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Practice Setting : Education & Outpatient
Innovation Name : The Functional Reach and Multidirectional Reach Assessment Device and Clinical Utilization Method

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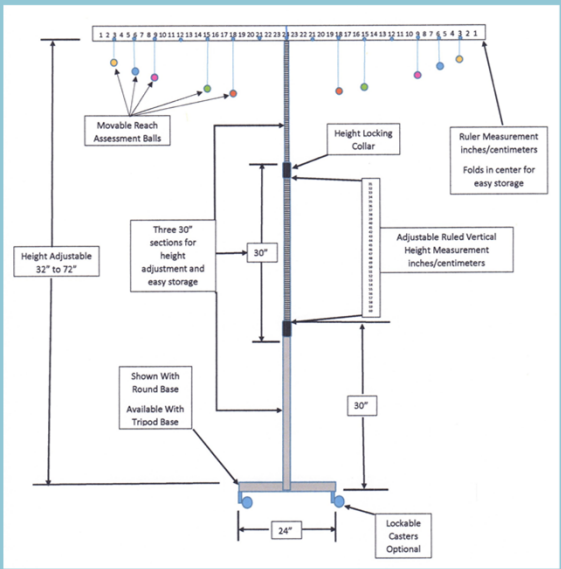
Functional Reach Assessment & Treatment Device



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Description of Practice Innovation

The Functional Reach and Multidirectional Reach Assessment Device and Clinical Utilization Method are an efficient, cost-effective, and practical clinical innovations. The portable device may be used in any treatment setting for a variety of patients. It is adjustable, adaptable, and mobile for use with standing and seated patients in a wheelchair, on an exercise mat or on a treatment table. The device may be used to measure standing or seated functional reach and functional lumbar range of motion. The device may be used to assess risk of falls or instability. The motions of forward, lateral and backwards bending may be assessed to obtain objective data that is easily measurable and reproducible on follow-up examination. The Functional Reach and Multidirectional Reach Assessment Device and Clinical Utilization Method benefits diverse medical conditions involving balance, coordination, instability, mobility and postural deficits. Additionally, it may be used to provide therapeutic exercise, balance activities, coordination activities, postural training, strength training, and perturbation-based balance training.

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Description of Practice Innovation (Continued)

Medical conditions:

- Ankle and foot problems
- Concussions
- COVID long-haulers
- Hip arthroplasty
- Inner ear problems
- Knee arthroplasty
- Limb loss or amputation
- Low back pain
- Lower extremity injuries
- Lung disease
- Osteoarthritis
- Parkinson’s disease

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Application of Practice Innovation

The clinical application of the Functional Reach Test (FRT) and Multidirectional Reach Test (MDRT) are cost-effective, reliable, and valid tools to obtain baseline patient information. From the information obtained during assessment, a personalized plan to address the identified deficit(s) can be devised for therapeutic activities and treatment outcome goals.

However, one of the factors that currently limits the use of the traditional Functional Reach Test is the attachment of the yardstick to the stationary wall. Often, clinicians feel compelled to perform a test or activity as specifically described in a research study. By removing the yardstick from the wall attachment, the full potential of the functional research can be realized. Newton (2001) posits the Multidirectional Reach Test may be more challenging in a free standing environment when compared to the Functional Reach Test where the wall is in close proximity creating a perception of security. The Functional Reach is item #8 (reach forward with an outstretched arm) in the Berg Balance Test. The clinical application of the Functional Reach and Multidirectional Reach Assessment Device and Clinical Utilization Method yields the benefits of measuring and performing dynamic activities. The related International Classification of Functioning, Disability and Health (ICF) domain to the application of this practice innovation include Body Structure and Function, while the ICF categories include mobility, walking, and moving around.

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Application of Practice Innovation (Continued)

The clinical utilization of the Functional Reach Test and Multidirectional Reach Test and reaching activities is not limited to just the screening of the elderly patient for the risk of falling. The principles can be applied to a diverse patient population to include: amputation, brain injury, balance and coordination deficits, concussion, CVA, low back injury, ankle and foot, lower extremity injury, post-op total hip replacement, total knee replacement, post-op knee surgery, multiple sclerosis, Parkinson's, and postural faults.

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What makes it innovative?

The Functional Reach Test and Multidirectional Reach Test Assessment Device removes the one dimensional yardstick attached with Velcro or tape to a wall permitting mobile testing and training. This was accomplished by using a portable IV pole stand with a removable IV hanger, removing the IV hanger with two off-set IV bag hooks and flattening the off-set IV bag hooks. Two holes were drilled in a four foot straight edge aluminum ruler. Two bolts, nuts, and washers were used to attach the ruler to the IV hanger. The IV hanger with the straight edge ruler attached was then placed back on the IV pole stand.

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What makes it innovative? (Continued)

The Functional Reach Test and Multidirectional Reach Test are performed by placing the yardstick at the height of the patient's outstretched arm in a position of 90 degrees of flexion. The yardstick needs to be reattached to the wall each time the test is performed to the patient's shoulder height. Unless a measurement is taken to record the height of the patient's shoulder, this step would need to be repeated prior to subsequent testing. A second feature of the innovation addresses the need for remeasurement to obtain the patient shoulder height, the end of a six foot measuring tape is attached to the base of the IV stand and the case of the six foot measuring tape is attached to the top of the IV hanger which has the four foot straight edge ruler attached. A third feature of the innovation, the pole height is easily adjusted and held in place with a threaded collar. The measurement is recorded for ease of future set-up.

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What makes it innovative? (Continued)

The Functional Reach and Multidirectional Reach Assessment Device is versatile, easily transitioning from assessment to therapeutic activities. For the target identification and acquisition therapeutic activity, different colored golf balls can be attached using cord and metal badge clips at various lengths. The patient can be directed to touch a colored ball (target) upon verbal instruction. The selected ball (target) could be straight ahead requiring the patient to reach forward or diagonally requiring the patient to reach across the midline or laterally requiring the patient to reach left or right. The difficulty of the activity can be increased by using resistance tubing or bands. The graduated resistance bands and tubing have manufacturer assigned pounds and kilograms. In lieu of resistance bands or tubing, a luggage scale can be used to measure resistance. Other activities include using foam for balance and perturbation.

* A document titled “Clinical Application of Functional Reach and Multidirectional Reach and Method” has been prepared and submitted with this presentation.

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Unique Attributes of the Innovation

The guiding principles behind this innovation are grounded in contemporary physical therapy clinical practice and research. The mobility of the assessment device allows for the assessment at functional and multidirectional reach in the standing and seated positions. Seated positions include wheelchair, exercise mat, or treatment table.

Furthermore, the easily adjustable height of the assessment device is recorded utilizing the attached tape measure and the height of the patient’s outstretched arm in 90 degrees of flexion.

The typical straight edge aluminum ruler only shows measurements from **left** to **right** using inches. By incorporating a straight edge aluminum ruler that can show measurements from both **left** to **right** and **right** to **left** addresses this limitation. Additionally, a flexible adhesive tape measure may be obtained to add centimeters if desired to the straight edge aluminum ruler.

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Unique Attributes of the Innovation (Continued)

The Posture Correction Orthosis with the addition of a D-Ring can be used to attach graded resistance band or tubing, a luggage scale or carry handle. The luggage scale may be used to measure the amount of resistance generated by the patient when performing the activity. The Posture Correction Orthosis may also be used to spot the patient during perturbation based balance training.

*A document titled “Clinical Application of Functional Reach and Multidirectional Reach and Method” has been prepared and submitted with this presentation.

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Impact on the Profession

For the past century, the profession of physical therapy has thrived on the incorporation of innovations into clinical practice, education, and research. The adoption of the Functional Reach and Multidirectional Reach Assessment Device and Clinical Utilization Method as presented for this innovation, holds limitless potential to enhance the delivery of the patient assessment and multiple treatment activities in the physical therapy profession. The innovation which costs less than $200 to assemble, provides an unparalleled, cost-effective, reliable and valid option to gather objective patient information on reaching, a functional and dynamic activity, that is frequently performed each day.

Healthcare in the 21st Century, specifically physical therapy, has been challenged to balance patient outcomes with decreased reimbursement and decreased patient visits. These factors drive the need for innovative approaches for effective and efficient assessment and treatment of patients.

An expanded use of the proposed Functional Reach and Multidirectional Reach Assessment Device and Clinical Utilization Method is warranted as reaching is a functional task performed multiple times daily throughout a lifetime. By expanding the utilization of the functional reach, multidirectional reach and related therapeutic activities to any age patient, clinical practice guidelines, and research may follow the transition.

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Impact/Relevance of Practice Innovation to Patient Care/Treatment

At the time of this innovation submission, Congress is considering the passage of the Stopping Addiction and Falls for the Elderly or SAFE Act (H.R. 7618). If enacted, the bipartisan SAFE Act (H.R. 7618) legislation would refer to physical therapy falls-related services for the Medicare initial "welcome" visit and annual wellness checks. The legislation presents a historic and important opportunity for the physical therapy profession to safeguard this rapidly growing population.

Unintentional Falls - In 2021, 38,742 (78.0 per 100,000 population) older adults died as the result of unintentional falls. The unintentional fall-related death rate was higher among men (91.4 per 100,000) than among women (68.3). The fall-related death rate among older adults ranged from 30.7 per 100,000 (Alabama) to 176.5 (Wisconsin). https://cdc.gov

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Impact/Relevance of Practice Innovation to Patient Care/Treatment (Continued)

CDC Injury Prevention and Control - Falls are common and costly, especially among Americans age 65 and older. But falls are preventable and do not have to be an inevitable part of aging. Every second of every day, an older adult (age 65+) suffers a fall in the U.S.- making falls the leading cause of injury and injury death in this age group. **One** out of **four** older adults will fall each year in the United States, making falls a public health concern, particularly among the aging population. https://cdc.gov

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Impact/Relevance of Practice Innovation to Patient Care/Treatment (Continued)

Facts About Older Adult Falls

- About 36 million falls are reported among older adults each year-resulting in more than 32,000 deaths.
- Each year, about 3 million older adults are treated in emergency departments for a fall injury.
- One out of every five falls causes an injury, such as broken bones or a head injury.
- Each year at least 300,000 older people are hospitalized for hip fractures.
- More than 95% of hip fractures are caused by falling-usually by falling sideways.

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Impact/Relevance of Practice Innovation to Patient Care/Treatment (Continued)

Current Number of People over 65 years of age - The age distribution of the United States is shifting. According to 2021 data, more than 55.8 million adults ages 65 and older live in the U.S., accounting for about 16.8% of the nation's population. https:www.americanshealthrankings.org

How many Americans are turning 65? - Every day in the US, 10,000 people turn 65, and the number of older adults will more than double over the next several decades to top 88 million people and represent over 20% of the population by 2050. https:www.aarpinternational.org

What are the odds of living to be 80? - About two-thirds will live past 80, and one-third past 90. Almost one in 10 girls born now will live past 100. https://slate.com

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Impact/Relevance of Practice Innovation to Patient Care/Treatment (Continued)

There is significant value in the established functional reach and multidirectional reach test norms when requesting treatment authorization, re-authorization, discharge planning, and establishing patient goals. These tests are efficient and can be administered in minutes. Furthermore, if the height of the outstretched shoulder position is in 90 degrees of flexion is recorded on the first visit, future testing and treatment is accurately replicated.

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Impact/Relevance of Practice Innovation to Patient Care/Treatment (Continued)

The Innovation aligns with and incorporates the following:

- Stopping Addiction and Fall for the Elderly or SAFE Act (H.R. 7618)
- Vision, Mission, and Strategic Plan of the APTA
- APTA 7 Core Professional Values
- APTA Guide to Physical Therapist Practice 4.0
- American Academy of Geriatrics Physical Therapy
- American Academy of Neurologic Physical Therapy
- American Academy of Orthopaedic Physical Therapy
- American Academy of Pediatric Physical Therapy

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Impact/Relevance of Practice Innovation to Patient Care/Treatment (Continued)

The Innovation aligns with and incorporates the following:

- CDC Traumatic Brain Injury/Concussion
- CDC Older Adult Falls Prevention
- Evidence-based Medicine
- Healthy People 2030 (Office of Disease Prevention and Health Promotion)
- National Safety Council
- Safety of Seniors Act
- The International Classification of Functioning, Disability and Health

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Impact/Relevance of Practice Innovation to Patient Care/Treatment (Continued)

The Innovation supports therapeutic intervention/activities:

- Perturbation for balance and postural training
- Balance and coordination
- Multidirectional range of motion
- Multidirectional strength training
- Visual target identification and acquisition

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Outcomes of the Practice Innovation

Historically, the Functional Reach Test and Multidirectional Reach Test have been used to screen for the risk of falling in the geriatric population. The safe mobility of **all** patients is imperative in the performance of daily functional activities. Any patient that faces center of gravity challenges that may result in a loss of stability, specifically with movement reaching and transfer activities should not be excluded from consideration. Clinical practice, education, and research are essential in obtaining and examining the practice outcomes related to this innovation.

Potential outcomes may include decreased healthcare costs through decreased visits to the emergency department for the evaluation and treatment of falls-related injuries to include: joint dislocations, fractures, head injuries, and other musculoskeletal injuries. Annually, the Center for Disease Control and Preventions reports incidents and costs.

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Outcomes of the Practice Innovations (Continued)

A robust patient population exists to establish reporting benchmarks for this innovation:

- Over 36 million Americans played Pickleball in 2022, seniors are approximately 1/3 of this group, which may be contributing to more injury-related healthcare costs.
- There are approximately 790,000 knee replacements and 450 hip replacements annually.
- Every 40 seconds, someone in the United States has a stroke resulting in 795,000 strokes annually.
- CDC experts estimate 1.6 to 3.8 million sports and recreational Traumatic Brain Injury/Concussions occur annually. There were approximately 214,110 TBI-related hospitalizations in 2020.
- The U.S. Department of Health Services estimates between 7.7 million to 23 million Americans have developed long COVID during the pandemic.

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Outcomes of the Practice Innovations (Continued)

A robust patient population exists to establish reporting benchmarks for this innovation:

- The Parkinson's Foundation states that 1 million Americans are currently living with Parkinson's Disease and that number will rise to 1.3 million by 2030, while 90,000 Americans are diagnosed yearly.
- The Magazine and Blog of The National MS Society found that 1 million people in the United States are currently living with MS, double the amount that was previously believed.
- The National Epilepsy Foundation reports more than 3.4 million people living with Epilepsy in America.
- Roughly 764,000 children and adults are currently living with Cerebral Palsy in the United States according to My Child at Cerebral Palsy.

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Outcomes of the Practice Innovations (Continued)

Fritz and Lusardi (2009) proposed "Walking Speed: The Sixth Vital Sign" which has significant merit in healthcare preventions and outcomes. Notionally, I propose for consideration "The Seventh Vital Sign: Functional Reach and Multidirectional Functional Reach." Functional Reach and Multidirectional Reach are methods used in the clinical assessment of instability. Newton (2001) concluded "The Multi-Directional Reach Test is an inexpensive, reliable, and valid tool for measuring the limits of stability as derived by reach in four directions."

In the event the Stopping Addiction and Falls for the Elderly or SAFE Act (H.R. 7618) becomes law, the physical therapy profession will be tasked with safeguarding the elderly. The legislation aligns with the Vision, Mission, and Strategic plan for the APTA, as well as the APTAs 7 Core Professional Values. This opportunity is the direct result of our many years of advocacy, clinical practice, education, lobbying, quality patient care, and research, which has culminated in the advance of the physical therapy profession.

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Outcomes of the Practice Innovations (Continued)

The proposed framework in the SAFE Act (H.R. 7618) where physical therapy services become part of the Initial Preventative Physical Examination (IPPE) for falls-related services for the Medicare initial "welcome" visit and annual wellness checks provides a blueprint worthy of consideration to expand physical therapy within the community.

The Physical Therapy profession can become a leader through the promulgation of a plan to address the healthcare disparity that exists in our country. Physical therapy opportunities exist through community screenings, pro bono services, and physical therapy and physical therapist assistant programs organizing service learning projects. The future provision of physical therapy services to underserved populations include ethnic, homebound, and socio-economic groups would be welcomed.

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Cost of Innovation

Item	Amount	Cost
Removeable Top IV Pole	1	$40
4 foot Straight Edge Aluminum Ruler	1	$10 - $15
¼ inch Bolts and Washers	2	$5
6 foot length by ½ inch width Measuring Tape	1	$10
Adjustable Posture Corrector Orthosis or One of Each Size (Small to XXLarge)	1	$50 - $250
Velcro Easy Hang Strap	1	$10
Assorted Resistance Bands or Tubing	1	$10
20-40 feet of 3/16 inch Braided Cord or 4.8mm Parachute Cord	2	$10
Spring Cord Lock End Stopper Fastener Slider Toggles	12	$5
Metal Split Key Ring Chain Link Clasp Connector, 20 mm diameter	12	$12
Metal Badge Clips	12	$6
Multi-colored Plastic Golf Balls, 42 mm diameter	12	$4
Luggage Scale or Large Carry Handle	1	$15-$50
Total cost for innovation:		**$187 - $427**

*the prices reflected on this slide are from 03/25/2024, prices are subject to change

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Training Required for Utilizing the Innovation

The learning curve to use the Functional Reach and Multidirectional Reach Assessment Device and Clinical Utilization Method is minimal in terms of the amount of time required for demonstration and training. The demonstration and training for clinical utilization can be accomplished by either one-on-one instruction or during an in-service. The approximate time required to complete the training presentation is 10-15 minutes. An additional 10-15 minutes can be allotted for practice.

*A document titled “Clinical Application of Functional Reach and Multidirectional Reach and Method” has been prepared and submitted with this presentation.

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Training Required for Utilizing the Innovation (Continued)

Key components of training include:

- Overview
- Safety
- Adjusting the height
- Patient positioning
- Performance of the functional reach and multidirectional reach tests
- Recording the information
- Identify and select therapeutic activities
- Utilization of the harness and elastic bands or rubber tubing
- Target identification and acquisition training
- Perturbation for balance and postural training
- Questions & Answers

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Justify AOPT funding this Innovation

It would be an honor to have The Functional Reach and Multidirectional Reach Assessment Device and Clinical Utilization Method Innovation selected for recognition and funding by the Academy of Orthopaedic Physical Therapy. In the event my innovation and clinical application is selected for funding, I will donate two units that include the four sizes (small, medium, large, and extra-large) of the posture corrector orthosis with the D-link attached for research and utilization. One unit will be donated to a physical therapy program for the purpose of education and research. The other unit will be given to an outpatient physical therapy clinic that treats patients with various medical afflictions. Additionally, I would provide in-service training to the instructors, students, and clinical staff. I would provide a template for documentation and flow chart for patient activities.

If the recognition of my innovation by the Academy of Orthopaedic Physical Therapy leads to the development and sale of The Functional Reach and Multidirectional Reach Assessment Device and Clinical Utilization Method, a portion of the net profit would be returned to the Academy of Orthopaedic Physical Therapy. The use of this money would be discussed to formulate a plan for fund distribution. The funding of future innovation and research are potential options.

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Benefit(s)/Value to Clinical Practice

- Provides a strategy to support Stopping Addiction and Falls for the Elderly or SAFE Act (H.R. 7618)
- Developed from contemporary literature and research
- Reduces overall healthcare costs
- Reduces measurement error
- Provides objective data to support Medicare G code modifier for 1st, 10th and discharge visit.
- Provides an option to perform functional therapeutic exercise activities
- Reproducible patient position with tape measure feature
- Dynamic measure of postural control

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Benefit(s)/Value to Clinical Practice (Continued)

- Quickly perform valuable assessment tests
- Provides the option to perform standing or seated functional reach test
- Visible markings in centimeters and inches
- Portable, convenient set-up and breakdown
- Adapts to a variety of clinical settings and homes
- Complement to Telehealth
- Complement to Home Health
- Complement to Balance Therapy
- Complement to Vibration Therapy
- Stores, transports and cleans easily

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