


## Balance Assessment and Training: Predicting Falls, Improving Outcomes

A comprehensive guide for chiropractors, physical therapists, and healthcare providers on implementing effective balance assessment and training programs to improve patient outcomes and prevent falls.

 **by Dr. Mark Sanna**

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## Why Balance Matters

**Leading Cause of Injury**


Falls are a leading cause of injury and death in older adults.

**Emergency Room Visits**

Over 8 million emergency room visits annually are due to falls.

**Functional Independence**

Balance is a key functional component tied to independence and health outcomes.



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## The Impact of Falls

**1M+**

**Annual Injuries**

Falls cause over one million injuries per year in the U.S. alone.

**5%**

**Fracture Rate**

Fractures occur in five percent of all falls.

**50%**

**Gender Distribution**

Fall fatalities are equally divided between men and women.

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### Balance Decline with Age

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Youth (0-30)

Peak balance performance with rapid recovery from perturbations.

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Middle Age (30-50)

Gradual decline begins but often goes unnoticed.

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Senior (50+)

Significant deterioration occurs, faster than strength or gait mechanics loss.

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Advanced Age (70+)

Visual, vestibular, and proprioceptive systems all notably weaken.

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### Balance as a Mortality Predictor

**Araujo Study (2022)**  
Inability to hold a 10-second single-leg stance linked to 84% higher mortality risk.

**Risk Persistence**  
Mortality risk persisted even after controlling for age, BMI, and comorbidities.

**Clinical Value**  
Balance testing adds significant prognostic value to routine clinical assessments.

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### Evidence from the Mayo Clinic

**Balance Decline Rate**  
Balance deteriorates faster than grip strength or gait speed.

**High Risk Indicator**  
Standing on one leg less than 5 seconds signals high fall risk.

**Excellent Performance**  
30 seconds on nondominant leg indicates excellent balance in older adults.

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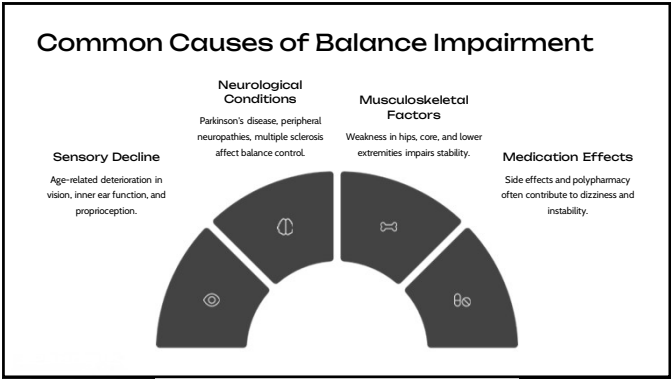
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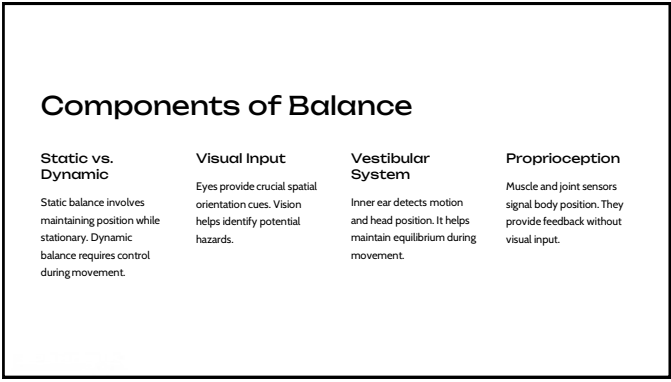
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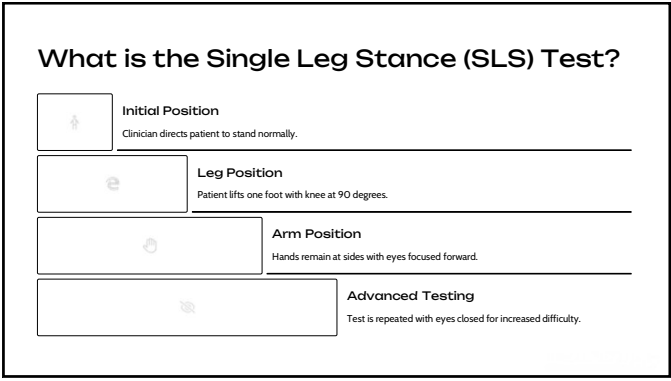
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### Clinical Procedure for SLS Test

Preparation

Test is performed barefoot. Ensure a safe environment with support nearby.

Performance

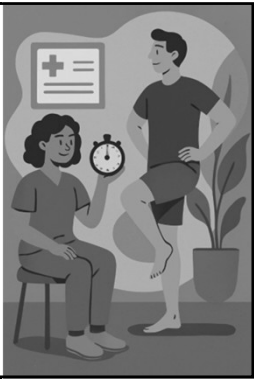
Record best of 3 trials per leg. Test with eyes open first, then eyes closed.

Measurement

Use stopwatch to time duration. Stop when foot touches down or balance is lost.

Documentation

Record times and observations of performance quality for clinical records.



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### SLS Normative Data

UNILATERAL  
STANDING



AGE (years)	EYES OPEN (seconds)	EYES CLOSED (seconds)
20-59	29-30	21-28.8
60-69	22.5	10
70-79	14.2	4.3

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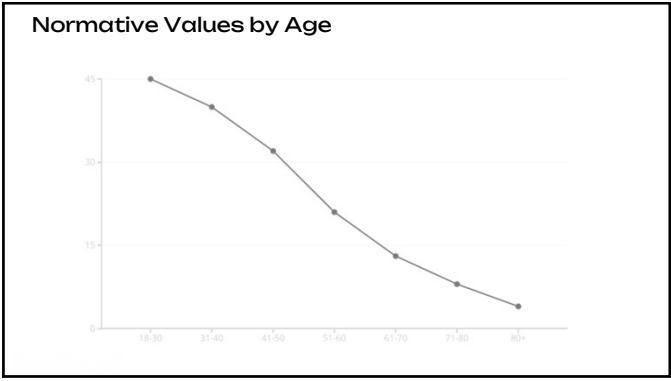
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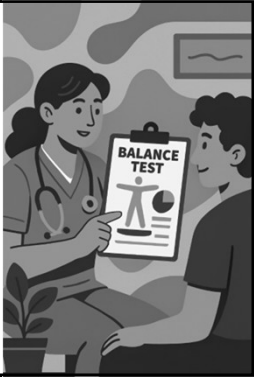
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### Interpreting Results

Duration	Clinical Interpretation	Action Required
<5 seconds	Severe balance impairment	Immediate intervention
5-10 seconds	Moderate impairment	Targeted training
10-20 seconds	Minimum functional level	Maintenance program
30+ seconds	Excellent balance	Prevention focus



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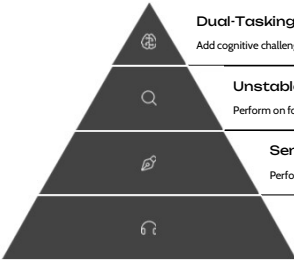
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### Adding Complexity to SLS



**Dual-Tasking**  
Add cognitive challenges like counting backward by 3s

**Unstable Surfaces**  
Perform on foam pad or BOSU ball

**Sensory Alterations**  
Perform with eyes closed

**Movement Challenges**  
Add head turns or arm movements

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### Balance Training Protocols

**Static Holds**  
Begin with basic position maintenance. Start with wide stance for stability.

**Multi-Planar Training**  
Train in all movement planes. Address sagittal, frontal, and transverse movements.



**Dynamic Movement**  
Progress to controlled motion. Incorporate weight shifts and directional changes.

**Perturbations**  
Add controlled disturbances. Challenge recovery mechanisms with gentle pushes.

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### Integration with Gait Assessment




#### Gait Cycle Analysis

Correlate gait patterns with balance deficits. Measure stride length and cadence.




#### Asymmetry Detection

Identify weight-bearing differences. Look for uneven loading patterns during stance.




#### Stance Width Evaluation

Assess base of support width. Note compensatory stance widening.



#### Compensation Patterns

Evaluate for trunk lean or arm swing alterations. Document adaptive mechanisms.



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### Types of Pathological Gaits




#### Ataxic Gait

Wide base of support with unsteady movements. Often seen in cerebellar disorders.



#### Parkinsonian Gait

Shuffling steps with slow initiation. Reduced arm swing with forward-leaning posture.



#### Steppage Gait

High knee lift to compensate for foot drop. Often from peripheral nerve damage.

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### Coding for Balance Assessment

#### ICD-10 Codes

- R26.81: Unsteadiness on feet
- R26.89: Other abnormalities of gait and mobility
- R27.8: Other lack of coordination
- M62.81: Muscle weakness (generalized)

#### CPT Codes

- 99212: E/M Visit (10-19 min)
- 97750: Functional capacity evaluation
- 97110: Therapeutic exercise
- 97112: Neuromuscular reeducation
- 97116: Gait training

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## Documenting SLS Test Results

### Time Recording

Document exact duration for each attempt in seconds. Record both eyes open and closed values.

### Qualitative Observations

Note compensatory behaviors like arm flailing or trunk sway. Document patient's subjective experience.

### Comparative Analysis

Include normative comparison for patient's age and gender. Track changes over time for progress monitoring.

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## Red Flags During Testing




### Immediate Loss of Balance

Inability to maintain even brief stance suggests serious deficits.




### Dizziness or Fear

Reports of vertigo or excessive fear warrant further investigation.



### Neurological Symptoms

Tremors, foot drop, or numbness may indicate neurological involvement.



### Medical Referral

Refer for neurological or vestibular evaluation when concerning signs appear.

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## Patient Education Tools




### Fall Prevention Handouts

Provide clear, illustrated guidance on environmental modifications and safe practices.



### Home Exercise Programs

Illustrate specific exercises with written instructions. Include frequency and progression guidelines.



### Progress Tracking

Give patients milestone charts to monitor improvement. Encourage daily practice and record-keeping.

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### Training Progression by Skill Level

	<b>Beginner Level</b> Use chair support with static holds.
<b>2</b>	<b>Intermediate Level</b> Remove support and add dynamic movements.
<b>3</b>	<b>Advanced Level</b> Add sensory challenges like eyes closed.
	<b>Expert Level</b> Incorporate uneven surfaces and dual-tasking.

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### Home Exercise Programs

**One-Legged Stance**  
Stand near a sturdy chair. Lift one foot for 10-30 seconds.

**2**

**Tandem Stance**  
Place one foot directly in front of the other, heel-to-toe.

**Marching in Place**  
Lift knees high while maintaining balance. Aim for 20-30 steps.

**Clock Reach**  
Extend arm outward as if pointing to different clock positions.

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### Incorporating Technology

**Smartphone Timers**  
Use for at-home SLS test tracking. Record progress over time.

**Balance Apps**  
Provide guided exercises and tracking. Offer visual feedback on performance.

**Virtual Reality**  
Create immersive rehabilitation environments. Increase engagement and motivation.

**Wearable Devices**  
Monitor activity and detect falls. Alert caregivers to potential emergencies.



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### Billing Considerations

#### Time Tracking

Record service duration for CPT compliance. Document direct patient contact minutes.

- Specify assessment duration
- Note treatment time separately

#### Service Bundling

Combine with therapeutic exercise when appropriate. Link services to justified medical necessity.

- Assessment with treatment
- Education with home program

#### Documentation Language

Use precise terminology for reimbursement. Include "neuromuscular re-education" and "functional testing."

- Match language to CPT codes
- Document objective measures

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### Group Balance Classes

#### Community Engagement

Ideal for creating social connections among older adults.

#### Consistent Practice

Regular scheduled sessions improve adherence and outcomes.

#### Tai Chi

Slow, controlled movements enhance stability and body awareness.

#### Fall Prevention Workshops

Combines exercise with environmental safety education.

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### Role of the Interdisciplinary Team

#### Chiropractors

Assess joint mobility and alignment. Adjust to optimize biomechanics. Prescribe targeted exercises for stability.

#### Physical Therapists

Design progressive training programs. Focus on functional movement patterns. Advance challenges as patients improve.

#### Nurses/NPs

Monitor vital signs and safety concerns. Screen for medication effects. Coordinate care with primary providers.

#### Support Staff

Assist with program compliance. Manage documentation and scheduling. Provide encouragement and motivation.

### INTERDISCIPLINARY TEAM

Chiropractors Physical Therapists Nurse Therapy Assistants

**BREAKTHROUGH**  
COACHING

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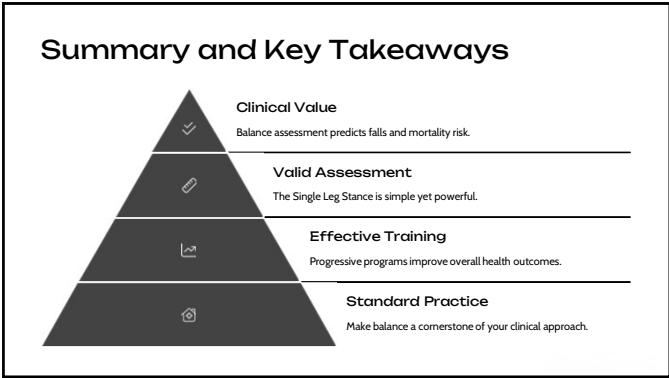
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