# Physiotherapy in palliative oncology

Lynette Rashleigh

Outreach multi-disciplinary palliative care teams have tended to duplicate hospital-based teams which historically have consisted almost exclusively of doctors and nurses. This paper outlines the role of physiotherapy in palliative care. It provides a conceptual framework for physiotherapy involvement and its potential to contribute within the palliative care team therapeutically and cost-effectively. To put physiotherapy management of the disease process into perspective, some basic data on terminal illness, and statistics of a Brisbane hospice, are included. The need for more outreach physiotherapy intervention is emphasised.

[Rashleigh LS: Physiotherapy in palliative oncology. *Australian Journal of Physiotherapy* 42: 307-312]

**Key words: Cancer Care Facilities; Oncology Service, Hospital; Pain; Palliative Treatment**

LS Rashleigh BPhty, BEdSt, MPH is Senior Physiotherapist at the Geriatric and Rehabilitation Unit of Princess Alexandra Hospital, Brisbane. She was previously a physiotherapist in the Hospice/Home Care Unit of the Mount Olivet Hospital, Brisbane.

Correspondence: Lynette S Rashleigh, Senior Physiotherapist, Geriatric and Rehabilitation Unit, Princess Alexandra Hospital, Ipswich Road, Woolloongabba, Queensland 4102.

In oncology, palliative care takes over when cure is not possible or probable. Palliative care has an holistic focus and refers to the active inter-disciplinary care of the total person including the physical, social, psychosocial and spiritual needs of the person and carers. It also encompasses the bereavement period.

The physiotherapist has an extensive role to play in palliative oncology, beginning early with rehabilitation (Fulton 1994) and continuing as a team member into hospice care (Gray 1989). Physiotherapists have large preventative, educative and supportive roles to play as well as providing independent and complementary therapies for physical debility and pain. The roles are significant and varying at both the hospital and community levels.

Historically, there has been little recognition of the value of physiotherapy in palliative care. Redpath's (1990) recommendations for community-based palliative care services in Australia did not include physiotherapy. By the mid '90s, palliative care was still one area of health care where drugs for pain relief were used as the first and often the only line of action, and where physical dysfunction was often not managed by physiotherapists.

The Physiotherapy Department at Mount Olivet Hospital was early to recognise the unique contribution of physiotherapy to palliative care and included a physiotherapist in the hospice program. Some data collected from hospice statistics are included in this paper.

In 1988, the top 10 diseases in Australia were ranked according to morbidity and disability-free life expectancy. Cancer was ranked the fifth highest in females and sixth highest in males. Cancer was preceded by diseases of the musculoskeletal, circulatory and neural systems and traumatic injury.

In contrast, when disease induced disability was ranked in terms of quality of life, cancer was second highest for both females and males. (*National Health Strategy* No. 7, 1993). Once cancer was diagnosed, disability might not occur for many years. However, when disability did occur, it had a severe impact on quality of life.

In cancer, the management of disability was often overlooked and required an understanding of the nature of cancer induced disability and the role of the physiotherapist.

## Cancer induced disability

Many factors lead to cancer induced physical debility. Such factors include bony and neurological metastases, metabolic complications, cachexia, drugs, lymphoedema, pain itself and the course of malignancy.

## Metastases

More than half the patients diagnosed with cancer have a pattern of dissemination predominantly to bone, lung, liver and brain. High incidences of bony metastases occur in the three most frequent disease sites - lung, breast and prostate. Woodruff (1993) reports that pain is the most common symptom of bony metastases. Associated pathological fractures, hypercalcaemia, neurologic

From Page 307

impairment and immobility also cause varying degrees of physical debility. Bone metastases occur predominantly in the axial skeleton.

Neurological metastases occur less frequently than bony metastases, with brain metastases predominantly in cancers of the lung, breast and melanoma (Woodruff 1993). Neural damage to any level of the nervous system results from pressure and inflammation when primary tumours impinge upon nerves or spread to them via the lymphatic and circulatory systems. Myopathy, paresis, paralysis, muscle spasm, sensory loss, ataxia and cerebral dysfunction occur, affecting the integrity of the entire neuromuscular system.

## Hypercalcaemia

Hypercalcaemia occurs in about 40 per cent of patients, especially in those with advanced melanoma, cancer of the breast or cancer of the lung. Woodruff (1993) describes symptoms of nausea, vomiting and confusion as well as renal and neurological clinical features including tiredness, progressive weakness and poor balance.

## Cachexia

Cachexia, a major cause of physical debility, occurs during the final stages of cancer. The term derives from the Greek *kakos* (bad) and *exein* (state of the body). Clinically, it is delineated as a drastic loss of weight, anorexia, nausea, asthenia, anaemia and progressive weakness (Strain 1979).

## Drugs

Drug related side effects may be reduced by physiotherapy intervention. Corticosteroids are used in palliative care to reduce bone pain, inflammation and cerebral pressure and as an adjuvant curative therapy. Prolonged use of high doses of corticosteroids causes, among other complications, myopathy of the proximal musculature of limbs (Woodruff 1993). Walking, toileting and other activities become difficult or impossible. These circumstances present the therapist with the opportunity to trial electrostimulation of the muscles involved.

Centrally acting opiates for pain relief (eg morphine, which can be administered in a variety of ways) have a variety of side effects. They depress respiration and suppress the cough reflex (Woodruff 1993), thus increasing the incidence of chest infections and reducing the ability to expectorate.

Opiates also increase peristaltic tone and reduce gut motility, causing constipation, which is a major problem. From the physical perspective, this impacts upon toileting and requires additional bracing to sit and bear down for prolonged periods of time.

## Pain

Twycross and Lack (1990) report that two thirds of cancer patients suffer from pain of varying degrees of severity. Surgery, radiotherapy or chemotherapy cause pain because of their destructive nature. Visceral pain, bone pain, soft tissue pain and nerve pain (such as pain as a result of nerve plexus pressure or infiltration) typically occur (Turk and Melzack 1992). Multiple pain sources coexist (Turk and Melzack 1992), adding to the complexity of cancer pain.

Hollow viscous involvement (crampy, episodic pain), compression of neural structures (burning, dysaesthesia, lancinating, stabbing pain) and bone pain (deep, aching, localised pain) have typical pain descriptors. Bone pain is the most common aetiology of pain. The physiotherapist is most involved with bone and nerve pain and least involved with visceral pain.

**Pain of bony origin:** Bone metastases are the most common cause of pain in patients with cancer (Twycross and Lack 1990) and symptoms often precede radiological confirmation. The exact cause of bone pain is unknown but is believed to be linked to the liberation of prostaglandin. Non steroidal anti-inflammatory drugs (NSAIDS) which inhibit prostaglandin synthesis and anti-inflammatory doses of corticosteroids are most effectively used in the treatment of bone pain.

Radiotherapy is also effective in relieving bone pain, particularly when the site is superficial and localised. Immobilisation, surgical procedures and nerve blocks are more appropriate in many cases.

Pain from bone metastases interferes with physical function, especially if metastases occur along the axial skeleton, in a major weight-bearing joint or where weight is transmitted through the pelvis during walking. Pelvic involvement results in pain referred from L1 evident during walking and sitting. Bony metastases in the femur frequently cause avascular necrosis of the femoral head with severe pain on weight-bearing (Wiener 1993).

A pathological fracture of the proximal third of the humerus or aseptic necrosis of the head of the humerus (from prolonged steroid therapy) causes shoulder and arm pain complicating functions such as dressing and personal care. The physiotherapist is often first to recognise early aberrations in normal movement and able to set in motion prophylactic strategies.

**Pain of neural origin:** Nerve pain is the largest category of pain treated by physiotherapists.

*Spinal cord compression*: Epidural spinal cord compression is a serious complication requiring surgical decompression and high doses of steroids (Woodruff 1993). Loss of motor, sensory and autonomic function below the level of compression occurs to varying degrees and the physiotherapist is involved in managing the patient following surgery.

*Radicular pain*: Pain occurring along the distribution of the nerve occurs typically in cancer pain. Back pain with a radicular distribution is a candidate for treatment using transcutaneous electrical nerve stimulation (TENS) (Kahn 1987, Snyder-Mackler 1989). Pain in the upper limb can also be referred pain from the pleura, chest wall, abdomen or liver and not radicular in nature (Wiener 1993).

*Movement-induced pain*: The term

movement-induced pain has been coined to describe a nerve related pain that occurs primarily as a result of bone metastases. The pain develops when any position or movement causes nerve root or peripheral nerve compression (Wiener 1993) or neural stretch, also known as adverse mechanical tension of the nervous system (Butler and Clifford 1989). It manifests clinically as intense radicular pain accompanying specific movements or as pain anywhere along the stretched nerve. Positional pain is included in this category of pain.

Movement-induced pain is frequently morphine resistant (Twycross and Lack 1990) and does not respond well to drugs. When movement-induced pain is present, essential activities of daily living such as transferring, toileting, showering, sitting, walking and lying down become difficult or impossible. Poor positioning of the spine at rest disturbs sleep and reduces the pain threshold, amplifying the pain cycle.

Classic radicular patterns of movement-induced pain can occur. In cancer of the breast, for example, where there is typically mid-thoracic metastatic involvement, sharp pain in the distribution of T8-10 occurs during movements such as sitting to standing or slouching in a chair. Pain is also triggered with any activity involving protraction and elevation of the arms such as pushing a forward drive wheelchair inappropriately prescribed.

In cancer of the lung with thoracolumbar metastatic involvement, the patient experiences severe pain around the waist during coughing, bearing down while toileting and when twisting to get out of bed. Frequently, without intervention, the pain is severe enough to debilitate and confine the person to bed, necessitating early administration of high doses of narcotics.

Lumbosacral involvement in cancer of the colon can make prolonged sitting and walking difficult without spinal support and physiotherapy intervention.

Metastases often develop at two or more separate levels of the spine, especially in cancer of the prostate and breast. This increases both the likelihood and complexity of movement-induced pain.

Radicular and movement-induced pain are frequently complicated by other types of pain. The cancerous compression of nerve fibres often leads to neural necrosis producing a mixed picture of somatic pain and deafferentation or neurogenic pain (Tasker and Dostrovsky 1989), also known as neuropathic pain. It can also be superimposed on other types of pain (Wiener 1993).

From the physiotherapy perspective, obstruction to the normal mechanics of the nervous system inevitably disrupts the integrity of neural pathways and results in clinical signs of adverse mechanical neural tension (Butler and Clifford 1989). With cancer, neural stretching occurs in a nervous system that is repeatedly damaged by surgery, tumour and other causes of scarring, abnormal pressure and tissue infiltration. Often, with whole nerve bundle and multiple segment involvement, the pain threshold is lowered and widespread neural hyperexcitability occurs. With sciatic nerve and brachial plexus stretching, hyperexcitable trigger points manifest throughout the limbs - at the ischial tuberosity, behind the knee and at the lateral malleolus in the lower limb and, with sustained shoulder and arm drag, in the whole upper limb.

Continual damage to neural tissue may cause painful gross sensory aberrations, such as the sensation that the affected limb has an abnormal shape and is horribly twisted. Such aberrations further exacerbate the pain cycle.

**Musculoskeletal pain:** Pain from reflex spasm and subsequent contractures represents another category of pain adequately dealt with by physiotherapists (O'Gorman 1988). Capsulitis of the shoulder often occurs (Twycross and Lack 1990) and can disturb positioning at rest and personal care.

**Pain associated with lymphoedema:** Lymphoedema frequently develops following surgery, radiotherapy or tumour spread. It also occurs as a sequela of cancer following prolonged venous oedema accompanying lymphatic insufficiency. If lymphoedema is severe and remains untreated, the risk of infection increases. Pain and debility frequently co-exist in lymphoedema and dependence is often the end-product of untreated lymphoedema. In advanced pelvic tumours, swelling frequently involves the whole lower half of the body and excretion of body waste may become blocked or difficult.

Patients with lymphoedema describe neurogenic pain symptoms such as dysaesthesia and perceptual aberrations, such as grossly distorted body size beyond the boundaries of the swollen limb, in addition to bursting pains. Pain can be very severe.

## Physiotherapy intervention

Cost analyses of cancer programs tend to focus upon health outcomes in terms of cure, with cost-effectiveness estimated in terms of years of life saved. This is despite the fact that there is little change in the mortality rate of the major cancers. Breast cancer has actually increased since 1987 (*National Health Strategy* No. 7, 1993). There is no reference to quality of life or quality-adjusted life years in terms of preventable dependence or avoidable hospitalisation.

Physical palliation of the terminally ill is very complex and involves aspects of musculoskeletal, neural, respiratory and circulatory therapeutic management as well as education. Physiotherapy treatment at the hospice level is dependent primarily upon findings during assessment. Many factors influence the selection, appropriateness and withdrawal of physiotherapy treatment. A factor is the body's capacity to heal. Some cancers such as lung cancer progress more rapidly than others such as prostatic cancer. As a body part becomes more eroded by cancer and less able to heal, some types of therapy

From Page 309

such as wound and pressure area treatments are less likely to have an impact. Physical status can change rapidly from day to day. When cachexia sets in, the body's capacity to heal deteriorates rapidly. Exercise tolerance, skin colour and texture, especially around the mouth, clarity of the eyes and the changing psychosocial/spiritual perspective of the person are all indicators of the body's capacity to heal.

## Ambulation and musculoskeletal therapy

Ambulation, pelvic movements and the effects of gravity and lower limb activity serve to facilitate bowel and bladder action inhibited by opiates.

Treatment of hypercalcaemia is expensive, involving hospitalisation for intravenous drug administration and blood tests. Woodruff (1993) states that mobilisation prevents hypercalcaemia. A physiotherapist is skilled in the mobilisation of physically difficult patients.

Non-malignant causes of pain frequently occur and use of gentle mobilisation techniques often results in relief (Marcant and Rapin 1993). Neck stiffness, which tends to develop in patients with brain tumours as a result of muscle spasm, is relieved by heat, regular stretches and reflex-inhibiting positions.

At the Mount Olivet hospice during 1989-92, physical debility was the major reason for both referral to the hospice outreach service and admission for terminal care. Pain was the second reason. This supports the National Health Strategy statement concerning the impact of physical status in cancer.

## Neurological therapy

Exhaustive neurologically based rehabilitative programs are inappropriate to manage neurological deficits in advanced cancer. The use of computerised electrostimulatory devices to facilitate the dorsiflexors of patients who have brain tumours (such as astrocytoma and glioma) or the gluteal and proximal shoulder muscles weakened by prolonged use of dexamethazone can be effective to reduce or postpone dependence. With very advanced cancer, the impact of functional electrical stimulation wears off and is ineffective in the treatment of the cachexic patient.

Sometimes, subtle signs of early motor and sensory changes such as tripping, leg stiffness, difficulty when climbing stairs, slowness of gait, paraesthesia, limb coldness, loss of balance and progressive weakness are associated with spinal cord compression but mistakenly attributed to cachexia (Scott 1989). Often by the time a diagnosis of spinal cord compression is made, serious neurological dysfunction has developed (Scott 1989). Evaluation by a physiotherapist skilled in observing slight aberrations in gait enhances early detection of cord compression and may prevent misdiagnosis of cachexia as the causative factor.

## Respiratory therapy

Palliative respiratory procedures such as appropriate touch, vibrations, gravity assisted positioning and the manipulation of expiration (Marcant and Rapin 1993) complement the use of moisturising inhalants (eg nebulised normal saline), oxygen and drugs (nebulised morphine and anticholinergic drugs to dry secretions). Percussion is frequently not used (Mitchie 1994), especially when there is the threat of haemoptysis in advanced cancer of the lung. Laryngeal pressure to induce coughing is used selectively.

As death becomes imminent, gravity assisted positioning is often reduced to side to side lying. This positioning is usually assumed by nursing staff when peripheral shutdown commences, evident by pallor of the finger tips and increasing loss of consciousness even when death is a few hours to several days away.

Treatment occasionally includes a manually elicited, meditative style of diaphragmatic breathing (relatives and volunteers are taught this procedure) to reduce the claustrophobic anticipation of impending death until the commencement of the death rattle - a characteristic noise accompanying breathing as death approaches.

To be successful, respiratory management is a team effort, with one profession handing over to the other for the comfort of the patient.

## Electrophysical agents

Early treatment of non-malignant pain, such as radicular pain, with electrotherapeutic modalities (Scott 1989) is advised prior to commencing the more severe surgical procedures such as sympathectomy and nerve block. Provided that paraesthesia can be generated in the region of the pain (richly innervated areas of the face and neck being the most effective), TENS can be trialled for pain relief. Transcutaneous electrical nerve stimulation is ineffective in reducing visceral pain (Woodruff 1993). Transcutaneous electrical nerve stimulation has reasonable levels of effectiveness in deafferentation pain (Tasker and Dostrovsky 1989) which has symptoms of tingling, burning and dysaesthesia and is often recurrent and refractory to conventional analgesia (Twycross and Lack 1990). Transcutaneous electrical nerve stimulation effectively reduces post-herpatic neuralgia with proximal electrode placement (Gray 1989).

With reduced sensation, very low rates of muscle stimulation (1-2 Hz) can be used as an analgesic (Kahn 1987). Non-pharmacological relief of cancer pain often requires combinations and mixes of high TENS, low TENS and low frequency muscle stimulation. High TENS is used to block the pain at the level of the dermatome; low TENS is used to elevate the pain threshold in between bursts of high TENS and muscles in the relevant myotomes are stimulated to twitch. Electrophysical agents can be used this way to supply sufficient afferent input to obtain the desired analgesic effect necessary to treat pain of somatic or neurogenic origin.

With movement-induced pain, TENS may be used effectively to complement bracing and other strategies. For example, persons with cervical movement-induced pain in

advanced cancer of the breast may be able to sit up for a limited period of time without pain or with reduced pain, provided they are supported by a cervical collar and given a boost of high TENS for an hour beforehand.

Nausea that occurs as a result of opiate use can be effectively reduced using TENS applied to the shoulder tip and thumb web on the right upper limb (Kahn 1987).

Acupuncture is viewed as a useful therapy in the management of chronic pain (Filsche and Morrison 1988). Magnetic fields are effective in relieving capsulitis (Binder et al 1984). Neurogenic pain that involves a whole limb or side and is associated with brain tumours (eg thalamic pain) and the neurogenic pain which accompanies lymphoedema are both relieved by magnetic fields with large electrode coverage.

## Mechanical therapy

The analysis of spinal and neural mechanics at rest and during movement constitutes a major aspect of the physiotherapist's role in treating movement-induced pain. A skilled therapist is able to isolate the offending segments and provide alternative movement strategies to reduce pain with movement. Flooring, room design, bathroom access and transfer techniques all require modification if they exacerbate movement-induced pain.

Appropriate prescription of walking aids that align the spine correctly, reduce twisting and brace the vertebral segments involved is essential. Walking aids can be adjusted to take pressure off the side causing the pain, for example elevating one arm rest of a rollator or building up the opposite shoe. Minimal inexpensive adjustments may postpone hospitalisation and sedating drug use.

Positional pain can be modified by repositioning the affected limbs and trunk and supporting the mobile segments (McCaffery and Wolff 1992) in order to alter neural mechanics. The appropriate use of spinal supports and foot, knee and leg supports reduces neural stretch. Inexpensive spinal braces such as rolled and folded towels work in the home. Face washers may be rolled up and placed between the pinned towel and the skin to provide pressure on the spine centrally or on the adjacent joints. Such combinations may be ingeniously used to act as movement-inhibiting levers. Carers can be taught to apply such braces before toileting and other activities.

Many strategies utilised by physiotherapists are encompassed within the context of "lifestyle modification" which aims to "reduce the pain threshold in preference to the administration of breakthrough morphine with its side effects of drowsiness, confusion and other feelings of unreality" (Woodruff 1993, p. 47).

In the outreach section of the hospice at Mount Olivet Hospital, the physiotherapist routinely assesses movement-induced pain. During 1991-92, 38 per cent of referrals for consultancy physiotherapy were for the assessment of movement-induced pain, in most cases morphine resistant. More than 50 per cent of the patients assessed had a diagnosis of cancer of the breast with mid-thoracic spine involvement. The remainder of the patients had abdominal and pelvic tumours spreading to the lumbar spine.

During 1993, of 60 patients referred to the outreach section during a four month period, one patient in every three was medically diagnosed as having movement-induced or drug-resistant pain. This was greatly in excess of the numbers who actually received non-pharmacological pain management, owing to limited physiotherapy resources.

## Decongestive physiotherapy

Complex decongestive physiotherapy which relieves lymphoedema (Mason 1993) includes skin care, manual lymph drainage, bandaging or other forms of compression and remedial exercises.

If intervention commences early, when venous or lymphatic swelling is minimal, the extent of lymphoedema tends not to become as severe. The treatment also appears to be effective in healing large leg ulcers and in reducing swelling in dependent paralytic limbs with a compromised lymphatic system. As such, this treatment has wide application for pain and symptom control in palliative care. It also appears to help reduce shortness of breath when advanced bilateral lymphoedema causes pressure at the level of the chest.

From patients' reports, massage and compression enhance the perception of normal body size and reduce the dysaesthetic pain, with the required afferent input being supplied by massage and compression.

In the case of terminal lymphoedema, it is of interest that, as death approaches, the watersheds collapse as the barrier to lymph flow from one lymphotome to the other. At this time, the subcutaneous tissue feels more gel-like to touch.

In the Mount Olivet hospice, more than 50 patients were treated during 1991, the first year decongestive physiotherapy was introduced there. In the inpatient section, the treatment constituted 20 per cent of the total number of treatments performed by the physiotherapist. The most prevalent site was bilateral lower limb lymphoedema involving the pelvis. In the outreach section, 36 per cent of referrals were for lymphoedema, 70 per cent of these being bilateral lower limb lymphoedema. Half the number of patients assessed were managed by carers taught by the physiotherapist and half were referred to domiciliary physiotherapy services for treatment.

## Education

Education of palliative care patients and carers to utilise energy conservation strategies and utilise mechanical aids to cope with limited physical resources constitutes an essential element of a home visit assessment.

Metastases in the long bones such as the femur and humerus weaken the bones and increase the risk of pathological fractures. Excessive torque or even normal torque applied to a weakened bone is capable of causing a fracture. Strategies to reduce

From Page 311

torque and to plan rest/activity periods gives both patient and carer some control over their disempowering situation. Education of carers to move and position painful limbs is described by McCaffery and Wolff (1992).

## Need for future research

The physical assessment and management of pain and disability outside drug administration falls within the role of mainstream physiotherapy in most areas of medicine. However, in a disease such as cancer, where drugs, radiation and other curative therapies predominate, it is not unusual to discover that non-drug pain relief has made few advancements during the last decade. This is despite findings that, in certain circumstances, nerve related pain responds well to electrostimulation and that some cancer pain is opiate resistant.

Nerve and bone pain often occur well before the final stages of the disease. Many people do not wish to use drugs at an early stage, which provides an opportunity for physiotherapists to trial non-drug therapies for pain relief. More research is required into the efficacy of TENS and other electrophysical agents used in palliative care.

Movement-induced pain that occurs with spinal metastases is a major complication in terminal cancer. Spatio-temporal analysis of movement-induced pain is the domain of the physiotherapist. There is a need to analyse the cost benefit of physiotherapy involvement in the management of this type of pain. Drugs and physical methods can be used to complement each other and should not be viewed as competitive.

Lympoedema research focuses primarily upon reduction in swelling in non terminal patients with no real emphasis on its capacity to reduce pain accompanying limb swelling. The cost in terms of nursing and other community resources to manage patients with untreated lymphoedema has not been estimated. Hospitalisation delayed as a result of treating lymphoedema in terminal patients has yet to be estimated in health dollars.

Reduced physical status has been identified as an indicator of referral to an outreach service and for admission to hospital. Improvements in mobility status, pain or personal care resulting from physiotherapy intervention may delay the need for community resources or hospitalisation by one or more days, thus saving money.

## Conclusion

A wide range of physical complications occur in the terminal phase of cancer. These physical problems need to be managed by professionals trained to deal with them, including physiotherapists. Additional physiotherapy resources are required at the community level. Outreach palliative care teams need to include physiotherapists as essential members.

Funds for palliative therapy should not compete with curative therapies and cost-benefit analyses should consider the prophylactic and therapeutic value of physiotherapy.

In physiotherapy, most physical techniques are aimed at reducing the source of the pain, whereas in palliative care, it is necessary to treat pain as the entity. That is true whether it is the pain/fatigue of physical debility, bone pain or nerve-related pain, or pain associated with lymphoedema.

It is necessary to evaluate techniques unique to palliative care such as those used for the treatment of lymphoedema and drug resistant pain. Such research should focus upon the potential for physiotherapy to enhance the medical and nursing models of care. Indicators of therapeutic effectiveness need to be cross correlated with indicators of cost-effectiveness to arrive at realistic outcomes in health care.

To help people live with cancer and avoid unnecessary and expensive drug intake, there is a need to increase patient and carer access to physiotherapy services at the community level. The real cost to hospital resources owing to the under-utilisation of physiotherapy services at the community level has yet to be estimated.

## References


Binder A, Parr G and Hazelman B (1984): Pulsed electromagnetic field therapy of persistent rotator cuff tendonitis. *The Lancet* March: 695-697.

Butler D and Clifford L (1989): The concept of adverse mechanical tension in the nervous system. *Physiotherapy* 75: 622-636.

Filsche J and Morrison PJ (1988): Acupuncture for chronic pain: a review. *Palliative Medicine* 2: 1-14.

Fulton C (1994): Physiotherapists in cancer care. *Physiotherapy* 80: 830-834.

Gray R (1989): The role of physiotherapy in hospice care. *Physiotherapy Practice* 5: 9-16.

Kahn J (1987): Principles and Practice of Electrotherapy. London: Churchill Livingstone, pp. 127-152.

McCaffery M and Wolff M (1992): Pain relief using cutaneous modalities, positioning, and movement. *Hospice Journal* 8: 121-153.

Marcant D and Rapin C (1993): Role of the physiotherapist in palliative care. *Journal of Pain and Symptom Management* 8: 68-71.

.Mason M (1993): The treatment of lymphoedema by Complex Physical Therapy. *Australian Journal of Physiotherapy* 39: 41-45.

Mitchie J (1994): An Introduction to Lung Cancer. *Physiotherapy* 80: 844-847.

National Health Strategy (1993): Pathways to Better Health. Issues Paper No. 7, March.

Redpath R (1990): Community-based programmes. In Woodruff (Ed.): Proceedings of a multidisciplinary meeting conducted by the Medical Oncology Group of Australia in Canberra, April 1989. Melbourne: Asperula Pty Ltd, pp. 5-29.

Scott JF (1989): Carcinoma invading nerve. In Wall PD and Melzack R (Eds): Textbook of Pain. (2nd ed.) New York: Churchill Livingstone, pp. 598-609.

Snyder-Mackler L (1989): Electrical stimulation for pain modulation. In Snyder-Mackler and Robinson A (Eds): Clinical Electrophysiology. London: Williams and Wilkins, pp. 203-228.

Strain AJ (1979): Cancer cachexia in man: A review. *Investigation of Cell Pathology* 2: 181-93.

Tasker RR and Dostrovsky JO (1989): Deafferentation and central pain. In Wall PD and Melzack R (Eds): Textbook of Pain. (2nd ed.) New York: Churchill Livingstone, pp. 154-180.

Turk DC and Melzack R (Eds)(1992): Handbook of Pain Assessment. New York: The Guilford Press.

Twycross RC and Lack SA (1990): Therapeutics in Terminal Cancer (2nd ed.) London: Churchill Livingstone, pp. 12-178.

Wiener SL (1993): Differential Diagnosis of Acute Pain by Body Region. New York: McGraw-Hill Inc.

Woodruff R (1993): Palliative Medicine. Adelaide: Asperula, pp. 47-300.