

# CrossFit™ Intervention on Autism and Down Syndrome- A Case Study.



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## Introduction

- Down Syndrome and Autism are common disabilities, with limited research on the cause and effect on health, wellbeing and quality of life (ACSM, 2009).
- CrossFit™ claims that their training methodology can improve an individual's quality of life (Malia, 2016). Although tested on apparently healthy individuals, to date, no investigations have been conducted investigating the efficacy of strength and conditioning interventions on the improvement in physiological function, specifically balance, strength and reaction for those with Down Syndrome and Autism.

## Purpose

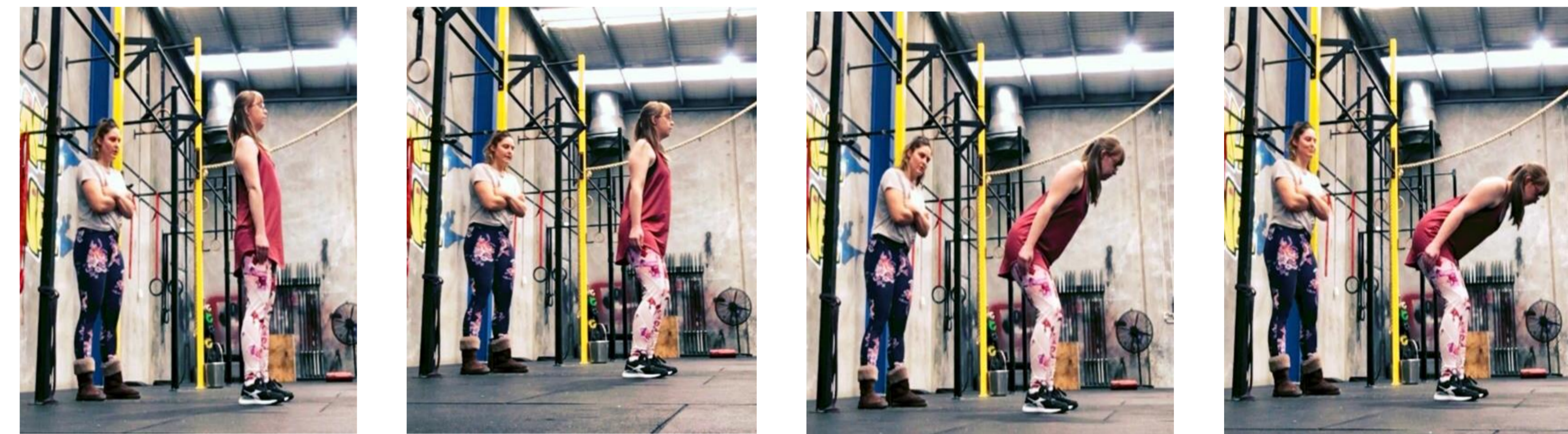
- The purpose of this investigation was to investigate the efficacy of participation in a 3-week adapted CrossFit™ training intervention on physiological function for a 30-year old female with Down Syndrome and Autism.

## Methods

- A 30-year old female with Down Syndrome and Autism participated in this case study.
- Pre and post testing consisted of the IMTP, Fitlight® reaction test and Y-Balance protocols to assess the force production, reaction and balance respectively.
- The training intervention consisted of an adapted 3-week CrossFit™ training intervention.
- Raw and percentage differences were calculated from pre- and post- intervention data.

**Table 2: Pre- and post-testing results and comparisons between left and right sides during the Y-balance, IMTP and Fitlight® reaction-speed test**

Pre-test				
	Left	Right	Raw difference	% difference
<b>Y-Balance Test</b>				
Anterior direction (cm)	40.3	42.8	-2.5	-5.8
Posterior-medial direction (cm)	42.6	65.7	-23.0	-35.0
Posterior-lateral direction (cm)	30.5	56.7	-26.2	-46.2
<b>Isometric Mid-thigh Pull</b>				
Mean force (N)	98.3	101.7	-3.4	-3.4
Peak force (N)	154.9	158.0	-3.2	-2.0
Post-test				
	Left	Right	Raw difference	% difference
<b>Y-Balance Test</b>				
Anterior direction (cm)	45.2	48.9	-3.7	-7.5
Posterior-medial direction (cm)	58.5	74.3	-15.8	-21.3
Posterior-lateral direction (cm)	61.9	61.0	0.8	1.4
<b>Isometric Mid-thigh Pull</b>				
Mean force (N)	109.0	102.4	6.6	6.4
Peak force (N)	154.8	176.6	-21.9	-12.4



## Results

- Y- Balance: There was between 15.8- 31.3cm and 31-102% improvement in posterior balance testing, and decrement in bilateral deficit.
- IMTP: There was an increase of 11.5N mean force produced (5.8% difference). Peak force production increased 17.7N in raw difference (31.18%)
- Fitlight®: There was a 3.3 (1000%) improvement in hits, -2.3 (-12.5%) decrease in misses, and average reaction speed improved by 0.171 seconds (74.7%).

## Future Research

- Studies incorporating larger groups of Autistic and Down Syndrome individuals are required to better investigate health, well-being and quality of life trends, within this population.
- Comparative studies assessing efficacy of CrossFit methodology versus traditional gym strength and conditioning programming would allow greater understanding in physical and health development.
- It is hypothesised that a longitudinal case study training intervention may allow for greater development of physical health and motor capacity.
- Future research should incorporate both quantitative and qualitative analysis as a part of pre- and post- testing strategy

**Table 1: Pre- and Post- Testing, raw and percentage differences in IMTP, Fitlight® and Y-Balance**

	Pre-test	Post-test	Raw difference	% difference
<b>Y-Balance Test</b>				
Left foot anterior (cm)	40.3	45.2	4.8	11.9
Right foot anterior (cm)	42.8	48.8	6.0	14.0
Left foot posterior-medial (cm)	42.7	58.5	15.8	37.1
Right foot posterior-medial (cm)	65.7	74.3	8.7	13.2
Left foot posterior-lateral (cm)	30.5	61.8	31.3	102.7
Right foot posterior-lateral (cm)	56.7	61.0	4.3	7.6
<b>Isometric Mid-thigh Pull</b>				
Mean Force Left (N)	98.3	109.0	10.7	10.9
Peak Force Left (N)	154.9	154.7	-0.2	-0.1
Mean Force Right (N)	101.7	102.4	0.7	0.7
Peak Force Right (N)	158.0	176.6	18.6	11.8
Mean Force (N)	199.9	211.4	11.5	5.8
Peak Force(N)	303.9	321.7	17.7	5.8
Mean RFD (N/S)	2.6	0.3	-2.2	-87.0
Peak RFD (N/S)	1344.3	2143.0	798.7	59.4
Mean Balance (%)	13.7	7.1	-6.6	-48.1
<b>Fitlight® Reaction-speed test</b>				
Hit	0.3	3.7	3.3	1000.0
Miss	18.7	16.3	-2.3	-12.5
Average reaction speed (sec.)	0.400	0.229	-0.171	-74.7

## Main Finding

**There is a clear effect of a three-week CrossFit™ training intervention improving physiological function for those with Down Syndrome and Autism**

## References

- Mallia, S. (2016). Lift to Live Well. *CrossFit™ Journal*.
- American College of Sports Medicine. (2009). *ACSM's exercise management for persons with chronic diseases and disabilities*. Durstine, Moore, Painter & Roberts.

**This case study was conducted in collaboration with Wintec and CrossFit 3216**