Wheelchair Postural Training
Benefits of Exercise for Patients with Traumatic Brain Injuries

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Introduction

- Supportive Living is a non-profit organization with a mission of raising the quality of life for survivors of brain injuries.
- The Neuro-Fitness Wellness Program creates, implements, and operates life-long physical, cognitive, and social wellness programs. Their goal is to improve the lives of people living with acquired brain injuries by adhering to the motto: *Fitness, Function, Fun*
- Fitness- They provide aerobic conditioning to promote cardiovascular and cardiopulmonary health. Aerobic conditioning helps members manage the risks of negative health conditions. All members, regardless of physical disability, can improve their cardiovascular fitness.
- Function- Activities that promote standing and weight bearing help members navigate their activities of daily living such as transferring and showering. Improving a persons' fitness will help that person function in the community in order to support independence.
- Fun- They actively work to maintain meaningful relationships and promote positive environments focused on positive change and growth. Members who have fun will continue in the program and see real changes in their health.

Supportive Living, INC.
1991 — BRAIN INJURY PROGRAMS — 2021

Objective

Provide an exercise plan for patients with traumatic brain injuries in a wheelchair to improve their posture and prevent further damage.

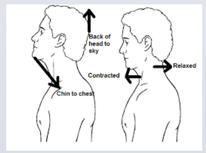
Related Literature

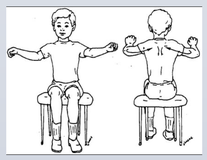
- "A traumatic brain injury is usually a result from a violent accident to the head or body. Mild traumatic brain injuries could affect your brain cells temporarily. Serious traumatic brain injuries cause bruising, torn tissues, and bleeding. These injuries could result in long term complications." (Mayo Foundation for Medical Education and Research. 2021, February 4, p.1).
- "Brain injuries can be determined by several different criteria. Traumatic brain injuries could be referred to as either "penetrating" or "closed-head." Penetrating head injuries occur when the skull has been compromised by a foreign object, as in a gunshot wound. This type of injury is destructive to the brain because, in addition to the damage to brain cells, it also causes bleeding and infection. Closed-head injuries are typically acceleration-deceleration injuries, caused by a person's head accelerating (such as from a blow to the head) or decelerating (such as in an automobile collision), which results in the brain striking the inside of the skull." (Auday, B. C., PhD, & Abrahamsen, E. A. 2019, p.2).
- "Physical activity increases the release of growth factors in the brain that help build new brain cells and increase brain size which leads to improved learning and memory, increase bone density, and improve your heart and lung function. " (Pinto, S. M., Watson, E. M., Contreras, W. A., Luffman, K. A., & Newman, M. A. 202, p.2).
- "An estimated 3.2 to 5.3 million people in the US have disabilities from traumatic brain injury. Among older adults, falls are responsible for 51% of TBIs. Following hospitalization for TBI, an estimated 37% of people will need long-term cognitive and functional supports. "(Lorenz, L. S., Charrette, A. L., O'Neil-Pirozzi, T. M., Doucett, J. M., & Fong, J. 2018, p.5)

Materials and Methods

- A weekly exercise plan is made for patients according to their needs. This is done by evaluating what kind of traumatic brain injury they have. Some participants cannot move the right side of their body or others cannot use weights over ten pounds. Each participant has requirements that need to be accounted for.
- The focus on the plan will be to improve posture.
- The exercise plan will include several exercises that will be completed during each session. Each exercise is done according to the participants abilities.
- Exercises should be slow and controlled. Good posture and form will lead to less strain on the neck, shoulders, and back. It is important to sit up and look straight ahead, as can prevent any further damage to their body.
- Exercise progressions are dependent on each participant. Consistency is important to making progress and documenting notes on the activities done through each session assures that each exercise session is appropriate for each participant.

Exercise	Description
Neck Retraction or Chin Tuck	Sitting tall throughout the exercise. Touch your chin with the tip of your fingers and pull your chin back while staying level
Shoulder Girdle	Sitting up strait, move your elbows outside to shoulder length, breath in so the shoulder blade pinches in together, breath out as you bring your arms together.
Pelvic Rocking	Gently arch your back, then tighten the abdominal muscles to flatten the lower back





Exercise Plans

- Having a clear and balanced exercise plan is an important step to seeing results. A chart is used to track the exercises being performed. Warm-up exercises might include exercises such as hip marches and toe taps. Exercise intensity can then be increased with rows with a band and shoulder extensions. These should be completed consistently throughout the week and with each exercise, weight and repetition recorded. Once the participant feels comfortable, more weight or a different exercise may be added.
- Too many exercises could be overwhelming. It is appropriate to use a variety of exercises, but too many may make it difficult for the patients. Some days the focus is on the arms and other days on shoulders. These all align with improving the posture of patients in a wheelchair.

First Exercise Plan		
Patient 1:		
Exercise	Sets	Reps
Hip Marches	3	12
Toe Taps	3	12
Ball Kicks	3	12
Rows	3	10
Shoulder Extensions	3	10
Triceps Extensions	3	10

Results

- As a result of the twelve-week program participants showed great improvements.
- Lower body and upper body strength improved.
- Participants started with three sets of ten, improving to three sets of twenty. Participants also increased the amount of weight lifted from five pounds to ten pounds.
- Lower body improvements were also made, with participants starting using no ankle weights to then using two-pound ankle weights. Resistance bands were also used to make exercises more challenging with great improvements.
- Participants also enjoyed exercises of their choosing. Some liked throwing or kicking the ball. This is great exercise and an effective way to be engaging.

Updated Exercise Plan			
Patient 1:			
Exercise	Sets	Reps	Notes
Hip Marches	3	20	Add a resistance band
Toe Taps	3	20	Add a resistance band
Ball Kicks	3	20	
Rows	3	15	
Shoulder Extensions	3	15	Start with 10-pound weights then use 15-pound weights for the final set
Triceps Extensions	3	15	Start with 10-pound weights then use 15-pound weights for the final set

Conclusion

- Participants enjoyed their daily exercise. They wanted to come back each week and were excited to see their improvements.
- Working closely with patients you can communicate their struggles and listen to what they want to work on. Some days we took it easy and other days they had to work extra hard.
- Physical activity is important in all ages. Patients with traumatic brain injuries benefit greatly from doing small exercises each week. They see improvements in their arms and legs. They see improvements in their physical and emotional health.
- Exercise plans should be made for all patients including those with traumatic brain injuries.

References

- Auday, B. C., PhD, & Abrahamsen, E. A. (2019). Traumatic brain injury. *Salem Press Encyclopedia of Health.*
- Mayo Foundation for Medical Education and Research. (2021, February 4). *Traumatic brain injury.* Mayo Clinic. Retrieved April 19, 2022, from https://www.mayoclinic.org/diseases-conditions/traumatic-brain-injury/symptoms-causes/syc-20378557
- Pinto, S. M., Watson, E. M., Contreras, W. A., Luffman, K. A., & Newman, M. A. (2021). Physical Activity After Traumatic Brain Injury. *ARCHIVES OF PHYSICAL MEDICINE AND REHABILITATION*, *102*(8), 1673–1675.
- Lorenz, L. S., Charrette, A. L., O'Neil-Pirozzi, T. M., Doucett, J. M., & Fong, J. (2018). Healthy body, healthy mind: A mixed methods study of outcomes, barriers and supports for exercise by people who have chronic moderate-to-severe acquired brain injury. *Disability and Health Journal*, *11*(1), 70–78. https://doi-org.corvette.salemstate.edu/10.1016/j.dhjo.2017.08.005