

APPLICATION OF KINESIO® TAPE TRENDS TOWARD FACILITATION OF THE PARASPINAL MUSCLES: IMPLICATIONS FOR EXERCISE COUNTERMEASURES.

“I AM VERY GRATEFUL FOR THE EXPERIENCE, KNOWLEDGE, AND GROWTH PROVIDED BY THE NORTH DAKOTA SPACE GRANT CONSORTIUM SUMMER RESEARCH FELLOWSHIP. I WAS ABLE TO COMBINE MY KNOWLEDGE OF HUMAN PERFORMANCE WITH A PLETHORA OF TECHNOLOGIES (MANY OF WHICH WERE NEW TO ME) CAUSING ME TO GROW NOT ONLY AS A STUDENT, BUT ALSO AS A RESEARCHER.”



BACKGROUND

- Skeletal Muscle Mass Declines
- Physiological Decompensation with Spaceflight (2,6)

Exercise Countermeasures

Low back pain and injury(5)



(1)

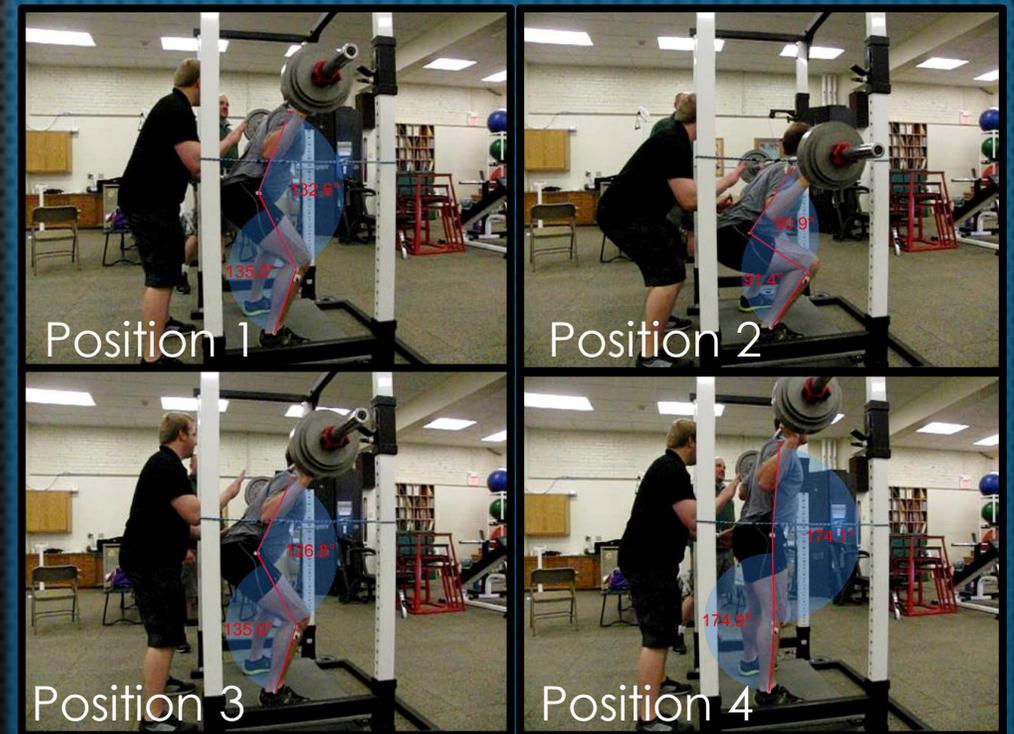
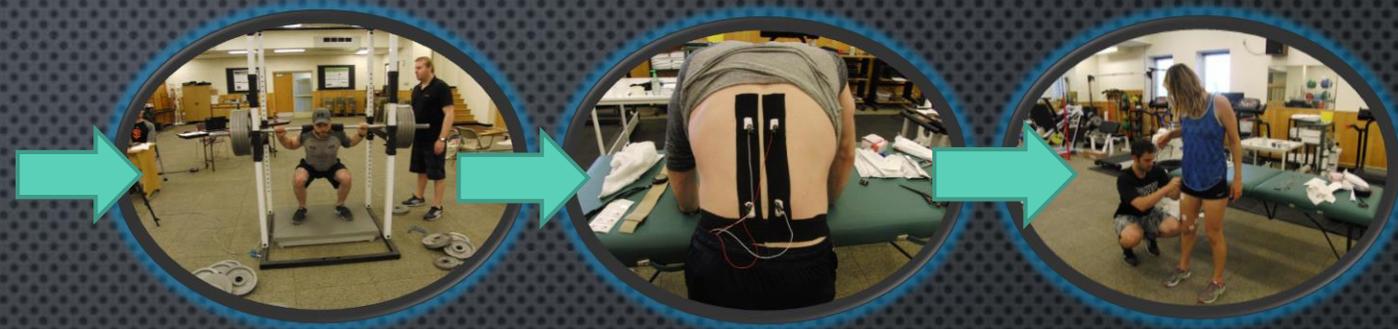
- Paraspinal muscle facilitation?



Prevention and/or alleviation of back pain?

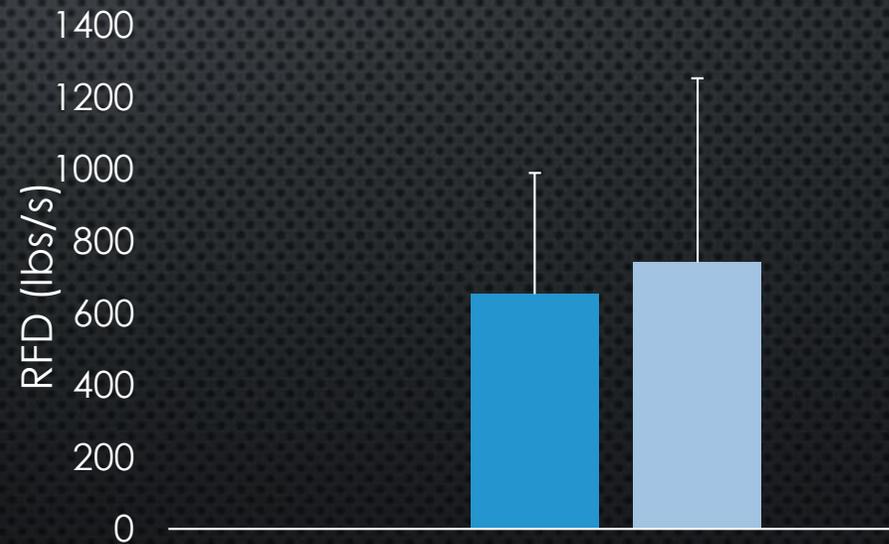
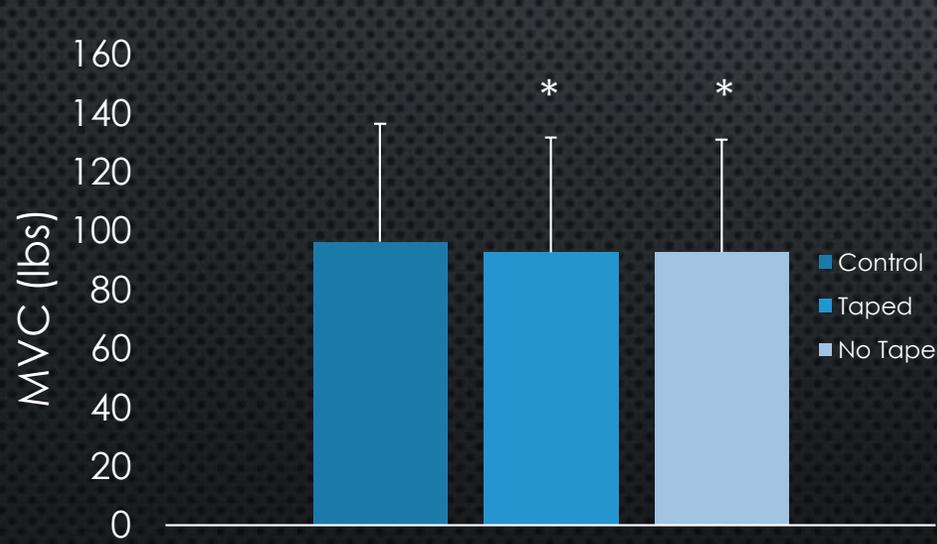
METHODS

- 32 SUBJECTS
 - AGED 25-50 YEARS
- MAXIMAL VOLUNTARY CONTRACTIONS (MVCs)
- TWO GROUPS
 - RANDOMIZED TAPING ORDER, CROSSOVER DESIGN
- RATE OF FORCE DEVELOPMENT (RFD)
- BARBELL BACK SQUAT
 - 2X8 AT 70% MVC
- MUSCLE ACTIVATION VIA SURFACE ELECTROMYOGRAPHY (EMG) (3,4).
 - RECTUS FEMORIS (RF), VASTUS MEDIALIS OBLIQUE (VMO), AND THE BILATERAL PARASPINAL MUSCLE
- JOINT KINEMATICS FOR THE HIP AND KNEE WAS RECORDED AT FOUR POSITIONS DURING THE SQUAT
 - HIP ANGLES AT ALL POSITIONS
 - KNEE ANGLES AT THE BOTTOM OF THE SQUAT



RESULTS

- SIGNIFICANT DECREASES IN MVC IN BOTH CONDITIONS
- NO SIGNIFICANT DIFFERENCES WERE OBSERVED BETWEEN CONDITIONS IN RFD (P=0.28)



* Denotes significant difference from control (p<0.05)

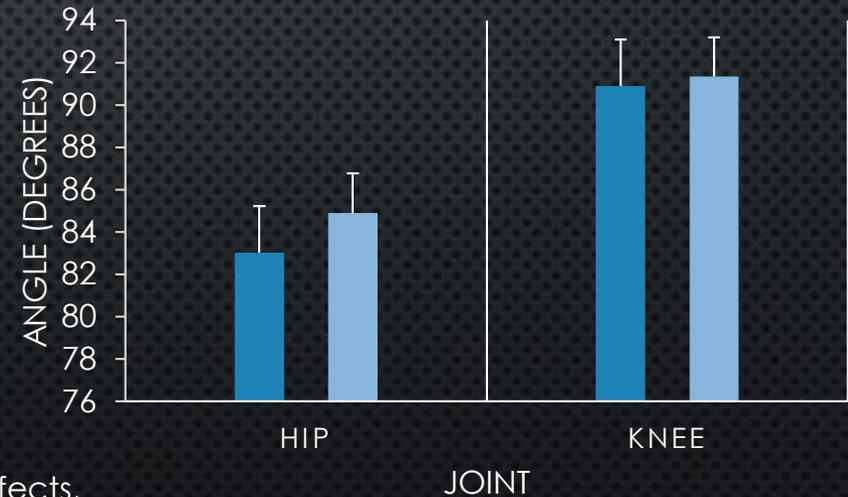
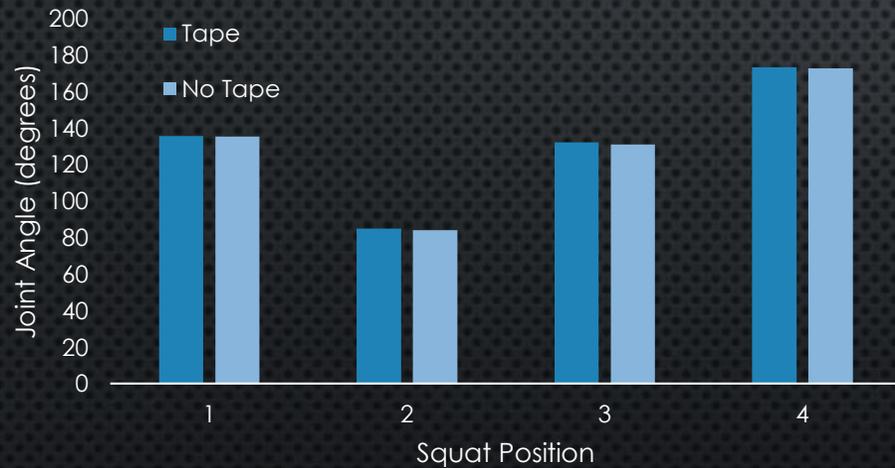
RESULTS

- THE CHANGE IN MUSCLE ACTIVATION WAS NOT STATISTICALLY SIGNIFICANT FOR THE LEFT PARASPINAL ,RIGHT PARASPINAL, RF, OR VMO.

Muscle	Change	SD	<i>t</i> (df=27)	<i>P</i>
Left	+0.0025	0.0995	0.135	0.89
Right	+0.0071	0.1356	0.274	0.77
VMO	-0.0031	0.1163	-0.139	0.89
RF	+0.0079	0.1272	0.335	0.74

RESULTS

- NO STATISTICALLY SIGNIFICANT DIFFERENCES BETWEEN THE TAPE AND NO TAPE CONDITIONS ($F[1,32.14]=.499, P = 0.486$)*.
- JOINT KINEMATICS OF THE HIP AND KNEE WERE NOT SIGNIFICANTLY DIFFERENT AT THE LOWEST POINT OF THE SQUAT *.



* To examine fatigue effects, data were analyzed using only the 8th rep for each set with a repeated measures

CONCLUSIONS

- WE HYPOTHESIZED THAT THE TAPE APPLICATION WOULD FACILITATE THE PARASPINALS AND ASSIST IN BACK EXTENSION DURING THE BACK SQUAT → CHANGES IN HIP ANGLE WITH FATIGUE AND A GREATER MAINTENANCE OF RFD.
- WE SAW THAT THE PARTICIPANTS EXPERIENCED FATIGUE
- SMALL “TRENDS” IN MUSCLE ACTIVATION ≠ “WEIGHT BELT EFFECT”
- HAVE WE POSSIBLY BEEN TESTING THE WRONG TISSUE OR UNDER THE WRONG CONDITIONS?
 - MORE RESEARCH IS NEEDED TO UNDERSTAND THE IMPLICATIONS OF TAPING ASTRONAUTS DURING LONG DURATION SPACEFLIGHT

ACKNOWLEDGEMENTS

- THE NORTH DAKOTA SPACE GRANT CONSORTIUM GRADUATE RESEARCH FELLOWSHIP
- NORTH DAKOTA STATE DEPARTMENT OF HEALTH, NUTRITION, AND EXERCISE SCIENCES
 - KATIE LYMAN, PH.D., BRYAN CHRISTENSEN, PH.D., & KYLE HACKNEY, PH.D.
- UNDERGRADUATE RESEARCH ASSISTANTS: JOSHUA BRODERSEN, JANELL BURKART, & TAMMY JOE
- 32 FANTASTIC PARTICIPANTS FROM THE FARGO-MOORHEAD AREA ☺



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