



# SCI: MOVING FORWARD

A RESPONSE TO COVID-19



North American  
Spinal Cord Injury  
— Consortium —

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SCI: Moving Forward is made possible by:



# About NASCIC

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North American  
Spinal Cord Injury  
— Consortium —

The North American Spinal Cord Injury Consortium (NASCIC) has the mission to bring about unified achievements in research, care, cure, and policy by supporting collaborative efforts across the spinal cord injury community.

[www.nasciconsortium.org](http://www.nasciconsortium.org)

# About SCI: Moving Forward

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- Webinar series in response to the COVID-19 pandemic and how it is affecting the SCI population
- Website to house archived webinars and additional resources

<http://www.nasciconsortium.org/scimovingforward.com/>

# SCI Moving Forward

## Upcoming Webinar Topics

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Advocacy during  
COVID-19 and Beyond  
(July 7, 2020)

SCI Latinx Community  
and COVID-19: A  
Continued Conversation  
(July 14, 2020)

Positive Learnings from  
COVID-19  
July 21, 2020

# Audience Poll – Question 1

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Which do you feel is the MOST COMMON barrier you face with exercise?

1. Lack of motivation, mood
2. Lack of knowledge on how to exercise
3. Pain
4. Stiffness, reduced ROM
5. Lack of assistance
6. Bladder & Bowel routine
7. Irregular Blood Pressure
8. Lack of Access (equipment, facility, etc.)
9. Fear of Injury
10. Other



# Audience Poll – Question 2

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Which do you feel is THE TOUGHEST barrier you face with exercise?

1. Lack of motivation, mood
2. Lack of knowledge on how to exercise properly at home
3. Pain
4. Stiffness, reduced ROM
5. Lack of assistance
6. Bladder & Bowel routine
7. Irregular Blood Pressure
8. Lack of Access (equipment, facility, etc.)
9. Fear of Injury
10. Other



**Rebecca Wheeler, R.Kin, BKin Hon**  
Registered Kinesiologist and Lead Trainer  
Staff/Student Educator

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Rebecca has been working at Walk It Off, an out-patient neuro-rehabilitation facility north of Toronto, for almost 6 years. She specializes in Activity-Based Therapy working with individuals living with neurological conditions, in particular SCI. Rebecca loves creating and adapting exercises to challenge clients' abilities and fit their goals.

Rebecca graduated from the University of Ottawa in 2014 where she was first exposed to the exciting nature of neuro-rehabilitation during a placement working with post-stroke and acquired brain injury and has never looked back!

She is currently studying to become an osteopath and once the coronavirus lockdown lifts, she will be entering her last year of the program!



# Spinal Cord Injury & Exercise in Times of Covid-19

presented by Rebecca Wheeler  
with Walk It Off Spinal Cord Recovery & Wellness Centre



WHY?

HOW?



# HOME EXERCISE PROGRAMS



# Exercise Guidelines: SCI Population

## Cardiorespiratory & Strength Fitness

### Aerobic Exercises

- ▶ 20 minutes per session
- ▶ at least 2 x per week
- ▶ moderate to vigorous intensity

**“the ability of the heart, lungs, and vascular system to deliver oxygen-rich blood to working muscles during sustained physical activity”**



### Anaerobic Exercises

- ▶ 3 sets
- ▶ per major functioning muscle group
- ▶ at least 2 x per week
- ▶ moderate to vigorous intensity

**Strength refers to the amount of force a muscle can exert**

# Exercise Guidelines: SCI Population & Cardiometabolic Health

***“Cardio”*** pertaining to your Heart

***“Metabolic”*** pertaining to biological composition and functioning

Risk Factors:



- ▶ increased blood pressure (BP)
- ▶ obesity/overweight
- ▶ hyperglycemia (high levels of glucose in blood)
- ▶ hyperlipidemia (high levels of fat in blood)

Reduce Risk by Engaging in  
**Aerobic Training**

- ▶ 30 minutes per session
- ▶ at least 3 x per week
- ▶ moderate to vigorous intensity

**Cardiometabolic Disease includes heart attack,  
stroke and type 2 diabetes**

# AERObic vs. ANAERObic

## “with oxygen”

- ▶ sustainable energy source
- ▶ breaks down carbohydrates (sugars), lipid (fats), proteins
- ▶ exercises that require energy maintenance for longer time
- ▶ shown to reduce blood glucose, lipids in blood
- ▶ reduce risk factors of cardiometabolic diseases

## “without oxygen”

- ▶ quickly accessed energy
- ▶ breaks down carbohydrates only: glycogen (sugar)
- ▶ energy source is stored amounts in contracting muscles
- ▶ used for short, explosive movements



Pain  
Stiffness, limited ROM  
Irregular/low blood pressure

Unable to access facility  
Don't have home gym,  
equipment

Biological

Environmental

Barriers to  
Exercise

Psychological

Sociological

Low to no motivation  
Don't feel can complete  
worthwhile exercise at home

Don't have assistance  
Don't want to burden family/  
support for help with exercise

Improved strength & endurance  
Reduced incidence of  
contractures, pressure sores

Ease of independent  
mobility, transfers  
Learn to use environment to  
facilitate exercise

Biological

Environmental

## Benefits of Exercise

Psychological

Sociological

Positive impact on mental  
wellbeing  
Increase of exercise endorphins  
Reduction of stress hormones

Interaction and involvement  
with trainers & community  
Energy to engage with family  
& friends





## Depression

## Decreased Respiration

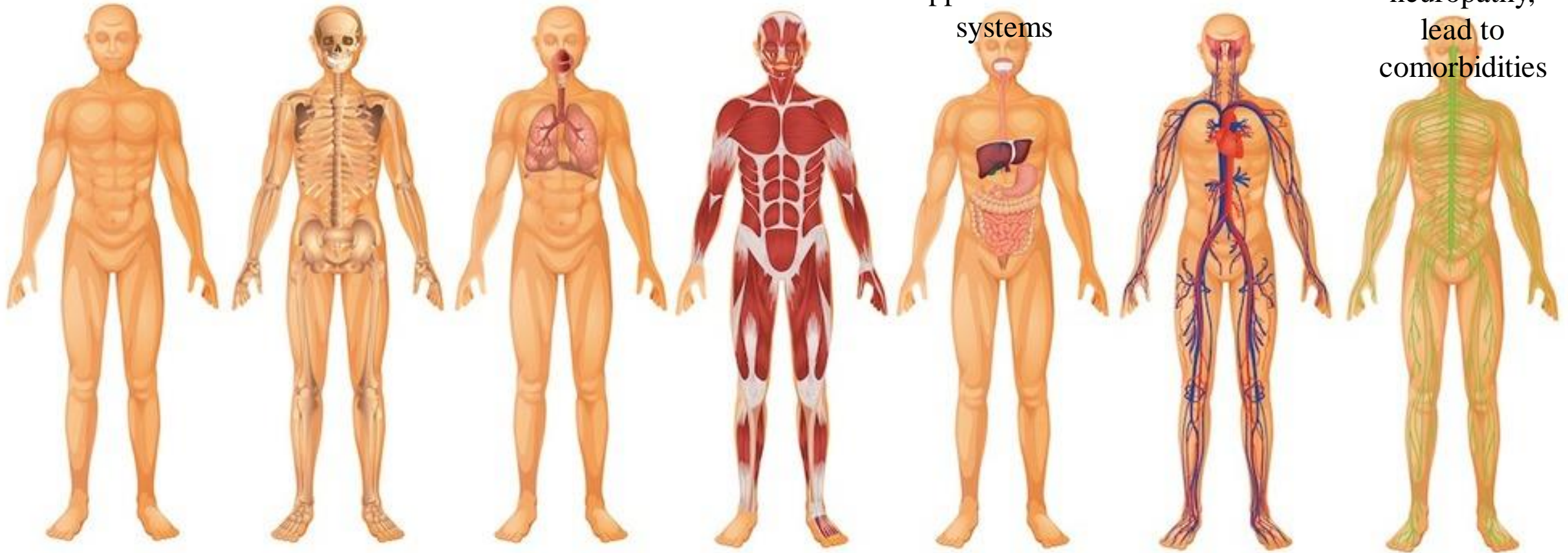
decreased lung capacity  
& elasticity,  
less ability to fight  
infection

## Stress

increases adrenaline &  
cortisol,  
lead to comorbidities,  
suppresses other  
systems

## Inflammation

increases when  
immune system  
low, increase in  
neuropathy,  
lead to  
comorbidities



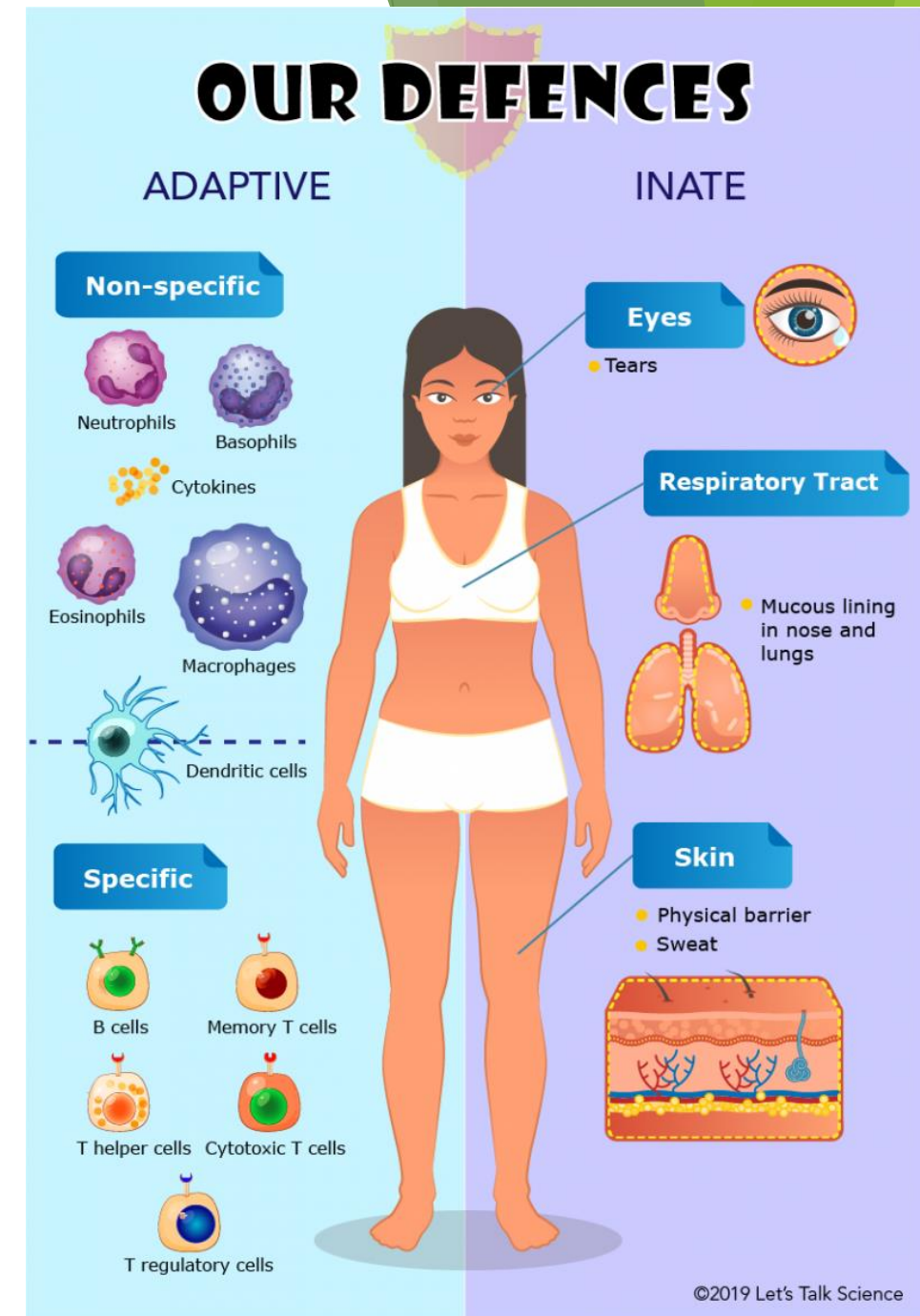
**Loss of  
Bone  
Density**

**Atrophy in  
Functioning  
Muscles**

**Reduced  
Circulation**  
slows healing

# Our Immune System & Covid-19

- ▶ Immune system is the body's natural defense system
  - ▶ network of cells, molecules, tissues, organs
- ▶ helps body prevent, fight infection, disease, and **viruses** (like Covid-19)
- ▶ studies found relationships between psychological anxiety, stress, depression and immune system suppression (APA.org, 2006)
  - ▶ psychosomatic dysfunction: mental factors can be the cause of, or reason for worsening, physical conditions
- ▶ immune system suppression can lead to increased inflammatory responses causing **secondary conditions** (da Silva Alves, de Aquino Lemos, Ruiz da Silva, dos Santos & Rosa, 2013)





**Depression**  
endorphins  
more = less

**Improved  
Respiration**

**Stress**  
less fat storage, blood  
glucose,  
better responses to  
stress,  
reduced disease  
vulnerability

**Inhibited  
Inflammation**



**Loss of  
Bone  
Density**

**Atrophy in  
Functioning  
Muscles**

**Increased  
Circulation**  
blood  
lymph

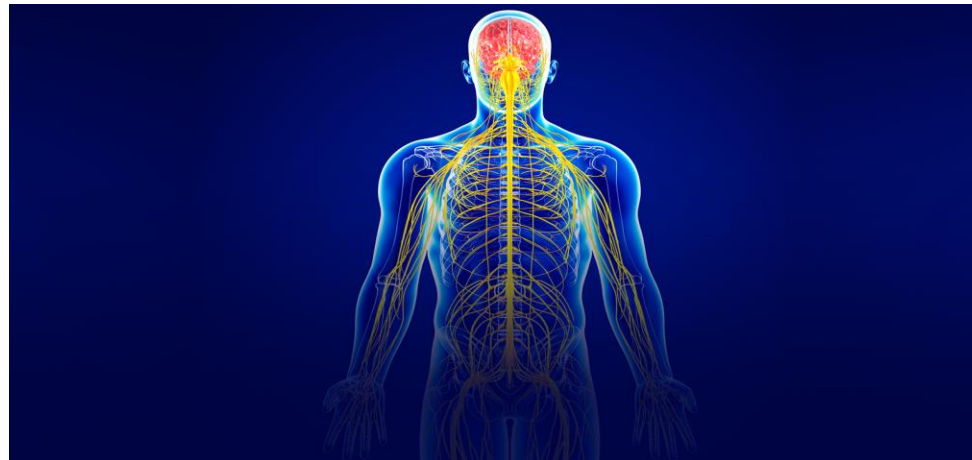
# Movement & Covid-19

- ▶ health maintenance
- ▶ ROM
- ▶ pressure sores
- ▶ pain
- ▶ BP regulation
- ▶ blood sugar regulation
- ▶ urinary & bowel function
- ▶ bone loss
- ▶ atrophy

## Care & Cure

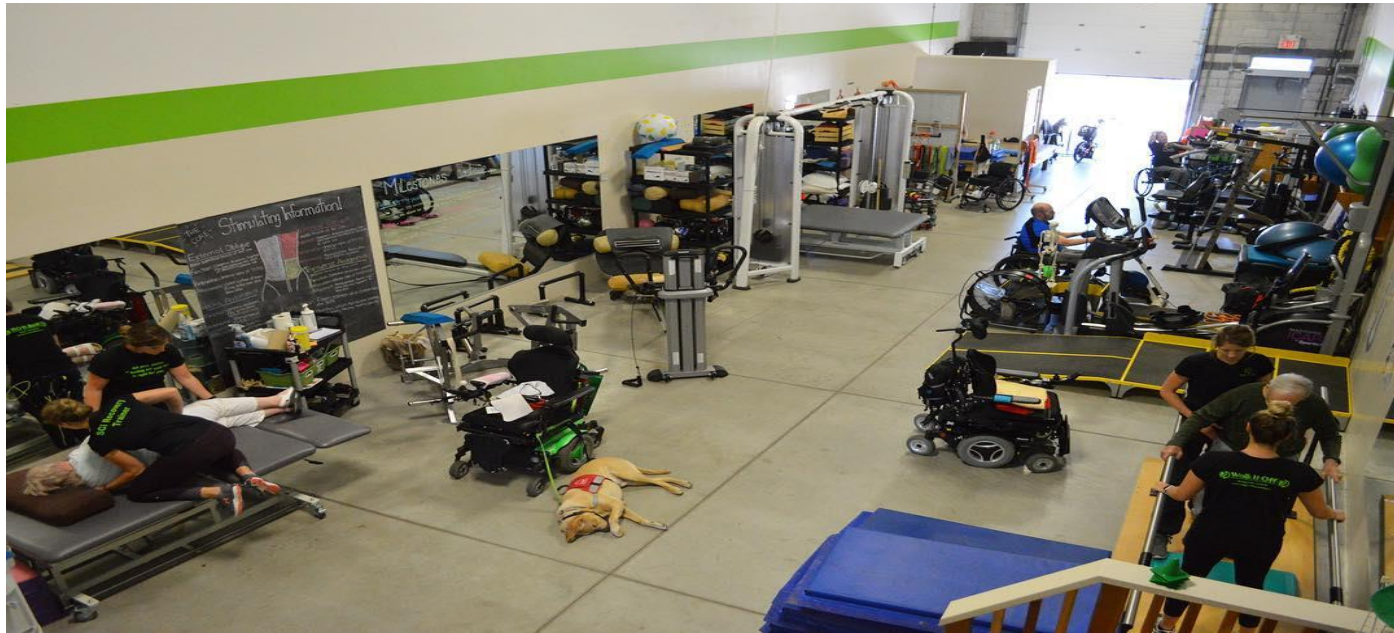
# Brain Derived Neurotrophic Factor (BDNF)

- ▶ BDNF has been found as a promotor of neurite growth; axonal regeneration, plasticity and re-myelination
- ▶ Neuronal activity and exercise in combination can modulate the increase of BDNF non-invasively
- ▶ Exercise induced increase of BDNF has been associated with improved cognitive function and alleviation of depression and anxiety



# Who we were “Pre-Covid-19”

- ▶ Neurological Rehabilitation Facility in Newmarket, Ontario, Canada
- ▶ opened in 2012; originally only served SCI population but now serve clients living with all types of neurological conditions
- ▶ Multi-disciplinary team of Physiotherapists, Kinesiologists, Physiotherapist Assistant
- ▶ host to high school, undergraduate and post-graduate student placements
- ▶ WIO Community dinners & fundraisers





# Who we were “Pre-Covid-19”

- ▶ servicing ~70 sessions per week
- ▶ working 1-on-1, hands-on in 1-3 hour sessions
- ▶ Physiotherapy and Activity Based Therapy training
- ▶ additional by-appointment cardiovascular strengthening sessions with FES leg and arm ergometer, Nustep, Motomed

Our focus in on stimulating the paralyzed parts of the body via:

- strengthening
- load bearing
- repetitive movements



# Our In-House Program SCI & Exercise

- ▶ Patterned Neural Activity
- ▶ High Intensity
- ▶ Nervous System Activation Technique (NSAT\*) coupled with PROM
- ▶ High Repetition of Movement
- ▶ Load Bearing
- ▶ Muscular Strengthening & Endurance
- ▶ Cardiovascular Strengthening & Endurance
- ▶ Task-specific Functional Electrical Stimulation (FES)
- ▶ Complimentary upper and/or lower body FES ergometry
- ▶ Locomotor Training



# Who are we now in Times of Covid-19?

## What's Changed?

- ▶ Unable to Access Clinic
- ▶ Clientele at home
- ▶ Trainers at home
- ▶ Limited resources, equipment, assistance



## What has Not Changed?

- ▶ Need for Body Movement
- ▶ Need for Immune System Health
- ▶ Need for Social Connection, Community

# Who are we now in Times of Covid-19?

## Time To Adapt!

- ▶ Now doing Community Outreach Webinars
- ▶ Now offering 1-on-1 Virtual Training Sessions
- ▶ Now using Social Media for exercises, engagement, challenges, updates
- ▶ Re-opening clinic to WIO Members on limited basis
  - ▶ Monday - Thursday
  - ▶ 1 hour sessions
  - ▶ 2 trainers + 2 clients maximum in gym
  - ▶ use of PPE's
  - ▶ new health and safety protocols and procedures for daily operations





HOW?

# HOME EXERCISE PROGRAMS



# Strength

\*Guidelines recommend 3 sets per major muscle group 2x/week

## **Seated Dynamic Core with Nikki**

[https://www.youtube.com/watch?v=sn\\_-pKTTvZM](https://www.youtube.com/watch?v=sn_-pKTTvZM)

## **Bridging, Clams & Reverse Clams with Rebecca**

<https://www.youtube.com/watch?v=q1mlXWWq2eA&t=2s>

## **Back & Shoulder Exercises with Bry**

<https://www.youtube.com/watch?v=bfzqp6lwOVY>

## **Harborview Medical Center SCI Arm Workout**

uses therabands, free weights  
downloadable PDF

<http://sci.washington.edu/info/forums/reports/SCI%20Home%20Exercise%20Packet.pdf>







**Walk It Off**  
SPINAL CORD RECOVERY  
AND WELLNESS CENTRE

# Aerobic

\* Guidelines recommend 20 min. sessions <2x/week for cardiovascular health;  
30 min. sessions <3x/week for cardiometabolic health





# Possible Setups for Exercise

**Long Sitting**



Wheelchair  
considerations

**Short Sitting**



**Hero Pose**



# Tips & Tricks

## Limited Hand Grip

- Active Hands
- hair ties
- loops in thera-band ends
- position to use gravity and body weight as resistance



## No Weights?

- water bottle
- soup can
- tights/leggings
- towels/long socks

## Attach to What?

- tie knot in end, close in door
- coat hanger over top of door

## Blocking/Supports

- pillows
- rolled towel/blanket, yoga mat under knees
- belt to hold position or add resistance

## Intensity

- interval training
- hold contraction
- slow movement down, control
- posture

# Flexibility

## Long Sitting Core with Rebecca

<https://www.youtube.com/watch?v=OvZGMYmhEBg>

## Prone Exercises with Nikki

<https://www.youtube.com/watch?v=H4H6iylAXt0>

## Adaptive Yoga or Yoga from a Chair

### Adaptive Yoga with Nina Class 1

“all you need if comfortable clothing  
and a small space”

<https://www.youtube.com/watch?v=amINhmeGe3U>



### YOGAdapt Adaptive Yoga Class - Series 1

“always listen to your body, skip on  
poses which don't feel right”

[https://www.youtube.com/watch?v=84\\_eH-P4aBg](https://www.youtube.com/watch?v=84_eH-P4aBg)



# Wellbeing

**Headspace App**  
guided meditation,  
as little as 5 min.



**Spotify**  
guided meditations  
playlists, podcasts



**VIP4SCI**  
SCI Ontario program  
online peer community  
for SCI members,  
family member

[https://  
sciontario.org /  
support-services/at-  
your-service/vip4sci/](https://sciontario.org/support-services/at-your-service/vip4sci/)

## BENEFITS OF MEDITATION





# Thank You!

Questions, Comments, Concerns?



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