Establishing a Basis for Supportive Care Recommendations in a Life Care Plan Utilizing the Observed and Objective Measures of Physical Function Algorithm (OOMPFA)

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Abstract

Life care plans are expert reports often relied upon in litigation matters to identify future costs associated with functional impairments. Life care plans can be challenged if the basis for recommendations contained in the report are not supported with defensible evidence. This article aims to educate the life care planner as to valuable empirical information that can be gained during the evaluation process to support life care planning recommendations and to decipher the meaning of objective measures noted in medical records. Appropriate tools and methods for obtaining objective measures of physical function are discussed as a review for those qualified to use them, and as a means of interpreting test results in medical records for those not qualified to perform testing. Examples of utilizing observational methods when tools are not available or appropriate for objective physical measurements are considered as a basis for recommendations. Concerns regarding video conferencing when trying to obtain empirical information are also addressed. The Observed and Objective Measures of Physical Function Algorithm (OOMPFA) is proposed as a tool to gather observed and objective physical information as a basis for providing supporting care recommendations within a life care plan.

Background

A life care plan is "a dynamic document based upon published standards of practice, comprehensive assessment, data analysis, and research, which provides an organized, concise plan for current and future needs with associated costs for individuals who have experienced catastrophic injury or have chronic health care needs." (International Association of Rehabilitation Professionals, 2024) A comprehensive assessment entails elements from both cognitive and physical function obtained in an objective manner. Life care planners, whether trained in physical assessment or not, should consider adding objective measures, when pos-

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sible, to the assessment of the evaluee. Cognitive assessment is not addressed in this article and often requires a consultation with a trained professional.

Physical function refers to the ability to carry out various activities ranging from self-care to intense work. Often, life care planners obtain information regarding physical function capabilities from the medical records and/or through an evaluation of the injured person. Evaluations typically include an interview to obtain subjective information from the evaluee. However, this subjective information can be challenged as being biased, motivated by financial gain, or invalid. Subjective measures are valuable for understanding an individual's history and perceived experience, while objective measures add robustness and validity to evaluations in life care plans. When objective measures are not attainable, observational methods can be helpful. Life care planners are expected to:

- "Use a consistent, objective and thorough methodology to construct the life care plan," (International Academy of Life Care Planners, 2022) as the Standards of Practice for Life Care Planners state; And,
- Provide a basis for recommendations contained in the life care plan, as the Consensus and Majority Statements instruct. (Johnson et al., 2018)

Utilizing observed and objective measures to verify evaluee subjective claims provides a stronger basis for recommendations in a life care plan. Gathering objective information to support recommendations has become more complicated in recent years for life care planners, as many client interviews and evaluations occur over video or teleconference due to the COVID pandemic. Financial considerations may also limit the opportunity for in-person evaluations. In consideration of these factors, it is valuable to remember these stipulated best practices:

- The ICHCC recommends in-person interviews as well as observation/testing of physical and cognitive status. (International Comission on Healthcare Certification, 2023)
- The Consensus and Majority Statements state life care planners shall conduct in-person interviews whenever possible. (Johnson et al., 2018)

While it is not always feasible, life care planners generally acknowledge the benefit of performing in-person interviews and evaluations. Video and teleconference evaluations present problems for a life care planner attempting to secure objective measures of physical function. Many tests and measures require the physical presence of the tester in order to be considered valid. Even if another qualified person is physically present with the client and willing to perform the tests and measures, allowing a second person to perform the testing makes inter-rater reliability a factor in presenting accurate objective measures. Additionally, observing a person in their home environment gives the life care planner valuable information about their daily routine and the need for home modifications and equipment. Whether performing an in-person evaluation or video evaluation, the life care planner is encouraged to develop a thorough and objective approach to their evaluation.

The Observational and Objective Measures of Physical Function Algorithm (OOMPFA) is presented at the end of this article and focuses on physical impairments of a client and related support needs. The OOMPFA is not intended to address cognitive or

psychological needs or impairments and is not intended to be an exhaustive physical assessment. The authors are not encouraging persons unqualified or unlicensed to perform range of motion, manual muscle testing, gait, and balance assessment or any other maneuvers that put the evaluee at risk. Life care planners not qualified to perform physical impairment testing may use the OOMPFA as a guide to collect observational data on physical function to support independent recommendations or to add validity to qualified provider recommendations. The following explanation of testing may also serve to help the reader interpret physical examinations in medical records.

Physical Function Testing

The physical function of a client is typically determined by measuring four areas: strength, range of motion, balance, and - less commonly- endurance. The OOMPFA addresses these areas by emphasizing objective and observational measurements strengthening supportive care recommendations. Depending on the life care planner's scope of practice, non-medical, supportive care areas of a life care plan can be independent recommendations. Medical recommendations that overlap this area of a life care plan are reserved for those qualified to make them. The OOMPFA is not intended to be used by life care planners to make medical recommendations outside their scope of practice. Non-medical supportive care recommendations related to physical impairments include but are not limited to:

- Non-skilled attendant care for assistance with activities daily living;
- Lawn, housekeeping, and handyman services for assistance with heavy chores;
- Transportation;
- Home modifications for accessibility; and
- Equipment needs such as grab bars, non-slip mats, elevated toilet seats, and hand-held showers.

The following sections include objective testing methods used by clinicians to gather information on the physical function of a client. Examples of information obtained by observation are provided in the following sections for life care planners not qualified to perform physical exam.

Range of Motion (ROM)

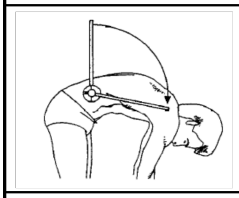
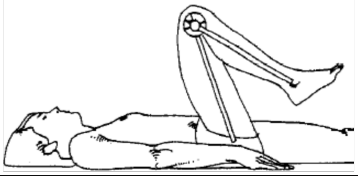
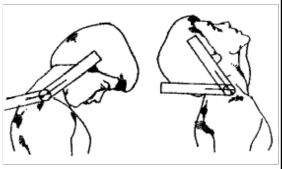
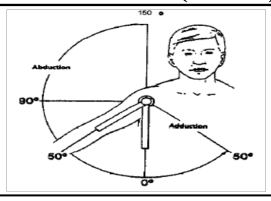
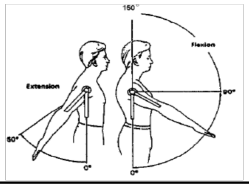
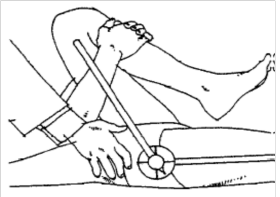
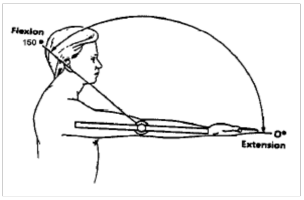
Range of Motion measurements can differ depending on the methodology used or the practitioner performing the measurements. For life care planning purposes, range of motion may best be focused on the impaired body part and described related to observed motion. It is important not to impose the risk for injury or pain when asking clients to perform these movements. Below is a chart with anatomical drawings (Washington State Department of Social & Health Services, 2014) that depicts normal goniometric measurements of common body parts. Those not actually performing objective measurement with a goniometer could refer to the chart as a reference and make a note of movements that cause pain, and how

that movement affects client function. See notes in the chart for these major joints and body areas.

It is important that clinicians strive to use a standard methodology when documenting findings to avoid confusion regarding notations. For example, clinicians should avoid using + and – symbols interchangeably to denote both lack of full ROM and hyperextension (Mulder & Whittmeier, 2009). Hyperextension is excessive range of motion while limitation is decreased range of motion.

Figure 1

Empty end feel: *Describes when evaluee does not allow increase range of motion due to pain. There is no perceivable physical resistance to continued motion from the examiner.*
Firm end feel: *Describes an elastic resistance to range of motion as occurs when a muscle is being stretched, or when soft tissue is approximated. (example: end-range elbow flexion)*
Hard end feel: *Describes a sudden or abrupt resistance to range or motion. No further range is noted. This occurs when bone approximates bone. (example: end-range elbow extension)*

Back	Ext 25°	Flex 90°	**Knee (flex/ext)**	Ext 0°	Flex 150°
	Note how close the fingertips get to the floor. Note when and if pain occurs.			Note if movement is painful and when it occurs. Note if end feel is empty, soft, or firm.	
Neck	Ext 60°	Flex 50°	**Shoulder (abb/add)**	Abd 150°	Add 30°
	Note when and if pain occurs. Take caution if client has a balance impairment.			Note if movement is equal or different when comparing sides. Note end feel, and when pain occurs.	
Neck (rotation)	Left 80°	Right 80°	**Shoulder (flex/ext)**	Ext 50°	Flex150°
	Note when and if pain occurs. Take caution if client has a balance impairment.			Note if movement is equal or different when comparing sides. Note end feel, and when pain occurs.	
Hip (flexion)	Left 130°	Right 130°	**Elbow (flex/ext)**	Ext 0°	Flex 150°
	Note when and if pain occurs. Note if pain is in the hip or low back.			Note when pain occurs. Note end range feel. Extension should have a hard end feel.	

While the goniometer is the tool of choice in obtaining objective ROM measurements, a multitude of factors affect the reliability of those measurements. These factors include the body part being measured, variations in body types, and the methodology of measurement

(Gajdosik & Bohannon, 1987). It is important, when viewing range of motion data in a report, that all parties involved have the same operational definition in mind. For example, 45 degrees of active flexion range of motion of the right elbow should present the same clinical picture to each life care planner.

If one is not qualified to make specific measurements, it may be best to consider describing the observed safe and painless movements or unobserved movements the client cannot perform safely or without pain. For example, "Ms. Smith was able to lift her arm over her head from the front and from the side" This indicates shoulder flexion and abduction are greater than 90 degrees. Another example is, "Mr. Jones is unable to rotate his head to the left halfway to his shoulder before he experiences pain." This could be used as a basis to support transportation assistance as his lack of pain-free neck rotation and inability to check his left "blind spot" before making a lane change hinders his ability to safely drive. These notations create a clear picture of client function for the reader from which a supportive care recommendation could be made in the life care plan. It is important to point out those not medically trained should refrain from asking an evaluee to perform any movement that causes them pain or makes them unsafe.

Manual Muscle Testing (MMT)

Manual muscle testing is an assessment of muscle strength and can reveal information about neurological deficits. It is often incorporated as part of a complete physical assessment by qualified clinicians. Below is a chart that describes the grade of strength with a corresponding description.

Manual Muscle Testing (MMT) Grades	
Grade	**Description**
0	No visible or palpable contraction
1	Visible or palpable contraction
2	Full range of motion, gravity eliminated
3	Full range of motion against gravity
4	Full range of motion, moderate resistance
5	Full range of motion, maximal resistance

A disadvantage to manual muscle testing is its lack of sensitivity in grades above 3/5 and lack of normative values. Handheld dynamometry (HHD) can provide objective measures in grip strength but requires an expensive piece of equipment and is limited to grip or pincer strength, which may not reflect overall body strength (Bohannon et al., 2019). Some objective measure of muscle testing should be made for each area of the body where impairment has been identified. Simply identifying an extremity as "weak" in a life care plan is not objective, hardly descriptive, and does not provide a defendable basis for supportive measures in the life care plan. To be considered objective, the weakness should be quantified with an MMT score.

Those not qualified to perform MMT testing should provide concrete examples of weakness in the life care plan that create a clear picture for the reader regarding the strength

of the client. For example, "Mr. Jones is unable to lift a gallon of milk from the refrigerator to the counter due to weakness in grip strength in his hands." It may also be helpful to compare one side of the body to the other. This example of Mr. Jones could be used to support assistance at home with heavy chores as it provides a basis to support his inability to lift heavier objects.

Balance and Gait

Balance measurements are important in life care planning related to mobility and safety at home and in the community. Tests presented in this section are administered by physical therapists or physicians. There are several tests used by qualified clinicians to objectively determine balance. The Timed Up and Go test, the five times sit-to-stand test, the Rhomberg, and the Berg Balance Scale are a few that are regularly used. They can determine the necessity of items such as canes, walkers, wheelchairs, and scooters.

The Timed Up and Go (TUG) test is a screening tool used to project the likelihood of a fall in older adults (Shumway-Cook et al., 2000). It can be administered by not only therapists and physicians but is often used by registered nurses as well (Murphy & Lowe, 2013). The test is performed by having the client begin in a seated position, rise to stand, walk three meters, turn around, walk back to the chair, and sit down. If performing this simple test takes longer than 12 seconds, the older adult is at risk for falls. This test has good inter-rater reliability in the elderly population from 0.92 to 0.99 (Steffen et al., 2002). Sensitivity and specificity have been shown to be 87% (Shumway-Cook et al., 2000). This screening tool is easy to administer; however, it is unable to predict falls in the community (Barry et al., 2014). Using the TUG screening tool would be a good way to screen for the need of a more thorough standardized test, such as the Berg Balance Scale.

The Berg Balance Scale objectively measures a client's ability to balance using 14 different criteria and takes approximately 20 minutes to administer. It requires additional equipment usually found in any home. These items include a ruler, two chairs (one with arm rests), a footstool or step, and a watch. Each item is given 0-4 points. A total score of 56 indicates functional balance. A score of less than 45 indicates a risk of falling. This test has been shown to be reliable in the elderly population and in those with hemiplegia (Berg et al., 1995). It has been shown to have both content and criterion validity in older adults with disability (Berg et al., 1991; Whitney et al., 2003). Due to the increased complexity of this test, it is reserved for the clinicians qualified to administer it.

The Five Times Sit-to-Stand Test (5XSST) is used to measure lower extremity strength and transfer ability and is designed for adults 18 and older(physio-pedia.com, 2023a). It is a common test used in clients who suffer from vestibular impairment. The test requires only a standard chair and a watch with the capability of measuring tenths of a second. The client begins seated with arms folded and then performs five sit-to-stand transfers as quickly as possible. Age matched norms have been established for the 60–69-year-old group to be 11.4 seconds, for the 70-79-year-old group to be 12.6 seconds, and for the 80-89-year-old group to be 14.8 seconds (Bohannon, 2006). This test is quick, easy to administer, and has demonstrated reliability in healthy older adults (Teo et al., 2013) and validity when compared to the TUG test (Goldberg et al., 2012).

The Rhomberg test is frequently administered in the life care planning arena as it is sensitive to balance impairment caused by central and peripheral vertigo as well as head

trauma (Kim et al., 2011). It measures the ability of the visual, proprioceptive, and vestibular systems to maintain balance. The client is asked to stand with arms crossed or held next to the body with eyes open. The client is then asked to maintain this position with eyes closed. The test is positive if the client loses their balance with eyes closed. Losing balance is defined as increased body sway, lifting one foot to prevent a fall, or an actual fall. This test also has variations with feet placed in semi-tandem or tandem (heel to toe). The Rhomberg test has no consensus in validity or reliability as it tests qualitative performance rather than quantitative performance, making the test less objective than others. The Rhomberg is, however, a good screening tool when balance impairment is expected, especially if that balance impairment is expected to be related to vestibular function. Due to low diagnostic sensitivity and specificity as well as poor ability to predict risk of falling, this test should not be used as a stand-alone test in life care planning to objectively measure balance impairment (McMichael et al., 2008; O'Neill et al., 1998).

The Tinetti test can predict fall risk. It is also quick and easy to administer, requiring only a standard chair without arm rests, a stopwatch, and space to walk 15 feet. The Evaluee is asked to rise to stand from the chair, walk 15 feet, turn, walk back to the chair and sit down while being timed. The test can be used on a variety of patients with diagnoses including Parkinson's, motor neuron disease, brain injury, cerebrovascular accident, and spinal cord injury. There are a possible 28 points total consisting of 12 for gait and 16 for balance. A score of less than 18 predicts a high fall risk, 19-23 a moderate risk, and greater than 24 low risk. The inter-rater reliability varies between 0.8 and 0.93. Studies have shown persons with a Tinetti test score lower than 26 have an increased chance of falling with a sensitivity of 70% and a specificity of 52%. This indicates a person scoring lower than 26 has a 52% chance of falling within a year (Raiche et al., 2000).

Life care planners not experienced or qualified in utilizing these balance assessments may still provide documentation in reports when a balance impairment is present by simply describing what is observed in person or on video without requesting the individual risk their safety. It is important to note any observable leaning or use of adaptive equipment if mobility is observed. Timing of the balance impairment is also valuable. For example, "Mr. Jones demonstrates difficulty with balance when rising to stand by taking increased time to perform the movement. He utilizes short steps with outstretched arms when walking without support and prefers to use an assistive device."

Balance impairments, when documented in the life care plan, provide a basis for assistive devices in minor circumstances. It more severe cases, they may even provide the basis for attendant care. While an objective standardized test to validate balance impairment is ideal, it is not necessary or feasible for life care planners unqualified to administer them. However, providing a basis for recommendations in the life care plan is a standard of practice. Therefore, some attempt should be made to document balance impairment, either by safe observation or by subjective report by client or family member.

Endurance Testing

Testing of endurance in life care planning is problematic to measure objectively. While multiple tests measure muscular endurance, clients needing a life care plan are likely to present with issues that inhibit endurance testing. An example is an individual with a brain injury who has difficulty following directions or staying on task. Another example is

someone with a severe balance impairment related to vestibular or brain injury, or a victim of a motor vehicle accident who has increased low back pain or injury to another body part that makes prolonged standing difficult or impossible. In these situations, endurance may or may not be impaired but other dysfunctions inhibit endurance before endurance would become a limiting factor of function.

A second constraint in testing endurance of a client is the time that is necessary to measure it. How long can a person stand or ambulate before they need to sit and rest? How many hours a day can they tolerate standing? It is not practical to test objectively in life care planning how long a person can remain standing; however, there are simple tests used by qualified physicians and therapists that are not time consuming, such as the 6-Minute Walk Test, which can measure changes in aerobic capacity (physio-pedia.com, 2023c). Testing endurance in a greater capacity could take hours.

However, there are circumstances when this information is important in the life care planning arena, and endurance is especially crucial in the vocational field. When endurance in standing and/or walking is important to quantify a client's ability to return to work or perform work at a certain level, objective testing is indicated. The best tool for this is a functional capacity evaluation. A functional capacity evaluation (FCE) is intended to measure a client's ability to perform a specific job or tolerate a specific level of work. It includes many previously mentioned objective measures in one test: ROM, muscle strength, and endurance. There are built-in measures of patient reliability of pain and consistency of effort. When there is some question about a client's ability to perform the job they had prior to an incident or injury, or even if they have the ability to return to work at all, an FCE can be helpful in objectively measuring the ability to tolerate work and in what setting. The time needed to perform an FCE can range from two to six hours, depending on what areas need to be tested. Due to the length of time necessary to perform an FCE and the skills necessary, it is not reasonable to perform one in a life care planning interview or evaluation. When indicated, an FCE would be conducted outside of the interview and patient evaluation by a qualified, trained individual. FCEs are usually performed by trained physicians, therapists (occupational or physical), and chiropractors. They are used to determine the work capacity of an individual (sedentary, light, medium, heavy) and the length of time certain activities (standing, sitting) can be tolerated during the workday. Occasionally, an FCE will have already been performed and is available in the medical records for review prior to the life care planning interview. The FCE, when available for review, provides not only objective measures for endurance, but also for range of motion, strength, and balance and gait. If available for review and administered within a reasonably recent time frame, an FCE can provide a basis for future recommendations for all these areas of physical function.

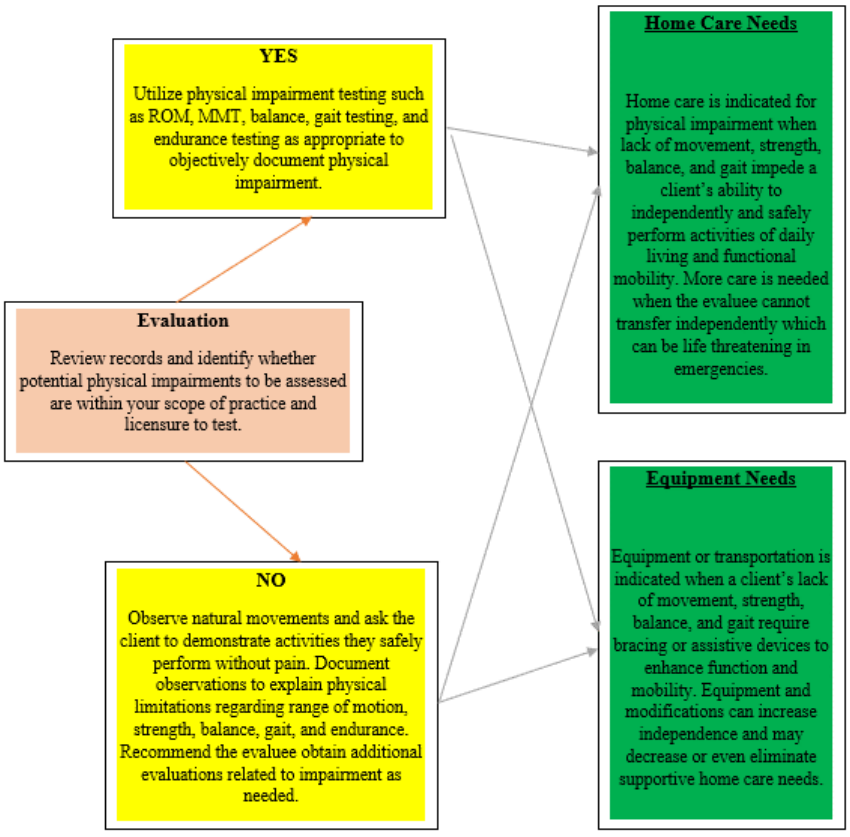
Reliability of the FCE in the ability of the evaluator to make a determination of client effort has been determined to be 0.95 to 0.98 when observing altered body mechanics, increased base of support, decreased efficiency of movement, increased heart rate, and other factors (Gross & Battié, 2002). The inter-rater reliability in determining a light or heavy lift was 0.81, indicating proper training of the evaluator is necessary for reliable results (Isernhagen et al., 1999). There are contraindications for performing a functional capacity evaluation that include impaired cardiac or pulmonary function and impaired psychological function (physio-pedia.com, 2023b). If a client has demonstrated deficits in communication or ability to understand given instructions, a functional capacity evaluation may be contraindi-

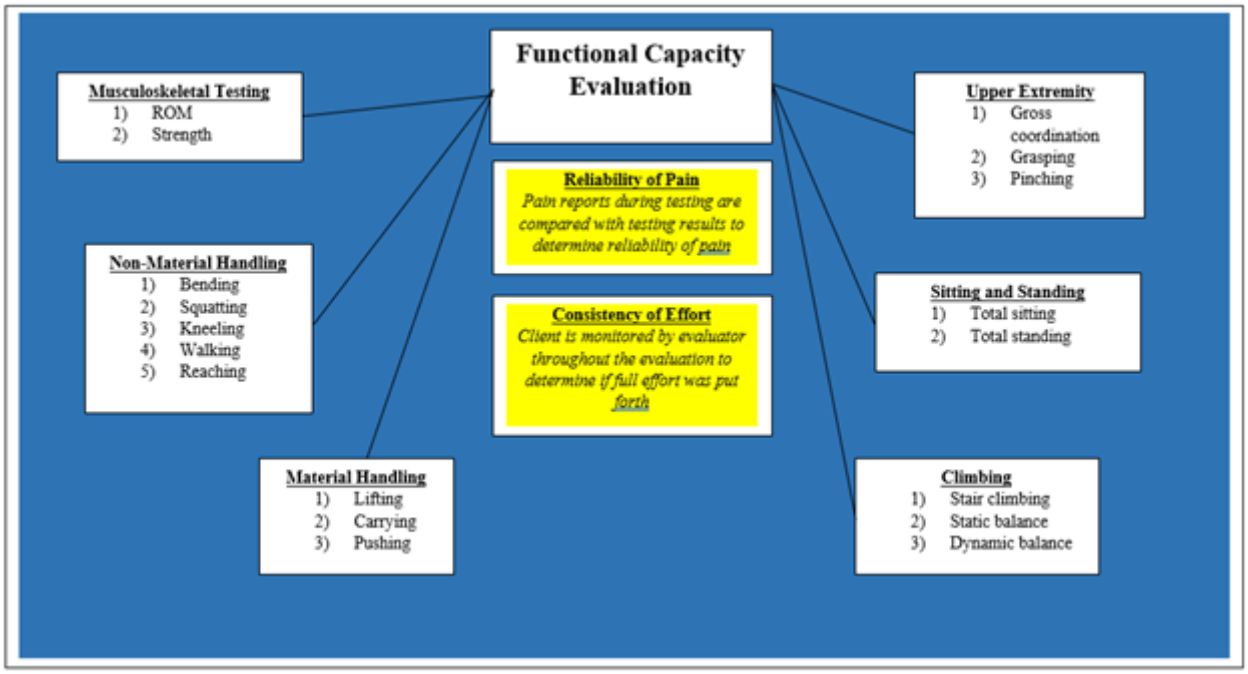
cated.

Discussion

The Observed and Objective Measures of Physical Function Algorithm (OOMPFA) is proposed as a tool to gather observed and objective physical information as a basis for supporting recommendations within a life care plan. The cognitive and psychological needs of a client should be addressed outside the OOMPFA. A proposed algorithm to address cognitive and psychological assessment developed by a qualified clinician would be beneficial in the life care planning field. Evaluations provide the life care planner multiple opportunities for observing and measuring physical impairments. This methodology provides a reliable basis for supportive care recommendations in the life care plan. Life care planners who utilize the OOMPFA and provide a basis for supportive care needs in their reports will be better prepared to defend their reports at deposition or trial.

Observed and Objective Measures of Physical Function Algorithm (OOMPFA)





References

Barry, E., Galvin, R., Keogh, C., Horgan, F., & Fahey, T. (2014). Is the timed up and go test a useful predictor of risk of falls in community dwelling older adults: A systematic review and meta-analysis. *BMC geriatrics*, *14*(1), 1–14.

Berg, K., Wood-Dauphinee, S., & Williams, J. (1995). The balance scale: Reliability assessment with elderly residents and patients with an acute stroke. *Scandinavian journal of rehabilitation medicine*, *27*(1), 27–36.

Berg, K., Wood-Dauphinee, S., Williams, J., & Maki, B. (1991). The balance scale: Reliability assessment with elderly residents and patients with an acute stroke. *Measuring balance in the elderly: Validation of an instrument*, *83*(2), 7–11.

Bohannon, R. W. (2006). Reference values for the five-repetition sit-to-stand test: A descriptive meta-analysis of data from elders. *Perceptual and motor skills*, *103*(1), 215–222.

Bohannon, R. W., et al. (2019). Considerations and practical options for measuring muscle strength: A narrative review. *BioMed Research International*, *2019*.

Gajdosik, R. L., & Bohannon, R. W. (1987). Clinical measurement of range of motion: Review of goniometry emphasizing reliability and validity. *Physical therapy*, *67*(12), 1867–1872.

Goldberg, A., Chavis, M., Watkins, J., & Wilson, T. (2012). The five-times-sit-to-stand test: Validity, reliability and detectable change in older females. *Aging clinical and experimental research*, *24*, 339–344.

Gross, D. P., & Battié, M. C. (2002). Reliability of safe maximum lifting determinations of a functional capacity evaluation. *Physical Therapy*, *82*(4), 364–371.

International Academy of Life Care Planners. (2022). *Standards of practice for life care planners* (4th ed.). International Association of Rehabilitation Professionals.

International Association of Rehabilitation Professionals. (2024). *What is life care planning*. %7Bhttps://connect.rehabpro.org/lcp/about/new-item/new-item5#:~:text=According%20to%20the%20agreed%2Dupon,for%20individuals%20who%20have%20experienced%7D

International Comission on Healthcare Certification. (2023). *Candidate handbook*. https://www.ichcc.org/images/PDFs/Current_Working_Candidate_Handbook_and_Application_Form_me_.pdf

Isernhagen, S., Hart, D., & Matheson, L. (1999). Reliability of independent observer judgments of level of lift effort in a kinesiophysical functional capacity evaluation. *Work*, *12*(2), 145–150.

Johnson, C., Pomeranz, J., & Stetten, N. (2018). Consensus and majority statements derived from life care planning summits held in 2000, 2002, 2004, 2006, 2008, 2010, 2012, 2015 and 2017 and updated via delphi study in 2018. *Journal of Life Care Planning*, *16*(4), 15–18.

Kim, S., Kim, M., Kim, N., Kim, S., & Han, G. (2011). Quantification and validity of modified romberg tests using three-axis accelerometers. *International Conference on Technology Systems and Management*, 254–261.

McMichael, K. A., Vander Bilt, J., Lavery, L., Rodriguez, E., & Ganguli, M. (2008). Simple balance and mobility tests can assess falls risk when cognition is impaired. *Geriatric Nursing*, *29*(5), 311–323.

Mulder, M., & Whittmeier, K. (2009). Objective vs. subjective: The challenge of clear documentation of range of motion. *Physiotherapy Canada*, *61*(4), 266–267.

Murphy, K., & Lowe, S. (2013). Improving fall risk assessment in home care: Interdisciplinary use of the timed up and go (tug). *Home Healthcare Now*, *31*(7), 389–396. https://doi.org/10.1097/NHH.0b013e3182977cdc

O'Neill, D. E., Gill-Body, K. M., & Krebs, D. E. (1998). Posturography changes do not predict functional performance changes. *Otology & Neurotology*, *19*(6), 797–803.

physio-pedia.com. (2023a). *Five times sit to stand test*. %7Bhttps://www.physio-pedia.com/Five_Times_Sit_to_Stand_Test%7D

physio-pedia.com. (2023b). *Functional capacity evaluation*. %7Bhttps://www.physio-pedia.com/Functional_Capacity_Evaluation#Indications,_Contraindications,_and_Considerations%7D

physio-pedia.com. (2023c). *Six minute walk test / 6 minute walk test*. %7Bhttps://www.physio-pedia.com/Six_Minute_Walk_Test_/_6_Minute_Walk_Test%7D

Raiche, M., Hebert, R., Prince, F., & Corriveau, H. (2000). Screening older adults at risk of falling with the tinetti balance scale. *The Lancet*, *356*(9234), 1001–1002.

Shumway-Cook, A., Brauer, S., & Woollacott, M. (2000). Predicting the probability for falls in community-dwelling older adults using the timed up & go test. *Physical therapy*, *80*(9), 896–903.

Steffen, T. M., Hacker, T. A., & Mollinger, L. (2002). Age-and gender-related test performance in community-dwelling elderly people: Six-minute walk test, berg balance scale, timed up & go test, and gait speeds. *Physical therapy*, *82*(2), 128–137.

Teo, T. W., Mong, Y., & Ng, S. S. (2013). The repetitive five-times-sit-to-stand test: Its reliability in older adults. *International Journal of Therapy and Rehabilitation*, *20*(3), 122–130.

Washington State Department of Social & Health Services. (2014). *Range of joint motion evaluation chart*. %7Bhttps://www.dshs.wa.gov/sites/default/files/forms/pdf/13-585a.pdf%7D

Whitney, S., Wrisley, D., & Furman, J. (2003). Concurrent validity of the berg balance scale and the dynamic gait index in people with vestibular dysfunction. *Physiotherapy Research International*, *8*(4), 178–186.