



# PT PRE at Cherry Creek Schools

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# Overview

What is PRE

PRE Process

Who was  
included

Scheduling

Protocol

Our Athletes

Reflection

Next Steps

Thank you!



# Progressive Resistance Exercise (PRE)

Power training program for students in the schools with an IEP

Intensive adapted from Aurora Public Schools and Children's Hospital Colorado





# Adopting PRE in CCSD

1

Continuity of Evidence-Based Practice across school districts

3

Increase effectiveness of school-based PT interventions

2

Power training for functional strength and greater participation and *confidence!*

4

Opportunities for collaboration between PT, PTA, OT



How does PRE work in the school setting?

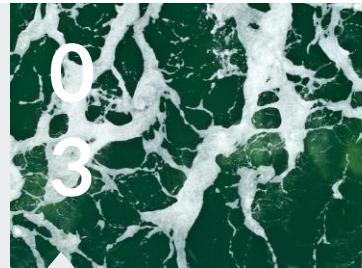


# PRE Process



## Pre-testing

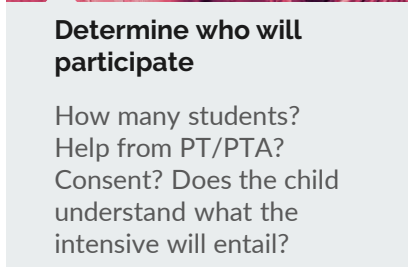
Perform **pre-testing** to establish baseline and track changes after PRE intensive **AND 1 Rep Max**



## Post-testing

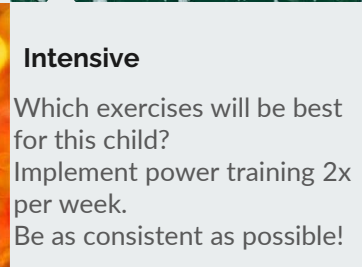
**Retest** to determine change

**Reflect** - what went well?  
What could I change for next time?



## Determine who will participate

How many students?  
Help from PT/PTA?  
Consent? Does the child understand what the intensive will entail?



## Intensive

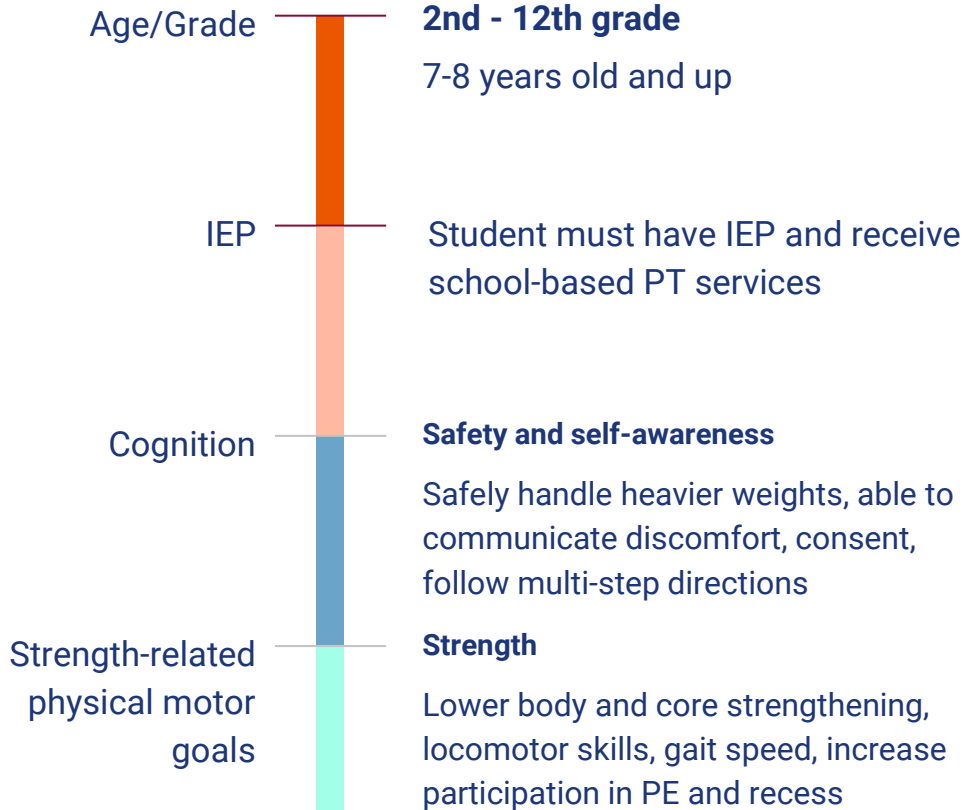
Which exercises will be best for this child?  
Implement power training 2x per week.  
Be as consistent as possible!





# Who?

## Inclusion Criteria





# Who?

Example diagnoses below

- 01 | Cerebral Palsy (CP)
- 02 | Developmental Coordination Disorder (DCD)
- 03 | Prader Willi Syndrome (PWS)
- 04 | Autism
- 05 | Down Syndrome







# When?

6-8 weeks; 2 sessions per week; 15-20 minutes per session

January - April  
(After Winter Break -Spring Break)

- Pull out from classroom
- During transition from specials to classroom time
- Brain-Break





## Service Time in IEP

Child's Name will receive 300 minutes semesterly direct physical therapy services from a licensed physical therapist or physical therapist assistant to address decreased power in motor skills. This service model allows flexibility in using either an episodic approach (1X/week) or a more intensive approach (2X/week with breaks in between each intensive).

# What do I need?

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## Equipment:

1. Measuring wheel (feet or meters)
2. Weighted vest (small and large size) with sand bags/weights
3. Ankle weights
4. Sled bag with waist strap
5. Exercise step



# Pre-Testing

01	Functional Strength (30s each)	<ul style="list-style-type: none"><li>• Sit to stand</li><li>• Lateral Step Up (R and L)</li><li>• Half Kneel to Stand (R and L)</li></ul>
02	Gait Speed	<ul style="list-style-type: none"><li>• 10 Meter Walk Test</li></ul>
03	Functional Gait Speed	<ul style="list-style-type: none"><li>• 1 Minute Walk Test</li></ul>

Test	Date:	Date:	Pre/Post Change	Significant (Yes/No)
Sit to Stand				
Lateral Step Up Left				
Lateral Step Up Right				
Half Kneel to Stand Left				
Half Kneel to Stand Right				
Strength Total Left (left step ups, left half kneel to stand, sit to stand)				
Strength Total Right (right step ups, right half kneel to stand, sit to stand)				

**Functional Strength Testing (30 seconds each)**

### *Sit to Stand Test*

- Student's hips and knees at 90 degrees of flexion
- Need to achieve less than 15 degrees of hip and knee extension
- MDC = 3 reps

### *Lateral Step Up Test*

- 20 cm step
- Need to achieve less than 15 degrees of knee extension
- MDC = 4.8 to 5.2 reps

### *Half Kneel to Stand Test*

- Start in half kneel with buttocks clear of floor or legs
- Need to achieve less than 15 degrees of hip and knee extension
- MDC = 2.2 to 2.8 reps

### *Total Strength (Left and Right)*

- Combined step ups, half kneel to stand, and sit to stand for each side
- MDC = 7.3 to 8.8 reps

## **Minimal Detectable Change (MDC)**

### 1 Minute Walk

- Walk as fast as you can for 1 minute (no 180 degree turns)
- MDC = 13 meters or 9% increase

Date	Distance in meters	Pre/Post Change	Significant?

### Gait Speed (meters/second)

- Collect 3 trials and average
- Self-selected—Walk at typical speed from A to B (10 meters)
- MDC = 0.1 m/s or 9% gain

Date	Trial 1	Trial 2	Trial 3	Average	Pre/Post Change	Significant?

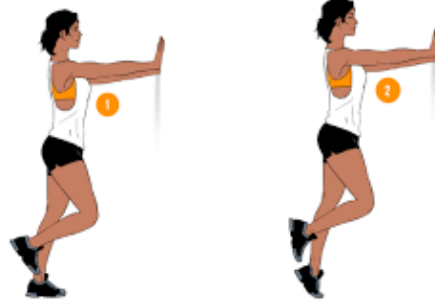
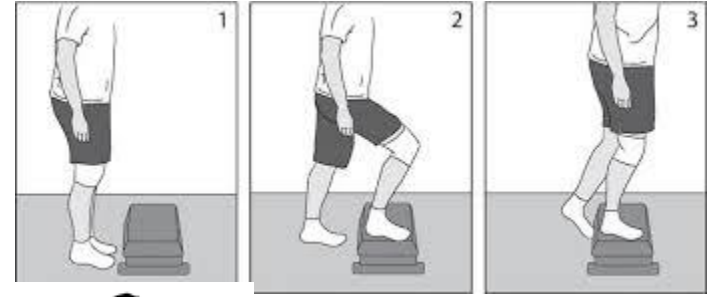
## Gait Speed Tests

# Protocol

POWER training =

- heavy weights for 4-6 reps
- 3 sets
- 3 specific exercises
- Increase in weight every 1-2 weeks; depending on form fatigue with current weight

Exercise #1:  
Forward Step up



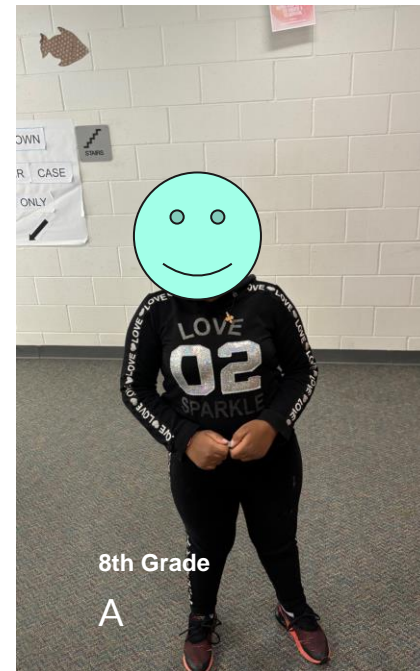
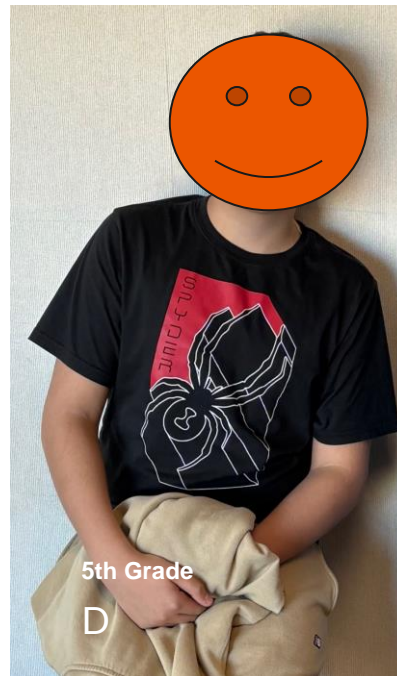
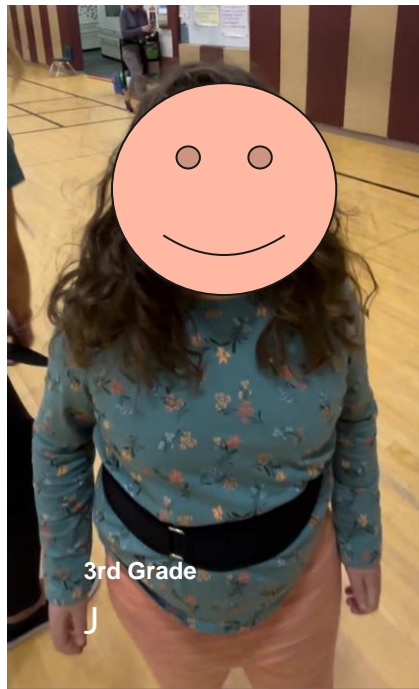
Exercise #2:  
Single Leg Calf  
Raise

Exercise #3:  
Sled Pull





# The Athletes





3rd Grade

L

<b>History</b>	<b>Cerebellar tumor</b>
<b>Goals</b>	<b>Jump from monkey bars and run faster</b>
<b>Classroom</b>	<b>Gen Ed</b>





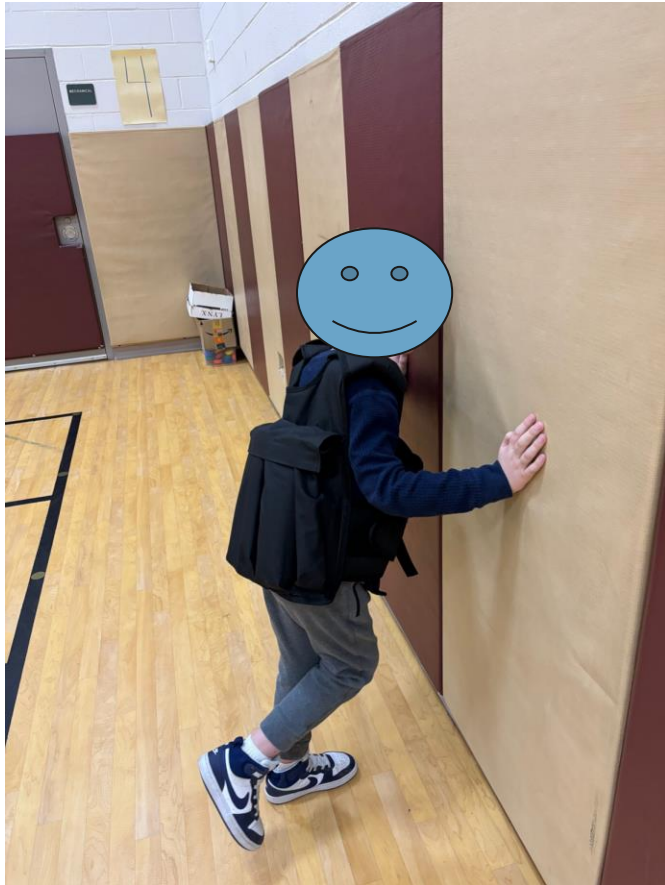
# L: Exercises and Results

## Exercises

- Single leg sit to stand
- Single leg calf raise
- 40 ft sled pull

## Results

- Number of sessions: 14
- SL Calf Raise: 10# → 18#
- SL Squat: 14# → 18# (increased to 20#, but decreased due to shoulder pain from vest)
- Sled Pull: 30# → 48#





Test	Date:11/6/23	Date:4/4/2024	Pre/Post Change	Significant (Yes/No)
Sit to Stand	19	24	5	Yes
Lateral Step Up Left	18	25	7	Yes
Lateral Step Up Right	21	28	7	Yes
Half Kneel to Stand Left	8	13	5	Yes
Half Kneel to Stand Right	10	17	7	Yes
Strength Total Left (left step ups, left half kneel to stand, sit to stand)	45	62	17	Yes
Strength Total Right (right step ups, right half kneel to stand, sit to stand)	50	69	19	Yes

### Functional Strength Testing (30 seconds each) Sample

## 1 Minute Walk Test

Date	Distance in meters	Pre/Post Change	Significant?
11/16/23	99.06m	23.16m	Yes
4/4/24	122.22m		

Plus: 14.79s shuttle run

Date	Trial 1	Trial 2	Trial 3	Average	Pre/Post Change	Significant?
11/16/23	6.63s	6.46s	4.4s	5.83s (1.72m/s)		
4/4/24	4.8s	4.9s	4.6s	4.77s (2.09m/s)	1.06s (0.37m/s)	Yes

Gait Speed 10m (meters/second)



“I’ve noticed a difference in my speed and I can outrun most people now” - L





3rd Grade

J

<b>History</b>	<b>Prader Willi Syndrome</b>
<b>Goals</b>	<b>Jumping, hopping, skipping, running faster, endurance/gait speed</b>
<b>Classroom</b>	<b>Gen Ed and ILC</b>







# J: Exercises and Results

## Exercises

- Single Leg Forward Step-up
- Quadruped Hip Abduction
- 40 ft Sled Pull

## Results

- Number of sessions: 14
- SL Step-up: 15# → 28#
- Right Hip Abduction: 3# → 7#
- Left Hip Abduction 5# → 7#
- Sled Pull: 25# → 38#



Sled pull



Step ups



Test	Date:11/16/23	Date:4/4/24	Pre/Post Change	Significant (Yes/No)
Sit to Stand	10	15	5	Yes
Lateral Step Up Left	11	22	11	Yes
Lateral Step Up Right	10	15	5	Yes
Half Kneel to Stand Left	4	10	6	Yes
Half Kneel to Stand Right	5	7	2	Yes
Strength Total Left (left step ups, left half kneel to stand, sit to stand)	25	47	22	Yes
Strength Total Right (right step ups, right half kneel to stand, sit to stand)	25	37	12	Yes

## Functional Strength Testing (30 seconds each) Sample

## 1 Minute Walk Test

Date	Distance in meters	Pre/Post Change	Significant?
11/16/23	54.9m	19.8m	Yes
4/4/24	74.7m		

Date	Trial 1	Trial 2	Trial 3	Average	Pre/Post Change	Significant?
11/16/23	9.6s	8.07s	8.12s	8.6s (1.16m/s)		
4/4/24	8.01s	7.02s	6.09s	7.04s (1.4m/s)	1.6 s (0.2m/s)	Yes

## Gait Speed 10m (meters/second) Sample



“I am better at pumping on the swings.” - J

“My legs are so much stronger, and I can do hard things.” -J





5th Grade

# D

<b>History</b>	<b>ADHD (DCD?)</b>
<b>Goals</b>	<b>Core strengthening and coordination</b>
<b>Classroom</b>	<b>Gen Ed</b>





# D: Exercises and Results

## Exercises

- Single Leg Calf Raise
- Single Leg Forward Step-up
- 40 ft Sled Pull

## Results

- Number of sessions: 5 (about 1x per week)
- SL Step-up: 40# → 30# (not completing all reps, and shoulder pain from vest)
- SL Calf Raise: 40# → 30# (per student request)
- Sled Pull: 50# → 34#

Test	Date:12/18/24	Date:3/28/24	Pre/Post Change	Significant (Yes/No)
Sit to Stand	14	15	1	No
Lateral Step Up Left	20	23 (w/o UE)	3	No (*no hands)
Lateral Step Up Right	21	24 (w/o UE)	3	No (*no hands)
Half Kneel to Stand Left	6	10 (w/o UE)	4	Yes
Half Kneel to Stand Right	7	12 (6 w/o UE)	5	Yes
Strength Total Left (left step ups, left half kneel to stand, sit to stand)	40	48	8	Yes
Strength Total Right (right step ups, right half kneel to stand, sit to stand)	42	51	9	Yes

Functional Strength Testing (30 seconds each)





Date	Trial 1	Trial 2	Trial 3	Average	Pre/Post Change	Significant?
11/30	9s	6.9s	9s	8.3s		
3/28	6.7s	6.7s		6.7s	0.3s	Yes

Gait Speed 10m (meters/second)



8th Grade

# A

<b>History</b>	<b>Autism</b>
<b>Goals</b>	<b>Stair navigation and Gait Speed</b>
<b>Classroom</b>	<b>ILC and Gen Ed</b>





# Amen: Exercises and Results

## Exercises

- Single Leg Calf Raise
- Single Leg Forward Step-up
- 40 ft Sled Pull

## Results

- Number of sessions: 4 (1 day/week)
- SL Step-up: 18# → 24#
- SL Calf Raise: 6# → 12#
- Sled Pull: 12# → 30#



Test	Date:11/17/24	Date:4/4/24	Pre/Post Change	Significant (Yes/No)
Sit to Stand	10	12	2	No
Lateral Step Up Left	8	15	7	Yes
Lateral Step Up Right	9	11	2	No
Half Kneel to Stand Left	9	7	-2	No
Half Kneel to Stand Right	4	8	4	Yes
Strength Total Left (left step ups, left half kneel to stand, sit to stand)	27	34	7	Yes
Strength Total Right (right step ups, right half kneel to stand, sit to stand)	23	31	8	Yes

### Functional Strength Testing (30 seconds each) Sample 2

**“Ms. Erica, I am so PROUD!”**

**“I’m going to tell T (*her friend*) he  
can be strong too!” - A**





# Reflection

## What went well?

- 3 of 4 students who participated discovered new-found inner strength and motivation to stay active!
- Relatively seamless timing with the help of a PTA (*shoutout to Carol! THANK YOU!*)
- Very supportive parents and staff to cheer on our athletes

## Barriers and Considerations for next time?

- The vest was too big for some students, and several expressed that they did not like the weight on their shoulders. May need to find a smaller vest with more even weight distribution
- Schedule with 5th grade was challenging
  - More time in the classroom means harder to pull out
  - Greater focus on friendships and prep for middle school
- Timing - missed some weeks for non-contact days, snow day, and Spring Break



# Ideas for Next Steps

Peer modeling

- Pair with a peer who can help direct the activity

Adapt for students who are not ambulatory

- And/or upper extremity and core strengthening

Is one time per week of weighted exercise enough to make meaningful change?

- Higher intensity exercise can help students reach their goals in less time



motivational penguin

chibird

**Biggest hope is that more school-based PT/PTAs will use PRE in their practice!**

A short horizontal bar with a teal-to-orange gradient, positioned above the main text.

# Thank you!

*Questions?*







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