

Improving Strength and Function in Parkinson's Disease with The ARPwave: A Case Report

Improving functional strength with exercise and ARPwave DC current in Parkinson's Disease

DIAGNOSIS:

Parkinson's Disease. C/c: generalized weakness, lack of independence.

TREATMENT AND OUTCOME

Patient is a 78 year old female diagnosed with Parkinson's Disease in 2017. Patient presents with R hand tremor (starting in 2015), stooped posture, decreased cadence and foot clearance during gait, balance disturbances, difficulty walking, dysmetria, bradykinesia, and hypophonia.

PT sessions 2x/week were performed for 12 weeks consisting of strength training and functional exercises with the ARPwave device.

CLINICAL FINDINGS

BEFORE

FLR Survey Results

SURVEY COMPLETED	SURVEY SCORE
Falls Efficacy Scale	42.0
Berg Balance Scale	18.0

TEST	LEFT
Timed Up and Go	Result: 22.6sec

Strength Measurements

MANUAL MUSCLE TESTS		
BODY PART	LEFT	RIGHT
Iliopsoas	4 / 5	4- / 5
Gluteus Maximus	3+ / 5	3 / 5
Gluteus Medius	3 / 5	3 / 5
Quadriceps	4- / 5	4+ / 5
Hamstrings	4+ / 5	4+ / 5
Anterior Tibialis	4 / 5	4 / 5
Gastronemius	4 / 5	4 / 5
Anterior Deltoid	4 / 5	3+ / 5
Middle Deltoid	4 / 5	4 / 5
Biceps	4 / 5	4- / 5
Triceps	4 / 5	3+ / 5
Pronator Teres/Quadratus	4 / 5	4- / 5

AFTER

FLR Survey Results

SURVEY COMPLETED	SURVEY SCORE
Berg Balance Scale	41.0
Falls Efficacy Scale	29.0

OTHER GENERAL TESTS	
TEST	LEFT
Timed Up and Go	Result: 10.3sec

Strength Measurements

MANUAL MUSCLE TESTS		
BODY PART	LEFT	RIGHT
Iliopsoas	4+ / 5	4 / 5
Quadriceps	5 / 5	5 / 5
Hamstrings	5 / 5	5 / 5
Anterior Tibialis	4+ / 5	4 / 5
Gastronemius	5 / 5	5 / 5
Anterior Deltoid	4+ / 5	4 / 5
Middle Deltoid	4+ / 5	4+ / 5
Biceps	5 / 5	5 / 5
Triceps	5 / 5	5 / 5
Pronator Teres/Quadratus	4+ / 5	4 / 5

Overall outcomes include improvements in strength as shown by MMT testing, improvements in functional mobility and balance as shown by TUG test and BERG Balance scale.

TREATMENT AND OUTCOME

Upon initial evaluation, assessment included independence level for transfers, gait assessment, strength testing, and functional outcome measures. **TREATMENT APPROACH:** Functional strengthening, part-tasking ADLs, postural education, R hand stretching/strengthening, gait training, and neuromuscular re-education.

PAD PLACEMENTS & EXERCISES

CHANNEL 1

Black Right Wrist Flexors

Red Right Wrist Extensors

FREQ

500pps, 100pps

EXERCISE

2x15

Grasping (3s/
3s) Wrist Flex/
Ext Wrist Sup/
Pro

CHANNEL 1

Black Glove on Therapist's Hand

Red Right Bicep

FREQ

500pps

EXERCISE

PROM of right wrist, fingers
STM to right hand/wrist musculature

CHANNEL 1

Black in Bath

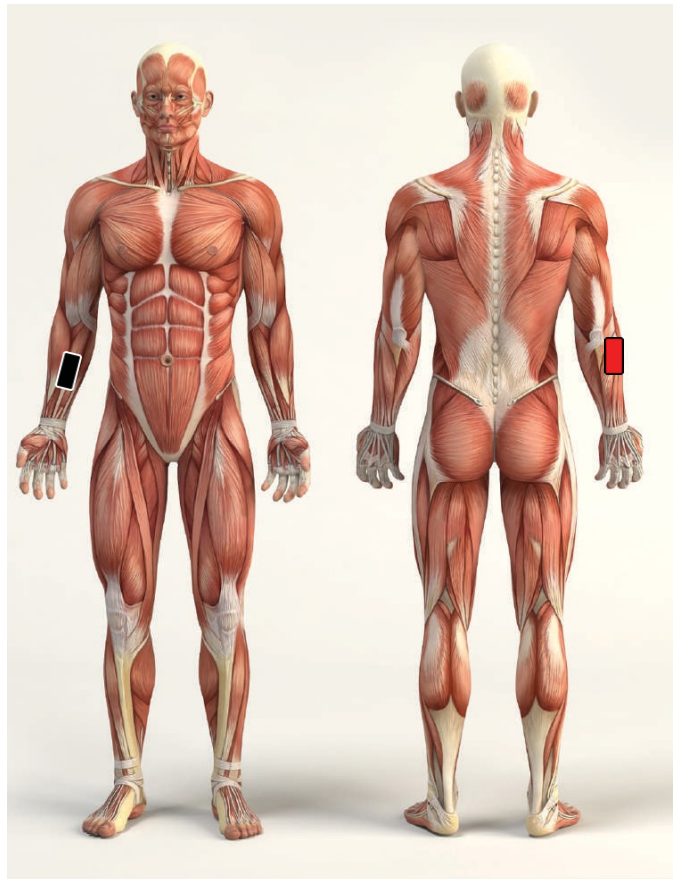
Red Right Bicep

FREQ

500pps

EXERCISE

Hand bath -



CHANNEL 1

Black Right Rhomboids

Red Right Low Back

CHANNEL 2

Black Left Rhomboids

Red Left Low Back

CHANNEL 3

Black Right Prox Quad

Red Right Distal Quad

CHANNEL 4

Black Left Prox Quad

Red Left Distal Quad

FREQ

500pps

EXERCISE

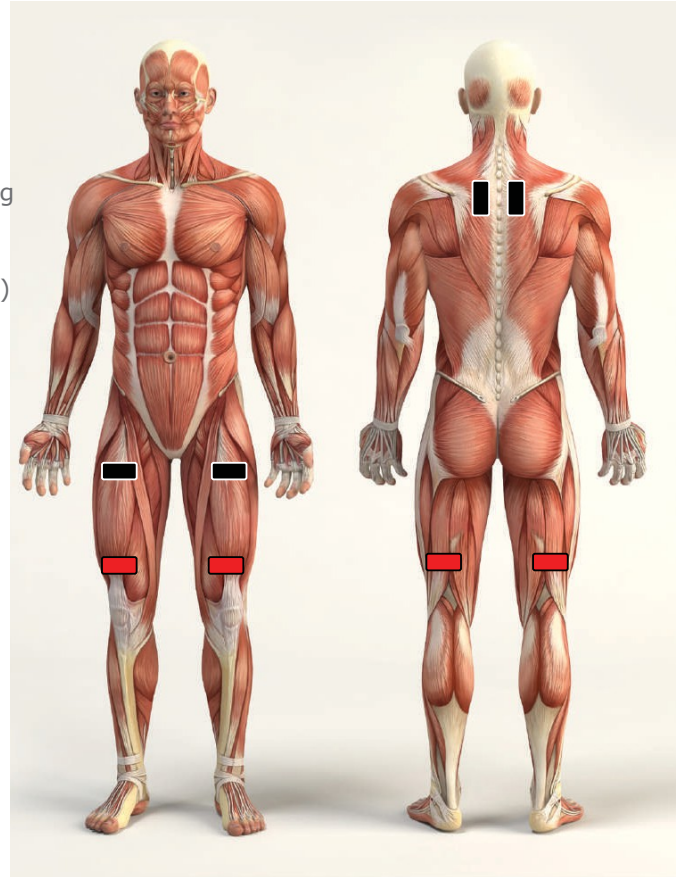
Stepping fwd/back 2xftg

Walking c RW 3xftg

Salom Cones x4 (HHA)

Standing Taps (balance)

2xftg



CHANNEL 1

Black Right Low Back

Red Right Upper Back

CHANNEL 2

Black Left Low Back

Red Left Upper Back

CHANNEL 3

Black Right Quad

Red Right HS

CHANNEL 4

Black Left Quad

Red Left HS

FREQ

500pps

EXERCISE

2 laps marching w/RW

CHANNEL 1

Black Right Low Back

Red Right Upper
Back

FREQ

500pps

CHANNEL 2

Black Left Low Back

Red Left Upper Back

EXERCISE

3x10

Seated Flex/Ext

Seated SB

Seated Rotation

CHANNEL 1

Black Right Rhomboids

Red Right Low Back

CHANNEL 2

Black Left Rhomboids

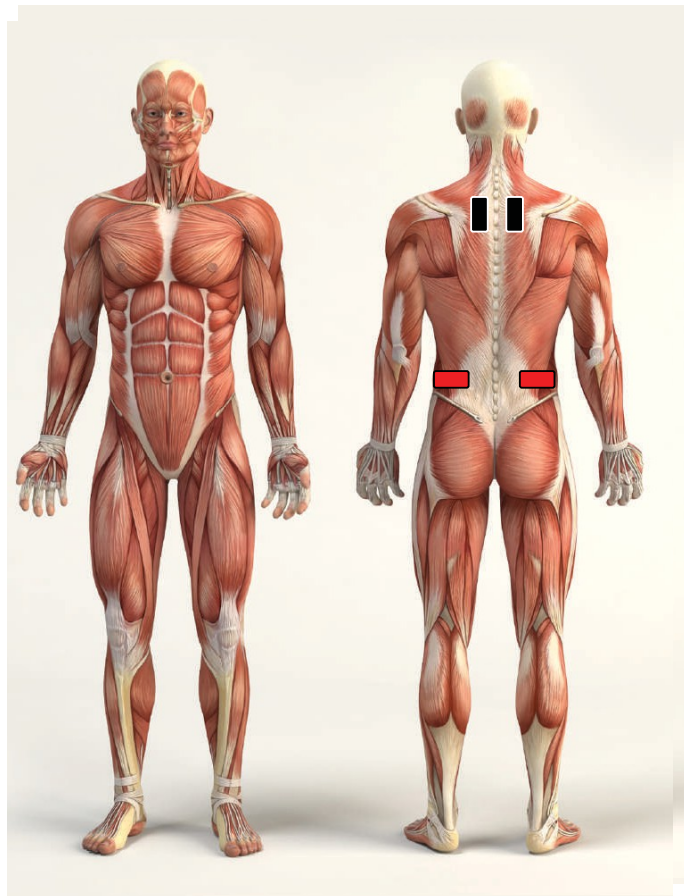
Red Left Low Back

FREQ

500pps

EXERCISE

3x20 Scapular Retraction



CHANNEL 1

Black in Water

Red Right forearm

CHANNEL 3

Black Right Neck

Red Right Foot

CHANNEL 3

Black Left Neck

Red Left Foot

FREQ

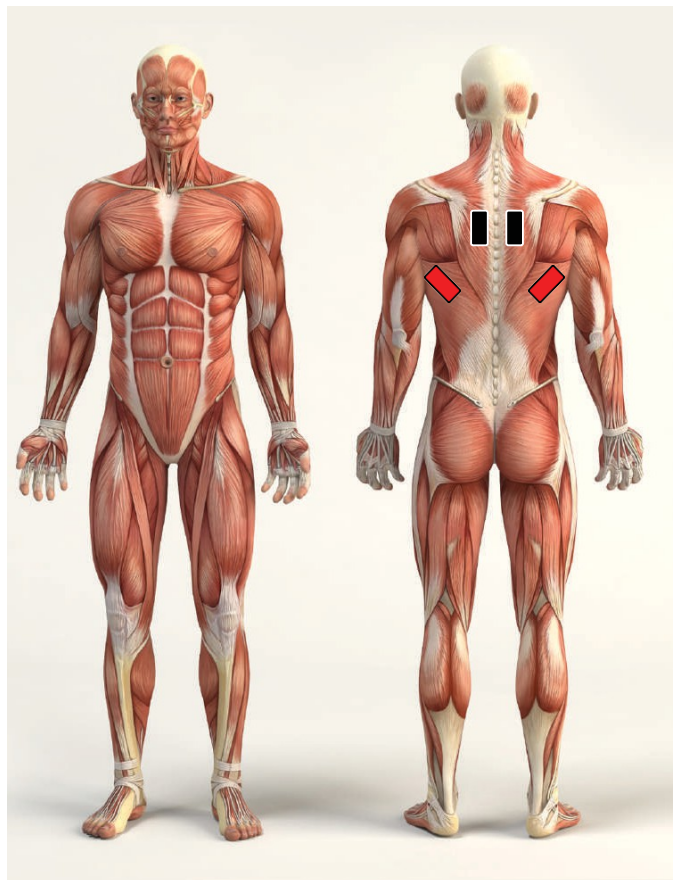
500pps

EXERCISE

Hand Bath x 10

Master Reset x

15



CHANNEL 1

Black Glove

Red Right forearm

FREQ

500pps

EXERCISE

Glove work to R hand for neuromuscular re-education, stretching R fingers & opening hand.

CHANNEL 1

Black Right Rhomboids

Red Right Lats

CHANNEL 2

Black Left Rhomboids

Red Left Lats

FREQ

500pps

EXERCISE

Seated Rows (YTB)
3x15

CHANNEL 1

Black Right Rhomboids

Red Right Lats

CHANNEL 2

Black Left Rhomboids

Red Left Lats

CHANNEL 3

Black Right Glute Med

Red Right Quads

CHANNEL 4

Black Left Glute Med

Red Left Quads

FREQ

500pps

EXERCISE

Standing NBOS, SGA 3x30 seconds
Standing NBOS EC, CGA 3x15
seconds Stand, "big" step forward &
back,
Sit-minA 3x8

EVALUATION

PROCESS: Manual Muscle Testing (MMT), scan & observation of posture/gait

FINDINGS: R hand tremor (starting 2 years prior), stooped posture, decreased cadence and foot clearance during gait, balance disturbances, difficulty walking, dysmetria, bradykinesia, and hypophonia.

ASSESSMENT: Patient will benefit from PT interventions including strengthening, functional mobility, balance training, and hand dexterity exercises.

SUBSEQUENT TREATMENT SESSIONS

FREQUENCY: 2x/week for 12 weeks

TECHNIQUES USED IN FOLLOW UP SESSIONS: Functional training, strengthening exercises, glove work to R hand for tremors, ARPwave glove on R hand with strengthening and hand dexterity exercises.

FREQUENCIES USED:

- 500pps during warm ups, R hand exercises, and gait training
- 40pps (set 1), 55pps (set 2), 75pps (set 3) when working on strengthening or lower extremities and postural re-education

RESULTS AFTER ALL THE TREATMENT COMPLETED (OR CURRENT RESULTS IF STILL BEING TREATED):

Improvement in strength in the following muscles: quadriceps, hamstrings, anterior tibialis, gastrocnemius, anterior deltoid, middle deltoid, biceps, and triceps. Ambulation improved as shown by tolerating ambulating 50ft CGA without AD. Transfers improved by tolerating STS and toilet transfers SBA.

ADVERSE EFFECTS: patient was very sensitive to the stimulation (tolerates between 8-15% intensity).

DISCUSSION

During this case report, strengths included the hands-on approach of seeing the patient every week 2x/week for 12 weeks in the clinic. Limitations included lack of patient independence at home, decreasing her ability to perform HEP.

RESULTS INCLUDE:

- Improvement to gross motor strength as shown in MMT findings
- Statistically significant improvement in balance as shown in the BERG balance scale from 18/45 to 41/15
- Improvement in gait/ambulation as shown in TUG test from 22.6s to 10.3s
- Improvement in patient confidence and risk for falls as shown by Falls Efficacy Scale from 42 to 29

The results of this case report concludes that a treatment approach with functional exercise and DC current from the ARPwave can significantly improve strength, balance, gait, and overall function in a Parkinson's Disease patient.