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Background

- Vastus medialis (VM) contributes to knee pain
- Strength difficult to measure
- Cross-sectional area (CSA) correlates to muscle strength
- Previous study validated panoramic ultrasound (US) to measure CSA of VM
- Assessing change in VM CSA over time can help with rehabilitation

Objective

Measure the change in VM CSA after 70 days of bedrest with panoramic US

-Control group: bedrest without exercise
-Group A: exercise
-Group B: exercise with supplemental testosterone

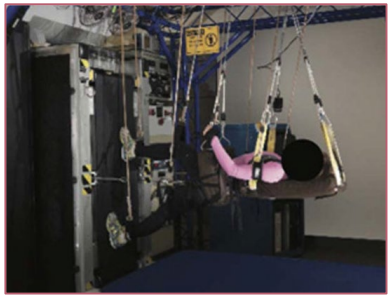

Figure 1: Vertical treadmill

NASA Methods

- **Prospective** cohort study
- 27 subjects (26 male,1 female; age:34.5 +/- 7.8 yrs)
- **70 days of bed rest** at 6-degree head down tilt
- **MRI and US images** of right lower extremity
  - 13 time points
- Oil-filled templates to identify location
- Horizontal strength and treadmill

MMC Methods

- **Secondary data** analysis using de-identified images
- **25 subjects** (2 excluded due to poor image quality)
- **Control group** (N=9): did not exercise
- **Group A** (N=8): strength training and cardiovascular training while horizontal
- **Group B** (N=8): strength training and cardiovascular training plus testosterone (IM 100 mg/2 week)

Data Analysis

- Used **distal** image of the thigh at **two time points**
- **ImageJ** software (NIH)
  - Outlined the VM in US with **freehand function**
  - Calculated CSA
- 1-way ANOVA
- SPSS for data analysis

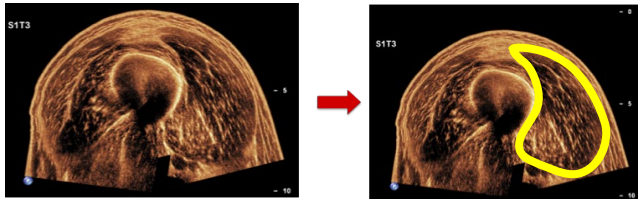

Figure 2: Outline of VM in ImageJ

Results

Group	Change in CSA (cm^2)	p value	d value
Control (no exercise)	-2.7	0.027	0.89
Group A (exercise only)	0.525	0.616	0.19
Group B (exercise + T)	0.09	0.933	0.03

Conclusion

Panoramic ultrasound detected a statistically significant decrease in the VM CSA of participants after 70 days of bedrest without exercise.

There was no statistically significant change in VM CSA in participants who underwent exercise alone or exercise plus testosterone while on bedrest.