



CENTER FOR DISRUPTIVE
MUSCULOSKELETAL INNOVATIONS

Transporter Table System

Anand Agarwal, MD
David Dick
Vijay K. Goel, PhD

This project funded by Spider Spine
Toledo, Ohio

WWW.NSFCDMI.ORG

This project aims to build a system for moving a patient between a gurney and operating room table without lifting.

- Protecting patients from handling injuries
- Protecting staff from Musculoskeletal Disorders (MSDs)
- Based on US Patent #9,463,127 granted to Leon Hochman, MD, Nancy Valvona, and Stephen Nicolato, West Bloomfield, MI.

¹<https://www.bls.gov/news.release/osh2.nr0.htm>

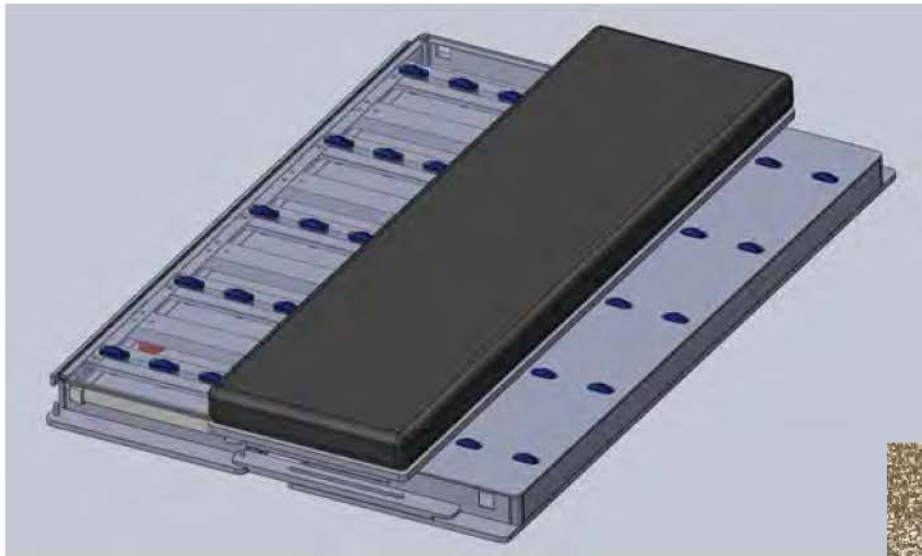
Deliverables

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October 2017 -	Solid model of design
November 2017 -	Complete prototype
June 2018 -	Prototype evaluation complete
November 2018 -	Final report

Progress – Prototyping

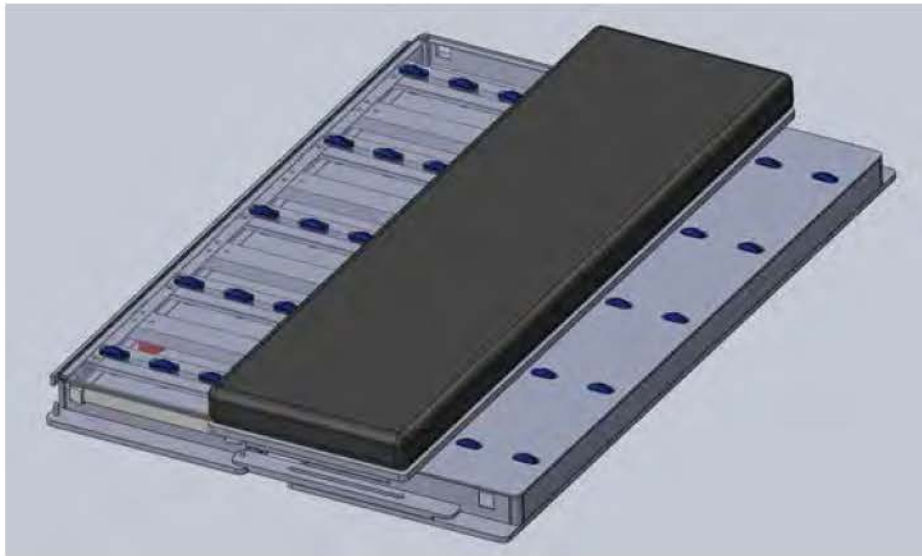
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- This design consists of units made to mount on existing gurneys and beds
- Roller wheels extend and retract using air pressure
- Provision is made to lock the units together during the transfer
- Spring loaded latches prevent overtravel
- See it here at the symposium!

Progress – Prototyping

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IAB Questions

At the last CDMI, the IAB asked about the use of a C-arm with this system, and about our plans for a study comparing the time and effort required with conventional methods

- This design is not radiolucent and not compatible with C-arm imaging.
- Effort comparisons are addressed on the following slide

Progress – Prototype Evaluation

The evaluation is divided into two areas

- Measure the effort required to effect the transfer
- Operational issues

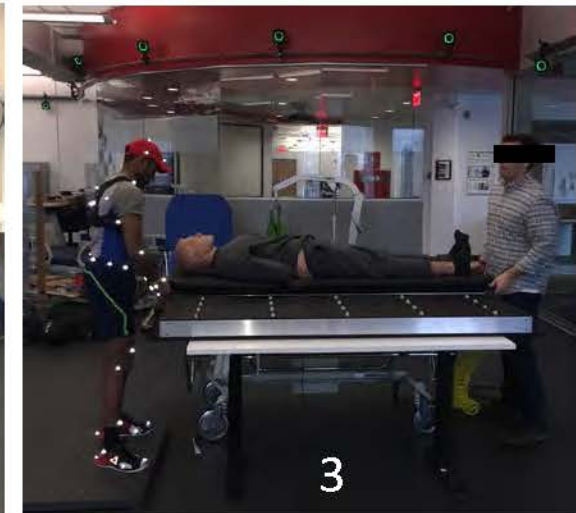
The effort measurement consists of mounting a dummy mass on the unit and measuring the force needed to complete the cycle

- As noted by the IAB at the January CDMI review, it would be valuable to have comparisons with conventional methods
 - This is a difficult question, given the variety of techniques and equipment in use
- We reached out to Dr. Bill Marras of The Ohio State University's Spine Research Institute for this data
- He offered to share his data, and also to evaluate the prototype in his facility.

Progress – Prototype Evaluation

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Ohio State Findings:

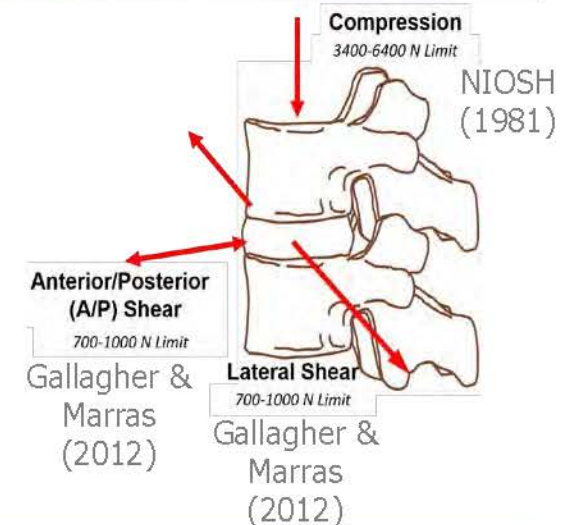


Instrumented investigators performed the transfer

1. Manually at the head and feet
2. Pushing and pulling from the center
3. Using the device (Intervention)

Heaviest dummy used was a 90% male (97kg/210lbs)

Results were presented as calculated spinal loads

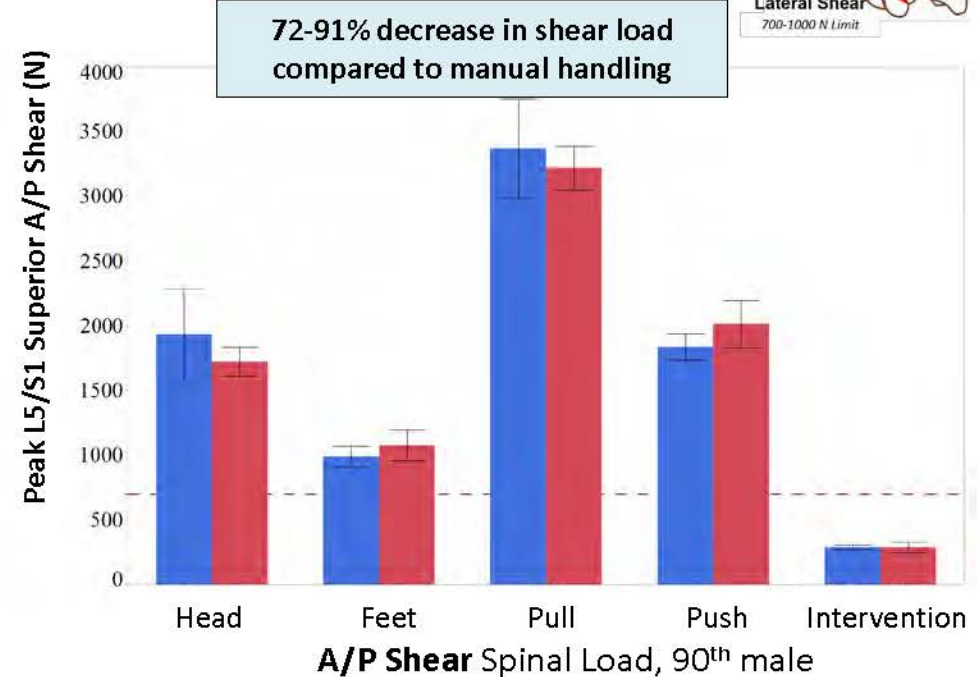
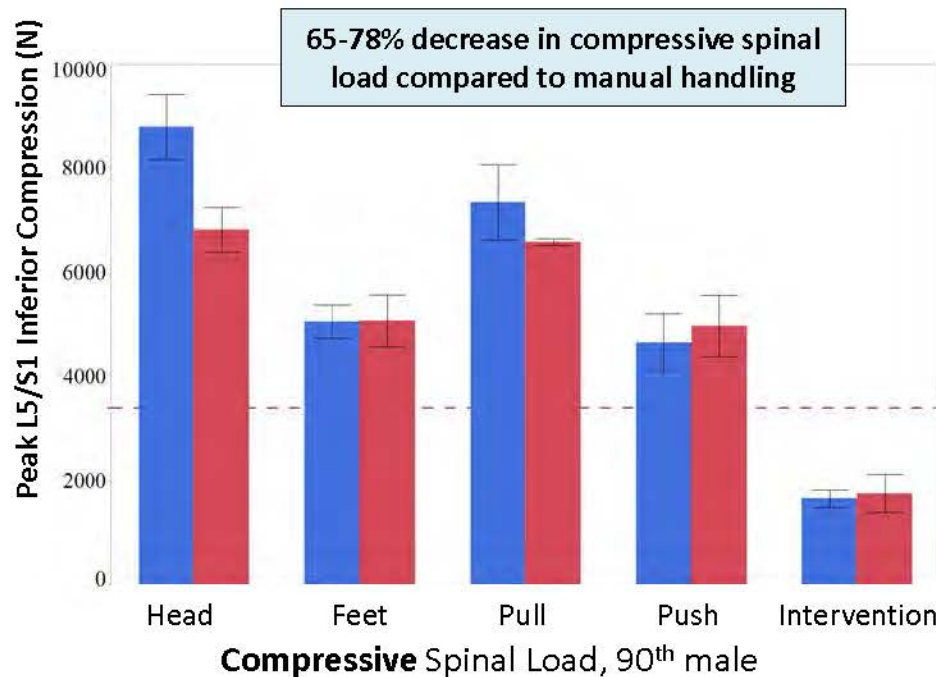
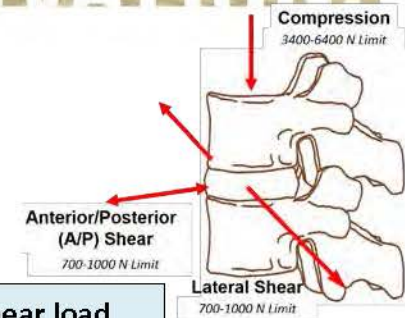


Progress – Prototype Evaluation

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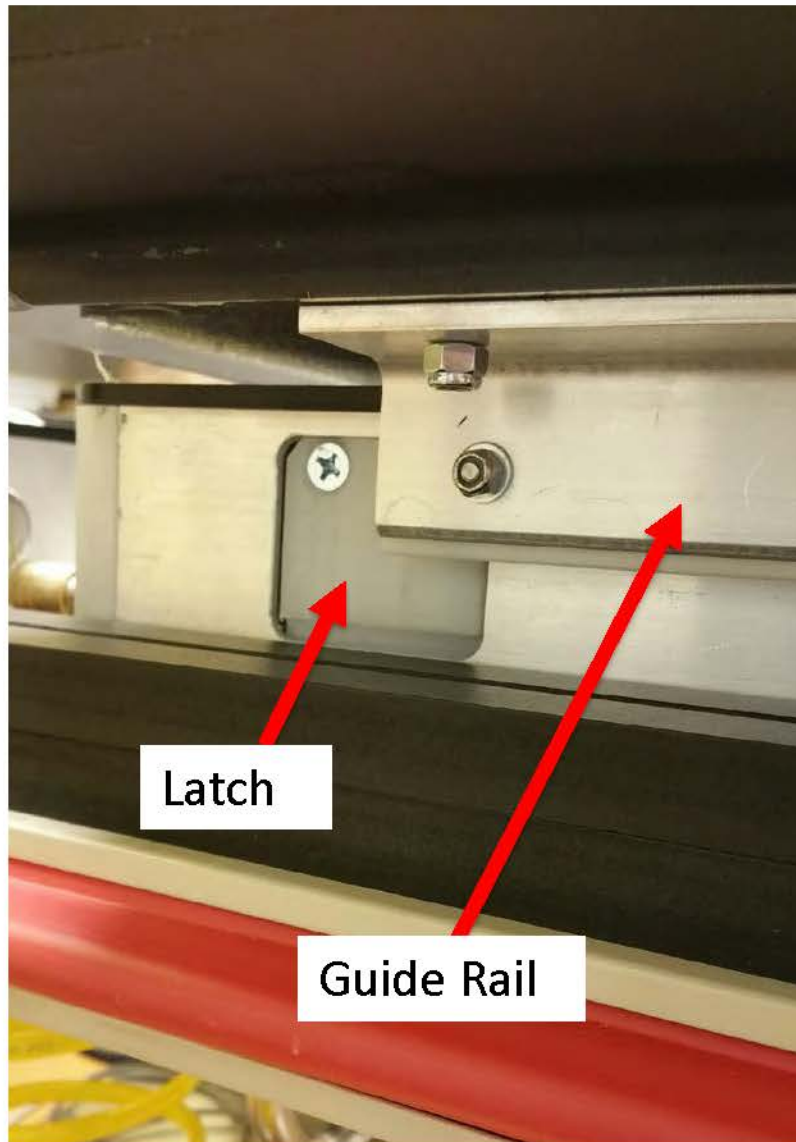
Ohio State Findings:

■ Light Patient (160 lbs)
■ Heavy Patient (210 lbs)



The transporter table intervention brought all peak spinal loads below the commonly accepted action/risk limits, indicating a considerable reduction in biomechanical risk for this intervention

Progress – Prototype Evaluation



Operational issues:

- The finger-operated latches have been identified as potential pinch hazards
- Considering a lever operated system to prevent this

Progress – Prototype Evaluation

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Operational issues, con't:

Since two people are generally present anyway when moving a stretcher with a heavy patient¹, this unit was set up to require a person at each end to operate the latches.

- It has been pointed out that for heavy patients, powered transport is recommended¹
- Changing the latch operation to a central position would allow one person to perform the transfer (Given the expected low force requirement)
 - This and powered stretchers would cooperate to reduce staff requirements.

¹AORN Guidance Statement: Safe Patient Handling and Movement in the Perioperative Setting 2007

Progress – Prototype

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Next Steps

- Evaluation complete by the June 2018 conference call
 - Test at higher patient weights
 - Literature comparisons of required forces
- Results presented via conference call at the September 2018 Fall Symposium @ UCSF
- Final written report by November 2, 2018

Acknowledgements

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I would like to thank the many members of the IAB and Ecore who have offered criticism and advice

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Spine Research Institute – Biodynamics Laboratory
Department of Integrated Systems Engineering, The Ohio State
University, Columbus, OH 43210



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Next Steps

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Thank you for your attention!



Questions?