

## CASE: Geriatric #1

Patient is a 78 year old female who is in outpatient physical therapy. She fell 6 weeks ago and sustained a minimally displaced right humerus fracture (NEER Classification I) while walking down the steps inside the movie theater. She was evaluated 6 weeks ago and underwent non-operative management and a brief inpatient rehab stay for occupational and physical therapy for 2 weeks, then she was discharged home. Her ROM and strength are nearing prior level of function and she is now ready to progress to balance exercises in order to prevent a second fall. MD Prescription: PT for BALANCE

**Home Situation:** Patient is a former math teacher who lives with her husband in a two-story home. The laundry room is in the basement and the bedroom is upstairs. There is a railing on the right ascending for each set of stairs.

**PMH:** Significant for Diabetes Mellitus II for 16 years, HTN, glaucoma, plantar neuropathy, loss of protective sensation on left plantar surface, corrective lenses for far-sightedness.

**Observation:** Patient ambulates without assistive device and has reduced right arm swing with ambulation. She walks with her head down for increased visualization of floor surfaces. The patient stumbles into the doorway as she enters the department from the bright sunshine and she complains that her transition lenses do not change quickly enough for her to see. She did not exhibit any protective response with her involved UE or sufficient reactive balance with her LE's.

**Patient Goals:** Patient wants to return to her prior level of independence with ADL's and IADL's, participating in community activities including tennis, driving and outdoor hiking but she expresses fear that she will fall again and break her hip.

**DIAGNOSIS:** Geriatric Case #1

**PRELIMINARY HYPOTHESIS: (add or delete rows as needed)**

Identify, from the case presented and your knowledge of motor control, motor learning, neuroscience and coursework thus far, how you THINK they should(would) present.

**What impairments do you expect? Why?** (state multi-system, then list the associated single system as a group and then identify why. This should link neuroscience, diagnosis and function)

Multi-System	Associated Single-System(s)	WHY?
Sensation	Light touch Two point discrimination Especially Plantar surface	Suspect due to diabetic neuropathy and lack of protective response, age related changes, and observed pt looks at ground while she walks. Due to poor vision, patient needs to be able to rely on sensation to aid in balance.
Vision	Visual acuity Glaucoma Contrast sensitivity	Reportedly wears glasses for farsightedness, and fell while walking down steps in a dark movie theater. Damage to optic nerve due to glaucoma. Patient needs adequate visual input to aid in balance.
ROM	R shoulder Trunk Motions	May have lack of terminal ROM (high reaching from the recent fx) Decreased arm swing possibly due to muscle guarding after immobilization. Possible reduced trunk shortening and lengthening from decreased activity due to fear of falling, rigidity, or decreased strength- will affect balance during stairs and gait (weight shifting).
Strength	R shoulder and LE (hip/kee/ankle/trunk) Type I fibers Type II fibers	Decreased strength in R UE due to prolonged immobilization. Natural process of aging includes decrease of type I and II (I before II) muscle fibers. In the LE decreased strength correlates to decreased foot clearance which could put her at a higher fall risk.
Cardiopulmonary	HTN Cardiovascular endurance Stiffness and decreased elasticity of vessels	PMH of HTN and diabetes. Needs endurance to ensure that she can complete exercises we are asking of her, to get her back to her goals, and ensure she is not falling from being tired.
Vestibular	Decreased vestibular hair cells Decreased vestibular nerve fibers Changes in VOR and VSR	Due to age related changes. Because the patient has spotty sensation and poor vision it is important that she has a strong vestibular sense to keep her balance

Protective Response	Ankle strategy Hip strategy Anticipatory balance Reactionary balance	Natural process of aging Increased latency period in muscle impulse transmission, loss of type II muscle fibers, and decreased reaction time. Needs these strategies to recover from perturbations and stumbles, to maintain balance in preparing for activities (how she adjusts her posture/control while anticipating activities that change her COM such as reaching, stepping onto a different surface, etc.)
Standing Balance	Bilateral (apart and close together) Unipedal Tandem Semi-tandem	Loss of muscle fibers and favored increased BOS is often seen with aging. Timed balance in these stances is indicative of future fall risks. Patient need to be able to balance in unipedal stance for SLS phase of gait, and for stair climbing
Osteopathic	Humerus fx Reduced bone density	Natural effects of aging Decreased bone density is especially common in postmenopausal women. Osteopathic pain can alter her posture, gait patterns, COM to balance, etc.
Psychosocial	Fear of falling	Fear of falling can lead to decreased participation, decreased movement leads to more falls! We want to keep her moving as long as we can (safely) to combat age related changes
Posture	Kyphosis Protracted shoulders Forward head	Walking with her head down could cause/increase kyphotic posture. This may be a cause of her falls if it is causing her COM to be outside of her BOS.
Pain	Shoulder B plantar surface	Due to humerus fx and plantar neuropathy. Her shoulder pain may have caused a guarding pattern contributing to her lack of arm swing
Integumentary	Diabetic neuropathic ulcers Skin tears	Since pt has diabetic neuropathy she may have ulcers or other skin damage on the bottom of her feet that she cannot feel.

**What activity limitations do you expect to see? Why?** Based off the case, current level, outcome measure provided and time since injury, what do you anticipate will be a functional limitation and to what degree, why? (the why should link neuroscience and neuromuscular processes, disease progression/pathology NOT 'because it was in the case')

Activity Limitation	To What Degree (Level of assist)	WHY?
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Stairs	Mod I	If the fall was only in the movie theater it could be purely due to visual impairment, if she has had falls/stumbles on other stairs/steps up it could be a lack of foot clearance due to decreased LE strength, could be depth perception/contrast sensitivity, or unable to balance on one leg at a time. She needs to be able to safely climb the steps in her home
Tennis racket swing	Mod I	Decreased strength and ROM, and possibly pain due to healing humerus fx. Difficulty with flex, abd and ER ROM and strength. She could be muscle guarding and therefore unable to achieve full ROM in her swing
Hiking	Min Assist	Reduced vision and sensation in feet will make it difficult to walk over obstacles found on trails. She may not want to go hiking due to fear of falling. We need to ensure she is able to safely and has the confidence to ambulate on uneven terrain.
Gait	Stand-by assist for negotiating obstacles or walking on uneven ground	Due to observation of limited arm swing, trip, and staring down at ground while walking.

**SUBJECTIVE QUESTIONS:**

Based off of the case presented and your associated coursework knowledge, identify 8 questions that would be helpful in guiding your examination and assisting in ruling in/ruling out the need for screens versus examinations and selecting appropriate outcome measures. (Limit home set-up and prior activity questions to ONLY those that you need RIGHT now to do your examination and make choices)

1. Are you taking any medications? If so have you noticed any side effects?
2. Have you had any other falls within the past 12 months? If so what were you doing when you fell?
3. Do you feel as though your fear of falling interferes with doing activities that you would like to do?
4. Do you see an eye doctor regularly? If not when was your last visit?
5. How much physical activity do you do in a week (walking, tennis, hiking)?
6. Do you ever feel dizzy?
7. Do you have good and supportive shoes?
- 8.

**SCREENS: (add or delete rows as needed in the next four sections)**

List the systems you will SCREEN (versus fully examine), identify what elements of the screen you will prioritize (or state "all" if the whole screen needs to be done) and why.

SYSTEM TO SCREEN	What will you screen (or write "all")	Why?
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Pain	NPRS Shoulder Neuropathic pain in feet	Do not expect her to have pain limiting R shoulder, but she may have perceived pain, or pain from overexertion, other conditions... want to ask to ensure there is nothing skewing our evaluation Neuropathic pain in her feet may be affecting her balance
Strength	R shoulder Compare to L Grip strength	Muscle mass and endurance decrease with age, so we suspect that she may have some weakness. Was reported that her strength is "almost back to normal" from fx, want to check it for ourselves and compare to other side. Only going to screen because it was reported that she is near normal after her fx. Grip strength is indicative of mortality and overall strength (Bohannon et al).
ROM	R Shld flex, abd, IR, ER B DF 16 trunk motions	We do not suspect that this will be a problem as she is reportedly near back to normal ROM and has no observed foot clearance issues while walking into the clinic, but will do a quick screen to make sure that she is not tripping due to lack of foot clearance. We assume that most of her shoulder ROM has returned since her fx was 6 weeks ago but want to rule out it being a cause of decreased arm swing. Want to screen her trunk to ensure that her reduced arm swing is not due to trunk rigidity. We also want to ensure there is adequate trunk shortening and lengthening needed for weight shifting, gait, stair climbing, hiking, etc.
Sensation	Light touch, pinprick touch on plantar surface of foot. Standing on foam during mCTSIB	We suspect that this will be an issue due to diabetic neuropathy, however we can not fix her sensation, and she has had this condition for a while. If we know that sensation is a problem we can work to improve other balance strategies to compensate, and monitor if the neuropathy gets worse.
Vision	Visual acuity	Due to past medical history and observation, we expect that her vision is poor. However this is not something we can improve with physical therapy and vision is not necessary for balance.
Integumentary	Diabetic neuropathic ulcers	The bottom of her feet can be quickly assessed while we are testing sensation.
Posture	Protracted scapula Forward head Kyphosis	These are common postural impairments in many people, especially elderly. Can quickly observe and see if it can be corrected with verbal and tactile cues.

### EXAMINATIONS:

List the systems you will FULLY EXAMINE (versus screen) and identify why.

<b>SYSTEM TO EXAMINE</b>	<b>What will you examine? (Or write "all")</b>	<b>WHY?</b>
Standing Balance	4 Stage Balance	Differing BOS is important to see how patient adjusts and is able to balance. Standing times are indicative of fall risk. Unipedal stance balance is needed for SLS phase of gait, as well as stepping onto higher surfaces (ie stairs) successfully.
Protective Response	Ankle strategy Hip strategy Stepping strategy Reactionary balance Anticipatory balance	Aging can cause decreased muscle latency, increased co-contraction, decreased reaction times, and more rigid patterns of movement. These are all important strategies that can prevent future falls.
Vestibular	Vestibulo-ocular reflex Vestibulo-spinal reflex Foam and dome	The natural process of aging can impact aspects of the vestibular system and cause changes in VOR and VSR and can lead to falls. This is something that may have been overlooked by other health care providers and can be improved with physical therapy. Without sensation patient may rely on this system, so we want to make sure it is top notch!
Strength	LE type I and II muscle fibers	Muscle mass and endurance decrease with age, so we suspect that she may have some weakness. LE type II muscle fibers play a large role in balance recovery. If she fell going down the stairs it could be eccentric strength issue. In general, she will need enough LE strength for normal gait, and for foot clearance stepping over obstacles/onto things, and to ambulate/stand for a long period of time.

**FUNCTIONAL TASKS:**

List the Functional Tasks you feel are necessary to assess at this initial examination and state a reason why.

<b>Functional Task you will assess</b>	<b>WHY?</b>
Gait	If patient wants to return to hiking, she must be able to walk on uneven surface with obstacles. We can also use this to assess what may be causing her poor balance. Consider observing her walk with a single point can on her affected side to give her more contact with the floor since she cannot feel her foot.
Stairs	Patient has stairs in her home so it is important that we establish safety while using them (considering her fall was on the stairs). We can also observe her performance to hypothesize why she fell.

	Since patient's hand rail is on her right side, she may need to find a safe strategy to ascend her stairs with safety without aggravating her healing humerus fx.
Floor Transfers	If she DOES fall again we want to be sure that she can safely get herself up, or at least in a position to call for help. Patients do not like "getting in the floor" but giving them the sense of independence may also decrease their fear of falling.

**OUTCOME MEASURES:**

List Outcome Measures you feel are **most relevant** for this patient and why and identify level of ICF. Add or remove rows as needed. (consider setting and appropriateness. What are goals? These outcome measures should guide your treatment toward goals as well as give you a means of prognosis and/or showing progress)

Outcome Measure Chosen	Why?	ICF Level
ABC	We can use to to interpret how accurate her perception of her abilities are, as well as learn how her confidence and fear of falling is impacting her activity.	Participation
mCTSIB	Since we suspect problems with her vision and sensation, this outcome measure will assess those systems as well as the vestibular system. This can help to determine the cause of her falls and therefore guide our treatment.	BSF
DGI	This will evaluate her balance and quality of movement during gait at various speeds and while stepping over and around obstacles, which is important for her safety at home and in the community. It also includes the use of stairs, which is important because that is what caused her fall and she has them in the home. The horizontal and vertical head turns will allow us to analyze her gait without looking at the ground.	Activity

**EDUCATIONAL NEEDS: add or remove rows as needed**

Person Being Educated	What education is needed?	Why is this education needed?
Patient	The natural process of aging and the effects that it has on the body.	This will help the patient understand why she is falling. It is also important to explain that her age makes her more susceptible to bone fractures.
Patient	Suggest the use of AD	Using a cane may help increase sensory feedback while walking.
Optometrist	Referral for change in corrective lenses	Patient complains that her corrective lenses do not adjust to the sun quick enough (glare may causes increased fall risk due to decreased visual acuity).

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**WHAT IS THE ROLE OF PT FOR THIS PATIENT?** (clearly identify if this is a one time visit, suggest a timeframe for visits for the episode of care, is this for restorative, compensations, family training, equipment prescription, a combination (explain).

<b>ROLE OF PT</b>	<b>Explain your plan related to the topic (if not part of plan put "not needed")</b>	<b>What resources will you or the patient need to accomplish this?</b>
# of visits	3x a week for 6 weeks	Insurance Transportation
Equipment	Cane Walking sticks for hiking	Insurance Money
Community Resources	YMCA or community rec center membership for physical activity	Money Information pamphlets
Home exercise program	-Shld flex and abd AAROM against gravity to restore remaining motion/strength to decrease guarding -Standing with a counter in front of her with a chair behind her practicing standing with eyes closed- start with normal BOS, for 10-15 seconds (longer if she can). By taking out her visual system, because she has spotty sensation, she will be improving the sharpness of her vestibular system to keep her balanced	Printed sheet with instructions in large font size and large pictures
Other:		