

vizziqTM

Neuromuscular Trainer

Vizziq Neuromuscular Trainer

David S. Case Study

December 2022

TABLE OF CONTENTS

Introduction 64-Year-Old Male Left Thigh Weakness	3
Vizziq Neuromuscular Training 6-Week Case Study.....	3
Vizziq Training Results	4
Visual Results	4
Figure #1 Fear of Falling Questionnaire – Responses	4
Figure #2 Increased Gait Speed	5
Figure #3 Increased Step Length.....	5
Figure #4 Increased Stride Length.....	6
Figure #5 Pre-Vizziq Use (Left). Post Vizziq Use (Right).....	6
Figure #6 Pre-Vizziq Use (Left). Post-Vizziq Use (Right).....	7
Key Findings	7
Increased Gait Speed	7
Increased Step & Stride Length	7
Straight Foreword Upward Gaze	8
Decreased Fear of Falling.....	8
Conclusion.....	8
Key Takeaways	8
References.....	9
End Notes.....	10

INTRODUCTION 64-YEAR-OLD MALE LEFT THIGH WEAKNESS

The CDC has found that in the United States, one out of four adults, or 36 million falls are reported, resulting in over 32,000 deaths, annually.¹ Gait speed is a reliable, sensitive, and specific measurement tool that can be used to predict future health status, as well as functional decline, because of the functional and physiological changes that occur, per the American Physical Therapy Association. This includes the ability to predict falls, hospitalizations, and mortality risk.² Vizziq Neuromuscular Trainer is a progressive, over the ground, neuromuscular/gait training tool that can be used at nearly any stage in a person's healthcare journey. Vizziq can be used as a tool for fall risk reduction, rehabilitation, rehabilitation after injury or illness, and prevention. The science behind Vizziq is in the patented, spring-loaded resistive pivoting frame to allow for activation of the 3 fall defense systems in our bodies, visual, vestibular, and somatosensory. The case study was done with David, a 64-year-old male with weakness in his left thigh muscle, with a history of 5 falls in the past 2 months. His goals were to increase his stride length, as well as improve his posture and balance. David began his journey walking with Vizziq at least 20 minutes 3 times a week for six weeks.

VIZZIQ NEUROMUSCULAR TRAINING 6-WEEK CASE STUDY

David had weakness in his left thigh muscle and pain in his right shoulder but is an otherwise healthy male, with no pre-existing conditions that limited him in his ability to properly utilize Vizziq on his own, without support and/or supervision. As mentioned above, David had a history of 5 falls in 2 months. David had the goals of improving stride length, balance, and posture.

The subjective assessment that was performed was the Falls Efficacy Scale International (FES-I), which reviews the person's fear of falling, self-efficacy, and balance confidence. This score can range from 16, no concern about falling to 64 or severe concern about falling. This assessment requires all but four items to be answered, otherwise the assessment is not valid. If the assessment is missing answers, it is scored by calculating the total score of the rated items, the multiply by 16, round to the nearest whole number, and that is the score. If the score ranges from 16-19 there is low concern for falls, 20-27 there is moderate concern, and 28 and above is high concern for falls.³

The first objective assessment that was completed was for gait speed, which was performed by measuring out 50 feet and placing cones 25 feet apart, in the middle of the 50-foot space. There would be the starting cone at 12.5 feet from the starting point and then one at 37.5 feet from the starting point, creating a 25-foot measurement. Gait speed was measured by the calculation of 7.6meters (25 feet) divided by the #of seconds (7.6/seconds).

The APTA Geriatric Physical Therapy, White Paper: “Walking Speed: The Sixth Vital Sign” was used to categorize individuals into four categories based on their gait speed. A gait speed less than 0.4m/s categorizes the person into the “household ambulatory” category. A gait speed between 0.4m/s and 0.8m/s categorizes the person into the “limited community ambulator”, while 0.8m/s to 1.2m/s places the person into the “community ambulator” category. The final category is anything above 1.2m/s and this is considered the “able to safely cross streets” category.

Step and stride lengths were measured during this case study, since that was one of David’s main goals was to improve his stride length. Step length is the measurement from the heel strike on one foot to the heel strike on the opposite foot, while walking. Stride length is the measurement from the heel strike of the same foot. Step length is measured by the distance in (25) feet divided by the number of steps taken (25/steps), giving a step length in feet. Stride length is measured by the number of steps of only one foot, the dividing the number of feet (25ft) by that number, giving you a stride length in feet. The average adult male’s step length should be about 2.1-2.5’ (25-29”), while the average stride length is approximately 5.2’ (62”).⁴

VIZZIQ TRAINING RESULTS

Visual Data

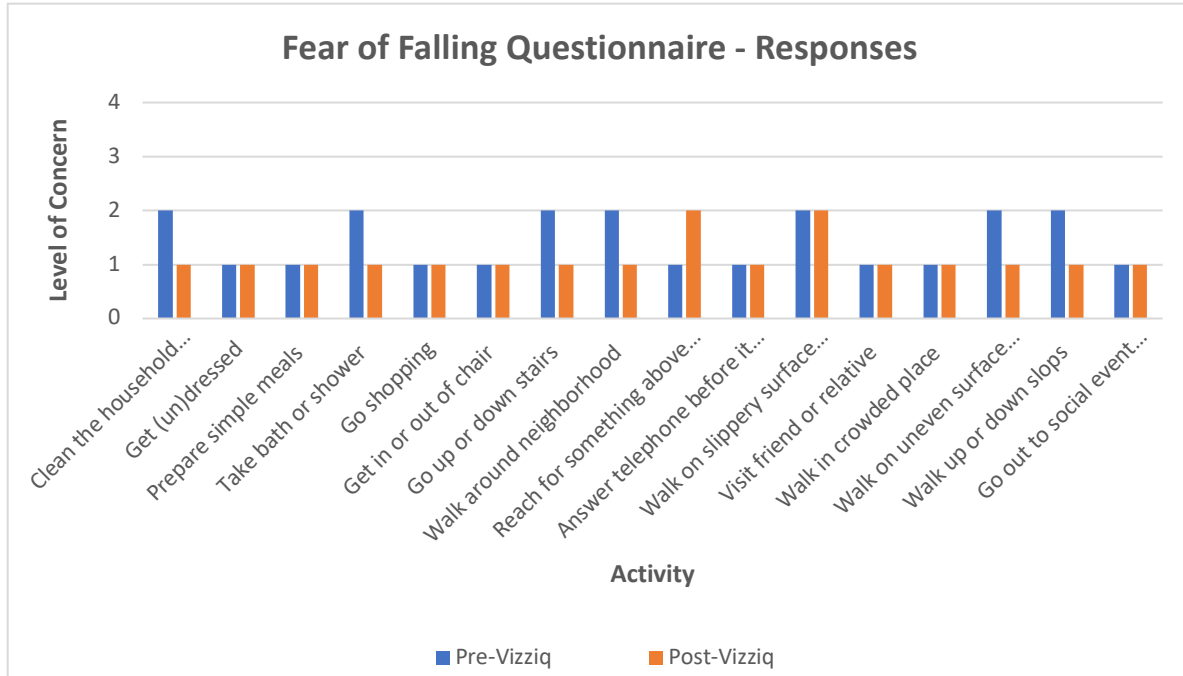


Figure 1: Fear of Falling Questionnaire – Responses Pre/Post Vizziq Use.

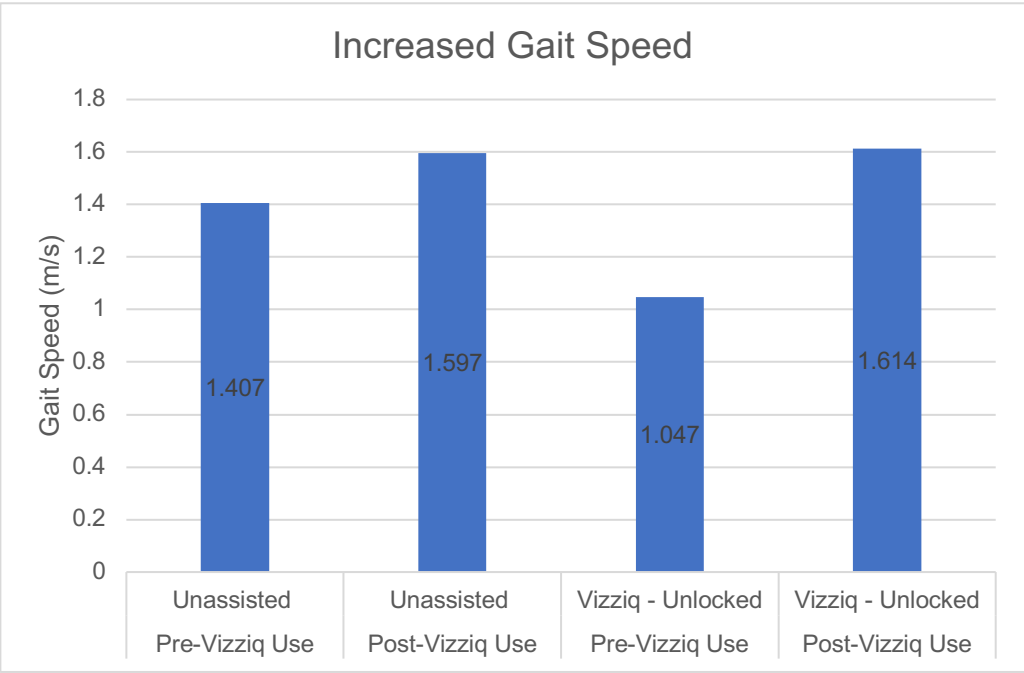


Figure 2: Increased Gait Speed Pre/Post Vizziq Use.

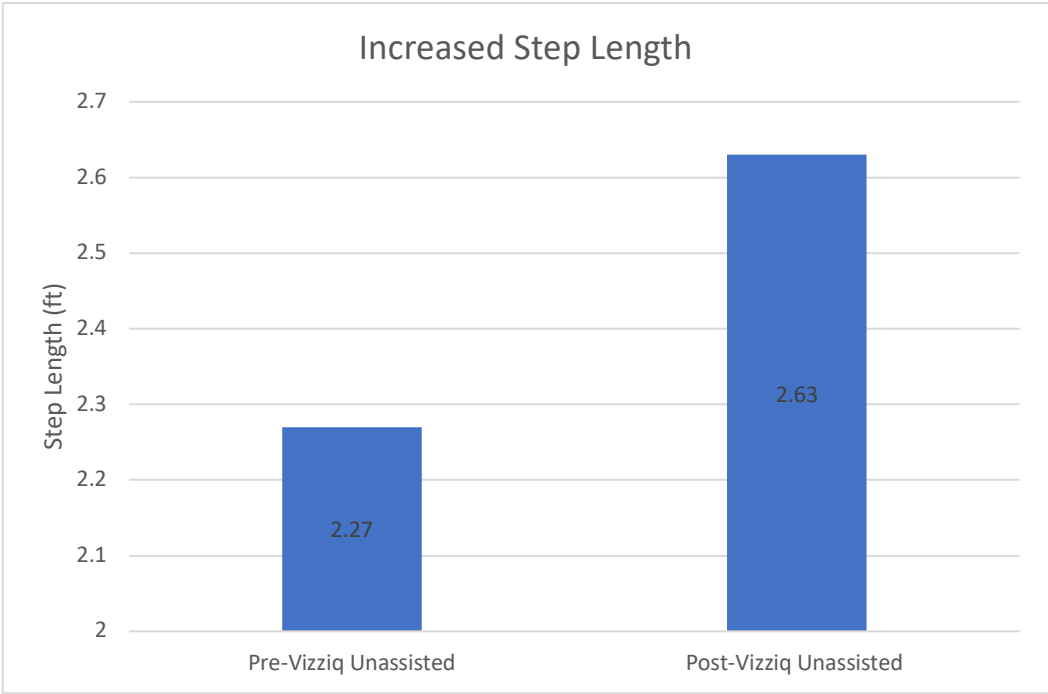


Figure 3: Increased Step Length Pre/Post Vizziq Use.

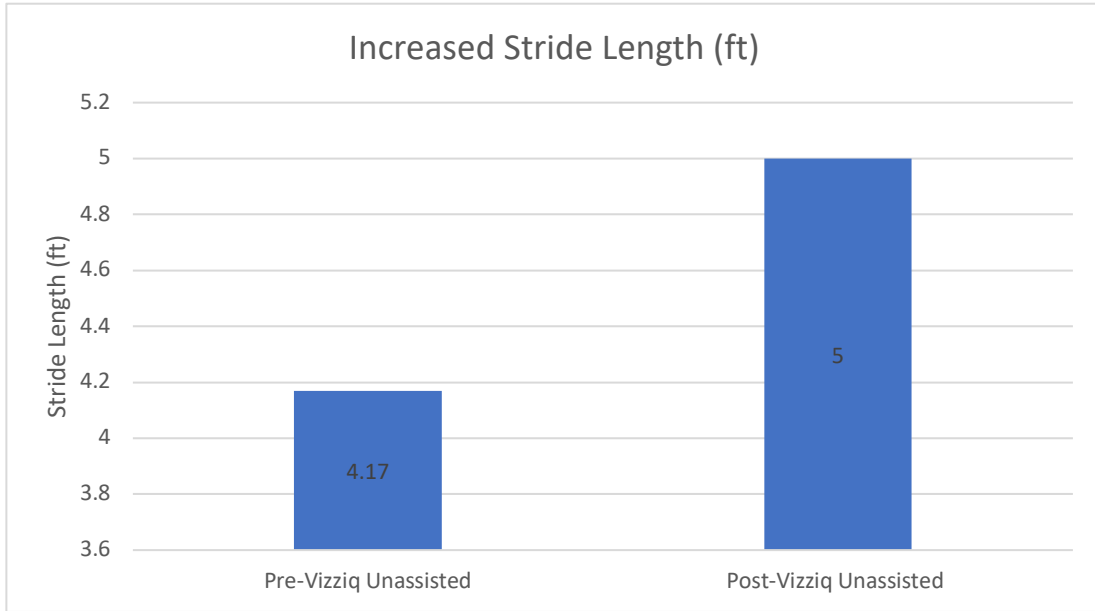


Figure 4: Increased Stride Length Pre/Post Vizziq Use.



Figure 5: Pre-Vizziq Use (Left). Post Vizziq Use (Right).



Figure 6: Pre-Vizziq Use (Left). Post-Vizziq Use (Right).

Increased Gait Speed

David's unassisted, pre-Vizziq training gait speed was 1.407m/s. His Vizziq assisted, with pivoting frame, gait speed before beginning the 6-week trial was 1.047m/s. David's unassisted, post-Vizziq training gait speed was 1.597 m/s, while his post 6-week trial, using Vizziq in the pivoting frame gait speed was 1.614m/s (see Figure 2: Increased Gait Speed). David explained in his post-study review that he felt like he had a better rhythm and speed to his gait. Even his wife complained about how fast he walks now and asks him to "slow down". He explained that even walking without Vizziq, he has increased his gait speed.

The average gait speed for a male, between 60-69 years of age is 1.34m/s. As shown above, David's unassisted gait speed was slightly above the average at 1.407m/s. However, after using Vizziq for 6-weeks, his unassisted gait speed increased to 1.597m/s. David is categorized in the highest category for gait speed, or the "able to safely cross streets" category.

Increased Step & Stride Length

David had a marked change in his step and stride length, even increasing his stride length above the average adult. His step length pre-Vizziq training was 2.27 feet, while post Vizziq training for 6-weeks went to 2.63 feet (see Figure 3: Increased Step Length). His stride length pre-Vizziq training was 4.17 feet, while post Vizziq training went to 5 feet (see Figure 4: Increased Stride Length). David said, "I always felt like I had a short stride, this made me feel, I felt like it (Vizziq) gave me a little longer stride."

Straight Foreword Upright Gaze

As seen in Figure 5 and 6, the images of David, pre and post Vizziq training show a significant improvement in his straight foreword gaze and posture. David's gaze before Vizziq training was at a 69° angle, while after 6-weeks of training, his gaze improved to 93°. David notes a difference in his posture and that he is looking more forward. David mentioned the desire to have a more straightforward and upright gaze and that he and his wife both feel that Vizziq helped him achieve that. "I think getting you upright more. I am a 'huncher' when I sit in a chair and everything, this gets you upright. The upright handlebars, it made me more upright. I found myself more upright even when I was walking without it, even my neighbor could tell the difference in my walking posture." The upright handlebars allow for the user to maintain an upright posture and foreword facing gaze instead of the stoop over and shuffle seen with mobility devices.

Decreased Fear of Falling

David completed the FES-I before beginning his Vizziq training. He answered all the questions and scored a 23 on his assessment, classifying him as moderately concern. After the completion of the six-week case study, David took the FES-I again. He completed the questionnaire, answering all the questions, and scored an 18, classifying him in the low concern for falls category (see Figure 1: Fear of Falling Questionnaire- Responses). The changes noted for David were significant in regard to his fear of falling. Vizziq training was able to decrease his fear of falling and increasing his confidence, allowing him to feel safe when he walks.

CONCLUSION

David felt a noticeable difference after training with Vizziq for 6-weeks. Vizziq has a patented, progressive, pivoting, spring-loaded resistive articulating frame. Vizziq has been shown to improve gait dynamics, while improving posture and confidence, and decreasing the fear of falling.

Vizziq Training leads to:

- Increased gait speed.
- Increased step length.
- Increased stride length.
- Improved posture.
- Improved Upright and Straightforward Gaze.
- Improved balance.
- Improved confidence in walking.
- Decreased fear of falling.

Why wait until a fall occurs? Begin using Vizziq today to reduce risk of falls.

References

- "Fes-I ", accessed 20221228, 2022, <https://sites.manchester.ac.uk/fes-i/>.
- Fritz PT, PhD, Stacy & Lusardi PT, PhD, Michelle. "White Paper: Walking Speed: The Sixth Vital Sign." *Journal of Geriatric Physical Therapy* 32, no. 2 (2009): 2-5.
- Johnson, Jolie. "The Average Walking Stride Length." *livestrong.com*. (2019). <https://www.livestrong.com/article/438170-the-average-walking-stride-length/>.
- "Keep on Your Feet- Preventing Older Adult Falls." *Injury Prevention & Control*, 2020, accessed December 13, 2022, 2022, <https://www.cdc.gov/injury/features/older-adult-falls/index.html#:~:text=One%20out%20of%20four%20older,particularly%20among%20the%20aging%20population.&text=About%2036%20million%20falls%20are,in%20more%20than%2032%2C000%20deaths.>

EndNotes

¹ "Keep on Your Feet- Preventing Older Adult Falls," Injury Prevention & Control, 2020, accessed December 13, 2022, 2022, <https://www.cdc.gov/injury/features/older-adult-falls/index.html#:~:text=One%20out%20of%20four%20older,particularly%20among%20the%20aging%20population.&text=About%2036%20million%20falls%20are,in%20more%20than%2032%2C000%20deaths>.

² PhD Fritz PT, Stacy & Lusardi PT, PhD, Michelle, "White Paper: Walking Speed: The Sixth Vital Sign," *Journal of Geriatric Physical Therapy* 32, no. 2 (2009). Page 1.

³ "FES-I ", accessed 20221228, 2022, <https://sites.manchester.ac.uk/fes-i/>.

⁴ Jolie Johnson, "The Average Walking Stride Length," *livestrong.com* (2019). <https://www.livestrong.com/article/438170-the-average-walking-stride-length/>.