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Review Article

Physical Medicine and Rehabilitation in the Oncological Patient

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Abstract

Cancer has become a chronic disease, in part due to advances in medical care, its early detection, the existence of a wide range of therapeutic options, and better general medical management. Physical medicine and rehabilitation can contribute to the treatment of cancer patients since rehabilitation helps to expand health action to the care of the quality of life and function of those patients who have suffered the consequences of cancer or its treatment and the associated disability.

Introduction

Traditionally, rehabilitation has been postponed for this population for different reasons, either because it was considered that these patients did not survive long enough to justify the investment of resources for rehabilitation, because greater importance was given to the discovery of a cure for cancer and its prevention and early detection, because of the lack of adequate education of oncologists about the importance of the rehabilitation of their patients, or in the rehabilitation profession in terms of giving greater space to the rehabilitation of the cancer patient in the training of the resident doctor [1,2].

There is a point of contact between the philosophies that underlie rehabilitation the concept of the good to die. Rehabilitation and palliative care show many common characteristics and goals when it comes to contemplating the need to improve quality of life by minimizing impairment of function as much as possible, working in a multidisciplinary team, and including the patient and family in treatment planning." Thinking about death or disability makes us fairer even if we are healthy, because it is an act of humility that classical medicine had forgotten."

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"It must be recognized that the habilitation of the terminal patient until the end of his days as the rehabilitation of the disabled, arises from a modern proposal based on a greater solidarity present."

Problems of More Frequent Presentation That May Require Rehabilitation in Cancer Patients. Cancer patients have several physical medical problems that occur in all types of tumors and especially in those of the Central Nervous System (CNS) breast, lung or head and neck occur in more than 70% of cases.

A high percentage have psychological problems that require assistance. However, we found a wide gap between the needs identified in this population and the rehabilitation provision they receive.

Among the problems that require treatment in cancer patients most often are the following:

- Pain
- Mobility and self-care problems
- Fatigue
- Weakness, asthenia.

Then there are other more specific problems depending on the type of tumor:

- Dyspnea
- Dysphagia
- Cognitive impairment, delirium
- Lymphedema
- Neuropathy
- Postoperative soft tissues or bones. (Especially amputations, mastectomy)

These are all situations where rehabilitation professionals can make a significant contribution. The rehabilitation physician educates, re-educates, and teaches the patient and family the compensations necessary to overcome the disability.

Not only can it provide supportive care, but it also gives expectations for the prevention and restoration of function based on the assessment and functional diagnosis it makes in each patient through functional assessment methods such as the Karnofsky performance status.

Table 1 provide indices that contribute to quantifying the clinical efficacy of rehabilitation interventions. All of this has an influence on the primary treatment of cancer. Several studies suggest that the biopsychosocial aspects of cancer are important for tumor survival and recurrence. Good symptomatic management is associated with good physical and mental functioning. [3,4]

The incidence by age has been decreasing for younger age groups and increasing for those over 55 years of age. 5-year survival has increased for most tumors. It is increasingly possible for the cancer patient to age and develop comorbidities and reduced tolerance to cancer treatment and for the rehabilitation physician to be consulted about their care, always in close communication with primary treating physicians and caregivers.

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Table 1

Karnofsky performance status

Condition	Percentage	Comments
A: Able to carry on normal activity and to work. No special care is needed.	100	Normal, no complaints, no evidence of disease.
	90	Able to carry on normal activity, minor signs or symptoms of disease.
	80	Normal activity with effort, some signs or symptoms of disease.
B: Unable to work. Able to live at home, care for most personal needs. A varying degree of assistance is needed.	70	Cares for self, unable to carry on normal activity or to do active work.
	60	Requires occasional assistance, but is able to care for most of his needs.
	50	Requires considerable assistance and frequent medical care.
C: Unable to care for self. Requires equivalent of institutional or hospital care. Disease may be progressing rapidly.	40	Disabled, requires special care and assistance. [In bed more than 50% of the time].
	30	Severely disabled, hospitalization is indicated although death not imminent. [Almost completely bedfast].
	20	Hospitalization necessary, very sick, active supportive treatment necessary. [Totally bedfast and requiring extensive nursing care by professionals and/or family].

Table 1: The unbracketed text is the original text of Karnofsky and Burchenal, 1949, while in square brackets [], the newly formulated KPS values 40%-10% of Abernethy et al., 2005, may be found.

Rehabilitation objectives in the cancer patient

As for the objectives of rehabilitation in this population with respect to others, they are basically the same with the exceptions inherent to the pathology of each one and the stage in which they are, being frequent variations in the time of treatment conditioned by the progress of the disease, complications or side effects of treatment with radiotherapy, chemotherapy or surgery that make it necessary to reevaluate the functional level of patients and frequently rethink the goals that must be achievable, and in the short term, always verifying that they coincide with the patient's wishes. Thus, it may be that at first the team's efforts are oriented to ambulation activities and activities of daily living independently, with the progress of the disease and an increasing disability may be in relation to the use of the wheelchair and techniques for self-care activities with assistance and at an advanced stage to the assistance of the immobilized or prostrate patient.

Although rehabilitation always has as its primary objective the complete restoration of function if this is not possible, the team will consider maintaining functional capacity by adapting to the clinical situation and the

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variable needs of the patient in each stage through which it transits.

Thus, we can classify the rehabilitation objectives in this population into four groups:

1. Preventive: Oriented to avoid through appropriate behaviors and anticipated treatment the complications of the oncological pathology or its treatment.
2. Restorers: They are proposed when the disability can be managed with a treatment that allows the patient to adapt to reduce the residual disability.
3. Support: When daily intervention treatment improves function, preserves the patient's ability to meet self-care needs, allows for a sense of self-worth despite progressive disease or sustained disability.
4. Palliatives: When used to anticipate the potential for malnutrition, delay bed rest problems with their accompanying loss of 3% of physical strength per day, manage respiratory, intestinal and bladder problems and limit joint retractions and pressure ulcers.

Basic principles of rehabilitation in the cancer patient

The rehabilitation techniques in oncology are the same as in the other rehabilitation patients [5,6]. However, some observations are imposed regarding the effects of oncological treatments and the approach required by this population, making it necessary to emphasize some basic principles, namely:

- Exercises are prescribed to maximize range of motion, endurance, and muscle strength, with the goal of improving independence and functionality and whenever possible, orthotics, prostheses, and adaptive equipment are used to help achieve these goals.
- Appropriate precautions to consider while providing treatment are an essential component of prescribing (risk of fractures and falls, cardiopulmonary risk, etc.)
- Terminally ill patients typically do not tolerate long periods of exertion and therefore the treatment team should incorporate frequent rest periods during exercise sessions. Therapy should not be programs that are given one after another so that the patient has time to rest between sessions.
- Adaptive equipment can be used to compensate for loss of range of motion, strength, and endurance.
- Occupational therapists may assess the patient's activities in daily living or make a home visit to make recommendations on the use of various appliances, such as extensions, stocking aids, toilet-raising seats, grab bars.
- Nurses, physical therapists, and occupational therapists can educate caregivers in transfer, hygiene, grooming, and dressing techniques that will make patient care easier.
- Orthoses can be used to protect or support an injured limb and replace lost function. For example, ankle-foot orthosis may make it easier for the

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foot to take off during the gait cycle in a cancer patient with absent foot dorsiflexion due to brain metastases.

Multi and interdisciplinary model applied to the rehabilitation of cancer patients.

This provision of support and treatment across the various stages of cancer management is shared, since the rehabilitative physician rarely works alone and is often responsible for coordinating the interventions of a group of professionals that usually includes occupational therapists, kinesiologists, recreational therapists, psychologists, and speech therapists.

Each member of the rehabilitation team makes a specific contribution to the cancer patient. Thus, the occupational therapist is responsible for those self-care activities, they require adaptation equipment and added safety in the bathroom. They help in problems concerning feeding and swallowing by working together with the speech therapist. The kinesiologist is generally dedicated to improving the mobility and stability of the spine and limbs, trains patients in the use of orthotics and walking aids.

It is also involved in the management of pain and edema. The recreational therapist provides support and guidance in the use of leisure time helping patients in the hospital to develop positive attitudes through the manufacture of products and constructive participation in social activities. Speech therapists are especially integrated into programs in which head and ass tumors. They also provide substantial advice on the provision of communication devices and augmentative communication techniques [7,8].

Rehabilitation considerations in each care space

The rehabilitation treatment of the cancer patient can be provided in different settings depending on the stage in which he is: during the hospitalization, through the outpatient office, while he is receiving the primary cancer treatment or at home.

The inpatient derives its benefits from rehabilitation but the incidence of interruptions during rehabilitation is higher in this group than in patients who do not have cancer who are also receiving rehabilitation during hospitalization: 33% versus 12% and 24% in other series. Chemotherapy, radiation therapy, and the specific type of tumor have been shown to adversely affect the rehabilitation process and therefore its outcomes.

Regarding the outpatient, the problems that most commonly present are related to the soft tissues and the musculoskeletal system: lymphedema, contracture, mobility, self-care, pain. You must be able to get enough mobilization and be clinically stable. The most frequent painful syndromes are those due to metastatic bone disease and polyneuropathy and in their treatment pharmacological and non-pharmacological strategies will intersect.

The most frequently indicated treatments include supervised active and active assisted mobility exercise plans, mobility training and

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transfers, use of braces, walking aids and other adaptations.

Effects of radiation therapy that may require rehabilitation intervention

About soft tissues

- Muscle atrophy
- Skin retractions, tendon aponeurotic

About the bones

- Osteolysis with bone fragility.
- Irradiation of growth plates can cause shortening, deformations, fractures due to epiphyseal detachment.

Effects of chemotherapy that may require rehabilitation intervention

It causes general and digestive, neurological (polyneuritis...), bone (corticosteroids, osteoporosis, osteonecrosis) and muscular (myasthenic syndrome) alterations. The local sequelae of infusions and injections can be ulcerations, paresthesias, pains and aponeurotic and tendon damage [9].

It is particularly important to be on the lookout for intercurrent medical issues, which are often related to the treatment regimen. Particularly important is infection resulting from myelosuppression, CNS complications from chemotherapy, and malnutrition.

Effects such as myelosuppression, nausea and vomiting are predominant in this population and the rehabilitation physician should routinely check for several conditions that if present may make it necessary to discontinue treatment and even require transfer from rehabilitation to an inpatient ward for acute medical care:

- Hematological profile with an Hb less than 7.5g, less than 50000/m^3 platelets, less than 3000/m^3 white globules.
- Metastatic bone disease, when it involves long bones, those in which more than 50% of the cortical is involved, erosion of the cortical bone approximately the diameter of the bone and more than 3 cm of injury to the femur.
- Compression of a hollow organ (bladder, bowel, urethra) spinal vessel or spinal cord.
- Accumulation of fluid in the pleura, pericardium or abdomen or retroperitoneum associated with persistent pain, dyspnea, or mobility problems [10].
- Hypo/ hyperkalemia, hyponatremia, hypo/ hypercalcemia
- Orthostatic hypotension, high blood pressure (more than 160/100 mmHg)
- HR>100 barks per minute the ventricular arrhythmia.

We will briefly develop in the following sections some of the most significant problems that this population can present and that have to do with surgical interventions–especially amputations and postmastectomy lymphedema- and with immobility and the consequent deconditioning physical, situations in which rehabilitation has an important role as we will see below [11].

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Immobility syndrome in the cancer patient and the importance of therapeutic exercise.

One of the problems that may occur in the cancer patient and that may require the intervention of the rehabilitation doctor is the syndrome of immobility or deconditioning due to disuse whose main cause is the prostration in bed due to convalescence of acute processes, predominantly in hospitalized patients. The ability to mobilize is an indicator of the level of health and quality of life since it is related to the degree of independence.

Immobility can be defined by the decrease in the ability to perform activities of daily living due to the deterioration of the individual's motor functions.

Acute, relative, and absolute immobility can be distinguished:

- Acute immobility: It is defined as the episode of rapid decline of independence in mobility for a minimum of three days and constitutes a medical emergency that requires immediate attention given its functional prognosis and its high mortality.
- Relative immobility: Your risk is progress to absolute immobility. It is one in which the person leads a sedentary life, being able to move with some independence.
- Absolute immobility: It is that of the patient prostrate chronically, with a very limited postural variability. It is a risk factor for institutionalization, morbidity and mortality and the appearance of caregiver syndrome [12].

Immobility or disuse deconditioning syndrome

It is defined as "the reduced functional capacity of a body system or systems and is considered as a separate process from the original process that led to the reduction of normal activity.

It is characterized by a marked reduction in exercise tolerance (tachycardia, arterial hypertension, dyspnea,), progressive muscle weakness and, in advanced cases, loss of automatisms and postural reflexes making walking impossible."

Inactivity can produce a series of adverse effects on multiple organs and systems, with chronically diseases, elderly, and disabled people being the most susceptible population, and additional functional losses may occur that will lead to greater disability.

Asthenia

Characterized by physical fatigue, poor endurance, inability to initiate activity, and impaired memory and concentration. It is usually seen among patients with advanced cancer who have been actively treated for cancer, who may have adverse effects from treatment and for whom hospitalization and palliative care are being considered. Winningham describes it as "cancer-related fatigue syndrome" (CRFS) as the most stressful experience among cancer patients, affecting their daily lives more than pain.

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Affected System	Most Frequent Alterations
Musculoskeletal System	Muscle weakness
	Disuse atrophy
	Contractures, stiffness, and joint deformity
	Osteoporosis
	Immobilization. Flawed postures
	Degenerative arthropathy
Cardiovascular	Cardiovascular conditioning
	Orthostatic hypotension
	Deep vein thrombosis and thromboembolic phenomena
	Decreased exercise tolerance
	Reduction of circulating volume and functional reserve
Respiratory	Ventilatory dysfunction
	Upper respiratory infections
	Decreased vital capacity
	Increased mucus
	Decreased ciliary mobility
	Atelectasis
Metabolic	Changes in androgen metabolism, growth hormone, parotid, parathormone elevation
	Immune deficiencies and impaired response
	Hyperlipidemia and decreased HDL-cholesterol
	Increased insulin resistance
	Negative mineral balances
	Increased protein catabolism with positive nitrogen balance
Genitourinary	Urinary retention
	Bladder stones
	Urinary tract infections
	Functional incontinence
Gastrointestinal	Constipation and fecal impaction
	Anorexia
	Swallowing disorders and digestive slowing
	Tendency to gastroesophageal reflux
	Weight loss
Nervous	Sensory deprivation
	Greater cognitive impairment
	Impaired balance and coordination
	Attention disorders and lack of motivation
	Anxiety
	Depression
	Confusion
Cutaneous	Painful and erythematous skin areas
	Maceration and atrophy
	Pressure ulcers

Table 1: Systems affected by immobility and its most frequent alterations.

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Disused atrophy

With complete and prolonged bed rest a muscle loses 10 to 15% of the strength per week, 50% in three to five weeks and at two months it retracts to half of the most original. The first muscles to weaken and atrophy are the anti gravitatories of the lower extremities and trunk. Other associated problems are low back pain, myalgia, instability with increased risk of falls.

Early mobilization with a therapeutic exercise plan that will vary according to the clinical situation of each patient is the simplest and most effective method of prevention of immobility syndrome and its consequences. With submaximal exercise (65 to 75% of the maximum) disuse muscle weakness can be reversed at a rate of 6% per week, which is much slower than the original loss.

Isometric exercises are those in which movement is affected by performing a muscular effort against a motionless object or holding an object in a static position. They increase muscle strength with poor effect on endurance and cardiovascular conditioning. Isotonic exercises are those in which there is the movement of a constant load or weight through an arc of movement, and significantly improve the functional capacity of the musculoskeletal and cardiovascular systems, being able to increase up to 20 to 40% per week in the healthy individual. After a few weeks an increase in potency is followed by an increase in muscle size that is due to hypertrophy of the individual fibers. Exercise is the specific physiological stimulus that helps increase functional capacity and reverse disuse atrophy and muscle weakness when used in intensity, frequency, and duration [13].

Body system	**Effects of aerobic exercise**	
	Increase	Disminuyen
Musculo	Muscle strength, endurance and work and exercise tolerance.	Lactic acid production at a given VO_2 max
	Use of oxygen	
	Density of capillaries.	
	Oxidative enzyme activity	
Cardiovascular	Left ventricular volume of diastole fi n, cardiac stroke volume, peripheral blood flow, heart muscle efficiency, fibrinolysis.	Heart rate at a given oxygen uptake, blood pressure, heart rate/blood pressure product, peripheral vascular resistance, platelet aggregation.
Metabolic	High-density lipoproteins, use of free fatty acids, heat tolerance, endorphins	Triglycerides, fasting blood glucose level
General	The ability to work	
	Prevention of osteoporosis.	

Table 2: Effects of aerobic exercise on body systems.

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In the case of a patient with forced immobilization, functional electrostimulation, which consists of the application of neuromuscular stimulation to reproduce a lost function, can be another valid resource to preserve strength and muscle trophism facilitating subsequent rehabilitation.

Joint retractions or contractures

They are defined as the lack of complete passive range of motion from joint, muscle or soft tissue limitations.

They are classified into three categories according to their location:

- Arthrogenic: Which can result from inflammation, infection, degenerative arthropathy or repeated trauma
- Muscular: Which in turn can be
- Intrinsic structural in nature associated with inflammatory, degenerative, ischemic, or traumatic processes located in the muscle itself
- Extrinsic or positional due to spasticity, paralysis, or mechanical restriction of movement.
- Connective tissue: The soft tissue surrounding a joint can also be shortened by inflammatory, traumatic processes or improper positions [14].

Muscle and soft tissue contractures are most often associated with immobility syndrome. It is important to diagnose which of the structures mentioned are affected to plan the best treatment strategy. There are three basic factors that have to do with the development of contractures:

- The position of the members.
- The duration of the immobilization.
- The mobilization of the affected parties.

The therapeutic exercise plan varies according to the clinical situation:

- In the healthy but inactive individual, a plan of flexibility exercises performed after times a week for 10 to 15 minutes is indicated to maintain the optimal length of rest of the long muscles.
- In the case of mild contractures, passive mobility exercises are indicated for joint amplitude, with sustained terminal stretching, for 20 to 30 minutes twice a day.
- In severe contractures, a continuous prolonged stretch is performed for at least 20 to 30 minutes, and it is usually accompanied by heat in the muscle mass or in the musculotendinous union, especially with ultrasound in case of structural contractures to optimize the stretch.

Other options to consider when passive stretching does not have the desired results is the use of serial casts especially for knee contractures or plantar flexion or dynamic splints in the case of elbow contractures for example, to allow the functional use of the limb while applying the stretch [15]. Bearing in mind the necessary precautions when

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prescribing therapeutic exercises for this population, in terms of hematological, cardiac, pulmonary, and skeletal factors, moderate exercise is considered beneficial for cancer patients. Factors such as depression and fatigue can limit participation in exercise. Exercise is also not recommended in the patient with a fever of more than 40ºC due to poor tolerance, increased HR and RF and increased platelet consumption.

As for the hematological parameters for exercise, one of the risks that we try to foresee is that of hemorrhages. In a study of patients with acute leukemia, ostensibly visible bleeding was rare with a platelet count of more than 20,000 and intracranial hemorrhage did not occur with a platelet count of more than 10,000. The risk of bleeding was correlated with platelet count. In thrombocytopenic states, blood pressure increases, especially with isometric exercises, which can result in intracranial hemorrhage. High-impact activities can cause intra-articular or muscular bleeding.

In general, unrestricted exercise may be proposed for patients with platelet counts greater than 30000/m^3 to 50000/m^3. Non-endurance aerobic exercises may be indicated with platelet counts of more than 10000/m3 to 20000/m3. Active therapy is not advised with a platelet count of less than 10000/m3. As for the white blood cell count there are no special precautions, but it should be considered that it produces a transient increase in its count, so it is discouraged before the extraction of blood for a routine laboratory. Patients receiving TNF as a treatment should postpone exercise for a few days to allow muscle regeneration. Those with marked cachexia, possibly mediated by TNF alfa, may not tolerate exercise altogether and rehabilitation efforts should focus on other alternatives for aerobic conditioning and achieving proposed functional goals [16].
Exercise programs counteract the weakness that occurs because of prolonged hospitalization and medical morbidity and help counteract social isolation and depression.
Exercise should not be too intense or produce fatigue. Exercise programs emphasize range of motion, aerobic activities such as stationary cycling or treadmill walking, light resistance exercises or manual resistance, and deep breathing to prevent atelectasis and pneumonia. Assisted active mobility should be performed to prevent contractures. It is necessary for patients to commit to the exercise plan for the program to result, but even a limited treatment such as passive mobilization in the range of motion or massage can be helpful in avoiding future complications.

Lymphedema in breast cancer

Concept of edema

It is the abnormal accumulation of fluid in the body caused by heart, liver, or kidney disease [17].

Concept of lymphedema

Földi defines it as "the swelling of soft tissues resulting from the accumulation of protein-rich interstitial fluid caused by the failure of lymphatic flow circulation in combination

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with insufficient extra lymphatic proteolysis of plasma proteins." From a practical point of view, it is when measuring two symmetrical perimeters in both extremities there is a difference of more than 1.5 to 2cm between them. Lymphedemas are classified according to etiology into primary and secondary. Primary lymphedema in turn is subclassified according to age of onset. The one that concerns us now is the secondary lymphedema that is most commonly of obstructive cause either by infections or by neoplasms. The neoplastic type is most often related to breast cancer in women and prostate cancer in men, it is usually unilateral, with or without fovea and improves slightly with postural measures such as elevation of the affected limb.

Figure 2: Patient with lymphedema of the left upper limb with blockage of the axillary lymphs. Courtesy of Dr. Hunis.

Therapeutic approach

Treatment is symptomatic, conservative, lifelong, should be early and timely to prevent a soft edema from becoming one of hard or woody consistency, prevent complications such as infections (lymphangitis, erysipelas), or sclerosis.

The first link of the treatment has to do with hygienic measures which implies the recognition of the role of the infection and the training of the patient to avoid infections and other factors that may contribute to the production of lymphedema. An edematized limb is a culture medium for bacteria that can enter through a skin lesion. Vigorous initial treatment of infections or their recurrences with antibiotics. For example, with 250mg of erythromycin four times a day for a week.

The patient should be instructed in the correct care of the affected limb, in avoiding cuts, punctures, scrapes, burns, use of soaps and strong detergents, but specifically not to hold a cigarette in the edematized hand, not

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to use the wristwatch on that side, not to touch a hot hormone, not to carry heavy bags, not to fix bouquets of roses. You should not give injections or draw blood from that arm or make blood pressure determinations. It is important to prevent the formation of cracks in the hand using cream several times a day, use glove to wash the dishes. Strenuous activities of the upper limb of the operated side should be avoided. Stimulation of the use of the limb within the patient's tolerance and of moderate elevation of the arm or leg when the patient sits for a long time or when in a position of decubitus.

Particularly indicated is the complex decongestive physiotherapy recommended by Földi with which it is possible to reduce edema between 50% and 100% according to its evolutionary degree and which implies a set of measures that complement each other:

- Postural care (for example: raising the arm on an adaptable wooden support).
- Manual lymphatic drainage: It consists of a manual method that is performed slowly and painlessly, exerting little pressure (less than 40 mmHg) starting from the root of the limb in a distal direction, alternating evacuation, and resorption maneuvers, once the aspiration movements have been carried out on the nodal areas. Its objective is to promote the development of secondary bypass pathways and stimulate the contraction of lymphangion of the lymphatic vessels.
- Pressotherapy with lymphoprepressor (pneumatic pumping).
- Elastic containment with multiple layers: Low elasticity bandages are placed on the affected limb to achieve low pressure at rest and high when making a movement. The patient must use them all day and only remove them when they perform manual lymphatic drainage, placing it again after each session to favor the effect of it.
- Myolinfokinetic gymnastics under containment: Consisting of active mobility exercises alternating with periods of relaxation, with the compressive elastic bandage on.

The treatment will also vary according to the type of edema, being important to have a method of quantification to assess its evolution and the response to the therapy following for example the Classification of Brun it will be indicated in:

Small edemas of less than 2cm

Manual lymphatic drainage alone and eventually containment by elastic sleeve during activities

Significant edemas of more than 2-4cm

- Manual lymphatic drainage +
- Weak pressure therapy+
- Final containment of the session

Edema larger than 4cm

Manual lymphatic drainage+ pressotherapy with more accentuated pressure+ multi-layer bandages

There are different methods of objective measurement but one of the most used is that

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of circumferential measurements since only one measuring tape is needed and consists of making six or seven measurements of the edematous upper limb and the contralateral (at the level of the hand at the first corner, behind the head of the metacarpals, on the wrist, in the lower, middle, and upper third of the arm).

Elastic containment

It involves the provision of a custom-made, pressure gradient elastic sleeve for maintenance, which the patient is expected to use continuously when getting up or walking. They can be elastic or silicone custom garments. They are presented in the most varied configurations: t-shirts, gloves, short and long sleeves, trunk. The pressures applied range from 20mmHg to 50mmHg and the process of taking measurements of the patient determines the pressure achieved with the garment [18].

Four types of compression can be distinguished:

- Class I: 20-30 mmHg. Mild edema.
- Class II: 30-40mmHg. Moderate edema.
- Class III: 40-50mmHg. Marked edema.
- Class IV: more than 50mmHg. Severe lymphedema.

Pressotherapy

It consists of the use of a lymph compressor apparatus with a mechanism of action like that of elastic containment measures. Its use is controversial as it produces fibrosis when used as a unique technique. It is used in grade 2 and 3 edema preceded by manual lymphatic drainage and in mild edema, grade 1 as the only therapeutic. It is contraindicated in case of active infection and in deep vein thrombosis.

The limb is inserted into an inflatable sheath and intermittent pneumatic compression is applied at a pressure of 30mmHg in three-minute cycles (2.5 minutes of compression and 0.5 minutes of release) for five to six hours. Others use the same pumping device but at a pressure of 60 mmHg for a shorter period (from 30 minutes to two hours). A mild diuretic (20mg of furosemide) may also be given at first to aid fluid excretion.

Amputaton

Amputation can be defined as the "excision of part or all of a limb that causes a deficiency through a destructive surgical intervention in which the part of the non-viable limb is eliminated, but which can become constructive provided that some requirements are met, in such a way that it decreases, minimize or suppress the disability by providing the individual with a functionality that he did not have before the ablation"

Every amputee patient goes through a series of phases in their rehabilitation process until they reach the final equipment when this is feasible and the best option. The objectives are set individually contemplating various factors such as age, concomitant pathologies, degree of previous activity of the person, recreational, social, and vocational needs. "What is considered is not what is removed but the patient and his circumstances"

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In the case of the oncological amputation the objective may be related to hygienic or curative purposes. It should be considered when making the assessment, the presence of metastases and the location of them, life expectancy, the medical treatment you are receiving (chemotherapy, radiotherapy, etc.) since all these data will influence the rehabilitation treatment and the results of it.

During the rehabilitation of this type of patients it is often necessary to suspend the treatment and wait for it to be replenished to follow the exercise pattern required for the recovery of its functionality.

It is necessary to set short-term objectives, reevaluating them frequently since it is feasible the need to change objectives of potentization and functionality according to the evolutionary stage of the patient [19].

Rehabilitation phases of the amputation patient

Preoperative

Starting rehabilitation before surgery allows to prevent complications that may negatively affect the re-education process, this is only feasible in the case of a scheduled amputation, a situation that almost always occurs in oncological amputation. In this phase, the pre-amputation interview is relevant to inform the patient about their state of health, level of amputation and possible functionality in relation to it, give them psychological support, explain about the importance of postural care, what phases they will go through in the rehabilitation process and why, start teaching them the therapeutic exercise plan that they will continue to carry out in the next stage.

Immediate postoperative

Rehabilitation treatment begins 24 hours after surgery with the aim of maintaining joint mobility, achieving maximum muscle strength, training the patient in self-care of the residual limb and in achieving the greatest possible independence. At this stage, the need to:

Postural care

They vary according to the level of amputation and aim to prevent vicious postures. Thus, in the case of a scapulohumeral disarticulation, scapulectomy or short humerus stump it will be essential to avoid the tendency to lateral inclination of the trunk towards the healthy side either by placing pillows or a sandbag so that the patient remembers the correct position. In the one that is not disarticulated, however, the position of the scapulohumeral joint and the residual limb becomes important to prevent contractures and preserve the articular range. The patient should be educated to become aware of their modified body schema, being very important in this phase the joint work with psychology to progress in the treatment.

Therapeutic exercises

In the immediate postoperative period, respiratory exercises, isometric exercises of the neck and trunk muscles, exercises to prevent thromboembolism and mobilizations of healthy limbs to avoid loss of mobility and

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consequent physical deconditioning will be indicated in all cases.

Compressive elastic bandage

It is used to reduce the edema of the residual limb and model it for later adaptation to the plug cone of the definitive prosthesis. The types and measures of bandage vary depending on the level of amputation. Thus, for example, in radical amputations of the upper limb only the healing of the surgical wound is performed, and gauze is placed. In case they have left a short stump, the bandage is fixed to the trunk through the patient's chest. In coxofemoral disarticulation, the bandage surrounds the patient's trunk, crosses the abdomen, and is padded over the entire surface of the scar and ischium area to protect the wound and the soft parts of the abdomen. In hemipelvectomy, a compression bandage and abdominal support is applied, or an elastic cyclist's pants, to which a leg is sewn.

Equipment with pre-prosthesis or walking pylon

It continues to insist on the objectives proposed in the post-surgical phase and the patient is educated in the technique to put on and remove a prosthesis, the work of balance, posture, and gait with the place the prosthesisprosthesis and the realization of the activities of daily living with it.

Equipment with definitive prosthesis

It must be borne in mind for the final equipment, the principle that "prostheses are medicines (mechanical, but medicines at last) and as such have their indications and contraindications" in everyone. Before prosthetization it is necessary to know the general condition of the patient or if he is being subject to a treatment that conditions his general condition such as chemotherapy. The needs of amputee patients are variable and a series of situations may arise in which prosthetization is contraindicated, either because the patient does not want to use a prosthesis, because it is technically impossible or because the underlying medical process prevents it. "If to obtain the ambulation it is necessary that the patient be assisted by another person or the same is carried out at the expense of such energy expenditure that makes it impractical or may compromise the physical integrity of the patient, the provision of a simpler (or cheaper) orthopedic element should be considered, or the alternative or definitive use of a wheelchair."

Conclusions

The disabilities faced by cancer patients are not too different from those faced by rehabilitation patients in general. However, they present with a variety of potentially treatable problems including more frequently fatigue, weakness, pain, mobility and self-care problems, dysphagia, lymphedema, neuropathy, postoperative soft tissue or bone, dyspnea, and delirium. Rehabilitation in cancer is defined as " a process by which individuals within their environments are assisted to achieve optimal functioning within the limits imposed by cancer." Treatment goals in these situations should be reviewed frequently specifically with respect to whether they match the patient's wishes. The rehabilitation objectives are divided into

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four categories namely: "Prevention of disability", when possible (stage 1) but if it is not, "Restoration" of the premorbid stage (stage 2) followed by "Support" to reduce cancer disabilities (stage 3); then, "Palliation" to reduce complications, maintain independence and provide comfort (stage 4). The main reason for providing comprehensive care that includes rehabilitation in patients with advanced cancer is that this improves and maintains physical function, in a situation in which the threat of disability and the advent of caregiver "burden" are among the most stressful concerns in cancer patients, especially if we consider that the burden of caregivers is often presented as a reason to petition for medical assistance to suicide and euthanasia. There are no exact methods for estimating cancer prognosis and the provision of rehabilitation services should not be postponed once the need for care is perceived. Treatment should not be based on prognosis Even moderate attempts help improve the quality of life and functionality of patients with terminal or incurable disease.

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