

**RESTORING  
INDEPENDENCE  
THROUGH  
DEDICATION &  
PERSISTENCE**

**DANIELLE ALBIN, PT, DPT, LSVT BIG, CSRS**

**LORAIN GRUETER, STROKE SURVIVOR**

# MEET LORRAINE

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- 61-year-old female
- Completely independent prior to her stroke
- Retired in March 2023 (worked for GE)
- Caregiver for her mother
- Prior caregiver for her late fiancé





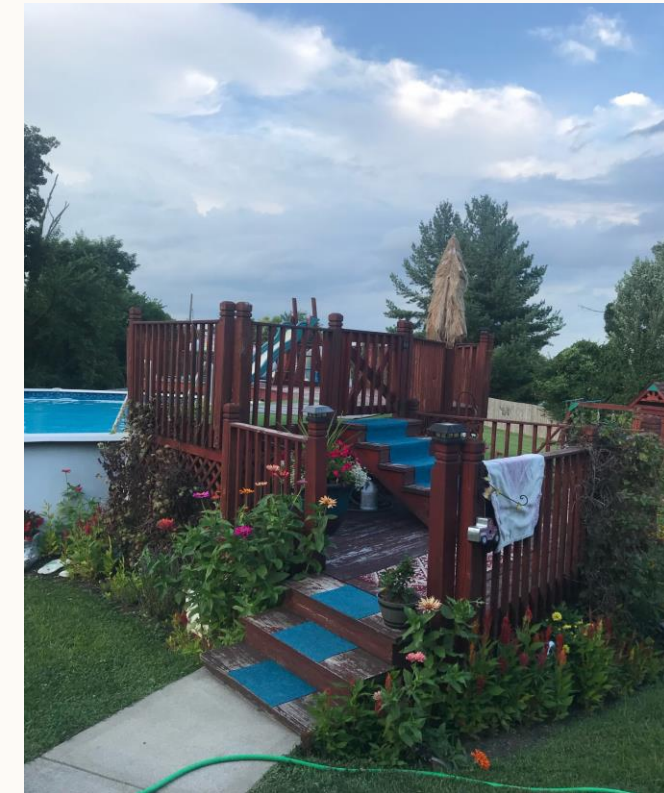
# LORRAINE'S FAMILY



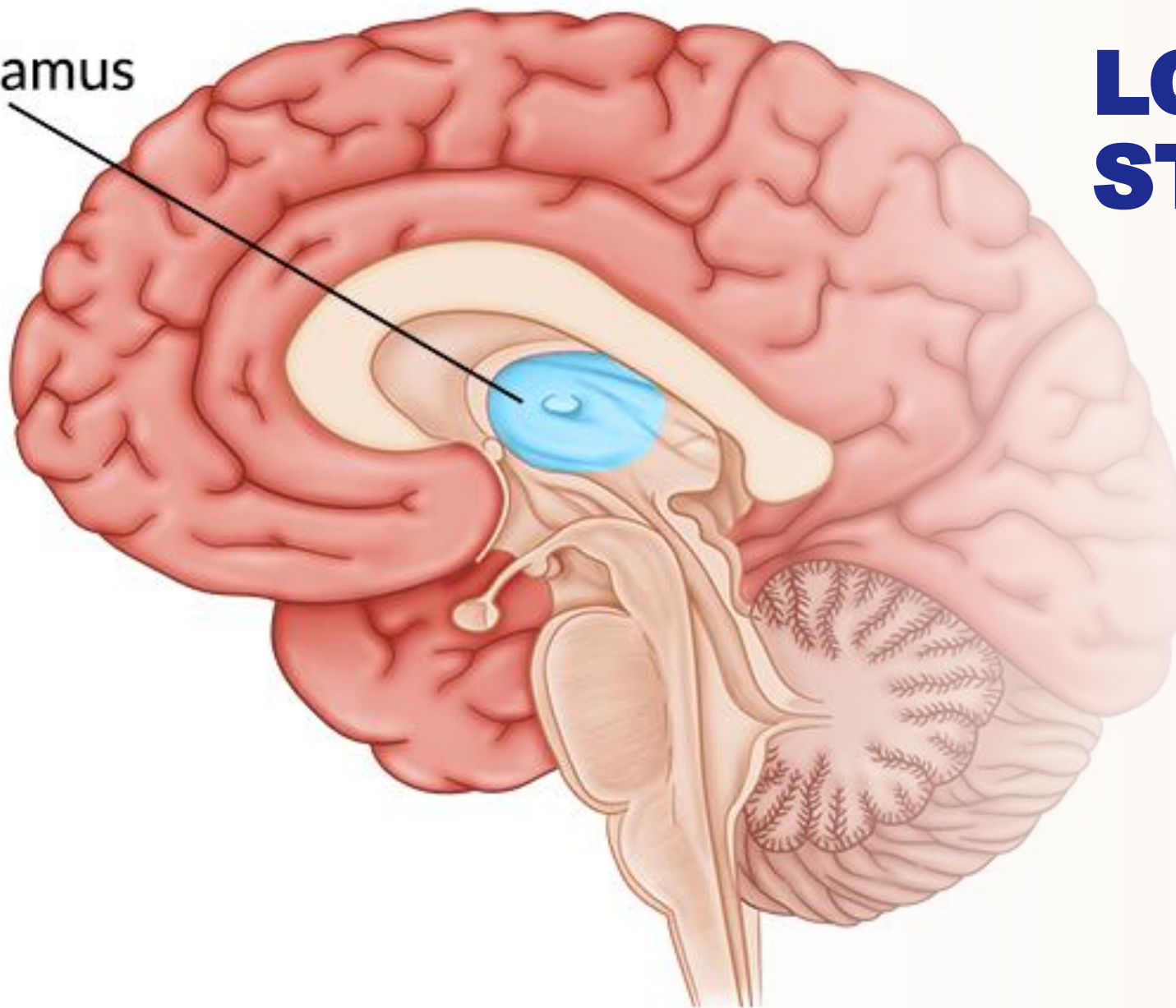
# LORRAINE'S HOBBIES

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- Gardening
- Going to car shows
- Riding motorcycles
- Boating
- Canning food
- Swimming
- Diamond bead-work
- Making diaper creations



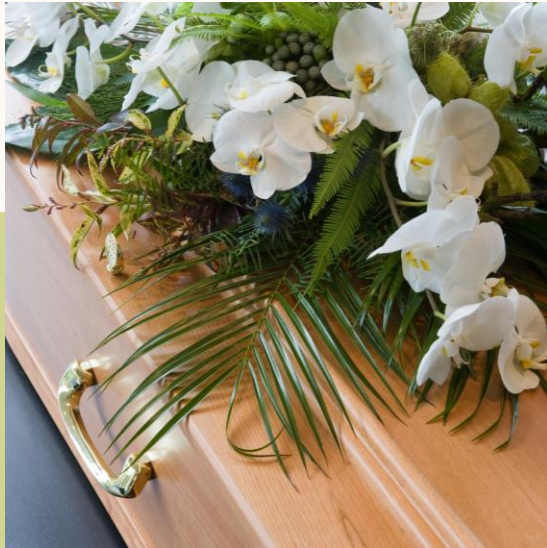
Thalamus



## LORAINNE'S STROKE

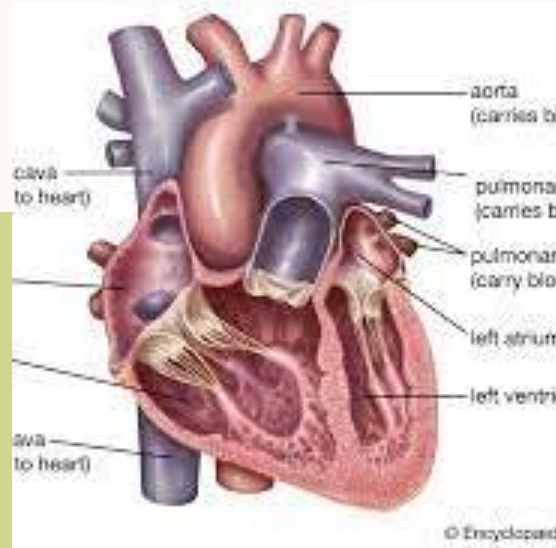
- Occurred on 5/21/23 (one week after returning from a cruise with her family)
- Left thalamic stroke
- Stroke caused by a cardiac myxoma
- Resulted in right hemiparesis
- Gateway Inpatient Rehab: 5/26/23-6/16/23 (non-ambulatory)

# OBSTACLES THROUGHOUT LORRAINE'S JOURNEY



**LOSS OF SIGNIFICANT  
OTHER**

AUGUST 7, 2023



**LEFT ATRIAL MYXOMA  
RESECTION**

August 28, 2023



**CAREGIVER TO  
MOTHER**



**MOVING TO NEW  
HOME**

Spring 2024

# OUTPATIENT PHYSICAL THERAPY (PT)

- Evaluated on 6/20/23
- Ambulating with hemi-walker
- Baseline Strength in R LE

	Right
Hip Flexion	3/5
Hip extension	1/5
Hip abduction	2/5
Knee flexion	1/5
Knee extension	3-/5
Ankle DF	0/5
Ankle PF	0/5

# OUTPATIENT PHYSICAL THERAPY BASELINE STANDARDIZED TESTS

<b>TIMED UP AND GO (6/20/23)</b>	<b>5X SIT TO STAND (7/5/23)</b>	<b>BERG (7/5/23)</b>	<b>6 MIN WALK TEST (7/5/23)</b>	<b>DGI</b>
50 seconds with hemi-walker	18.5 seconds without UE push	43/56	470 ft with NBQC	unable





# PHYSICAL THERAPY TREATMENT: GAIT

- Bioness L300 Go
- Treadmill training
- Resisted walking
- Dual task training
- Progression:
  - Hemi-walker--> Quad cane
  - > No AD

# FUNCTIONAL ELECTRICAL STIMULATION OF THE PERONEAL NERVE

**Objective:** To evaluate the effectiveness of functional electrical stimulation (FES) applied to the peroneal nerve on gait speed, active ankle dorsiflexion mobility, balance, and functional mobility of post-stroke individuals with foot drop.

\*looked at a total of 14 RCTs

**Primary Outcome:** 10-m Walk Test

**Secondary Outcomes:** active ankle dorsiflexion (DF), BERG, Timed Up and Go test (TUG)

**Results:** FES + supervised PT was better than supervised exercises alone for improving gait speed. FES is more effective than conventional therapy for improved DF, balance, and functional mobility.



## DUAL TASK GAIT TRAINING

**Objective:** To compare the effectiveness of dual task specific training and conventional physical therapy in ambulation of patients with chronic stroke.

**Outcomes:** TUG and 10MWT, step length, stride length, cycle time, cadence

**Results:** Post-treatments scores revealed significant improvement of 10-meter walk, cadence, step length, stride and cycle time in Group A (dual task group) compared to Group B (conventional PT).

**Conclusion:** The dual task group showed significant improvements in all spatial and temporal gait variables compared to conventional PT.

- TUG in dual task group went from average of 24.9 seconds down to 10.81 seconds.
- TUG in conventional PT group went from average of 26 seconds down to 19 seconds.



# PT TREATMENT: STRENGTHENING

- Home exercise program: supine and aquatic exercises + use of NMES unit
- Bioness in exercise mode
- Total gym
- Pilates Reformer
- Quadruped strengthening
- Tilt board for ankle strengthening
- Endurance training with elliptical
- Open and closed chain exercises for hamstring strengthening







# PT TREATMENT: BALANCE & FUNCTIONAL MOBILITY

- AirEx balance pad
- Tilt board
- Dynamic balance challenges
- Use of BITS
  
- Sit to stand and transfers
- Floor transfers
- Stair training





# OUTPATIENT PT CURRENT SCORES

**TIMED UP AND  
GO**

13 seconds  
without an AD

**5X SIT TO  
STAND**

9 seconds  
without UE  
push

**BERG**

56/56

**6 MIN WALK  
TEST**

739 ft without  
an AD

**DGI**

16/24



# CURRENT OUTPATIENT PT STRENGTH & MOBILITY

- Independent without an assistive device
- Up/down flight of stairs with HR, reciprocal pattern, independent
- Independent with floor transfers and all functional mobility

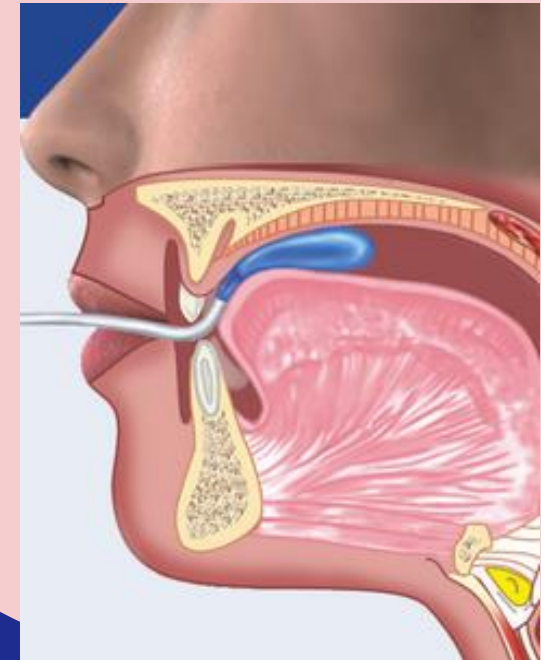
	Right
Hip Flexion	4/5
Hip extension	4+/5
Hip abduction	4+/5
Knee flexion	4/5
Knee extension	4+/5
Ankle DF	2/5
Ankle PF	0/5

# SPEECH THERAPY (ST)

- ST in ED 5/22/23 (one day after stroke).
  - Reduced strength, ROM, and sensation right side lip and tongue
  - Right side pocketing of food
  - Moderate dysarthria (slurred speech, reduced volume)
    - She discharged to Gateway Rehab and the dysarthria resolved.
- Had modified barium swallow study (MBS) 8/30/23, due to complaints of food sticking to right side of throat.
  - MBS revealed functional swallow with no penetration or aspiration and no pharyngeal residue.
  - No further acute ST was recommended at the time.
- Loraine was receiving OT and PT and mentioned ongoing difficulty chewing/swallowing, so was referred for OP ST evaluation.
- Loraine was evaluated by Paige Hester 11/7/23.

# OUTPATIENT ST

- Reported right facial and tongue weakness and numbness, which made it difficult to initiate swallow and propel food.
- She had lost ~20 pounds (mainly eating soups, protein shakes, and softer/creamy foods).
- Due to oral dysphagia, IOPI device was introduced (measures lip and tongue strength).
  - Blue bulb (filled with air for resistance training) is positioned at different areas of tongue or lips, lips or tongue presses against it.
  - Exercise plan was developed to improve strength.



# **IOPI RESULTS AND DISCHARGE STATUS**

- Posterior tongue strength increased by 12 kPa (kilopascals), reaching 56 kPa (normal 50-55)
  - Right side of lip stayed the same at 24 kPa (normal is 28)
  - Left lip increased by 9 kPa, reaching 28 kPa (normal is 28)
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- **By the end of treatment, Loraine was not avoiding as many food textures as she was before.**
  - **She continued with some reduced desire to eat and numbness but, admitted that she had more confidence with selecting food items.**

# OUTPATIENT OCCUPATIONAL THERAPY (OT)

Evaluation: 6/28/23

Functional use of L UE only:

- Mod I with dressing
- Min assist with bathing

Right Hand: 0# grip

Right shoulder: 1 finger-width  
subluxation

Right	MMT
Shoulder Flexion/Extension	0/5
Shoulder Abduction/Adduction	2/5
Shoulder Elevation	2+/5
Elbow Flexion	2/5
Elbow Extension	1/5
Wrist Flexion/Extension	0/5
Digit Extension	0/5
Digit Flexion	1/5



# OT TREATMENT

- Kinesio-tape, positioning, and NMES for shoulder subluxation and pain management
- Neuromuscular re-education exercises and functional tasks (in clinic and home) with weight-bearing and muscle isolation
- Incorporating R UE to assist with ADLs
- NMES (in clinic and home) and Bioness H200

# OT TREATMENT:

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- Grip assist glove to facilitate ROM and resistive strength training (utilized after subluxation minimized)
- Wrist stabilization brace to inhibit wrist flexion and allow for more functional use of R UE
- Barriers:
  - Developing R wrist cyst
  - Right scapula pain from past injury



# OT CURRENT MEASUREMENTS:

Right	MMT
Shoulder Flexion	0/5
Shoulder Abduction/Adduction	3/5
Shoulder Elevation	3+/5
Elbow Flexion	3-/5
Elbow Extension	3/5
Wrist Flexion/Extension	1/5
Digit Extension	2/5
Digit Flexion	3+/5

- ½ finger-width subluxation
- 18# grip with wrist brace on
- Mod I with bathing and dressing (incorporating R UE to actively assist)



**QUESTIONS?**



# REFERENCES

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