back [Miami J/Occian]) on cervical range of motion (CROM) and mandibular and occipital tissue-interface pressure (TIP).

Methods: Forty-eight healthy volunteers (24 men, 24 women; mean age, 38.9 years ± 10.5 years) were stratified by body mass index. CROM was measured in the seated position without and with collars. Sagittal, coronal, and rotatory CROM was measured with a goniometer. Occipital and mandibular pressures were mapped with subjects in upright and supine positions.

Results: All collars significantly restricted CROM in all planes (p < 0.001). The Philadelphia and standard Miami J collars were the most restrictive. The Aspen collar was the least restrictive for flexion and rotation. The Miami J/Occian back was the least restrictive for extension and lateral flexion. For supine measurements, Miami J and Miami J/Occian back had the lowest mean TIP, whereas Aspen and Philadelphia collars had the greatest (p < 0.001). For upright measurements, the Miami J/Occian back produced the smallest mean TIPs; the other collars, ranked by ascending TIP, were Philadelphia, Miami J, and Aspen (p < 0.001). Philadelphia and Miami J collars had significant collar-body mass index interaction effects on supine occiput mean pressure (p = 0.04).

Conclusions: Miami J and Philadelphia collars restricted CROM to the greatest extent. Miami J and Miami J/Occian back had the lowest levels of mandibular and occipital pressure; these collars may markedly reduce the risk of occipital pressure ulcers without compromising immobilization.
Improving Practice
Efforts to Reduce Occipital Pressure Ulcers

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Abstract

Cervical collars are necessary to stabilize the cervical spine of trauma patients but are known to contribute to the development of occipital pressure ulcers. A quality improvement project that began on one nursing unit stimulated the development of evidence-based practice guidelines and a multidisciplinary research study. As a result, a standardized plan of care and cervical collar recommendations were implemented, resulting in a sharp decline in the incidence of occipital pressure ulcers.

Results

“On the basis of the study’s findings, it was recommended that the Miami J collar be used as the standard cervical collar for trauma patients and that the Occian Back of the Miami J collar be used when patients were on strict spine precautions or bed-rest. Implementation occurred during first quarter of 2006 and resulted in an 89% reduction in the incidence of occipital pressure sores in 2006 as compared to 2005”.

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