

Paramedic CAT (Critically Appraised Topic)

Title: Powered Stretchers Versus Manual Stretchers

Report By: Joshua Neto

2nd Party Appraiser: Alan Batt

Clinical Scenario:

A paramedic crew is dispatched to a home for an 65 year-old male complaining of being generally unwell. The crew performs their assessments and decides to load the patient onto their stretcher and depart from the scene. The crew works for a service which does not have powered stretchers and powered load systems. When loading up the stretcher into the ambulance, the paramedic on the foot end of the stretcher throws out their back, forcing them to take time off of work. This is a scenario that is all too prevalent in emergency medical services today, one that can be prevented by the implementation of powered stretchers and load systems.

PICO (Population – Intervention – Comparison – Outcome) Question:

For paramedics, does the use of powered stretchers and load systems compared to manual stretchers result in decreased incidences of musculoskeletal injury.

Search Strategy:

Database CINAHL:

(((paramedic) OR EMT) OR emergency medical technician)) AND (((powered stretcher) OR stretcher) OR manual stretcher) Limit: Publication date 2015-2020

Search Outcomes: 42

Database Google Scholar:

Do powered stretchers help paramedics? Limit: Publication date 2015-2020

Search Outcomes: 246

Relevant Papers: 3

Author, Date	Population	Design (LOE)	Outcomes	Results	Strengths/Weaknesses
Armstrong et al., 2017	274 paramedics from Hamilton Paramedic Service (HPS) and 300 paramedics from Niagara Emergency Services (NEMS). HPS paramedics served as the control group, NEMS paramedics were the experimental group.	Retrospective cohort study LOE 1	<ul style="list-style-type: none"> • Work-place injuries • Economic feasibility of powered stretchers 	Prior to powered stretcher intervention, musculo-skeletal injury rate was 20% (+/- 6.8%) and 17.9% (+/- 6.4%) in NEMS and HPS respectively. Post intervention, rates dropped to 4.3% in NEMS (a 78% reduction), and increased to 24.6% in HPS.	<p>Strengths:</p> <ul style="list-style-type: none"> • Large population used • Good use of control in order compare interventions • When injuries were reported, multiple variables were looked at such as what equipment was being used, lost time, type of injury, and what health care was provided <p>Weaknesses:</p> <ul style="list-style-type: none"> • Standard of how the retrospective data was recorded cannot be controlled • Only information analyzed was the incidence rates of

					injury, could possibly look into what forces may be applied onto the body and how the powered stretcher may help these
Lad et al., 2018	8 working paramedics	Randomized control trial LOE 2	<ul style="list-style-type: none"> • L4/L5 joint compression • Shear forces placed on spine • Right shoulder flexor moments 	There was significant decrease in compression forces placed on L4/L5 when using the powered stretcher compared to the manual stretcher to load and unload. Significant decrease in shear forces on the anterior and posterior portions of the spine, when using powered stretcher compared to manual	<p>Strengths:</p> <ul style="list-style-type: none"> • Many outcome measures that looked at the whole body overall, accurately measure the amount of force going through a person's body • Measured both cumulative and peak forces, able to get a better understanding of how the movements are affecting the body <p>Weaknesses:</p> <ul style="list-style-type: none"> • Only 8 participants in the study,

				<p>stretcher. Right shoulder flexor moments were greater with manual stretcher. Ratings of perceived exertion were less with the powered stretcher compared to the manual stretcher.</p>	<p>not enough to produce a significant power to the study</p>
<p>Potivn & Potivin, 2019</p>	<p>No physical participants, computer simulations were done with 3 different sized paramedics</p>	<p>Prospective study LOE 1</p>	<ul style="list-style-type: none"> • Trunk rotation • Knee flexion • Hand force • Lumbar compression force • Lumbar shear force • Shoulder movement • Elbow flexion • Hip extension 	<p>For all outcome measures, using a powered cot and powered loading system applied significantly less force to the body. Leads to the conclusion that the powered systems are better for preventing injuries.</p>	<p>Strengths:</p> <ul style="list-style-type: none"> • Computer Simulations make sure actual participants aren't getting hurt performing tasks • Used a variety of patient and EMT sizes, which is realistic in the field <p>Weaknesses:</p> <ul style="list-style-type: none"> • Only analyzing 2 postures, and done so in one plane

					<ul style="list-style-type: none"> Actual EMTs not used, only computer simulations. Some simulations may work on the computer, but not in the real world, cannot see this without using actual paramedics
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Comments:

These studies reinforce the importance of using a powered stretcher in comparison to a manual stretcher when it comes to preventing injuries and musculoskeletal disorders.

Clinical Bottom Line:

The literature indicates that the use of powered stretchers and load systems is superior when compared to manual stretchers and load systems. The evidence shows that there are less mechanical forces being applied to the body, decreasing the likelihood of injury and musculoskeletal disease. The implementation of powered stretchers and load systems would be beneficial to both the paramedic services, and the paramedics themselves. The reason being that less paramedics would be getting injured on the job, which then means that the service would be paying out less money in order to compensate for the lost time. Additionally, the paramedic would not be getting injured, meaning they can work more and have a better quality of life.

References:

- Armstrong, D. P., Ferron, R., Taylor, C., Mcleod, B., Fletcher, S., Macphee, R. S., & Fischer, S. L. (2017). Implementing powered stretcher and load systems was a cost effective intervention to reduce the incidence rates of stretcher related injuries in a paramedic service. *Applied Ergonomics*, *62*, 34–42. doi: 10.1016/j.apergo.2017.02.009
- Lad, U., Oomen, N. M., Callaghan, J. P., & Fischer, S. L. (2018). Comparing the biomechanical and psychophysical demands imposed on paramedics when using manual and powered stretchers. *Applied Ergonomics*, *70*, 167–174. doi: 10.1016/j.apergo.2018.03.001
- Potvin, J. R., & Potvin, A. W. (2019). Ergonomics demands associated with combinations of manual and powered emergency medical service cots and ambulance loading systems: A work simulation study. *International Journal of Industrial Ergonomics*, *73*. doi: 10.1016/j.ergon.2019.102831