Pilates and the Brain

Ischemic Stroke Disease

Barbara J Moore

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Abstract

Strokes happen every 40 seconds and is experienced by nearly 800,000 people. [1] Strokes are the leading cause of adult disability in the US. [1]

A stroke, or “brain attack” occurs when a blood vessel bringing blood and oxygen to the brain either becomes blocked or it ruptures. When the blood flow to the brain is interrupted, brain cells no longer receive oxygen and nutrients and the brain cells begin to die within minutes. This causes patients to lose their ability to function such as movement, speech or memory that in the past was subconsciously performed. [2]

In this case study Tony utilizes Pilate’s exercises to build strength improve loss of movement realized from his Ischemic stroke.

Joseph Pilate’s rehabilitation “through proper repetition of its exercises you gradually and progressively acquire that natural rhythm and coordination associated with all our subconscious activities.” [3]

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Anatomy of the Brain

The heart is a pump that sends oxygen-rich blood out through blood vessels called arteries, see image 1. When an artery between the heart and the brain is blocked, the brain can't get enough oxygen causing a stroke to occur, see image 2.

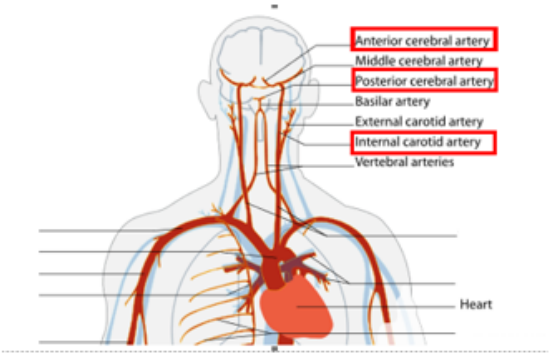

Image 1: Major Arteries from the heart to brain

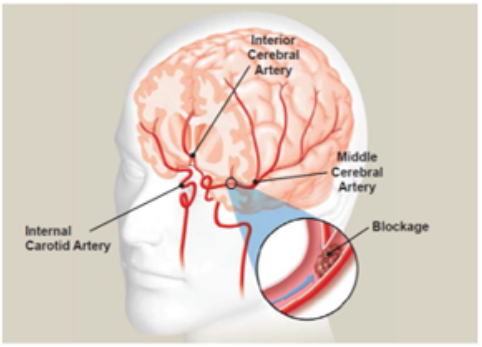

Image 2: How a stroke occurs

If the artery within the brain or one that goes to the brain is blocked for a short time, the blood flow to that area of the brain slows down or stops. This can cause a Transient Ischemic Attack (TIA), see image 3.

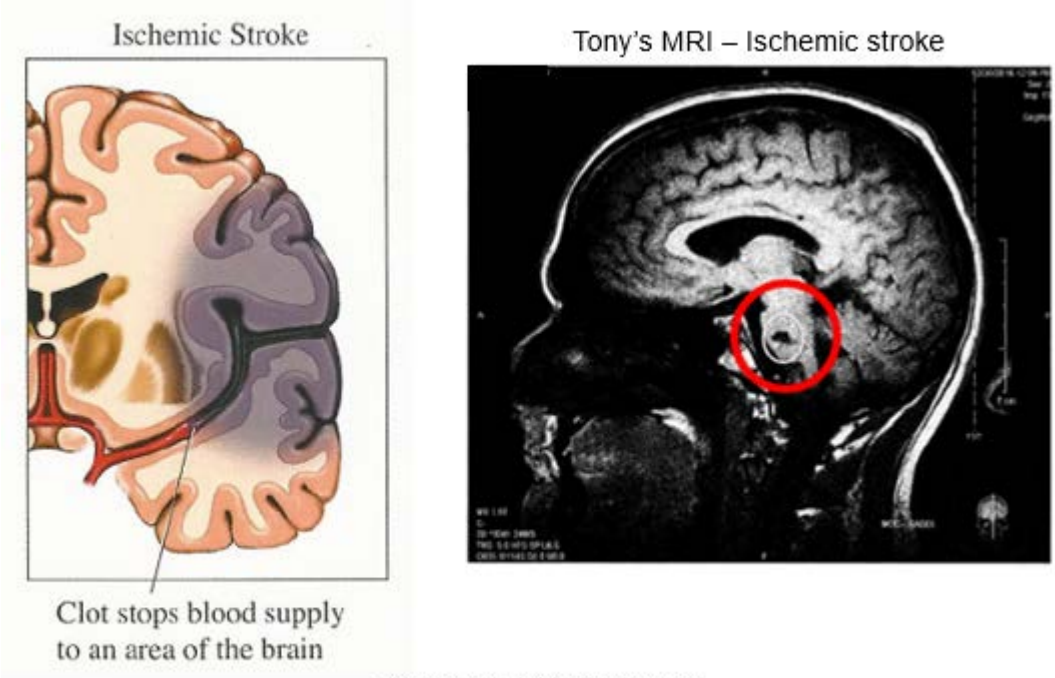

Image 3 : Ischemic stroke

The blockage affects either the left or right hemisphere of the brain. The left side of your brain controls the right side of the body. The right side of the brain controls the left side of the body. A stroke can affect understanding how to reason or do creative things. Tony's stroke affected his left hemisphere of the brain as shown in Image 4. [4]

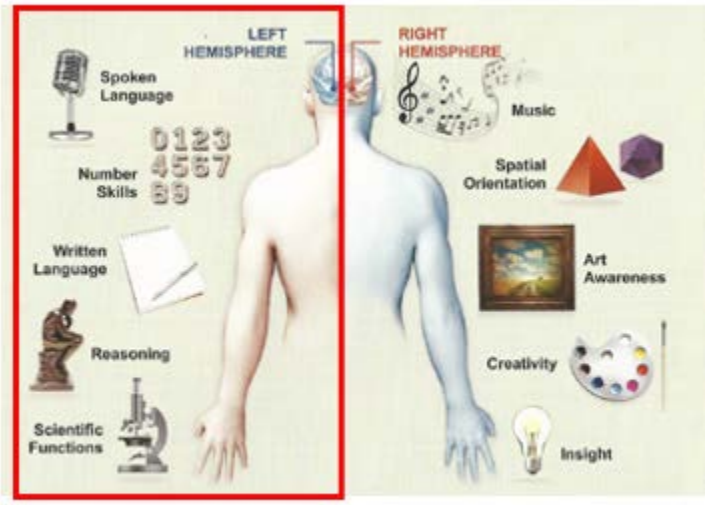

Image 4: Left Hemisphere impacts

Case Study

Tony Adams a 53-year-old male was hospitalized for a TIA stroke. He received intravenous Tissue Plasminogen Activity (TPA) in the emergency room to quickly dissolve the clot to regain blood flow to the affected area of the brain minimizing potential matter loss. The duration of the blood stoppage caused brain cells in Tony's left brain stem to die due to the lack of blood flow. This resulted in the temporary loss of the ability to move his right arm and leg.

Tony went through a daily occupational & mobility therapy program consciously challenging the following: hand strengthening and dexterity, ankle/foot plantar flexion, hip/knee flexion and extension, shoulder strengthening, and trunk stability. "It is essential that we challenge the brain systems immediately". [5]

After six weeks in therapy at Providence LCM, Tony was released. Steven Sheety, MD recommended that Tony continue occupational therapy to promote continued strengthen and functional use of right arm as well as the mobility therapy exercises to build strength and balance.

Tony was frustrated with his outpatient physical therapy he was receiving. Following the Ten Principles cited in the writings and teaching of Joseph Pilates, "A far greater part of the human potential is realized when the mental aspect of condition is integrated into the learning of re-education process." [6] I developed a BASI exercise program to re-educate / connect Tony's brain on activity requiring conscious movements that were previously subconscious movements.

BASI Program

I consulted with physical therapist Andy Davies regarding Tony's current condition. There wasn't any medical conditions that would limit Tony's exercise program. Andy recommended exercises focusing on supine bridging, hip adduction/abduction, toe taps, as well as spinal articulation. [8] He also stated that Tony needs to be challenged as he progresses through the program.

I took into account Andy's recommendations along with Tony's goals and developed a 5 week exercise plan utilizing the ""Mat" BASI Block System as seen in below.

Block System	Mat	
Legend Black: Fundamental Blue: Intermediate	Fundamental / Intermediate Week 1 (M-W-F)	Fundamental / Intermediate Week 2-5 (M-W-F)
Foundation	Pelvic curl, Supine spine twist, chest lift, leg lifts, rest position	Pelvic curl, Supine spine twist, chest lift, chest lift with rotation, leg lifts, leg changes, leg circles, rest position
Abdominal Work	Hundreds prep, roll-up	Hundreds prep, hundred, double leg stretch, single leg stretch, criss cross
Spinal Articulation	Roll-like-a-ball, spine stretch	Roll-like-a-ball, spine stretch
Bridging	Shoulder bridge prep	Shoulder bridge prep, Leg pull front, Leg pull back
Lateral Flexion / Rotation	Side lift, Spine twist	Side lift, Side kick, Saw, Spine twist
Back Extension	Back extensions	Back extensions, Double leg kick, Cat stretch, Swimming

The selection of these exercises provided Tony with the BASI Fundamental structure to strengthen and stabilize his movements. For example Pelvic Curl (Objective: spinal articulation, hamstring control and pelvic lumbar stabilization) and challenging him with Shoulder Bridge Prep (Objective: Hamstring strength, Pelvic lumbar stabilization and hip disassociation). Focusing

on how his muscle actions play a major role in stabilization of his every movement. Tony made great progress and wanted to continue to be challenged.

I began to progressively layer his exercise plan introducing him to the Comprehensive Block System utilizing the multiple equipment including Mat as seen below.

Block System	Comprehensive Weekly Mix (1-3)		
Multiple Equipment	**Reformer / Mat (1)**	**Cadillac / Ped-a-pull (2)**	**Chair / Reformer (3)**
Warm up (Fundamental)	Pelvic Curl, Spine Twist, Chest lift, Chest lift with rotation	Pelvic Curl, Spine Twist, Chest lift, Chest lift with rotation	Pelvic Curl, Spine Twist, Chest lift, Chest lift with rotation
Foot Work (Fundamental)	Parallel heels, Parallel toes, V position toes, Open V heels, Open V toes, Calf raises, Prances, Prehensile, Single leg heel, Single leg toes	**Cadillac:** Parallel heels, Parallel toes, V position toes, Open V heels, Open V toes, Calf raises, Prances, Single leg heel, Single leg toes	**Chair:** Parallel heels, Parallel toes, V position toes, Open V heels, Open V toes, Calf raises, Single leg toes
Abdominal Work (Fundamental / Intermediate)	Hundred Prep (Fundamental 1-5 sessions), Hundred Prep, Hundreds & coordination 6+	**Cadillac:** Roll-up with RUBar, Mini Roll-ups, Mini Roll-ups Obliques (Intermediate)	**Chair:** Standing Pike (Fundamental)
Hip Work (Fundamental)	Frog, Circles (Down, Up), Openings	**Cadillac:** Frog, Circles down, Circles up, walking	**Reformer:** Frog, Circles (Down, Up), Openings
Spinal Articulation (Fundamental Sessions 11+)	Bottom Lift, Bottom lift with extensions	**Cadillac:** Tower Prep	**Reformer:** Bottom Lift, Bottom lift with extensions
Stretches (Fundamental)	Standing Lunge	**Pole:** Shoulder stretch, Over head, Side, Spine twist	**Reformer:** Standing Lunge
Full Body Integration (F/I) (Fundamental / Intermediate) Sessions 11+	Scooter, Up Stretch 1, Elephant (Fundamental)	**Cadillac:** Sitting forward, Side reach (Intermediate)	**Reformer:** Scooter, Round back, flat back (Fundamental, Intermediate)
Arm Work (Fundamental / Intermediate)	Supine (s) Extension, Adduction, Circles Up, Circles down, Triceps (Fundamental)	**Ped-a-pull:** Extension, Adduction, Circles Up, Circles down, Triceps (Fundamental)	**Reformer:** Sitting (s) Chest expansion, biceps, rhomboids, hug-a-tree, salute (Intermediate)
Full Body Integration (A/M)			
Leg Work	**Gluteals Side Lying Series (mat):** Side leg lift, Forward leg lift, Forward drops (light weights) *comprehensive	**Cadillac mat:** (Gluteals Side Lying Series): Side leg lift, Forward leg lift, Forward drops (light weights) *comprehensive	**Reformer:** Jumping (s), Parallel Position, V Position, Single Leg Parallel, Leg Changes
Lateral Flexion / Rotation (Fundamental / Intermediate) Sessions 11+	**Mat:** Side lift (Fundamental) **Reformer:** Mermaid (Intermediate)	**Cadillac mat:** Side lift (Fundamental)	**Chair:** Side Stretch (Fundamental)
Back Extension	**Mat:** Back extension **Reformer:** Breast stroke prep, Pulling straps 1 (sessions 11+)	**Mat:** Back extension **Cadillac:** Prone 1 (sessions 11+)	**Chair:** Swan basic (Fundamental)

I selected the “Gluteal Side Line Series” for hip abductor strength and pelvic lumbar stabilization for his Leg Work and introduced him the Ped-a-Pull Arm Work. As seen above. Building up Tony’s core has helped with his balance.

Conclusion

Tony has shown significant improvement since his stroke. BASI "Ten Principles" approach key elements relate to the mental aspect of the Joseph Pilates work which in general conditioning is often ignored. [6] Tony's whole wellbeing is a far greater part in the re-education process realized from his stroke. [6] The BASI exercises have helped Tony gain strength and dexterity, ankle/foot plantar flexion, hip/knee flexion and extension, shoulder strengthening, and trunk stability. When Tony becomes fatigued he tends to drag his left heel. He needs to continue with the exercise program to stimulate his mental and physical aspects of this rehabilitation program.

Bibliography

1. National Stroke Association, Stroke By The Numbers
2. National Stroke Association, What is a Stroke
3. Pilates, Joseph H., *Return to Life Through Contrology*, Pilates method Alliance Inc, 2003
4. National Stroke Association, What is TIA
5. BolteTaylor Ph.D., Jill, My *stroke of Insight*, Plume, 2009
6. Isacowitz, Rael. *Study Guide: Comprehensive Course*. Costa Mesa, California: Body Arts and Science International, 2013.
7. Isacowitz, Rael. Mat: *Movement Analysis Workbook*. Costa Mesa, California: Body Arts and Science International, 2013.
8. UMC Health System, https://www.umc.medbridgego.com
9. Isacowitz, Rael. Mat, Reformer, Cadillac, Wunda Chair, *Movement Analysis Workbooks*. Costa Mesa, California: Body Arts and Science International, 2013.

Websites

National Stroke Association,

UMC Health System

https://www.umc.medbridgego.com