Evaluating Spinal Immobilization Effects on Patient Pain and Vital Signs at 0- and 20-degrees

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1. INTRODUCTION

Spinal immobilization (SI) is a technique where a patient is stabilized using a long backboard and cervical collar to reduce movement. This is used in most trauma cases for patients at risk of spinal cord injuries, and is intended to reduce the exacerbation of current injury. Although SI is effective in protecting spinal cord injuries, the technique has raised concerns about side effects such as decreased respiratory function,[1] increased pressure in the head,[2] and pain in the body from being immobilized.[3]

Patients that require SI are usually positioned on their back at a 0-degree angle. Another viable SI position is the reverse Trendelenburg, where a patient is positioned flat on their back with their head elevated above their feet. This study compares these two positions, ultimately to determine if the reverse Trendelenburg position at 20-degrees would reduce SI pain/discomfort and side effects, primarily the decrease in respiratory function, while maintaining effective stabilization.[4] Although the study is hopeful for the 20-degree position, concerns were posed for if the position would cause increased discomfort and pain in the lower extremities due to gravity.

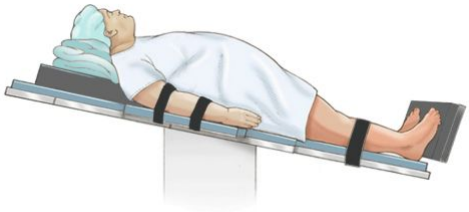

Figure 1 Reverse Trendelenburg position.[5]

2. PRIMARY FINDINGS

This study utilized 51 adult volunteers 25 to 45 years old with no chronic illnesses or preexisting pains.[4] The experiment was split into two sessions, where each were at least a week apart. In session one, each volunteer was immobilized at the 0-degree position for one hour. In session two, each volunteer was immobilized at the 20-degree position for one hour. Both conditions utilized a long backboard and cervical collar, and were followed by a 30 minute rest and physical examination. Vitals were collected at trial start and at 15, 30, and 60 minutes. To assess pain and discomfort, patients were tested using the visual analog scale (VAS) for various regions to rate their pain.

In result, there was a statistical difference between the tested positions. At 0-degrees, there was a significant decrease in vital readings, especially a drop in oxygen saturation. Meanwhile at 20-degrees, patients experienced a maintenance or increase in oxygen saturation over time. Regarding the VAS pain scoring, there was no statistically significant difference between the 0- and 20-degree groups, however both experienced about the same increase in pain over time.[4]

3. HOW THIS IMPACTS PATIENT CARE

Evaluating proper and effective SI is crucial for the safety of trauma patients, especially those with suspected spinal cord injuries. Therefore, it is important to determine the best SI position to allow for effective stabilization without side effects, and without increased pain for the patients. This study directly affects patient care because it shows that both 0- and 20-degrees are viable SI positions, but 20-degrees may be more effective in maintaining and/or increasing respiratory function, which may be especially useful for patients with history of pulmonary conditions like COPD.[4] Although there was not a significant difference in pain associated with either position, the increase in patient vital signs at 20-degrees lends this position to be more useful for certain patient populations.

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Maddie joined RAP-EMCC to be involved with clinical research, with specific interest in emergency medicine, to experience interaction with patients and hospital staff. Maddie is an undergraduate student at the University of Maryland majoring in Chemistry and a minor in Health, Humanities, and Medicine. She is involved in many on and off campus activities. At UMD, she is a member of the pre-medical chapter of Phi Delta Epsilon, a dancer and choreographer on the Unbound Dance Team, and part of the Gemstone's Honors research program. Off campus, Maddie devotes her time to learning more about the medical field by volunteering at the UMMC shock trauma center. A fun fact about Maddie is she traveled this summer to shadow doctors and a variety of specialties in a renowned international hospital, Carlo Poma in Mantova, Italy. In her free time, she loved going to the gym, spending time with friends and family, and playing board games.