Peripheral blood flow regulation in adults with Down syndrome

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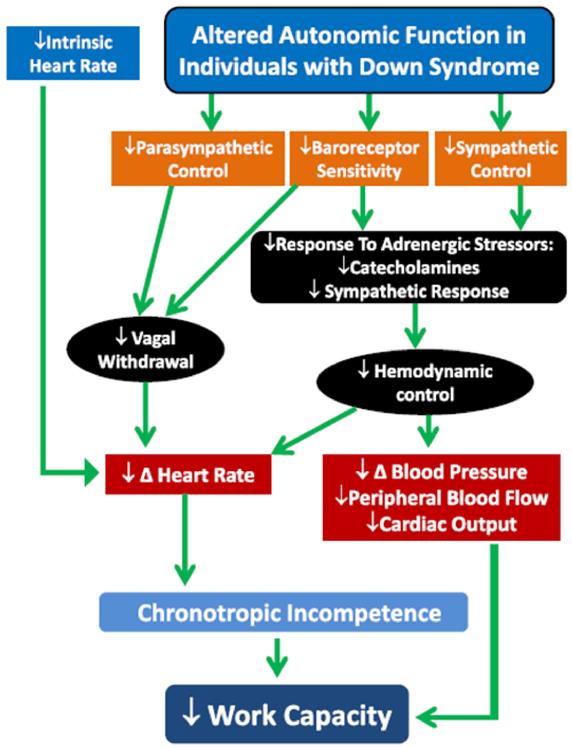
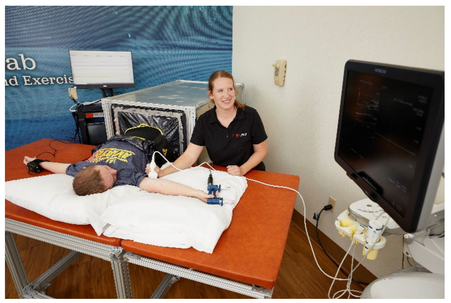
Introduction

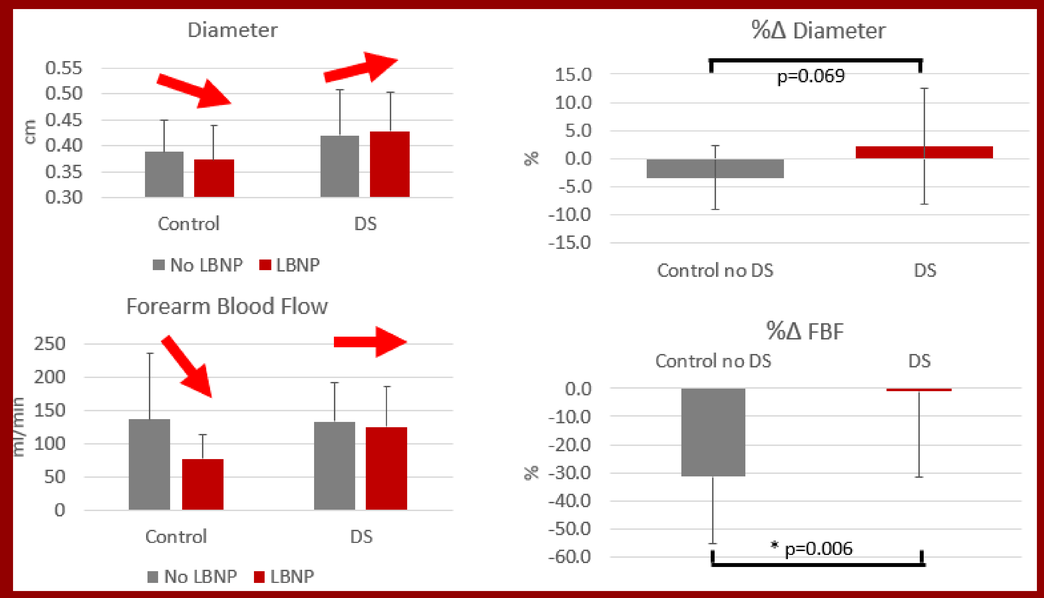
Adults with Down syndrome (DS) experience low aerobic capacity due to autonomic dysfunction, which results in altered systemic regulation of heart rate and blood pressure (Fernhall 2013). It is unknown how this impacts the regulation of peripheral blood flow.



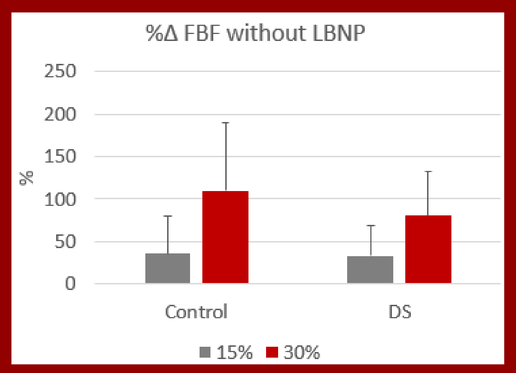
Aims

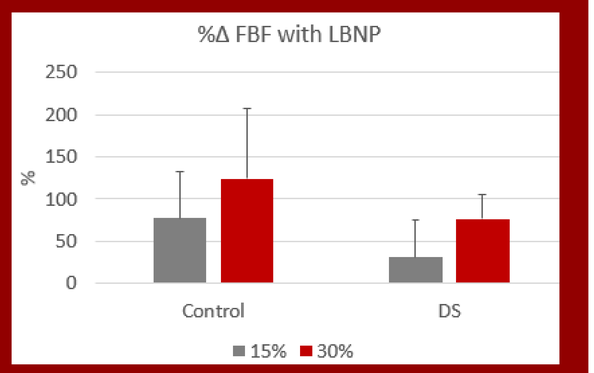
We aimed to investigate adaptations in peripheral blood flow in response to lower body negative pressure (LBNP) and hand grip exercise (HGE) in individuals with and without DS.





Adults with Down syndrome showed impaired vasoconstriction and decreased blood flow during LBNP.

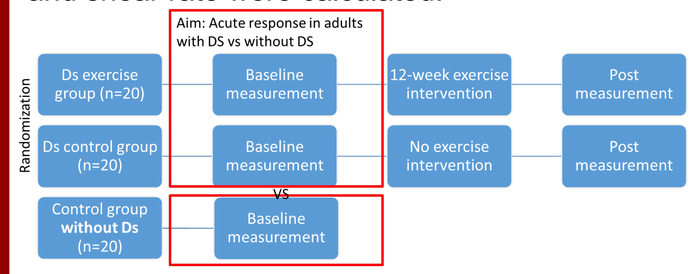




The ability to vasodilate in response to exercise seems to be sufficient at lower, but impaired at higher intensity.

Methods

Participants (DS n=11, control n=18) participated in -20 mmHg LBNP and HGE at 15% and 30% of maximum grip strength. Brachial artery diameter and velocity were recorded with ultrasonography at baseline and during LBNP and HGE, blood flow and shear rate were calculated.



Preliminary results

- **LBNP**

Between-group differences:
%Δ Diameter: p=0.069
Effect size Glass's Δ =0.541 (medium)
%Δ Forearm Blood Flow: p=0.006
Effect size Glass's Δ = 1.001 (large)

- **Handgrip exercise without LBNP**

Between-group differences:
Δ15%: p=.822, ES=0.081 (small)
Δ30%: p=.290, ES=0.381 (medium)

- **Handgrip exercise with LBNP**

Between-group differences:
Δ15%: p=.178, ES=1.047 (large)
Δ30%: p=.231, ES= 1.662 (large)

Discussion

- This study confirmed impaired vasoconstriction and decreased blood flow during LBNP, indicating blunted sympathetic control.
- The vasodilatory response to exercise seemed compromised at higher intensity and combined with LBNP.
- Results are preliminary as data collection and analyses are still ongoing.