

## Rehabilitation of the Hospice and Palliative Care Patient

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### Abstract

Disability is a common problem among hospice and palliative care patients. It leads to depression, poor quality of life, increased caregiver needs, health care resource utilization, and need for institutionalization. There is a growing body of evidence that rehabilitation interventions improve functional status, quality of life, and symptoms such as pain and anxiety in this population. Having adequate knowledge about rehabilitation is essential for the provision of comprehensive end-of-life care. The goals of this article are to review the role and benefits of rehabilitation in hospice and palliative care; to discuss the elements of patient assessment for rehabilitation including the use of functional assessment tools; and to review the roles of physical, occupational, and speech therapy in hospice and palliative care patients.

### Introduction

WITH DISEASE PROGRESSION, hospice and palliative care patients experience high levels of functional loss, dependency for activities of daily living (ADLs), and mobility dysfunction.<sup>1-2</sup> Disability in these patients is related to multiple factors that include deconditioning, fatigue, complications from therapies, undernutrition, neurologic and musculoskeletal problems, pain, bowel and bladder dysfunction, thromboembolic disease, depression, and coexisting comorbidities.<sup>1-8</sup> Lehmann and colleagues<sup>4</sup> documented that in the hospital setting, 35% of cancer patients experienced functional loss due to physical weakness, 32% required assistance with performance on ADLs, 23% experienced difficulty with ambulation, and 7% had deficits in transfers. Yoshioka<sup>3</sup> and Sabers and associates<sup>5</sup> also described significant functional impairments in patients with advanced and terminal cancer.

Physical disability affects most aspects of life and leads to depression, poor quality of life, increased caregiver needs, health care resource utilization, and need for institutionalization.<sup>1,9-11</sup> Physical strength, hours spent in bed, and the ability to do what one wants are important indicators of quality of life for cancer patients and their spouses.<sup>1-2,8,12</sup> Progressive debility and being a burden to others have been cited by Breitbart and colleagues<sup>13</sup> and Morita and associates<sup>14</sup> as reasons for desiring death among cancer patients. A study by Emanuel et al. identified the perception of increasing dependency as a strong predictor of patients' interest in physician-assisted suicide.<sup>15</sup>

The concept of rehabilitation in hospice and palliative care is gaining more attention in the literature. Most hospice and palliative care patients express a desire to remain physically independent during the course of their disease.<sup>3,16-18</sup> Maintaining the highest level of functional ability, particularly mobility, for as long as possible is one of the benefits that rehabilitative therapy can offer to this population.<sup>17</sup> Moreover, rehabilitation can reduce the burden of care for families and caregivers, improve patients' overall quality of life, satisfaction of care, functional status, pain, and anxiety.<sup>1-3,5-7,19-23</sup>

### Objectives

The objectives of this article are to review the concept and the benefits of rehabilitation in hospice and palliative care, to review patient evaluation and functional assessment tools, and to discuss the role of the interdisciplinary rehabilitation team in treating hospice and palliative care patients.

### The Concept of Rehabilitation in Hospice and Palliative Care

The concept of rehabilitation is based on function, which refers to an individual's ability to complete daily survival tasks. Rehabilitation is the process of helping a person to reach the fullest physical, psychological, social, vocational, and educational potential consistent with his or her physiological or anatomical impairment, environmental limitations, desires, and life plans.<sup>2,24</sup> Impairment is defined as the loss or abnormality of psychological, physiological, or anatomical structure or function resulting from pathology, whereas

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disability refers to any restriction or lack of ability to perform an activity in the manner or within range considered normal for a human being.<sup>25</sup> The concept of palliative rehabilitation is derived from Dietz's concept of cancer rehabilitation according to disease staging, as follows: preventative, restorative, supportive, and palliative.<sup>20,23</sup> Preventative rehabilitation attempts to preclude or mitigate functional morbidity caused by cancer or its treatment. Restorative rehabilitation refers to the effort to return patients to their premorbid functional status when little or no long-term impairment is anticipated. Supportive rehabilitation attempts to maximize function after permanent impairments caused by cancer and/or its treatment. Palliative rehabilitation's primary goal is the reduction of dependence in mobility and self-care activities in association with the provision of comfort and emotional support.

Patients with progressive and oftentimes irreversible diseases often have symptomatic problems such as pain, decreased endurance, orthostatic intolerance, dysphagia, and skin breakdown, among others that can potentially respond to supportive and palliative rehabilitation strategies.<sup>2,11,26</sup>

### Benefits of Palliative Rehabilitation

Several studies document the benefits of rehabilitation in patients with advanced cancer, cardiac, and lung disease (Table 1).

Yoshioka<sup>3</sup> found that hospice patients who received rehabilitation had improved quality of life, mobility, and symptoms such as pain, dyspnea, and leg edema. In two separate studies using comprehensive inpatient rehabilitation for cancer patients, Sabers et al.<sup>5</sup> demonstrated improvement in pain, mood, and mobility, whereas Marciniak and associates<sup>6</sup> found significant functional gains in all cancer subgroups including those with metastases. Montagnini et al.<sup>24</sup> supported findings that inpatient physical therapy benefited 56% of palliative care patients whose ADL scores improved within 2 weeks and after completion of the program. Scialla and colleagues<sup>21</sup> retrospective study of older patients with cancer asthenia revealed statistically significant gains in motor and cognitive function from admission to discharge. Cole et al.'s<sup>7</sup> study of 200 cancer patients who underwent comprehensive inpatient rehabilitation showed improvement in both motor and cognitive functions with the exception of those with intracranial neoplasm, who had only a notable improvement in motor function. In contrast, Huang and associates<sup>27</sup> case-controlled retrospective study concluded that brain tumor patients can achieve outcome and rates of discharge comparable to community and have a shorter rehabilitation length of stay than stroke patients. Another study by O'Dell et al.<sup>28</sup> documented that daily functional gains made by patients with brain tumors who are undergoing rehabilitation were similar to those patients with traumatic brain injury. Two small exercise intervention studies demonstrated some benefit on hospice and palliative care patients. Porock and colleagues<sup>29</sup> 28-day exercise program showed improvement in fatigue, anxiety, and quality of life for 9 hospice patients, whereas Oldervoll et al.'s<sup>30</sup> 6-week structured physical exercise program demonstrated improvements in physical performance, fatigue, and quality of life in 34 hospice and palliative care cancer patients. Furthermore, cardiopulmonary rehabilitation has been studied in patients with advanced chronic obstructive pulmonary disease (COPD) and congestive heart failure

(CHF). Guell et al.<sup>31</sup> demonstrated that inpatient pulmonary rehabilitation may decrease psychosocial morbidity in severe COPD patients in addition to confirming the positive impact on exercise capacity and quality of life. Resqueti and associates<sup>32</sup> found that home-based pulmonary rehabilitation in severe COPD patients led to improvements in exercise tolerance and quality of life that were maintained at 6 months. Freimark et al.'s<sup>33</sup> study involving CHF patients demonstrated improvement in the functional and hemodynamic parameters following a hospital-based supervised exercise and rehabilitation program.

### Planning Rehabilitation

Ideally, the rehabilitation plan should be developed by an interdisciplinary team led by a physiatrist experienced in hospice and palliative medicine and comprised of members from physical therapy, occupational therapy, speech therapy, psychology, nursing, nutrition, respiratory therapy, recreational therapy, and case management.<sup>34</sup> The plan should be individualized and based on the patient's overall prognosis, potential to regain function, and desire and motivation to participate in the program.

Rehabilitation can be provided in the inpatient, outpatient, and home settings. Inpatient acute rehabilitation is designed for patients who have the potential for significant functional improvement, and are able to tolerate at least 3 hours of daily therapy five times per week.<sup>35,36</sup> In contrast, subacute inpatient rehabilitation offers coordinated interdisciplinary services to patients with less intense rehabilitation needs who can tolerate at least 1 hour of therapy each day. It may also serve as a transitional program before discharge from medical and surgical units and for respite or palliative care.<sup>37</sup> Outpatient rehabilitation offers comprehensive interdisciplinary or single rehabilitation services for patients living in the community. Most home care agencies can provide physical therapy, occupational therapy, speech therapy, social work, and skilled nursing care to homebound patients. Hospice programs may provide physical, occupational, and speech-language therapy in the inpatient as well as the home environment.

Discharge planning is an integral component of any rehabilitation program across various settings. It is a dynamic interdisciplinary process that should take into consideration the patient's progress toward meeting the preestablished rehabilitation goals, the degree of caregiver support needed after the rehabilitation program, and the setting in which the patient will receive care.

Rehabilitation services in the inpatient, outpatient, and home settings are covered by Medicare, Medicaid, and most private insurance companies according to their specific criteria for reimbursement. Patients enrolled in the Medicare hospice benefit are eligible to receive physical, occupational, and speech-language therapy as well as adaptive equipment without additional cost.<sup>38</sup>

### Patient Assessment

A thorough patient assessment is essential for rehabilitation planning and should include information on disease location, staging, previous and current therapies, estimated life expectancy, comorbidities, pain and nonpain symptoms,

medications, cognition, mood, nutrition, and physical function. Assessment of home and community support systems as well as financial resources is also important. A complete physical examination with special attention to the neurological and musculoskeletal systems is essential in determining motor strength, joint flexibility, gait pattern, and fall risk. Several functional assessment scales may be utilized in hospice and palliative care patients as follows:

The *Karnofsky Performance Scale (KPS)* is a functional assessment tool developed for cancer patients that consists of a 100-point scale of general function corresponding to the patient's ability to live at home and/or the need for institutionalization.<sup>28-29</sup> It is also used for prognostication in hospice and palliative care.<sup>39-40</sup>

The *Palliative Performance Scale (PPS)* is an observer-rated assessment scale of ambulation, activity level, self-care, oral intake, and level of consciousness that is useful in identifying potential care needs for the palliative care patient. It is a reliable and valid tool that correlates well with the survival time of cancer patients.<sup>41</sup>

The *Eastern Cooperative Oncologic Scale (ECOG)* developed for cancer patients is utilized for prognostication in hospice and palliative care. This is a 5-point scale that assesses the patient's ability to walk, care for self, and the need for dependence on others.<sup>42</sup>

The *Edmonton Functional Assessment Tool (EFAT)* consisting of two parts is designed and validated for the palliative care population.<sup>43-45</sup> The first part includes 10 items scored on a 4-point rating scale (0 to 4). These items include communication, mental status, pain, respiratory function, sitting or standing balance, mobility, walking or wheelchair locomotion, ADL, fatigue, and motivation. The second part is a single overall rating of the patient's functional status on a 4-point scale (0 to 4).

The *Katz Activities of Daily Living*<sup>46,47</sup> was originally developed for the chronically ill and the aged, but is also commonly used to assess the functional status of hospice and palliative care patients. It consists of six domains that include bathing, dressing, toileting, transferring, continence, and feeding. Each category is rated as dependent (0) or independent (1).

The *Lawton Instrumental Activities of Daily Living*<sup>48-49</sup> measures eight domains of function that include medication management, telephone use, housekeeping, food preparation, laundry, financial management, transportation, and shopping. It is most useful for identifying how a person is functioning at the present time and to identify improvement or deterioration over time.

The *Barthel Index*<sup>3,50-51</sup> assesses the patient's independence in performing ADLs. The 10 items of this scale include feeding, dressing, personal hygiene, bowel control, bladder control, wheelchair transfer to and from bed, toilet transfer, bathtub transfer, walking on level or being propelled by wheelchair, and ascending and descending stairs.

The *Functional Independence Measure (FIM)* is a comprehensive observer-rated scale that contains 18 items rated on 7-level ordinal scale with a score of 1 requiring total assistance and 7 with full independence. The items include self-care (6 items), sphincter control (2 items), mobility (3 items), locomotion (2 items), communication (2 items), and social cognition (3 items). It is a reliable and valid tool measuring functional outcomes in rehabilitation settings.<sup>5,7,21,52-53</sup>

For fall risk assessment, the *Berg Balance Scale* and *Tinetti Assessment of Balance and Gait* are commonly used. Both are performance-based instruments.

The *Berg Balance Test*<sup>54</sup> assesses 14 tasks generally related to changes in position from sitting to standing, transfers, reaching with outstretched arm, turning, and standing with one foot.

The *Tinetti Assessment of Balance and Gait*<sup>55</sup> has nine items for balance and seven items for gait. The items for balance include sitting balance, arising, attempts to arise, immediate standing balance within 5 seconds, standing balance, being nudged, eyes closed, turning 360 degrees, and sitting down. The items for gait include initiation of gait, step length and height, step symmetry, step continuity, path walked, trunk, and walking stance.

The *Timed Up and Go (TUG)* test<sup>56-57</sup> is a performance assessment tool used in the elderly population. The patient is asked to stand without using proximal muscles if possible from a sitting position and asked to walk 3 meters forward and come back to a sitting position. The average normal time to complete the task is about 10 seconds. If the time to finish the task is greater than 20 seconds, that patient has a strong likelihood of falling.

The *6 Minute Walk Test (6MWT)*<sup>58</sup> is a self-paced endurance assessment in which the patient is scored in his or her ability to walk in 6 minutes. The 6MWT is a useful measure of functional capacity and is widely used for measuring response to rehabilitation interventions for pulmonary and cardiac disease. Table 2 outlines the scoring system for each tool.

## Role of Physical Therapy

Table 3 adapted from Frost highlights the functional tasks evaluated by the physical therapist.<sup>59</sup> Specific interventions utilized by physical therapy include physical modalities for pain control, provision of adaptive and assistive equipment, environmental modification, education on energy conservation, and exercise.<sup>60</sup> Examples of physical modalities used to treat pain include massage, heat, cold, ultrasound, transcutaneous electrical nerve stimulation (TENS), diathermy, manual lymphatic drainage, and soft tissue mobilization.<sup>61</sup> Adaptive equipment is used to improve performance in ADLs.<sup>34,62</sup> Examples include reachers, rocker knives, one-handed cutting boards, and sandwich holders for assistance with cooking and eating. Assistive devices are prescribed to help with ambulation, mobility, balance, pain, fatigue, weakness, joint instability, excessive skeletal loading, and elimination of weight-bearing on an affected extremity. Examples include crutches, canes, walkers, wheelchairs, and scooters for mobility, and lifts, ramps, and transfer boards for facilitation with transfers. Orthotics can be helpful in enhancing joint stability and safety for patients with motor deficits.<sup>1</sup> Examples include truncal orthotics for osseous instability, upper extremity orthotics to assist with manipulation of objects, and lower extremity orthotics to promote joint stability and muscle function for safe ambulation.

Environmental modification is another important intervention by physical therapy.<sup>59</sup> Some examples include placing a recliner on a platform to assist in transfer, having a high stool in the kitchen to reach a cupboard, and adjusting the height and arms of the chair to assist in transfer. The therapist

TABLE 1. STUDIES SUPPORTING THE BENEFITS OF PALLIATIVE REHABILITATION

Author(s)	Design/Setting	Population	Intervention/Measurement	Results
Yoshioka <sup>3</sup>	Retrospective case series Hospice facility in Japan	301 terminal cancer patients	Rehabilitation within 6 months of death  Therapeutic exercises for range of motion, balance, muscle strength Activities of Daily Living (ADL) training Bed exercises Endurance training Chest physiotherapy Swallowing exercises Thermotherapy Intermittent pneumatic compression Acupuncture Use of brace, sling, and splint Comfortable or relaxed positioning with pillows Measurement: Barthel Index score (BI) before and after rehabilitation	- 27% average improvement in ADL scores  - Improvement in the Barthel Index score from 12.4 pre-rehabilitation to 19.9 post-rehabilitation - 63% patients considered rehabilitation procedures to be effective  - Families expressed satisfaction with the program - Almost all patients experienced some relief from pain, dyspnea, leg edema, and constipation
Sabers et al. <sup>5</sup>	Prospective study Mayo Clinic, Rochester, MN	299 hospitalized cancer patients	Inpatient rehabilitation Measurements: Barthel Index (BI), Karnofsky Performance Status Scale (KPS), Quality of Life (QOL) questionnaire at enrollment and completion of the program	- 189 completed the study - Significant improvement in KPS and BI scores at completion of the program - Improvement in multiple QOL parameters
Marciniak et al. <sup>6</sup>	Retrospective case series University-affiliated rehabilitation hospital in the US	159 patients with functional impairments related to cancer or its treatment	Comprehensive inpatient rehabilitation Measurement: Functional Independence Measure (FIM) motor score (FIM-MM)	- 49% of patients believed they benefited from rehabilitation - Significant functional gains made between admission (mean FIM score 4.29) and discharge (mean FIM score 56; $p < 0.001$ ) - The presence of metastatic disease did not influence functional outcome; those receiving radiation made larger functional gains - PT benefited 56% of patients with notable improvement in ADL scores. - A higher albumin level was correlated with functional improvement.
Montagnini et al. <sup>24</sup>	Retrospective chart review Hospital-based palliative care unit at a Veterans Affairs Medical Center	100 consecutive palliative care patients discharged from a palliative care unit	Completion of inpatient physical therapy (PT) program Measurements: Activities of Daily Living (ADL) scores on admission, at 2 weeks, and upon completion of the PT program	

(Continued)

TABLE 1. (CONTINUED)

Author(s)	Design/Setting	Population	Intervention/Measurement	Results
Scialla et al. <sup>21</sup>	Retrospective chart review Rehabilitation hospital in Scranton, PA	110 cancer patients; age >60 years	Comprehensive multidisciplinary inpatient rehabilitation Measurements: Functional -Independence Measure for motor (FIM-MIM) and cognitive function (FIM-CM) Comprehensive multidisciplinary inpatient rehabilitation Measurement: -Functional Independence Measure motor (FIM-MIM) and cognitive function (FIM-CM)	- Improvement in the median total FIM score from admission (71) to discharge (88) - Improvements in physical function, asthenia, and cognition
Cole et al. <sup>7</sup>	Retrospective case series Rehabilitation hospital in Scranton, PA	200 cancer patients; age >18 years	Acute inpatient rehabilitation Measurements: -Functional Independence Measure (FIM) on admission and discharge and measured in three subsets, namely activities of daily living (ADLs), mobility, and cognition -FIM change and FIM efficiency were also calculated	- All patients made significant gains in motor function regardless of diagnostic group, rehabilitation impairment group, rehabilitation goal group, and cytotoxic treatment status - Significant gains in cognitive function were made by all patients except those with intracranial neoplasms, and central nervous system dysfunction - No significant difference found in both populations as regards to total admission FIM, total discharge FIM, change in total FIM, or FIM efficiency - The admission mobility FIM was higher in the brain tumor group (13.6 vs. 11.1, $p = 0.04$ ). - The admission ADL FIM was found to have a greater change in the stroke group (10.8 vs. 8.3, $p = 0.03$ ) - The two groups had similar rates of discharge to the community at 85% - The tumor group had a significantly shorter rehabilitation length of stay than the stroke group (25 vs 34 days, $p < 0.01$ ). - Mean length of stay for the tumor group was 17.8 days - Mean FIM gain of 25.4 points from admission to discharge - 82.5% were discharged home - No demographic or tumor characteristic was statistically significant in predicting functional outcome at discharge, but greater gains were seen for patients with meningioma, left-sided cerebral lesions, and those not receiving radiation - FIM efficiency and length of stay (LOS) were not statistically different between the TBI and tumor groups
Huang et al. <sup>27</sup>	Case-controlled, retrospective study Tertiary care medical center inpatient rehabilitation unit	63 brain tumor patients matched with 63 acute stroke patients according to age, sex, and location of lesion	Acute inpatient rehabilitation Measurements: -Functional Independence Measure (FIM) on admission and discharge and measured in three subsets, namely activities of daily living (ADLs), mobility, and cognition -FIM change and FIM efficiency were also calculated	- Improvement in the median total FIM score from admission (71) to discharge (88) - Improvements in physical function, asthenia, and cognition
O'Dell et al. <sup>28</sup>	Retrospective, descriptive, and case- matched study Free-standing inpatient brain injury rehabilitation unit	40 consecutive patients with a variety of tumor types, 40% with glioblastoma compared with 40 patients with traumatic brain injury (TBI) matched for age, gender, and admission functional status	Acute inpatient rehabilitation Measurements: Change in Functional Independence Measure (FIM) scores Length of rehabilitation stay Discharge disposition	- Improvement in the median total FIM score from admission (71) to discharge (88) - Improvements in physical function, asthenia, and cognition

(Continued)

TABLE 1. (CONTINUED)

Author(s)	Design/Setting	Population	Intervention/Measurement	Results
Porock et al. <sup>29</sup>	Experimental pre-test, post-test design Home Hospice Program in Australia	9 hospice patients (mean age 59years)	28-day exercise intervention to test the effects of exercise on levels of fatigue, anxiety, depression, symptom distress, and quality of life Measurements: -Multidimensional Fatigue Inventory (MFI), Symptom Distress Scale (SDS), Hospital Anxiety and Depression Scale (HADS), and Graham and Longman's Quality of Life Scale (QOLS) 6 weeks of structured exercise program supervised by physiotherapist Exercise consisted of 10 minutes of warm-up session, 30 minutes of circuit training in six stations and 10 minutes of relaxation/stretching session Measurements for physical performance and balance: - 6 Minute Walk Test - Timed repeated sit to stand - Functional reach Measurement for fatigue: - Fatigue Questionnaire - Measurement for quality of life: - European Organization for Research and Treatment of Cancer Core Quality of Life Questionnaire	- Overall minimal fluctuation in the mean MFI subscale scores between days 0 and 28 - The general fatigue score remained the same - HADS trend toward decreasing anxiety levels - Improvement in QOL scores - Patients enjoyed the individualized approach to exercise and in no instance was fatigue made worse - 34 patients completed the study -Significant increase in walking length by 29 m from pre- to post-test ( $p = 0.007$ ) - Significant decrease in timed sit to stand from 5.1 to 4.1 seconds ( $p = 0.001$ ) - Measuring balance by functional reach improved from 30.4 to 32.8 cm ( $p = 0.07$ ) - The fatigue score decreased from 51 to 43 ( $p = 0.06$ ) - Global quality of life remained stable - Dyspnea reduced from 42 to 30 points ( $p = 0.006$ ) - Role and social functioning improved from 50 to 63 points ( $p = 0.02$ ) from 55 to 65 points ( $p = 0.008$ ).
Oldervoll et al. <sup>30</sup>	Phase II Interventional (Exercise) Study Palliative care unit and oncological outpatient clinic in Norway	63 hospice and palliative care cancer patients	16 weeks of pulmonary rehabilitation that included breathing retraining and exercise Measurements: - Psychosocial morbidity using the Million Behavior Health Inventory (MBHI) and the Revised Symptom Checklist (SCL-90-R) - 6 Minute Walk Test (6MWT) - Health-related quality of life using the Chronic Respiratory Questionnaire (CRQ)	- Statistically and clinically significant differences between groups in 6MWD, dyspnea, fatigue, emotional function, and psychological domains (depression, anxiety, and symptom distress)
Guell et al. <sup>31</sup>	Prospective randomized controlled trial Tertiary care respiratory service in Spain	40 patients ( mean age 65 years) with severe chronic obstructive pulmonary disease		

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TABLE 1. (CONTINUED)

<i>Author(s)</i>	<i>Design/Setting</i>	<i>Population</i>	<i>Intervention/Measurement</i>	<i>Results</i>
Resqueti et al. <sup>32</sup>	Prospective controlled trial Outpatient clinics at two university hospitals in Spain	29 patients with severe or very severe chronic obstructive pulmonary disease (COPD) (Stage III-IV)	9-week supervised pulmonary rehabilitation program at home Measurements: - Lung function tests - Exercise tolerance; 3 minute walk test - Dyspnea/Medical Research Council Score (MRC) - Health-related quality of life with the Chronic Respiratory Questionnaire (CRQ)	- Distance covered on the walk test increased significantly in the rehabilitation group ( $p = 0.001$ ) and the difference maintained at 6 months - Dyspnea improved significantly with rehabilitation ( $p < 0.05$ ) but reduction not evident at 6 months
Freimark et al. <sup>33</sup>	Intervention study Cardiac Rehabilitation Institute in Israel	56 consecutive patients with Class III congestive heart failure	Supervised cardiac exercise and rehabilitation program (twice a week for 18 weeks) Measurements: - 6 Minute Walk Test (6MWT) - Peak exercise $\text{VO}_2$ - Exercise duration time - Resting and immediate post-peak exercise stroke index (SI) - Cardiac index (CI) - Delta peak $\text{VO}_2$ - Immediate post-peak exercise systemic vascular resistance (SVR)	- 44 patients completed the study - Post-exercise training, functional, and hemodynamic parameters improved significantly in the exercise group compared with controls - A highly significant interaction between the groups and change was found in the 6MWT ( $p < 0.001$ ), exercise test duration ( $p < 0.001$ ), metabolic equivalents (METS) during exercise ( $p < 0.001$ ), immediate post-peak exercise CI (0.016), delta peak $\text{VO}_2$ ( $p = 0.028$ ), and immediate post-peak exercise SVR ( $p = 0.045$ )

TABLE 2. FUNCTIONAL ASSESSMENT TOOLS

Category	Assessment tools	Scoring system
Physical Function	Karnofsky Performance Scale (KPS) <sup>39-40</sup>	- 100-point scale (100 = normal function; 0 = death) - KPS score of 50 or lower is associated with a limited survival
	Palliative Performance Scale (PPS) <sup>41</sup>	- 100-point scale (100 = normal function and activity; 0 = death) - Lower scores are associated with limited survival
	Eastern Cooperative Oncology Group (ECOG) Functional Index <sup>42</sup>	- 5-point scale (0 = perfect health; 5 = death) - ECOG scores of 3 and 4 are associated with limited survival
	Edmonton Functional Assessment Tool (EFAT) <sup>43-45</sup>	- 4-point rating scale (0 = functionally independent; 0 = total loss of function)
	Katz Activities of Daily Living (ADLs) <sup>46-47</sup>	- Measures six domains of function - Each domain is rated as 0 (dependent) or 1 (independent) - Total scores: 6 = full function; 4 = moderate impairment; and 2 = severe impairment - Dependency in two or more ADLs contributes to clinical decline and limited prognosis
	Lawton Instrumental Activities of Daily Living (IADLs) <sup>48-49</sup>	- Measures eight domains of function - Each domain is scored either 0 (impairment) or 1 (normal function) - Higher scores indicate higher functional status
	Barthel Index (BI) <sup>51</sup>	- Measures patients' performance in 10 ADL tasks - Each task is scored in increments of 5 points (5-10-15) - Scores range from 100 (full independence) to 0 (bedridden state)
Balance/Fall Risk	Functional Independence Measure (FIM) <sup>52-53</sup>	- Yields a total score, motor score, and a cognitive score - The scores vary from 18 to 126; higher scores indicate higher independence levels
	Berg Balance Scale <sup>54</sup>	- 14-item performance based measure of balance - Each task is measured on a 5-point scale ranging from 0 (lowest level of function) to 4 (highest level of function) (Total maximum score = 56) - Scores correlate with fall risk: 41-56 = low fall risk; 21-40 = medium fall risk; and 0-20 = high fall risk
	Tinetti Assessment of Balance and Gait <sup>55</sup>	- Nine items for balance and seven items for gait - Each task is scored on a 3-point scale from 0 (complete impairment) to 2 (independence) - Maximum score for gait is 12 and balance is 16 (total of 28) - Risk for falls if total score 19-24; high risk for falls if total score < 19
Endurance	Timed Up and Go (TUG) <sup>56-57</sup>	- High risk for falls if time to complete the task is $\geq$ 20 seconds
	6 Minute Walk Test (6MWT) <sup>58</sup>	- Primary measurement is total distance walked in 6 minutes

can also teach the patient energy management and conservation such as monitoring of fatigue levels and guidance on rest periods. The therapist can play an active role in caregiver education and support to include instructions on the use of equipment, use of good body mechanics, and utilization of strategies to prevent falls and maintain balance. Physical therapists use exercise in the maintenance of muscle strength, joint flexibility, range of motion, and balance.<sup>2,61</sup> In general, the types of exercise include passive, active, active-assisted, resistive, progressive resistive, stretching, and aerobic.<sup>2,61</sup> The positive effects of exercise in patients with advanced diseases include improvements in the physiological and psychological

functional parameters such as functional capacity, body composition, mood, self-esteem, quality of life, and problems such as fatigue, nausea, pain, muscle spasm, and edema.<sup>2,28-30</sup>

Reconditioning programs for patients with advanced cancer, cardiac, and lung diseases include graded aerobic and stretching exercises to increase cardiopulmonary capacity and endurance.<sup>63</sup> Stationary devices such as treadmills, ergometers, and rowing machines are used for aerobic exercise training. In addition to aerobic exercise, pulmonary rehabilitation programs also include interventions such as inspiratory muscle retraining, noninvasive mechanical ventilation, education on oxygen consumption, breathing techniques,



TABLE 3. FUNCTIONAL TASKS ADDRESSED BY PHYSICAL THERAPY

<i>Functional task</i>	<i>Components/Description</i>
Bed mobility	<ul style="list-style-type: none"> <li>- Rolling (supine to side lying – right and left)</li> <li>- Positioning for comfort</li> <li>- Positioning for pressure relief</li> <li>- Bridging (lifting pelvis off the bed)</li> <li>- Supine to sit</li> <li>- Sit to supine</li> </ul>
Transfers	<ul style="list-style-type: none"> <li>- Set up (i.e., positioning of wheelchair in relation to bed)</li> <li>- Sit to stand</li> <li>- Pivot (or slide)</li> <li>- Stand to sit</li> </ul>
Ambulation or gait	<ul style="list-style-type: none"> <li>- Assistive device placement</li> <li>- Gait assessment</li> <li>- Foot placement</li> </ul>

Source: Frost M: The role of physical, occupational, and speech therapy in hospice: Patient empowerment. *Am J Hosp Palliat Care* 2001;18:397-402. (Adapted with permission.)

postural drainage, management of secretions, and relaxation techniques.<sup>64</sup>

### Role of Occupational Therapy

The National Council for Hospice and Specialist Palliative Care Services in 2000 valued the importance of occupational therapy in the rehabilitation of oncology and palliative care patients.<sup>65</sup> The occupational therapist assesses and provides treatment programs in the functional areas such as ADLs, work tasks, self-esteem, employment, role-related tasks, recreation, use of adaptive equipment, as well as discharge planning. Table 4 highlights the ADLs addressed by the occupational therapist.<sup>59</sup>

Specific interventions include home assessment, prescription of equipment, coaching in personal and domestic tasks, education strategies for symptom control, relaxation, stress management, facilitation of social and leisure activities, and provision of information and support for caregivers.<sup>66</sup>

### Role of Speech and Language Therapy

Pollens has identified four roles of the speech-language therapy in end-of-life care.<sup>67</sup> First, to provide consultation to patients, families, and the hospice team in the areas of communication, cognition, and swallowing function. Second, to develop strategies in the area of communication skills to support the patient's role in decision making, maintain social closeness, and to assist the patient in the fulfillment of end-of-life goals.<sup>68,69</sup> Third, to assist in optimizing function related to dysphagia symptoms to improve patient comfort and satisfaction and promote positive feeding interactions with family members. Fourth, to communicate with the hospice team in the provision and acknowledgment of input related to overall patient care.

Speech-language therapy addresses functional tasks involving the oral-pharyngeal-laryngeal function and the cognitive components in the communication process.<sup>59</sup> Table 5 outlines the areas addressed by the speech therapist.

TABLE 4. FUNCTIONAL TASKS ADDRESSED BY OCCUPATIONAL THERAPY

<i>Functional task</i>	<i>Components/Description</i>
Self-care	<ul style="list-style-type: none"> <li>- Bathing</li> <li>- Dressing</li> <li>- Grooming</li> <li>- Toileting</li> <li>- Self-feeding</li> </ul>
Transfers (as they relate to ADL or home management)	<ul style="list-style-type: none"> <li>- Shower or tub transfers</li> <li>- Toilet transfers</li> <li>- Retrieving objects from the floor, cupboards, high shelves</li> <li>- Carrying objects</li> </ul>
Home management	<ul style="list-style-type: none"> <li>- Food preparation</li> <li>- Managing faucets, lights, doors, drawers</li> <li>- Use of remote controls, phone, home appliances</li> <li>- Food management (grocery list compilation, grocery shopping)</li> <li>- Social management (transportation, calendar, communications)</li> <li>- Money management</li> </ul>

Source: Frost M: The role of physical, occupational, and speech therapy in hospice: Patient empowerment. *Am J Hosp Palliat Care* 2001;18:397-402. (Adapted with permission.)

TABLE 5. FUNCTIONAL TASKS ADDRESSED BY SPEECH THERAPY

<i>Functional Task</i>	<i>Components/Description</i>
Receiving information	<ul style="list-style-type: none"> <li>- Auditory comprehension</li> <li>- Visual comprehension</li> <li>- Reading comprehension</li> </ul>
Communicating information (expressing needs)	<ul style="list-style-type: none"> <li>- Verbal expression</li> <li>- Nonverbal and graphic expression</li> <li>- Speech intelligibility</li> <li>- Voice quality and volume</li> <li>- Prosody (change in pitch, stress, intensity, and duration of sound)</li> <li>- Latency of response</li> </ul>
Oral motor function	<ul style="list-style-type: none"> <li>- Tongue coordination</li> <li>- Lip closure (loss of food or drinking)</li> <li>- Bolus control</li> <li>- Transit time</li> <li>- Food management (pocketing, etc.)- Swallow reflex</li> <li>- Cough or choke</li> <li>- Vocal quality following intake</li> <li>- Consistency of foods or liquids tolerated (i.e., thin vs. thickened, puree, soft, mechanical, or regular solids)</li> <li>- Presence of regurgitation</li> </ul>

Source: Frost M: The role of physical, occupational, and speech therapy in hospice: Patient empowerment. *Am J Hosp Palliat Care* 2001;18:397-402. (Adapted with permission.)

## Summary

Progressive disability is common among hospice and palliative care patients. It leads to depression, poor quality of life, increased caregiver needs, health resource utilization, and need for institutionalization. Supportive and palliative rehabilitation interventions are intended to optimize function and comfort in these patients. Small retrospective studies have demonstrated some of the potential benefits of rehabilitation in this population. They include improvement in functional capacity, quality of life, mobility, fatigue, pain, well-being, dyspnea, emotional state, and cognitive function. Patient assessment for rehabilitation should be comprehensive and interdisciplinary. The treatment plan should be individualized and based on the patient's overall prognosis, potential to regain function, and desire and motivation to participate in the program. Several interventions can be used in supportive and palliative care rehabilitation programs, such as physical, occupational, and speech-language therapy. Having knowledge of the potential benefits of palliative rehabilitation is essential for the health care provider dealing with patients with life-limiting diseases. Larger randomized controlled trials are also needed to further demonstrate the benefits of rehabilitation in this population.

## Author Disclosure Statement

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