

# Balance and Gait Training to Reduce Fall Risk in a Patient with Bilateral Foot and Hand Deformities Secondary to Rheumatoid Arthritis: A Case Report



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## Background

- Each year, one out of three adults over the age of 65 sustains a fall. Although the risk of suffering a fall increases with age, falls are not an unavoidable aspect of the aging process.<sup>1</sup>
- Fall risk can be heightened in patients with medical comorbidities that impact the physiological senses which help maintain balance.
- Rheumatoid arthritis (RA) is a chronic inflammatory disorder that affects the lining of the joints and causes painful swelling that can eventually result in bone erosion and joint deformity.<sup>2</sup>
- The fall incidence rate in individuals with RA is 0.62 falls per person per year as compared to a fall incidence rate of 0.45 falls per person per year in healthy elderly individuals.<sup>3</sup>

## Purpose

- To provide an overview of the physical therapy plan of care for a patient at high risk for falls.
- Procedural interventions focused on balance and gait training while accommodating for the patient's bilateral foot and hand deformities secondary to RA.

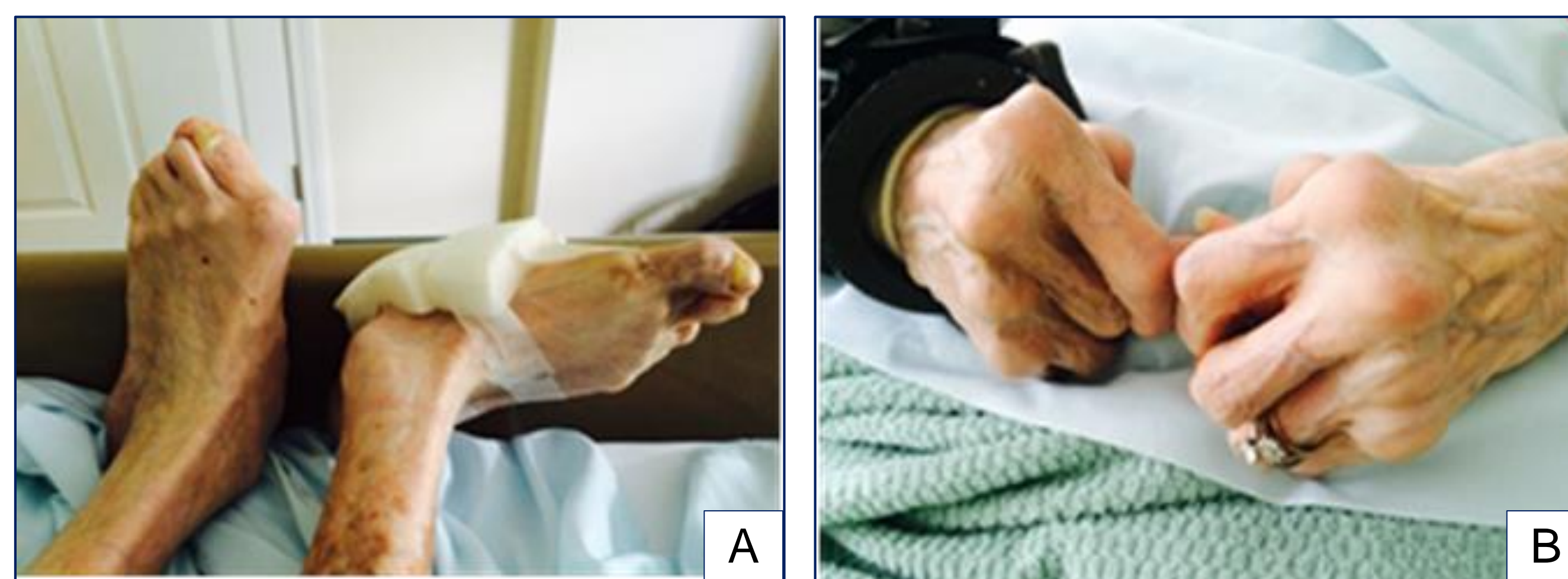


Figure A and B: Resting position of the patient's bilateral foot and hand deformities secondary to rheumatoid arthritis. She presented with grossly 25% of AROM in bilateral feet and hands.

## Case Description

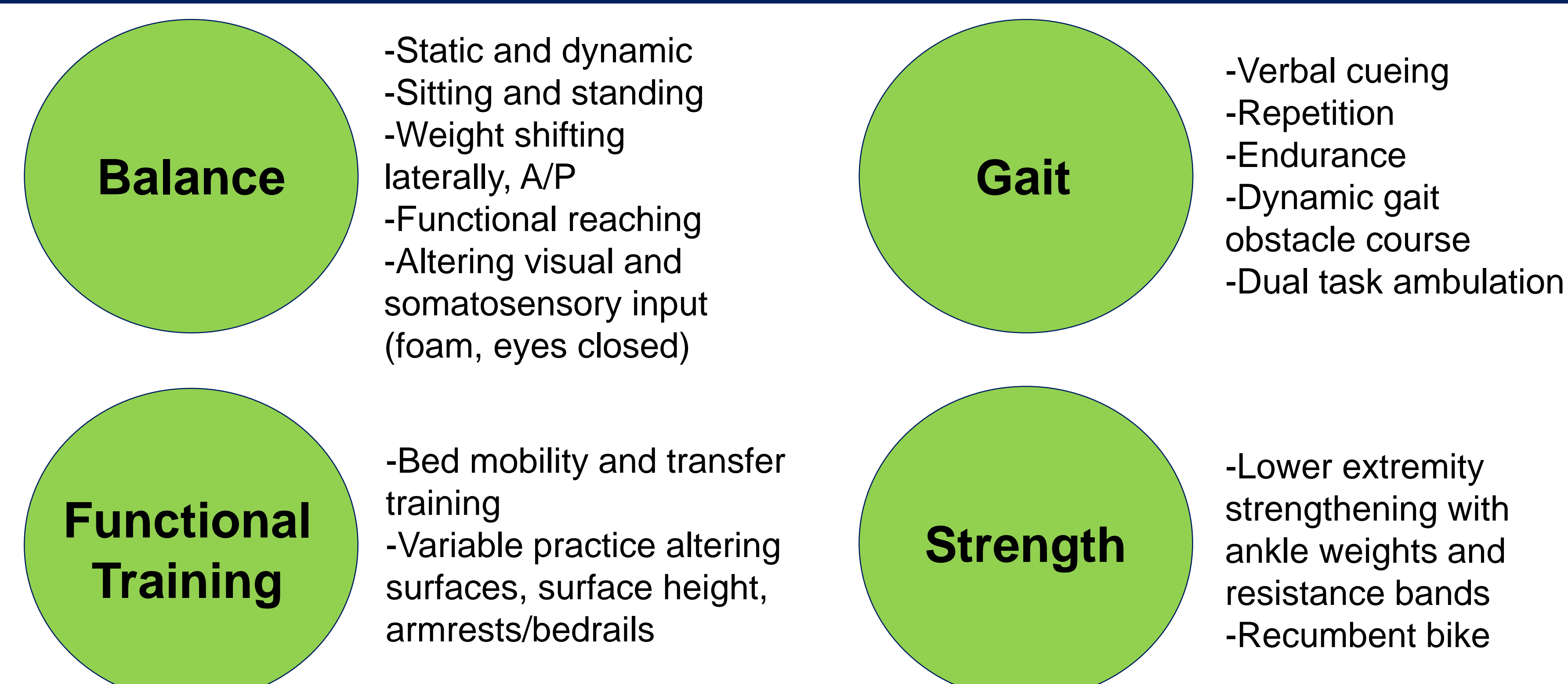
- 84 year old female who suffered a fall likely due to structural deformities secondary to RA that impaired her balance and ability to safely ambulate.
- Fall resulted in a right olecranon fracture and subsequent open reduction internal fixation for surgical repair.
- Transferred to a skilled facility for continued care. She presented with deficits in strength, endurance, balance, coordination and overall functional mobility which heightened her fall risk.

## Examination

Tests & Measures	Initial Evaluation Results	Discharge Results
<b>Bed Mobility</b>		
Sit to Supine	MinA to lift trunk from supine position	Independent
Supine to Sit	MinA for upper body and trunk	Independent
<b>Transfers</b>		
Sit to Stand	MinA with hemi-walker, used L UE to push from surface	SBA with hemi-walker, used L UE to push from surface
Stand to Sit	MinA for controlled descent, verbal cues to reach back for surface with L UE after feeling the surface on the back of her legs	Modified Independent with hemi-walker
<b>Ambulation</b>		
With hemi-walker	1x20ft with hemi-walker and CGA	2x200ft with hemi-walker and distant supervision
<b>Gait Analysis</b> With hemi-walker		
	Unsteady gait, foot-flat contact, decreased step length, decreased cadence, forward trunk lean, out-toeing bilaterally.	Unsteady gait at times, improved step length, improved cadence, continuous stepping, slight forward trunk lean, out-toeing bilaterally.
<b>Balance</b>		
	<b>Sitting</b>	<b>Standing</b>
Static	Good	Fair+
Dynamic	Good-	Fair
<b>Activity Tolerance /Endurance</b>		
	Minimal limitations, sustained ordinary activities cause fatigue	Age appropriate activities do not cause increased fatigue
<b>Timed Up and Go</b>		
	73 seconds with hemi-walker and MinA for sit<->stand	48 seconds with hemi-walker and SBA for sit<->stand
<b>Tinetti Performance Oriented Mobility Assessment</b>		
	10/28	18/28
<b>Falls Efficacy Scale</b>		
	70/100	37/100

L = left, UE = upper extremity, MinA = minimal assist, sit<->stand = to and from sit to stand, SBA = stand-by assist

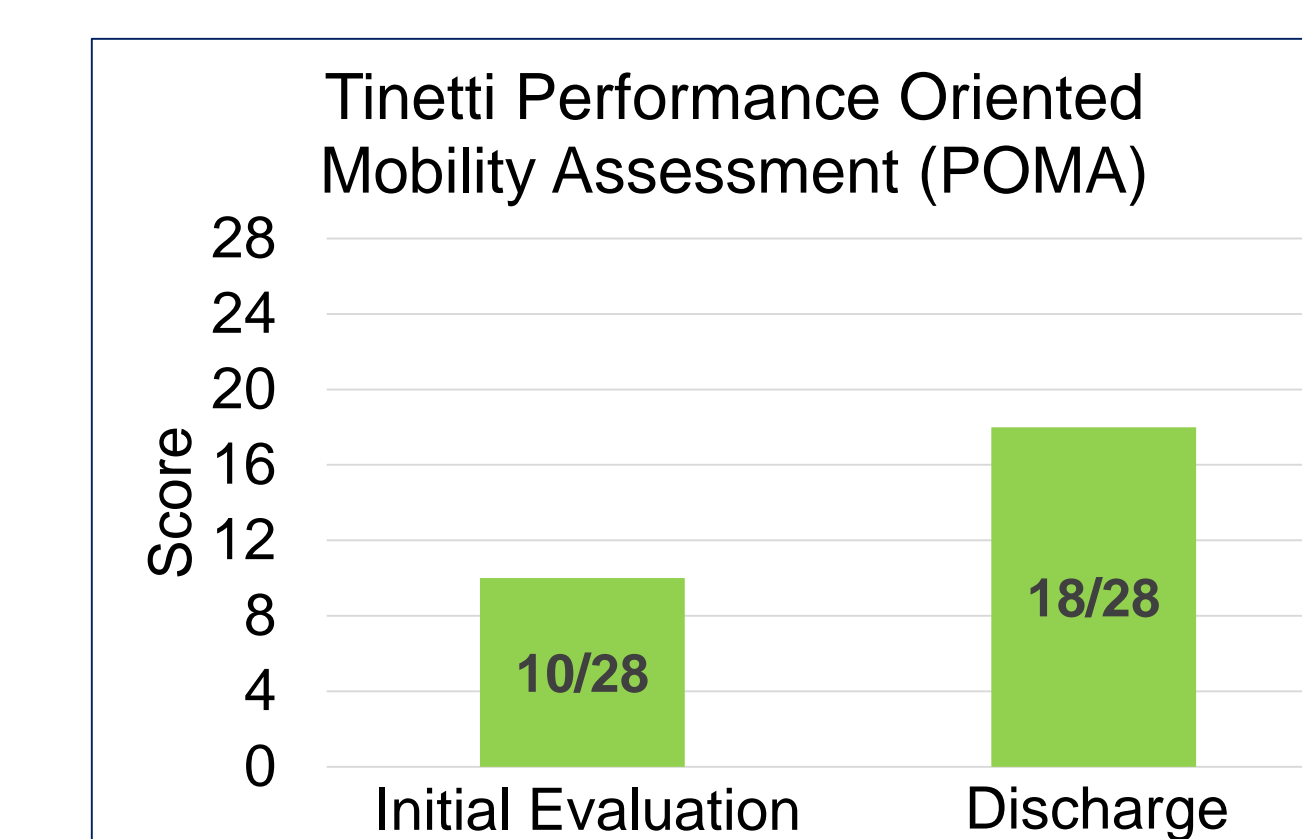
## Interventions



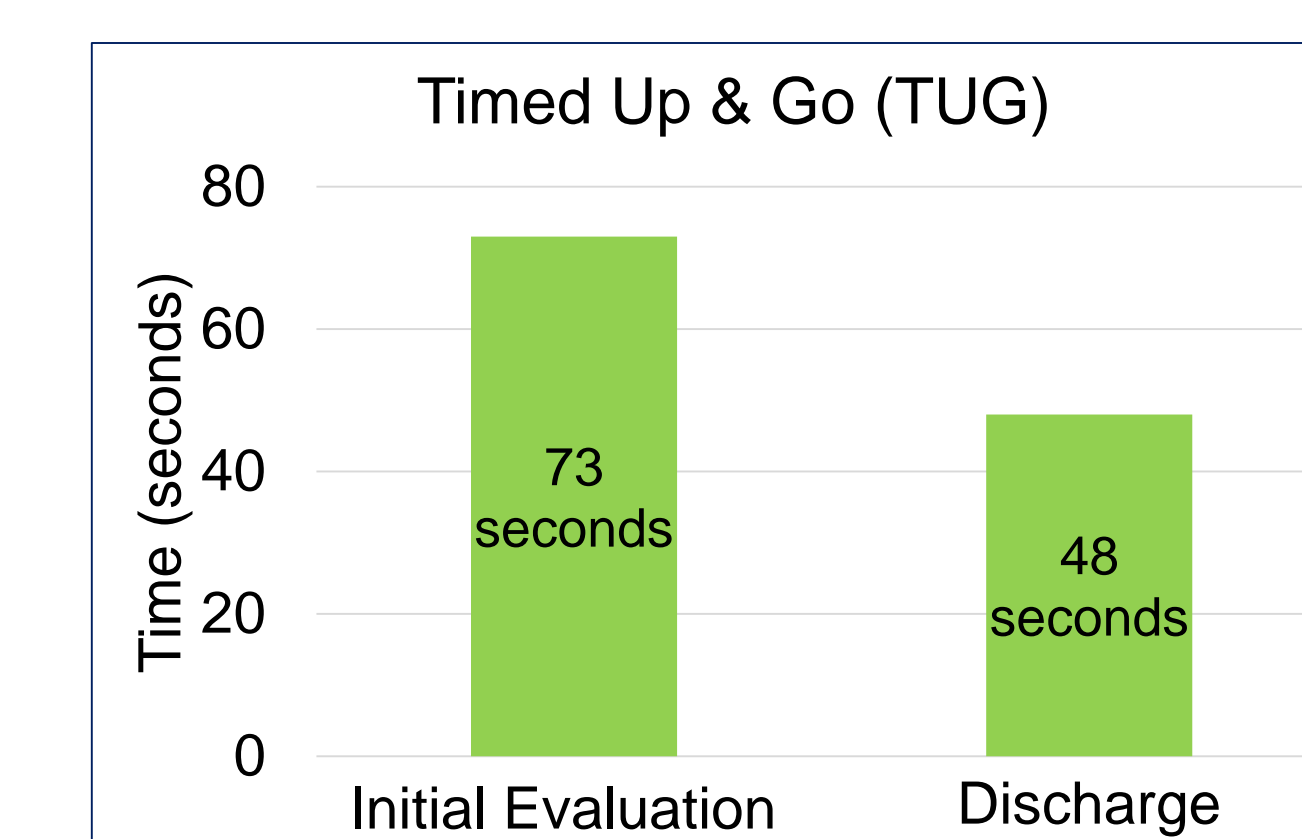
- Coordination, communication and documentation as well as patient-client related instruction were also interventions utilized throughout the episode of care.
- Interventions were progressed based on patient tolerance and improvements as to continue progressing towards her short term and long term goals.

## Outcomes

- After 3 weeks of interventions, the patient achieved higher levels of independence on all mobility tasks.
- The patient ambulated with a hemi-walker on indoor surfaces 2x200ft with distant supervision.
- The patient decreased her fall risk as demonstrated by improved TUG, POMA and FES scores.



A higher score on the POMA indicates a better outcome.



A decreased time to perform the TUG indicates a better outcome.

## Discussion

- The patient demonstrated improved endurance, strength, balance, bed mobility, transfers and gait.
- The positive outcomes of patient-centered balance and gait training reflected upon the patient's improved TUG, POMA and FES scores.
- Patient-centered PT with a focus on balance and gait training appeared to make significant improvements in this patient's overall function and decrease her fall risk.
- Future research studies analyzing the efficacy of particular gait training and neuromuscular re-education interventions targeting fall risk in a population of individuals experiencing instability secondary to RA related structural changes are necessary in order to generalize the results to different patients.

## Acknowledgements

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## References

1. Older Adult Falls: Get the Facts. Centers for Disease Control and Prevention. <http://www.cdc.gov/homeandrecreationalsafety/falls/adultfalls.html>. Updated July 1, 2015. Accessed September 2, 2015.
2. Rheumatoid Arthritis. Mayo Clinic. <http://www.mayoclinic.org/diseases-conditions/rheumatoid-arthritis/basics/definition/con-20014868>. Published October 29, 2014. Accessed September 20, 2015.
3. Smulders et al. Fall incidence and fall risk factors in people with rheumatoid arthritis. *Ann Rheum Dis*. 2009 Nov;68(11):1795-6.