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Rehabilitation of Patients with Prostate Cancer

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Additional information is available at the end of the chapter

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Abstract

Cancer rehabilitation involves helping an individual with cancer to regain maximum psychological, physical, cognitive, social, and vocational functioning with the limits up to disease and its treatments in an interdisciplinary team concept. Prostate cancer is one of the most frequent male malignancies in the world. Prostate cancer treatment options have the risk of some side effects including loss of muscle strength, fatigue, pain, urinary incontinence, erectile dysfunction, cognitive problems, decrease in bone density, weight loss, gynecomastia, and hot flushes with stress-related psychosocial problems. Relative to other cancers, the prognosis of men with prostate cancer is much better and the potential treatment-related side effects have important implications which can affect the health-related quality of life (QOL) of this population. Recent studies support the efficiency of multimodal treatment to recognize, prevent, and increase functional recovery with an interdisciplinary rehabilitation team which includes physical and occupational therapists. This chapter describes briefly cancer rehabilitation and rehabilitation approaches at every stage of patients with prostate cancer for minimizing the morbidity rate associated with prostate cancer treatment to increase occupational participation and improve QOL.

Keywords: prostate cancer, rehabilitation, physiotherapy, occupational therapy

1. Introduction

Cancer rehabilitation involves helping an individual with cancer to regain maximum psychological, physical, cognitive, social, and vocational functioning with the limits up to disease and its treatments in an interdisciplinary team concept [1]. Prostate cancer is one of the most frequent male malignancies in the world [2]. The development of serum prostate-specific antigen (PSA) and advanced cancer treatment modalities increased 10-year survival rates from ~60% to >70%. Prostate cancer can occur as a local disease or an advanced metastatic disease. Surgical removal

of the prostate gland, hormonal therapy, radiation therapy, cryoablation, and expectant monitoring are some of the treatment options for patients with prostate cancer [3].

These treatment options are associated with the risk of some side effects including fatigue, pain, urinary incontinence, erectile dysfunction, cognitive problems, decrease in bone density, weight loss, gynecomastia, and hot flushes with stress-related psychosocial problems [4]. Relative to other cancers, the prognosis of men with prostate cancer is much better, and the potential treatment-related side effects have important implications which can affect the health-related quality of life (QOL) of the patients; besides, these treatment-related side effects are significant in this population [5].

Increased rates of survival and support required for functional, physical, and psychological status led to a considerable interest in rehabilitation needs and the approaches used to increase the QOL of the patients with prostate cancer [5]. Recent studies support the efficiency of multimodal treatment to recognize, prevent, and increase functional recovery with an interdisciplinary rehabilitation team which includes physical and occupational therapists. These professionals provide inpatient care, outpatient follow-up and education, and services in home care, palliative, and hospice care settings [6].

Physical therapists play a vital role in the rehabilitation of patients with prostate cancer by teaching and implementing weight-bearing and gentle exercise, resistive exercises, and vibration exercises which transmit energy to the body with special techniques that strengthen the posture, balance, and body fitness, maintain or improve bone density, and prevent falls [6, 7]. In addition, pelvic floor training helps alleviate symptoms of urinary incontinence and maintain normal pelvic floor muscle functions [8]. Physical therapy also focuses on restoring the cardiovascular system which helps improve blood flow; this has been shown to improve symptoms associated with cancer-related fatigue and erectile dysfunction. Physical therapists assess the patients and develop individualized intervention programs including exercise programs to increase the endurance, muscle strength, mobility, and balance of patients with prostate cancer [6–8].

Occupational therapists play a vital role in increasing the occupational participation of the patients with prostate cancer [5]. Occupational therapists use training in activities of daily living, assistive technology approaches, education of energy conservation techniques, management of treatment-related problems such as pain, fatigue, and nausea. Moreover, occupational therapists give occupational balance training for regaining value of engagement in meaningful activities with a holistic view of creative and therapeutic use of activity [5, 9]. Occupational therapists focus on adaptations and offer education assistance for sexual activity for patients where certain sexual positions are limited or impossible due to pain, fatigue, or positioning issues. This complication in prostate cancer treatments is one of the most important limitations of activities of daily living that men face [9]. Occupational therapists offer ways to help patients with prostate cancer to confirm, express, accept, and use problem-solving techniques to present the changes due to prostate cancer and its treatment. Effective stress management must include relaxation and social support in a supportive environment. Such interventions decrease treatment-related symptoms, reduce the physiological accompaniments of stress, and improve mood. Patients who participate in such rehabilitation interven-

tions are shown to have improved mental health by feeling more controlled and experiencing reduced interpersonal conflicts and distress related to cancer-related intrusive thinking [5]. In addition, cognitive therapy and changing life style with cognitive behavioral therapy are the mostly used occupational therapy interventions for patients with prostate cancer [5]. Furthermore, remaining in or returning to work is increasingly important for patients with and survivors of prostate cancer. Occupational therapists support men to remain in or return to work by providing fast-track care, counseling, and monitoring the men in work environment [10].

This chapter describes briefly cancer rehabilitation and rehabilitation approaches for prostate cancer patients at every stage of the disease for minimizing the morbidity rates associated with prostate cancer treatment to increase occupational participation and improve QOL. The chapter also focuses on physical and occupational therapy approaches for patients with prostate cancer with psychosocial and vocational rehabilitation after prostate cancer treatment.

2. Cancer rehabilitation

Conventionally, function is the most important indicator of activity and is strongly associated with physical performance and interrelated areas such as range of motion, muscular strength, and endurance [11]. The more contemporary function is a perspective that encompasses individual's physical conditions, emotional and psychological states, and the environmental and social circumstances of the individual [12]. The World Health Organization's International Classification of Functioning, Disability and Health (ICF) describes a framework that focuses this multidimensional or biopsychosocial approach for a deeper understanding of function [11, 12]. Within the ICF framework, function is defined as the interactions between an individual, their health conditions, and the social and personal situations in which they thrive [13]. The complex interactions between these variables determine function and disability. In the context of prostate cancer, morbidity associated with the disease and its treatments can lead to functional problems or impairments in physiological, psychological, or behavioral attributes (body functions and structures), potentially leading to limitations in the ability to execute desired tasks (activity) and participation in social demands (participation) [14]. A variety of approaches and a framework for cancer rehabilitation are based on the ICF to diagnosis and treatment of function for prostate cancer survivors [15].

The overall aim in rehabilitation of all cancer types is to overcome all symptoms causing functional difficulties and increase QOL [16]. De Lisa mentioned the importance of maintaining QOL at a high level; therefore, rehabilitation should not only focus on improving function and prognosis [17]. In general, cancer rehabilitation goals are classified as restorative, supportive, palliative, and preventive according to progression and the nature of cancer. *Restorative care* aims at maximal recovery of residual function of the patients. *Supportive* efforts seek to increase ability in daily life and mobility using effective methods such as decrease in functional difficulties and compensate for permanent deficits. In this stage, rehabilitation also aims to prevent disuse for secondary problems such as contractures and loss of muscle

strength. *Palliative treatment* aims to reduce or eliminate symptoms such as pain and dyspnea. In the terminal stage of the patient, physical, psychological, and social high QOL as well as wishes of the patient are important, and positioning, heat modalities, low-frequency therapy, breathing–relaxation exercises, or assistive devices can be used. The primary goal of *preventive rehabilitation* is to prevent impairments. Rehabilitation in this stage must include preoperative education, maintenance of strength, and range of motion after treatment. This rehabilitation process starts right after diagnosis [18]. This framework can guide a therapist in all types of cancer.

Body functions and body structures

Somatic

- Direct operation sequences (wound healing, lymphocele, urinary retention, urinary)
- Radiation effects (cystitis, proctitis, lymphedema)
- Treatment-related hormone deficiency symptoms
- Urinary incontinence
- Post-therapeutic pain syndromes
- Sequelae cytostatic chemotherapy (polyneuropathy), myelosuppression
- Sexual dysfunction (erectile dysfunction)

Psychosocial

- Problems of coping
- Depression
- Relapse fears
- Sleep disorders
- Partnership problems
- Fatigue syndrome
- Post-traumatic stress disorder

Activities

- Reduction in exercise capacity
- Restriction in the field of transportation (incontinence, bone pain, edema)
- Social withdrawal

Participation

- Problems in integrating into the social environment
 - Problems with the reintegration
 - Limitation of mobility and participation in cultural life (incontinence)
-

Table 1. Impairment of functional health in prostate cancer.

General rehabilitation goals	Evaluation instruments
Physical performance	WHO Activity Index, Karnofsky Performance Score, Harvard Step Test, Ergometry, Muscle Strength Measurement (Vigorimeter, Digimax Muscle Testing), Quality of Life Questionnaires (EORTC-QLQ-C30), Functional Assessment of Cancer Therapy (G: General, F: Fatigue, P: Prostate-FACT)
Function-related treatment goals	Direct Assessment of Functional Abilities (DAFA) Direct Assessment of Functional Status (DAFS)
Reducing post-surgical problems (scars discomfort, seroma)	Clinical observation
Reducing symptoms after radiotherapy (cystitis, proctitis)	Micturition, Chair Diary
Reducing hormone deficiency symptoms (vasomotor reactions, osteoporosis)	Visual Analog Scale (VAS) *Osteodensitometry must be checked
Reducing symptoms after cytostatic chemotherapy (polyneuropathy)	Common Toxicity Criteria of the National Cancer Institute (NCI-CTC), Sensitivity Measurement, Vibration Sense
Reduction of fatigue	Multidimensional fatigue Inventory (MFI), Functional Assessment of Cancer Therapy, Fatigue (FACT-F), Visual Analog Scale (VAS), EORTC-QLQ-C30, Fatigue Module
Reducing pain	Visual Analog Scale (VAS), Pain Diary
Reduction of lymphedema	Clinical observation, Rating scale
Bladder in post therapeutic Urge symptoms	Voiding diary *Must be checked with the urologist
Improvement in urinary incontinence	Miktions protocol, PAD test, Biofeedback, *Residual urine and results of uroflowmetry must be checked with the urologist.
Dealing with sexual dysfunction, improvement of erectile dysfunction	Diary, International Index of Erectile Function (IIEF)
Improvement of functional disorders of the musculoskeletal system	Range of motion
Improving self-sufficiency	Detailed activity analysis, Functional Independence Measure (FIM), Barthel Index (BI), Instrumental Activities of Daily Living Scale (IADL), Role Checklist (RL)
Reduction of long-term care	Functional Independence Measure (FIM), Barthel Index (BI)
Learning proper movement, sporting and leisure activities	OQ (Occupational Questionnaire), Interest Checklist and Activity Checklist (ICAC)
Improvement of cognitive performance	d2-test (attention stress test), Benton test (visual memory-BT), Multiple Choice Vocabulary Intelligence Test (MWT-B),

General rehabilitation goals	Evaluation instruments
	Loewenstein Occupational Therapy Cognitive Assessment (LOTCA)
Promoting disease management, improving self-awareness and self-acceptance, emotional stabilization	EORTC, SF-36, Functional Assessment of Cancer Therapy (G: General, F: Fatigue, P: Prostate-FACT),
Coping with stress and anxiety depressive states and relaxation	“Stress thermometer”, Hospital Anxiety and Depression Scale (HADS-D), Beck Depression Inventory (BDI), Beck Anxiety Inventory (BAI), Visual Analog Scale (VAS)
Reduction of Progression	Fear of Progression Questionnaire
Assistance in transition and when dealing with stroke-related disabilities (incontinence, erectile dysfunction)	QLQ-C30, prostate module
Breakdown of family and partnership problems	Interview, Couples Climate Scales
Reduction of insomnia	SF, Diary
Construction of meaning and objective perspectives	Interview
Treatment goals in the social sphere and Preparation of reintegration, possibly initiating professional promotions	CIO Community Integration Questionnaire, ISSI (Interview Schedule For Social Interaction)
Obtaining self-sufficiency, financial management and participation in social life and counseling and assistance for reintegration, placement of self-help groups	Reintegration to Normal Living Index, Instrumental Activities of Daily Living Scale (IADL)
Learning to continence training and transfer in activities of daily living	Miktions protocol, Diary, Barthel Index (BI), Instrumental Activities of Daily Living Scale (IADL)
Reduction of risk behavior (smoking alcohol abuse, overwork)	Life Habits Assessment (LIFE-H), Questionnaires
Positive influence of eating habits within the meaning of health promotion	Diet Protocol, Body Mass Index (BMI), Bioelectrical Impedance Analysis (BIA)
Vocational rehabilitation	Worker Role Interview, Valpar Component Work Samples (VCWS), COPM

Table 2. Rehabilitation goals and the evaluation instruments mostly used for patients with prostate cancer.

In patients with prostate cancer, fatigue, urinary incontinence, sexual dysfunction, impaired physical performance, psychological distress, weight gain, and changes in male body image are stated as the long-term sequelae of disease. Therefore, while considering general rehabilitation framework, special attention has to be given and specific methods must be used while making a treatment plan for patients with prostate cancer.

The evaluation for rehabilitation program of patients with prostate cancer for determining the individual rehabilitation needs can be identified after completion of the primary treatment of prostate cancer to verify the success of rehabilitation intervention [19]. During the follow-up treatment in patients who are taken directly from the acute care settings, the results of the current status of malignancy and PSA levels must be recorded in addition to the results of special rehabilitation evaluation tests, instruments, or interviews on the day of admission to check the rehabilitation capacity of patients with prostate cancer. Patients must be evaluated by functional and goal-oriented evaluation instruments in the somatic, psychosocial, and vocational rehabilitation and participation in daily living activities and public life with contextual factor areas; thus, the therapist can obtain a top-down view of these patients [20]. **Table 1** shows the impairment areas of functional health in prostate cancer which must be analyzed by rehabilitation therapists.

Evaluation tests for assessing body structure and functions, activity, and participation conducted at the beginning and end of rehabilitation to assess the level of achieving success in terms of the rehabilitation goals. **Table 2** shows the rehabilitation goals and the evaluation instruments which are mostly used by the therapists for patients with prostate cancer.

Cancer rehabilitation must include different therapies from different specialists to improve muscle strength and cardiopulmonary endurance, preserve energy for daily living activities, decrease stress, and especially decrease the effects of prostate cancer and its treatments. Physical therapy and occupational therapy specialists may be involved in the care of prostate cancer patients from the beginning of treatment to the end of a patient's life. They provide evidence-based interventions during inpatient care, outpatient follow-up, education, and services in home care and hospice care settings.

3. Physical therapy

Herein, it is important to remember that rehabilitation programs are driven for men with prostate cancer. Therefore, physical therapists should also be aware of the factors threatening men's health. These factors are stated as obesity, overweight, and bad habits (smoking and drug or alcohol abuse). Epidemics in many diseases are directly related to smoking, poor diet, excess alcohol consumption, and sedentary lifestyles [21]. For a man with prostate cancer and life-threatening habits, the rehabilitation program must also include preparation of a healthy life plan for him as well as his partner. Smoking and other substance abuse should be avoided and such patients can be referred to psychotherapy or cognitive behavioral therapy to redesign their lifestyle. A coordinated plan of rehabilitation team aiming at a healthy diet and lifestyle can lead to good recovery after cancer diagnosis. The main role of physical therapy is to inhibit sedentary behavior and maintain adequate exercise for patients with prostate cancer.

3.1. Muscle strength and loss of bone mineral density

Prostate cancer and its treatments can cause inactivity and disuse syndrome which must be avoided, while fitness and active lifestyles should be encouraged [16]. It is important to preserve and restore function through exercise as exercise has several, evident positive effects on patients with cancer. Graded exercise has been suggested as a treatment strategy for cancer-related fatigue that has the strongest evidence [22]. Aerobic exercise has been found to have effects on not only fatigue but also psychological well-being, QOL, physical performance, and weight control [16, 22, 23]. Improvements in the sense of personal worth, self-esteem, self-image, and confidence have also been stated as good results of exercise. Therefore, exercise improves the positive mood of people and decreases negative moods such as depression and anxiety [16, 22–24]. Some studies also stated the reduced risk of disease recurrence [22–24].

It is stated that aerobic exercise is helpful if it is given in low to moderate intensity (50–70 heart rate%), starting from 15 minutes to 30 minutes duration 3–5 times a week in a progressive way. The current exercise guidelines indicate that cancer survivors should achieve 150-min aerobic exercise per week and resistance (strength) training twice weekly [24, 25]. Most importantly, exercise needs to become a habit. Patients can be encouraged to start exercise with a short duration (15 min a day, several times a week) and then shape the pattern. Electronic monitoring bracelets can be helpful while following this pattern [21]. The patient can also control himself via this bracelet.

Berglund offered a physical training program for men with prostate cancer for an hour lasting for 7 weeks. This training started with light physical training, breathing exercises, and relaxation, and then included exercises of the pelvic floor [26]. The participants stated the benefit of this exercise program. The physical therapist should prepare a patient-specific aerobic exercise plan. Strengthening and endurance exercises should be performed in addition to aerobic training to improve participation in the activities of daily living [16]. Pelvic floor exercises must be added to physical therapy program for prostate cancer patients. These exercises will be mentioned during the management of urinary incontinence.

3.2. Incontinence

Urinary incontinence is common in patients with prostate cancer who underwent surgery or radiation therapy. Stress incontinence characterized with loss of urine with a cough, sneeze, or laugh is the most common type of urine leakage after prostate surgery, while the need to frequently urinate with episodes of leakage is the most common type seen after radiation therapy [27]. The treatments are as follows:

- a. *Pelvic floor exercises:* Pelvic floor muscle training was found to be evident in speeding the recovery of continence [27, 28]. Recovery of normal urinary control after surgery normally takes 1 or 2 years. Pelvic-floor reeducation should be used for treating incontinence effectively [16]. First, it is important to train men to control their ability to hold in their urine. For this purpose, men are instructed on the identification and function of the pelvic floor muscles. Training men prior to prostate surgery can help men use their muscles more actively following surgery [27]. Kegel exercises are taught to men to strengthen the pelvic

floor muscles. These exercises consist of repeated, high-intensity contractions of the muscles. Similar to providing training, introducing the exercises before surgery is also very beneficial. If possible, the patient is advised to start exercises before the medical treatment. Pelvic floor exercises can be combined with biofeedback programs. In a study, the authors showed positive results on incontinence after a single session of biofeedback-assisted behavioral training. The use of biofeedback may improve a man's ability to isolate the pelvic floor muscle and differentiate between muscle contraction and relaxation [29, 30].

- b. *Supportive care, behavioral therapy:* This treatment includes behavior modification to prevent urine leakage. Men are advised to drink fewer fluids, avoid caffeine, alcohol, or spicy foods, and limit drink before bedtime. Patients must be encouraged to urinate regularly and not wait until the last moment possible. Conservative behavioral treatments by changing patients' behavior or environment or by teaching new skills can make improvements in symptoms [31].
- c. *Neuromuscular electrical stimulation:* Stimulation can be used to retrain and strengthen weak urinary muscles and improve bladder control. A probe is inserted into the anus and a current is passed through the probe at a level below the pain threshold, causing a contraction. The patient is instructed to squeeze the muscles when the current is on. After the contraction, the current is switched off [28, 30].

3.3. Fatigue management

Most cancer patients experience fatigue and loss of energy. This severe and activity-limiting symptom is also common among patients with prostate cancer. Fatigue is mostly related with cancer treatment [16, 31]; however, it may also be present after or before treatment due to cancer [32, 33]. From our experience, in the presence of fatigue, patients, their relatives, and even some professionals suggest to rest and slow down activities. During the day time, many patients sleep a lot and cannot sleep well at night. Prolonged rest and inactivity induces muscular catabolism and the time of being fatigue increases [16]. Therefore, cancer patients suffering from primary fatigue should not be advised to increase the amount of daily rest. As we have mentioned earlier, exercise has a positive effect on fatigue. Therefore, patients should not be advised to rest more but carry out aerobic exercise [34]. It is supported that an 8-week cardiovascular exercise program in patients with localized prostate cancer undergoing radiotherapy improved the overall QOL and helped prevent fatigue [31].

Occupational therapists follow other strategies in terms of physical, psychological, cognitive, and social dimensions of fatigue. Graded activity and diversional should be planned in the manner of giving exercise [33]. Other interventions to reduce the degree of fatigue are stress management, nutritional management, and energy conservation techniques [16]. During energy conservation, patients should be taught to spread out activities through the use of timetables, organize activities to the energy level required, ensure breaks during activities, and use adaptive devices [33]. Providing good rest/sleep patterns, teaching structured sleep is also an important role of a therapist [16]. The patient should be recommended to maintain a

schedule of sleeping and waking times, avoid sleeping constantly during day time, open curtains in the morning, and avoid doing things that can affect night sleep [33]. Therapists should remember that fatigue is an important symptom of cancer and help their patients to manage this symptom.

3.4. Lymphedema management

Lymphedema can be observed in patients with prostate cancer as a result of radiation damage or following the removal of lymph nodes during surgery. It is characterized with the collection of fluids in the lower extremities, and compression therapy helps the fluid to move and reduce swelling which can help the patient move easily and comfortably [34, 35].

Both occupational and physical therapists may decide the kind of compression therapy and the effective manual techniques for patients with prostate cancer. Elevation, exercise, and using custom-fitted compression wear can help increase the lymph flow in the early stages of lymphedema. Compression wears are worn continuously throughout the day and removed at night. They are reapplied as soon as the patient awakens in the early morning. Additionally; to drain the lymph from the extremity pneumatic pump compression which provides sequential, active compression can be used in the home [34, 35]. For severe edema, compression bandaging after manual lymphatic drainage using light massage (complete decongestive therapy) can be effective. Manual massage can help collateral lymph vessels to milk the lymphedema. To determine the effectiveness of the treatment, the size of the extremity always must be monitored by the therapist [36–38].

3.5. Peripheral neuropathy

Peripheral neuropathy is one of the side effects of chemotherapy. It is characterized with tingling, burning, or shooting pain sensation of hands and feet depending on nerve damage. Patients with prostate cancer may also experience loss of sensation which can cause problems on somatosensory perception, finger movements and grasping problems, balance problems, tripping, and/or decreased reflexes. Physical and occupational therapy can help the patients with prostate cancer to improve coordination, balance and gait, fine motor skills, and dexterity. The primary aim of treating peripheral neuropathy is to decrease the risk of falling and injuries [39].

3.6. Scar tissue management

Radiation therapy can cause scar tissue which may increase pain and decrease the flexibility of the skin. Physical therapists can use manual therapy and tissue techniques for stretching and tissue and nerve mobilization to decrease pain and increase the tissue mobility of the patients with prostate cancer [39].

3.7. Early ambulation

If patients underwent surgery, early postoperative ambulation and improving physical functions is the main goal of physical therapy [22]. During chemotherapy, physical strength

tends to diminish; hence, rehabilitation aims to encourage ambulation consistent with the patient’s condition even during chemotherapy and prevent disuse syndrome and maintain physical and muscle strength by performing early ambulation [24, 26].

4. Occupational therapy

Occupational therapy (OT) offers a client-centered approach to patients with prostate cancer. OT clinical reasoning assessments and interventions focus on functioning and participation by rehabilitating the abilities of the patients with prostate cancer. Therapists guide goal-directed activities that give meaning to the patient’s life [40]. According to the ICF, the affected performance areas of prostate cancer on which OT focuses are shown in **Table 3**.

ICF		
Body structure/body function	Impairment	Activity Participation
Prostate	Sensory	Basic ADL* Instrumental ADL*
	Cognitive	Loss of ability to participate in activities (self-care, sport, and leisure)
	Psychological	Loss of occupational roles: work/ family
	Motor	Inability to be independently involved in daily occupations

*ADL = Activities of Daily Living.

Table 3. Affected performance areas and occupational therapy focus in patients with prostate cancer.

As shown in **Table 3**, OT mainly focuses on activity and participation limitations in the rehabilitation phase. Patients with prostate cancer generally require activity education, sensory training breathing and relaxation education, stress management education, sensory stimuli and praxis skills, cognitive therapy, erectile dysfunction and sexual rehabilitation, cognitive therapy, vocational rehabilitation, patient education and counseling, and also rehabilitation during palliative care and supportive care to engage in activities independently.

4.1. Daily living activities education

Reasons of limitation of activity are both dysmotility and muscle weakness. Activity limitation interventions are important for improving the activity performance of patients with cancer. The occupational therapist describes and measures activity performance necessitated to be carried out by patients with prostate cancer. After the activity for individual needs is identified, intervention strategies may be determined. The practitioner must determine the appropriate intervention approach for each patient. These strategies are divided into four parts: restoration, compensation, environmental modification, and education of patient [41].

4.1.1. Restoration

Patients have many different activities related to their roles. It is important to determine the most important activities for their life. The focus of the restorative approach is to develop patient skills and abilities or restore the activity performance of the patient with prostate cancer. A restorative approach is planned specifically to the situation of the patient. In this stage, grading of the activity level can be done. Grading can be done according to the following parameters:

- *Physical assistance:* If the patient with prostate cancer is in need of help, practitioner or caregiver can provide assistance. In this way, patients' skill to complete task may be increased. The presence of some symptoms such as fatigue or pain can cause the patient with prostate cancer to take physical support. This support does not mean that caregiver do all of the tasks instead of the patient.
- *Supervision and cuing:* This involves a number and types of cues. For example, if the patient forgets some tasks of activity due to cognitive impairment, patient can be supported by verbal, tactile, and written material cues to help the patient with cancer finalize the activity.
- *Activity demands:* The activity can be changed due to complexity of performance skills. Generally, for patients with prostate cancer, it will be better to select an activity with low-motor and high-cognitive demands by the reason of symptoms. In activity education, the motor and cognitive demands of the activity can be increased step by step.
- *Sequencing of activity:* Activity is divided in order of priority and sequence. The number of steps in tasks and the total number of steps can be purposed to increase. Thus, patient with prostate cancer can complete the activity easily without fatigue or pain.
- *Type of activity:* During activity education, activities can be graded from familiar to unfamiliar or from former to new. This method can help the patient with prostate cancer feel more comfortable during activity education.
- *Environment:* Activity environment can affect participation in the activities. For instance, patients with prostate cancer may have urinary incontinence. Therefore, patients may need to use toilet frequently. This situation can affect men in a negative way. To avoid negative symptoms such as stress or unhappiness, patients may limit themselves to only familiar environments to find a toilet. In intervention programs, the activity can be graded from a familiar to unfamiliar environment.

4.1.2. Compensation

The compensation approach focuses on using the patients' skills to achieve the highest possible stage of functioning in the activities. Therapists may teach the patients with prostate cancer new methods for modifying task performance to compensate for deficient areas of occupation, performance, and individual factors. If the patients still require help for participation in new activities, the occupational therapist should also give some advice regarding the use of adapted techniques or equipment. Patients with prostate cancer may need to use some assisted technology devices such as activity facilitator or computer-aided software to perform the

activities. These instruments can help decrease symptoms (i.e., fatigue and pain) of cancer and increase participation in the activities of patients.

4.1.3. Environmental modification

Environmental modifications consist of compensation, modification, and adaptation strategy. The compensation approach directly influences patient functioning. However, environmental modification approach influences patients' functioning indirectly. Patients with prostate cancer will need help for home or work environment. Occupational therapists should give advice to redesign the home or work environment of the patient with prostate cancer where the patients can participate in activity easier than before. Modifications can include low-cost and easily accessible strategies to improve participation in domestic and community activities. Patients can also have problems in a social environment. They might not want to participate in social activities owing to general reluctance to do any activities. Besides, they may be exposed to stigma and pity from other people. For these reasons, occupational therapists must consider both physical and social aspects. Daily living activity education needs to be holistic and must integrate the activity, environment, and the patient with prostate cancer. Using occupation-based activity, education improves participation and supports wellness and QOL of patients with prostate cancer.

4.2. Sensory training

Treatment modalities such as surgery (e.g., radical prostatectomy), androgen deprivation therapy, radiation therapy, and chemotherapy affect the sensory–neural ways in body. After treatment, some deficiencies can occur in sensory skills. In particular, body composition may be affected if patients receive ADT. The generally observed side effects such as fatigue and pain might negatively affect patient body. Literature evidence demonstrates that sensory training is an important part of intervention program in patients with prostate cancer [42]. The purpose of sensory training is to develop body image by increasing body awareness. The body awareness includes these trainings and sensory stimuli, breathing, and relaxation techniques.

4.3. Breathing and relaxation education

Cancer and its treatment can be stressful for patients with prostate cancer and their partners and caregivers. Relaxation techniques and other body/mind practices can help calm the patient's mind, reduce stress, and sharpen the ability to focus to maintain inner peace. Some patients with prostate cancer use these techniques to help themselves relax while they wait for the results of treatments or tests. Breathing techniques include slow inhalation and exhalation to reduce tension in the shoulders, trunk, and abdomen. The process begins with focusing on normal breathing in a quiet and comfortable place when the patients feel stressful. Patients should perform deep inhalation and slow exhalation. During this phase, the abdominal muscles should be relaxed during inhalation; the abdominal muscles should be contracted during exhalation [41]. Relaxation techniques involve teaching the patient with prostate cancer to cope with stress which results in deficiency of body composition. During relaxation education, the patient with prostate cancer is instructed to contract and relax his major skeletal

muscles systematically and then asked to repeat phases silently and finally asked to use purposeful images to achieve the goals [41]. OT practitioners have a core role in providing therapeutic activities that enable the patients with sensory problems to develop body imagination in occupational performance.

4.4. Stress management

Occupational therapists help patients with prostate cancer to acknowledge, express, accept, and use problem-solving techniques to address the changes that result from prostate cancer and its treatments. Effective stress management can include relaxation training, education, a supportive environment, social support, and participation in daily living activities. It is supported that these interventions can help decrease the treatment-related symptoms, the physiological accompaniments of stress, and improve mood of the patient with prostate cancer. Patients who participate in such rehabilitation programs are shown to control and experience reduced interpersonal conflicts and distress related to cancer-related intrusive thinking and have improved mental health [5].

4.5. Sensory stimuli

The patients involve in many activities which include various sensory stimuli. The basic activities involve tactile and proprioceptive inputs. Occupational therapists impart sensory training to patients with prostate cancer and also suggest somatosensory perception activities that involve tactile and proprioceptive inputs especially after chemotherapy or hormonal therapy. Patients use these senses during routines of activity in daily life. In addition, mirror activities and visual perception skills must be added to intervention programs to promote sensory perception, harmony with the environment, and the body imagination of patients with prostate cancer [43–45].

4.6. Cognitive therapy

Cognitive therapy approach was generally used in patients with mental health problems. However, patients with prostate cancer may have some deficiencies in cognitive skills owing to cancer and its treatments [16]. OT intervention should focus on cognitive skills and activity function, and it includes orientation, memory, attention, motor planning, and executive functions of the patient with prostate cancer [44, 45].

Orientation is the ability to understand the self and the relationship between self and past-present environment time. After receiving the cancer treatments, patients might have orientation problems about place or time. In the intervention, verbal and external cues are used as reminders and therapy advances by changing numbers and types of cues [46]. *Memory* is described in terms of sensory memory, working or immediate memory, and long-term memory. If there are any problems on these types of memory, patients' tasks may be affected. Occupational therapists evaluate and improve memory abilities. They may also advise to use verbal, visual, and external cues for activity independently [46]. *Attention* is a multidimension that includes five components: sustained attention (concentration), selective attention, divided

attention, alternating attention, and shifting of attention. Patients may have problems pertaining to not only each component of attention but also several components of attention [46]. The occupational therapist provides examples of basic and complex tasks for each component of attention. *Motor planning or praxis* is the ability of individuals to point at how to get their body to do what they want it to do. Motor planning involves the cognitive skills of intending to move, selecting a goal, planning the movement, and anticipating the end result. Impaired motor planning is disabling in cancer patients so that they may not be able to initiate or follow through on tasks [46]. The occupational therapist may give information about the functional properties of an activity. Besides, they might inform about conceptual errors related to creating the idea of the movement, involving object usage information, and sequencing of activity. When evaluating or treating patients with prostate cancer for motor planning abilities, it is important to identify the patients' activities. A series of cues (visual, verbal, or tactile) may be used if the patient experiences difficulty in performing an activity demand in the OT [46]. *Executive functions* consist of organization, problem-solving, and coping skills. It may significantly influence performance of activities of daily living. Occupational therapist using a dynamic interactional approach to the intervention of executive functions and organizational, problem-solving, and coping skills would focus on self-awareness and ability to perform new, unexpected or routine tasks [46]. In conclusion, cognitive impairments can be seen, caused either by cancer or its treatments in patients with prostate cancer. Hence, cognitive skills of prostate cancer patients should not be ignored.

4.7. Erectile dysfunction and sexual rehabilitation

Rehabilitation approach to erectile dysfunction is focused on pelvic floor muscle training and the muscle strength at the base of the penis. After the initial examination and determining an intervention plan, the physical therapist may guide the patient to perform specific pelvic floor muscle exercises and indirectly related muscles such as abdominal and gluteal muscles. These exercises help increase oxygen supply to the tissues. Vacuum therapy can also be used to generate negative pressure that increases the blood flow to the penis [47].

Sexual rehabilitation is one of the most important components of rehabilitation of patients with prostate cancer and significantly related to quality of life. Men with prostate cancer are more stressed about sexual dysfunction if they are younger. Both younger and older men are in need of physical, social, emotional, and psychological treatment assistance for this issue [28].



Figure 1. Safe and less fatigue sex positions for patients with prostate cancer.

Sexuality is an intimate issue and occupational therapy practitioners can examine both societal attitudes toward patients with prostate cancer and their own beliefs, values, and attitudes

about sexuality. Patients can be emotionally vulnerable and recessive. The occupational therapists may provide information about the sexual rehabilitation. Rehabilitation should consists of an interdisciplinary team including nurses, physiotherapists, occupational therapists, social workers, sexologists, dieticians, massage therapists and psychologists. Die Perink et al. had conducted a rehabilitation program, with a 4-day course developed based on the experience with rehabilitation of more than 7000 cancer survivors, included physical activity, pelvic floor exercises, couples massage and relaxation, diet, and education of sexuality. They advise to practice sexual rehabilitation about sexual dysfunction [28]. Occupational therapists may give physically advice not only patients, but also partners regarding favorable sex positions (**Figure 1**). These positions can be more comfortable and safe for men. Thus, the occurrence of symptoms such as fatigue and pain will be reduced with occupational therapy intervention. Patients with prostate cancer will thus have normal sexual function. The patients and their partners should be informed about social support. It has many dimensions, including emotional, material assistance, and information. The occupational therapist should give lifestyle advice to patients for applying to their daily life. Thus, the patients and their partners will be improved.

4.8. Vocational Rehabilitation

Long survival with good quality of life make the patient with prostate cancer to think about returning to work after prostate cancer treatment and also 6 months after the radical prostatectomy surgery, men can return to their work. This may be a big positive step for men, and men might look forward to re-establishing his usual routine and it is understandable if they feel anxious or worried. But from a view of occupational therapy, having a return-to-work plan can help the patient to make the transition easier. Most of the mentally and physically healthy prostate cancer survivors do not require a job change, while others need some adjustments such as reduced working hours, modified duties, trying to do similar jobs, making self to do lists with time use with fatigue management, or the use of assistive technology. An occupational therapist can help the man determine if he is ready to go back to work, identify accommodations that will help him do his job, and help him get training or seek new employment if needed. In addition, improving self-management skills of prostate cancer survival helps him identify his needs and borders which can help him prepare for independent daily life and social reinteraction [48].

4.9. Patient education and counseling

Patient, partner, family, and caregiver education are an important part of occupational therapy because nearly all of the approaches (restoration, compensation, environmental modification, etc.) involve learning new strategies and combining these strategies into persons' lifestyles. Education contains information about prostate cancer; symptoms create and raise awareness about management skills. At the same time, an occupational therapist can use various materials such as demonstration, written format, pictures, and videotapes to help the patient and family participate in their activities. In addition to general education, it is supported that the main education resource of the patient with prostate cancer is internet but this way may not be

helpful for psychosocial healing of the patient with prostate cancer or the survivor. Hence, in recent studies, new education programs were designed such as “Between men,” which offers group online therapy sessions and education. The aims of these programs were to give the patients all the available information about prostate cancer, treatment, side effects, and how to deal with the side effects. Program planned once a week for 7 weeks and it included patients’ experiences and reactions, patients’ communication difficulties especially sexual and emotional effects, prostate cancer disease and treatments, incontinence, sexuality, importance, and problem solving. Online education programs must be improved and generalized for patients and survivors with prostate cancer [5, 49].

5. Rehabilitation in palliative care and hospice care

In palliative and hospice care, both physical and occupational therapists support men with prostate cancer by minimizing the secondary symptoms related to cancer and its treatments. The role of the occupational therapist and physical therapist in palliative and hospice care is quite similar and important.

At the end of life, physical therapy offers functional training, therapeutic exercise, and soft tissue mobilization. The goals of physical therapy are to improve overall strength, range of motion, and endurance of the patient with prostate cancer. Physical therapists may use heat, cold, and TENS (transcutaneous electrical nerve stimulation) for pain relief and design exercises that improve endurance and positioning regimens that help the patient maintain functional range of motion [50, 51].

In this stage, occupational therapists identify the roles and activities which are meaningful to the patient with prostate cancer and try to present the barriers that limit their performance. Occupational therapists support the patient both for physical and psychosocial/behavioral health requirements and pay close attention to what is most important for the patient. They look at the available activity and environmental resources to increase patient participation. The main goal of occupational therapy is to improve the quality of life according to patients’ values and maximize residual functional abilities [50].

6. Conclusion

Patients with prostate cancer can face problems about body structure and functions, activity, and participation which may limit their participation to life. Patients with prostate cancer require skilled rehabilitation and supportive care from the initial process of diagnosis through clinical reasoning and treatment to posttreatment periods. Qualified interdisciplinary rehabilitation interventions may help men regain their performance and independency and maintain the highest quality of life.

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References

- [1] Cheville AL. Cancer rehabilitation. *Semin Oncol.* 2005; 32 (2): 219–224. DOI:10.1053/j.seminoncol.2004.11.009
- [2] Jemal A, Bray F, Center MM, Ferlay J, Ward E, Forman D. Global cancer statistics. *CA Cancer J Clin.* 2011; 61: 69–90. DOI: 10.3322/caac.20107.
- [3] Bray F, Lortet-Tieulent J, Ferlay J, Forman D, Auvinen A. Prostate cancer incidence and mortality trends in 37 European countries: an overview. *Eur J Cancer.* 2010; 46 (17): 3040–3052. DOI:10.1016/j.ejca.2010.09.013
- [4] Heidenreich A, Bastian PJ, Bellmunt J, Bolla M, Joniau S, Kwaast TV. EAU guidelines on prostate cancer. Part 1: screening, diagnosis, and treatment of clinically localised disease. *Eur Urol.* 2011; 59: 61–71. DOI: 10.1016/j.eururo.2013.09.046
- [5] Huri M, Huri E, Kayihan H, Altuntas O. Effects of occupational therapy on quality of life of patients with metastatic prostate cancer: a randomized controlled study. *Saudi Med J.* 2015; 36 (38): 954–61. DOI: 10.15537/smj.2015.8.11461
- [6] Keogh J W, Patel A, MacLeod RD, Masters J. Perceived barriers and facilitators to physical activity in men with prostate cancer: possible influence of androgen deprivation therapy. *Eur J Cancer Care.* 2014; 23 (2): 263–273. DOI: 10.1111/ecc.12141.
- [7] Friedenreich C, Kopciuk K, Wang Q, McGregor S, Angyalfi S, Courneya K. Pre-and post-diagnosis physical activity and survival after prostate cancer. *J Sci Med Sport.* 2012; 15: 334–335.
- [8] Baumann FT, Zopf EM, Bloch W. Clinical exercise interventions in prostate cancer patients—A systematic review of randomized controlled trials. *Supp Care Cancer.* 2012; 20 (2): 221–233. DOI 10.1007/s00520-011-1271-0
- [9] Silver JK, Gilchrist LS. Cancer rehabilitation with a focus on evidence-based outpatient physical and occupational therapy interventions. *Am J Phys Med Rehabil.* 2011; 90 (5): 5–15.
- [10] Knoll N, Wiedemann AU, Schultze M, Schrader M, Heckhausen J. Prostate cancer patients gradually advance goals for rehabilitation after radical prostatectomy:

- applying a lines-of-defense model to rehabilitation. *Psychol Aging*. 2014; 29 (4): 787. DOI: 10.1037/a0038311.
- [11] Chasen M, Jacobsen PB. Rehabilitation in cancer. In: Olver IN, editor. *The MASCC Textbook of Cancer Supportive Care and Survivorship*. New York: Springer; 2011. P. 389–396.
- [12] Dalton SO, Johansen C. New paradigms in planning cancer rehabilitation and survivorship. *Acta Oncol*. 2013; 52 (2): 191–194. DOI:10.3109/0284186X.2012.748216
- [13] Egan MY, McEwen S, Sikora L, Chasen M, Fitch M, Eldred S. Rehabilitation following cancer treatment. *Disabil Rehabil*. 2013; 35(26): 2245–2258. DOI: 10.3109/09638288.2013.774441
- [14] Weis J, Giesler JM. Rehabilitation for cancer patients. In: Goerling U, editor. *Psycho-Oncology*. Berlin Heidelberg: Springer; 2014; 87–101.
- [15] Holm LV, Hansen DG, Kragstrup J, Johansen C, dePont Christensen R, Vedsted P. Influence of comorbidity on cancer patients' rehabilitation needs, participation in rehabilitation activities and unmet needs: a population-based cohort study. *Supp Care Cancer*. 2014; 22(8): 2095–2105.
- [16] Fialka-Moser V, Crevenna R, Korpan M, Quittan M. Cancer rehabilitation particularly with aspects on physical impairments. *J Rehabil Med*. 2003; 35: 153–162. DOI 10.1080/16501970310000511
- [17] DeLisa JA. A history of cancer rehabilitation. *Cancer*. 2001; 92(4): 970–974. DOI: 10.1002/1097-0142
- [18] Dietz JJ. Adaptive rehabilitation in cancer. *Postgrad Med*. 1980; 68: 145–153.
- [19] Ture M, Barth J, Angst F, Aeschlimann A, Schnyder U, Zerkiebel N. Use of inpatient rehabilitation for cancer patients in Switzerland: who undergoes cancer rehabilitation? *Swiss Med Wkly*. 2014; 145: 14214. DOI:10.4414/smw.2015.14214
- [20] Lehmann C, Beierlein V, Hagen-Aukamp C, Kerschgens C, Rhee M, Frühauf S. Psychosocial predictors of utilization of medical rehabilitation services among prostate cancer patients. *Die Rehabil*. 2012; 51 (3): 160–170. DOI: 10.4414/smw.2015.14214
- [21] Pelman RS, Elterman DS. Lifestyle and disease, male health and risks. *Rev Med Clin Condes*. 2014; 25(1): 25–29. DOI:10.1016/S0716-8640(14)70006-9
- [22] Shin KY, Guo Y, Konzen B, Fu J, Yadav R, Bruera E. Inpatient cancer rehabilitation: the experience of a national comprehensive cancer center. *Am J Phys Med Rehabil*. 2011; 90 (5): 63–S68. DOI: 10.1097/PHM.0b013e31820be1a4
- [23] Bourke L, Homer KE, Thaha MA, Steed L, Rosario DJ, Robb KA. Interventions to improve exercise behaviour in sedentary people living with and beyond cancer: a systematic review. *Br J Cancer*. 2014; 110: 831–841. DOI: 10.1038/bjc.2013

- [24] Bourke L, Sohanpal R, Nanton V, Crank H, Rosario DJ, Saxton JM. A qualitative study evaluating experiences of a lifestyle intervention in men with prostate cancer undergoing androgen suppression therapy. *Trials*. 2012; 13: 208. DOI: 10.1186/1745-6215-13-208
- [25] Hunter EG, Baltisberger J. Functional outcomes by age for inpatient cancer rehabilitation: a retrospective chart review. *J Appl Gerontol*. 2013; 32(4): 443–456. DOI: 10.1177/0733464811432632
- [26] Berglund G, Petersson LM, Eriksson KRN, Häggman M. “Between men”: patient perceptions and priorities in a rehabilitation program for men with prostate cancer. *Patient Educ Counsel*. 2003; 49 (3):285–292. DOI:10.1016/S0738-3991(02)00186-6
- [27] Newman DK, Guzzo T, Lee D, Jayadevappa R. An evidence-based strategy for the conservative management of the male patient with incontinence. *Curr Opin Urol*. 2014; 24: 553–559. DOI:10.1097/MOU.0000000000000115
- [28] Dieperink KB, Mark K, Mikkelsen TB. Marital rehabilitation after prostate cancer – a matter of intimacy. *Int J Urol Nurs*. 2016; 10 (1): 21–29. DOI: 10.1111/ijun.12091
- [29] Mina DS, Au D, Alibhai SMH, Jamnicky L, Faghani N, Hilton WJ. A pilot randomized trial of conventional versus advanced pelvic floor exercises to treat urinary incontinence after radical prostatectomy: a study protocol. *BMC Urol*. 2015; 15: 94. DOI 10.1186/s12894-015-0088-4
- [30] Wang W, Huang QM, Liu FP, Mao Q. Effectiveness of preoperative pelvic floor muscle training for urinary incontinence after radical prostatectomy: a meta-analysis. *BMC Urol*. 2014; 14: 99. DOI: 10.1186/1471-2490-14-99
- [31] Donna B, Greenberg MD, Jennifer L, Gray BA, Catherine M, Mannix RN. Treatment-related fatigue and serum interleukin-1 levels in patients during external beam irradiation for prostate cancer. *J Pain Sympt Manage*. 1993; 8 (4): 196–200. DOI: 10.1016/0885-3924(93)90127-H
- [32] Monga U, Garber SL, Thornby J, Vallbona C, Kerrigan AJ, Monga TN. Exercise prevents fatigue and improves quality of life in prostate cancer patients undergoing radiotherapy. *Arch Phys Med Rehabil*. 2007; 88(11): 1416–22. DOI: 10.1016/j.apmr.2007.08.110
- [33] Cooper J. Occupational therapy in oncology and palliative care. In: Lowrie D. *Occupational Therapy and Cancer Related Fatigue*. John Wiley Sons, 2006.
- [34] Courneya KS, Keats MR, Turner AR. Physical exercise and quality of life in cancer patients following high dose chemotherapy and autologous bone marrow transplantation. *Psychooncology*. 2000; 9: 127–136. DOI:10.1002/(SICI)1099-1611
- [35] Wollin DA, Makarov D. Extended pelvic lymph node dissection for prostate cancer: do more nodes mean better survival? *Oncology*. 2014; 8 (7): 601–601.
- [36] Rasmusson E, Kjellén E, Blom R, Björk-Eriksson T, Nilsson P, Gunnlaugsson A. EP-1081: low rate of lymphedema after pelvic lymphadenectomy followed by pelvic

irradiation of node positive prostate cancer. *Radiother Oncol.* 2013; 106 (2): 410. DOI: 10.1016/S0167-8140(15)33387-9

- [37] Shaitelman SF, Cromwell KD, Rasmussen JC, Stout NL, Armer JM, Lasinski BB. Recent progress in the treatment and prevention of cancer-related lymphedema. *Cancer J Clin.* 2015; 65 (1): 55–81. DOI: 10.3322/caac.21253
- [38] Preston, NJ, Seers, K, Mortimer, PS. Physical therapies for reducing and controlling lymphoedema of the limbs. *Cochrane Database Syst Rev*, 2004; 4.
- [39] Choi, M, Craft, B, Geraci, SA. Surveillance and monitoring of adult cancer survivors. *Am J Med.* 2011; 124 (7): 598-601.
- [40] Burhardt A. Oncology. In: Pendleton HM, Schultz-Krohn W, editors. *Pedretti's Occupational Therapy Practice Skills for Physical Dysfunction*. 6th ed. USA: Elsevier; 2006; 1157–1168.
- [41] Pergolotti M, Deal AM, Williams GR, Bryant AL, Reeve BB, Muss HB. A randomized controlled trial of outpatient Cancer REhabilitation for older adults: the CARE Program. *Contemporary Clinical Trials.* 2015; 44: 89–94. DOI:10.1016/j.cct.2015.07.021
- [42] Keogh JWL, MacLeod RD. Body composition, physical fitness, functional performance, quality of life, and fatigue benefits of exercise for prostate cancer patients: a systematic review. *J Pain Sympt Manage.* 2012; 43 (1): 96–110. DOI: 10.1016/j.jpainsymman.2011.03.006
- [43] Rhodes VA, McDaniel RW, Hanson B, Markway E, Johnson M. Sensory perception of patients on selected antineoplastic chemotherapy protocols. *Cancer Nurs.* 1994; 17 (1): 45–51.
- [44] Dolhi C, Leibold ML, Schreiber J. Interventions to improve personal skills and abilities, sensorimotor techniques. In: Crepeau EB, Cohn ES, Schell BAB, editors. *Willard and Spackman's Occupational Therapy*. 1st ed. Baltimore: Lippincott Williams and Wilkins; 2003. 595–606.
- [45] Waylett-Rendall J. Interventions to improve personal skills and abilities, sensory reeducation. In: Crepeau EB, Cohn ES, Schell BAB, editors. *Willard and Spackman's Occupational Therapy*. 1st ed. Baltimore: Lippincott Williams & Wilkins; 2003. 579–580.
- [46] Giles GM. Learning perspectives, cognitive therapy. In: Crepeau EB, Cohn ES, Schell BAB, editors. *Willard & Spackman's Occupational Therapy*. 1st ed. Baltimore: Lippincott Williams and Wilkins; 2003. 259–260.
- [47] Bernardo-Filho M, Barbosa ML, da Cunha Sá-Caputo D, de Oliveira Guedes E, Pacheco Carvalho de Lima R. The relevance of the procedures related to physiotherapy in interventions in patients with prostate cancer: short review with practice approach. *Int J Biomed Sci.* 2014; 10 (2): 73–84.

- [48] Tamminga SJ, De Boer AGEM, Verbeek JHAM, Frings-Dresen MHW. Return-to-work interventions integrated into cancer care: a systematic review. *Occup Environ Med.* 2010; 67 (9): 639–648. DOI:10.1136/oem.2009.050070
- [49] Klemm P, Bunnell D, Cullen M, Soneji R, Gibbons P, Holecek A. Online cancer support groups: a review of the research literature. *Comp Inform Nurs.* 2003; 21 (3): 136–142. DOI: 10.1097/00024665-200305000-00010
- [50] Prochnau C, Liu L, Boman, J. (2003). Personal–professional connections in palliative care occupational therapy. *Am J Occup Ther.* 2003; 57 (2): 196–204.
- [51] Kealey P, McIntyre, I. An evaluation of the domiciliary occupational therapy service in palliative cancer care in a community trust: a patient and carers perspective. *Eur J Cancer Care.* 2005; 14(3): 232–243.