Providing Occupational Therapy in an Intensive Care Unit

(sensory deprivation; rehabilitation, acute care; health facilities, intensive care; services, occupational therapy)

Anne T. Affleck, Sheri Lieberman, Jan Polon, Kerry Rohrkemper

This paper includes information required for establishing and conducting an occupational therapy program in an intensive care unit. Three common problems in the intensive care unit are immobility and prolonged bed rest, sensory deprivation and stress, and prolonged mechanical ventilation. The resolution of these rehabilitation problems through occupational therapy intervention is addressed.

Occupational therapists have served the intensive care patient for many years. For example, therapists on burn units have provided early intervention to help correct and prevent devastating disability and reduce long-term complications. Although patients in other types of intensive care may not need the extensive splinting programs of the burn patient, they may have special problems indicating the need for early intervention.

This article provides information required for establishing and conducting an occupational therapy program in intensive care; describes three problems of the intensive care unit (ICU) patient and the role of occupational therapy as practiced at Stanford University Hospital's Medical Intensive Care Unit (MICU); describes the occupational therapy evaluation format and process used; and illustrates through a case report a specific example of an occupational therapy program for an ICU patient.

Types and Technology of the ICU

It is not unusual for a hospital to house multiple ICUs tailored to meet the needs of particular patients. At Stanford University Hospital, five ICUs care for five different patient groups: medical, surgical, neonate, coronary, and cardiac surgery. To develop an occupational therapy program on a given ICU, the therapist must know the unit's purpose and staff to work supportively with the physician and nursing teams. The therapist should also be aware of nursing priorities and medical goals, be familiar with the members of the health care team, and understand what team members need from occupational therapy. The therapist must also know the patients, specifically those who go to the ICU, their reasons for going there, their diagnoses, the rehabilitation problems for which they are at risk, their medical status, and their care on the ICU.

The MICU at Stanford University Hospital, Stanford, CA 94305.
ity Hospital provides care to the patient who is in critical condition because of illness or injury. Occupational therapists on this unit work with primary nurses, physical therapists, respiratory therapists, dieticians, and social workers as well as a team of physicians. The physician group, which often includes anesthesiologists, pulmonary specialists, internists, and cardiologists, decides whether a patient is in need of the close monitoring that an ICU offers.

The patient must meet at least one of the following four criteria for admission to the MICU:

1. Patient requires 12 hours of nursing care.
2. Patient requires invasive hemodynamic monitoring.
3. Patient requires mechanical ventilation.
4. Patient requires intracranial pressure (ICP) monitoring.

Because of the advanced technology needed for life support and internal monitoring, the ICU is an equipment-laden environment. A patient’s heart rate, blood pressure, and cardiac functions can be constantly observed by using electrocardiogram (EKG) and invasive hemodynamic monitors. These devices are useful for occupational therapists because vital signs can be checked at any given moment during treatment simply by viewing the monitor. It is of the utmost importance that therapists have a thorough knowledge of where invasive lines go, what they do, what problems they can cause, and what precautions they warrant (see Table 1).

Common Rehabilitation Problems

A therapist who understands the basic medical condition of the patient is free to consider rehabilitation problems that might be responsive to occupational therapy intervention. The three problems that commonly occur in the ICU are immobility and prolonged bed rest, sensory deprivation and stress, and prolonged mechanical ventilation.

Immobility and Prolonged Bed Rest

For many patients, the ICU experience is synonymous with immobility. Since these patients are critically ill, supported by an array of high-technology equipment, and frequently experience some level of discomfort, they are often afraid or reluctant to move even when they have the ability to do so. In an amazingly short time (6 to 10 days [1]), the deleterious effects of bed rest and immobilization begin to complicate the patients' clinical condition. The therapist working in an ICU should have a thorough understanding of the seriousness and scope of these side effects because they will be reflected in the patient's performance in all activities (see Table 2). The patient who has been on prolonged bed rest will have very low endurance, low (or no) sitting tolerance, and generalized weakness, but these effects can be reversed. With the physicians' and the nurses' careful monitoring of the patient's status and with the proper management of the equipment in use, patients on occupational therapy programs frequently make rapid gains in cardiovascular endurance, activity tolerance, muscle strength, and functional skills. Helping to reverse the immobility cycle to speed recovery and reduce rehabilitation complications is a major role for occupational therapy in intensive care.

Activities that may be used in programming for patients on conditioning programs include bed mobility, transfer training, graded self-care, avocational or stress management activities, and communication activities. Activities can be graded in terms of length of treatment time, amount and speed of active movement, level of assistance given, adaptive aids, and position and postural support. The most important parameter in grading a task is the patient's physiological response. The patient's level of activity can be upgraded only when vital signs, symptoms, and respiratory function are acceptable at the existing level of activity. EKG for cardiac activity, heart rate, mean arterial pressure (MAP) or blood pressure, respiratory rate, and physical signs are monitored before, during, and after activity to assess tolerance. Guidelines for physiological responses to activity can be developed in the ICU using the cardiac and respiratory rehabilitation literature (2) and under the direction of the patient's (or ICU's) managing physicians.

Any occupational therapy program represents a coordinated effort that considers the patient's medical needs, nursing procedures, and physical and respiratory therapy programs. Close teamwork provides the patient with a daily schedule that can balance rest, mobilization, and functional recovery directly and effectively.

Sensory Deprivation and Stress

The highly technical environment of the ICU is stressful. The lights are always on, there is often commotion from people walking in and out of the room, and the constant drone of the monitors and ventilators can be so distracting that it makes sleep impossible. Daily living routines are nonexistent since the patient does not
### Table 1
Common Life Support and Monitoring Lines

<table>
<thead>
<tr>
<th>Line/Catheter</th>
<th>Location</th>
<th>Purpose</th>
<th>Precautions</th>
<th>Indications for OTR</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVP</td>
<td>Threaded into the superior vena cava, into right atrium of heart.</td>
<td>Monitors right side of the heart filling pressures. Used to introduce drugs directly into the system.</td>
<td>Line is sutured in. <strong>Do not pull.</strong> Normal CVP is 9–12 mm Hg.</td>
<td>Should not restrict ROM at head, shoulder, or scapula. CVP line should not restrict activity.</td>
</tr>
<tr>
<td>Arterial pressure line</td>
<td>Usually in radial or femoral artery, can also be seen in artery in the foot (dorsum pedis).</td>
<td>Used when continuous monitoring of blood pressure is indicated. Used when frequent blood gases are required (able to obtain blood sample directly from line).</td>
<td>Inserted into an artery; looks like an IV but is not. Usually sutured in. <strong>Do not pull.</strong> Normal MAP is 70–90 mm Hg.</td>
<td>Know patient's normal MAP. Monitor MAP with any change in activity. Notify nurse if safe MAP parameters change. Transducer must be at level of patient's heart for accurate reading.</td>
</tr>
<tr>
<td>Swan-Ganz catheter</td>
<td>Threaded into the superior vena cava, into right ventricle. Pulmonary valve catheter tip rests in pulmonary artery.</td>
<td>Indirectly monitors function of the left side of the heart. Can also obtain CVP and cardiac output readings. Used following open heart surgery, trauma, heart failure.</td>
<td>Line is sutured in. <strong>Do not pull.</strong> Usually patients with this line are in a very acute condition. Check activity orders closely. Nurse monitors PAWP. MAP to be monitored closely.</td>
<td>Specific activity order with specific parameters for each patient's MAP from doctor. Watch pulmonary artery pressure wave for damping with activity.</td>
</tr>
<tr>
<td>TPN</td>
<td>Most commonly seen in subclavian vein.</td>
<td>Used to administer very high concentration of calories. Used often following extensive surgery or trauma. Used when oral or NG intake is inadequate.</td>
<td>Line is usually sutured in. <strong>Do not pull.</strong></td>
<td>Usually activity is indicated secondary to high calorie intake. Line should not restrict mobility or ROM.</td>
</tr>
<tr>
<td>Neurological monitors</td>
<td>Examples: 1. IVC 2. Subarachnoid bolt, Richmond bolt</td>
<td>Monitors ICP following surgery or trauma.</td>
<td>Head of bed usually limited to no more than 30°. Normal ICP not to be more than 15 mm Hg.</td>
<td>Usually on bed rest; check with physician.</td>
</tr>
<tr>
<td></td>
<td>1. IVC tip rests in the ventricle of the brain.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Subarachnoid space—CSF in contact with column of H₂O to measure pressure</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chest tube</td>
<td>Usually through intercostal or subcostal space into pleural space.</td>
<td>Drain fluid from chest cavity. Restoration of normal pressure relationships within pleural space.</td>
<td>Usually sutured in. <strong>Do not pull.</strong></td>
<td>Avoid tension, torque, or kinking.</td>
</tr>
</tbody>
</table>

CSF, cerebrospinal fluid. CVP, central venous pressure. ICP, intracranial pressure. IV, intravenous. IVC, intraventricular catheter. MAP, mean arterial pressure. NG, nasogastric. OTR, occupational therapist, registered. PAWP, pulmonary artery wedge pressure. ROM, range of motion. TPN, total parenteral nutrition.

bathing, dressing, or eating in the usual non-Skin-specific manner, and the environment offers few, if any, alternative cues to mark the passage of time. To prevent the introduction of bacteria into the environment, no plants or flowers are allowed. Visiting hours are limited to 15 minutes every four hours. A nurse is in the room around the clock; privacy is almost impossible. The lines and tubes that invade the body not only physically limit mobility but also psychologically restrict freedom of movement for fear of pain or dislodging a line.

The ICU has all of the characteristics of the "low stimulus envir-
sources of stress, together with the Occupational therapy programs of gastro-intestinal delirium (5). Most seriously, moti- erance, and light hygiene, can help mation to live and participate in life-saving medical and nursing regi-
ments may be negatively affected (3).


day living (ABL) programs, including bed mobility, transfers, sitting toler-
ance, and light hygiene, can help restore a sense of daily routine and personal independence.

Relaxation techniques (see Figure 1) can be incorporated with reality-orienting programs to provide organized, patterned stimulation and to develop an increased sense of personal control (6). Finally, individualized activity programs using meaningful tasks can be used to promote cognitive and motor recovery in the patients and to enhance their motivation to participate in an overall care plan (see Figure 2).

Prolonged Mechanical Ventilation

Mechanical ventilation is commonly used to sustain cardiopulmonary homeostasis in critical care patients. To provide safe and efficient care, the occupational therapist working in the ICU must understand the purpose and goals of ventilation support. Figure 3 explains the divisions of lung capacity and Figure 4 the terminology used in MV. Tidal volume represents a measure of the amount of gas expired during normal breathing. Inspiratory reserve is the volume of gas between resting breathing and the upper limit of one’s lung capacity. Conversely, expiratory reserve is the volume of gas between normal expiration and maximum voluntary exhalation. Finally, residual volume is that amount of gas remaining in the lungs beyond maximum voluntary exhalation (7). A patient becomes a candidate for MV when inadequate gas exchange takes place. Changes in lung capacity values, as well as other measures, reflect the patient’s changing medical status.

Since the diagnoses that precipitate the need for MV are numerous, thinking about indications for commitment to a ventilator in terms of cardiopulmonary patho-

Table 2

<table>
<thead>
<tr>
<th>Function</th>
<th>Negative Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cardio-vascular</td>
<td>Orthostatic hypotension—secondary to loss of general muscle tone and decreased efficiency of orthostatic neurovascular reflex control</td>
</tr>
<tr>
<td></td>
<td>Increased work load—secondary to increase in cardiac output and in supine position</td>
</tr>
<tr>
<td></td>
<td>Thrombus formation—secondary to venous stasis with lack of muscle contraction in legs, and secondary to increased viscosity of blood with bed rest</td>
</tr>
<tr>
<td></td>
<td>Hypovolemia—secondary to the fluid shifts that take place in the body as horizontal posture is assumed</td>
</tr>
<tr>
<td>Respiratory</td>
<td>Slowed respiratory rate—to compensate for reduced demand of gaseous exchange</td>
</tr>
<tr>
<td></td>
<td>Oxygen–carbon dioxide imbalance—resulting in hypoxemia</td>
</tr>
<tr>
<td></td>
<td>Decreased respiratory movement—secondary to prolonged counterresistance of bed or chair on rib cage</td>
</tr>
<tr>
<td></td>
<td>Stasis of secretions—threatening patent airways resulting in bronchitis, pneumonia, medium for bacterial growth</td>
</tr>
<tr>
<td>Motor</td>
<td>Contractures—secondary to lack of active movement, ROM</td>
</tr>
<tr>
<td></td>
<td>Muscle atrophy—secondary to lack of active muscle contraction</td>
</tr>
<tr>
<td></td>
<td>Decubitus ulcers—secondary to lack of weight shifting off bony prominences; most likely to appear in malnourished persons with negative nitrogen balance</td>
</tr>
<tr>
<td></td>
<td>Osteoporosis—secondary to lack of stress on bone with muscle contraction and weight bearing</td>
</tr>
<tr>
<td>Metabolic</td>
<td>Decreased metabolic rate—secondary to decreased energy requirements</td>
</tr>
<tr>
<td></td>
<td>Accelerated catabolic activity—leading to protein deficiency and negative nitrogen balance and excretion of electrolytes</td>
</tr>
<tr>
<td></td>
<td>Change in body temperatures—increasing perspiration with loss of fluids and electrolytes</td>
</tr>
<tr>
<td></td>
<td>Decreased production of adreno–cortical hormones—changing metabolism of carbohydrates, protein, and fat, and changing electrolyte balance of sodium, potassium, chloride</td>
</tr>
<tr>
<td>Gastro-intestinal</td>
<td>Ingestion—within 6 to 10 days of bed rest, nitrogen balance reverses to a negative state accelerating catabolic activity resulting in protein deficiency and eventually anorexia</td>
</tr>
<tr>
<td></td>
<td>Elimination—immobility interferes with visceral reflex patterns causing loss of defecation reflex, diminished expulsion power resulting in constipation, fecal impaction</td>
</tr>
</tbody>
</table>


ROM, range of motion.
physiology can be helpful. The two most general objectives of MV are to assist or replace the action of the thoracic/abdominal musculature in effecting gas exchange in the lungs and to mechanically manipulate lung volumes to alter a pathophysiological process (7). Specific indications for and goals of MV are noted in Table 3.

The care and maintenance of the ventilator is the responsibility of the respiratory therapist. Guidelines for ventilator settings are determined by the physician according to the patient's needs. Blood gases, clinical findings, and the underlying disease process are all considered in determining each patient's ventilator program. The ultimate goal is to discontinue MV as early as the patient is able to tolerate independent breathing physiologically and psychologically.

To determine physiological readiness for independent breathing, a physician looks for specific indications of improving respiratory function. Measures that reflect a patient's progress include the following:

1. Decreasing intermittent mandatory ventilation (IMV);
2. Improving tolerance for altering IMV and longer duration of lower IMV;
3. Improving mean inspiratory force;
4. Improving vital capacity; and
5. Decreasing fraction of inspired air (F1O2) or decreasing positive and expiratory pressure (PEEP).

Many patients, particularly those with a primary lung disease or those who receive MV over an extended period of time, become physically and psychologically accustomed to having the machine breathe for them (7). In these situations, levels of O2 and the number of breaths per minute given by the ventilator (IMV) are gradually reduced to allow the body to adapt to independent breathing. This program helps the patient build confidence in his or her own ability to breathe.

Even with a gradual "weaning" program, coming off the ventilator can be unpleasant. Weakened musculature and reduced anaerobic capacity combine with other effects of bed rest to make this program a challenge for the patient. Stress also complicates the weaning process. Patients already physically stressed may experience a sensation of breathlessness as IMV is reduced. This "air hunger" can result in a "fight or flight" response in some patients. Since this stress

---

**Figure 1**
Common stress reduction techniques

1. Breathing—Rapid and/or shallow breathing is one component of a physiological awareness and control response to stress. By learning breathing, individuals can begin to reverse their own "fight or flight" response and alter their experience of stress.
2. Imagination—Visualization, or the active focusing of attention on healing images, successful treatment, or a state of health can be used to reduce tension and anxiety and to mobilize inner resources toward recovery. Guided imagery is a more passive resting of attention and a self-directing as one listens to music or a voice and imagines a particular "haven" from a stressful experience.
3. Autogenic training—Based on the work of Oskar Vogt,* this systematic program is designed to teach the body and mind to respond quickly and effectively to self-generated commands to relax.
4. Progressive relaxation—Progressive relaxation uses the voluntary tensing and releasing of muscle groups to identify muscles and muscle groups holding tension in the body. Individuals are taught to distinguish between tension and deep relaxation, and to begin to control the level of muscle tension they experience.
5. Relaxation music—Peaceful, soothing music that uses no lyrics and does not evoke an emotional response can be used alone or in tandem with other techniques to reduce stress.
6. Meditation—As practiced independently of any religious or philosophical orientation, meditation is an experiential exercise involving the resting of an individual's attention and focus on one object, thought, or word for a period of time.

---


---

**Figure 2**
Occupational therapy treatment in the ICU stress pattern

- Sensory deprivation
- Perceptual isolation
- Immobility
- Social isolation
- Sleep disruption
- Neurological disorganization
- Depression
- Apathy
- Loss of motivation
- Disorientation
- Decreased ability to participate
- Increased personal organization, motivation, ability to cooperate
- Assist to active wellness cycle
- Reality orienting
- Stress reduction
- Introduction of ADL
- Purposeful activity
- Organized stimulation program
- Decreased ability to get well
- Occupational therapy treatment
- ADL, activities of daily living.
The divisions of total lung capacity (TLC)

- **Inspiratory Reserve Volume (IRV)**
- **Tidal Volume (TV)**
- **Expiratory Reserve Volume (ERV)**
- **Residual Volume (RV)**
- **Inspiratory Capacity (IC)**
- **Vital Capacity (VC)**
- **Functional Residual Capacity (FRC)**

Note: Total lung capacity (TLC) is the maximum amount of air the lungs can hold. The TLC is divided into four primary volumes: inspiratory reserve volume (IRV), tidal volume (TV), expiratory reserve volume (ERV), and residual volume (RV). Capacities are combinations of two or more lung volumes: inspiratory capacity (IC), functional residual capacity (FRC), and vital capacity (VC). Adapted from Shapiro, B. A.: Clinical Application of Respiratory Care. Chicago: Year Book Medical Publishers, 1975, p. 64.

**Figure 4**
Terminology of mechanical ventilation

- **Control mode**: Depth and frequency of breaths determined by the ventilator. Patient is unable to override.
- **Assist/control**: Ventilator will deliver a specified number of breaths/minute at a predetermined volume. Patient efforts can also cycle the ventilatory initiating additional volume preset breaths.
- **Intermittent mandatory ventilation (IMV)**: At specific intervals, the ventilator will cycle, delivering a volume preset breath. In between machine breaths, the patient may breathe at whatever frequency and tidal volume is comfortable.
- **Constant positive airway pressure (CPAP)**: Spontaneous ventilation with a continuous distending pressure applied to the airway for the purpose of improving gas exchange.
- **Positive end expiratory pressure (PEEP)**: A maneuver during expiration in which the airway and intrathoracic pressures are not allowed to return to atmosphere. PEEP increases functional residual capacity to decrease the potential for alveolar collapse.
- **Fraction of inspired air (FiO2)**: Indicates the percentage of O2 delivered per breath. Normal room air is 21% O2.

The therapist helps patients come off the ventilator by giving them short sessions of physical therapy and occupational therapy interspersed into their daily schedule. During therapy, the IMV is increased, which gives the patient the respiratory support that is necessary to stress the musculoskeletal system and combat deconditioning. When the activity is completed, the patient is rested on an IMV at, or slightly below, the usual resting rate. The alternating periods of work and rest between musculoskeletal and respiratory system workouts allow the patient to increase overall strength and endurance in a more balanced and natural fashion. The gradual increase in activity tolerance can help patients come off the ventilator with reduced physical and psychological stress.

A therapist may use clinical observation, patient response, and physiological measures to monitor the patient's status. The physician, however, directs the ventilator weaning program, setting the target values and identifying critical
Table 3
Indications for and Goals of Mechanical Ventilation

<table>
<thead>
<tr>
<th>Indication</th>
<th>Goal of Mechanical Ventilation*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ventilatory failure—the inability of a</td>
<td>&quot;To provide the pulmonary system</td>
</tr>
<tr>
<td>patient to clear enough CO₂/minute to</td>
<td>with the mechanical power to</td>
</tr>
<tr>
<td>match metabolic production. Examples:</td>
<td>maintain physiologic function.&quot;</td>
</tr>
<tr>
<td>drug overdose, spine trauma.</td>
<td></td>
</tr>
<tr>
<td>Severe, intractable hypoxemia—failure</td>
<td>&quot;To manipulate the ventilatory</td>
</tr>
<tr>
<td>to maintain acceptable blood O₂ level</td>
<td>pattern and airway pressure for</td>
</tr>
<tr>
<td>of inspired O₂. Examples: pneumonia,</td>
<td>purposes of improving the</td>
</tr>
<tr>
<td>pulmonary edema.</td>
<td>efficiency of ventilation and/or</td>
</tr>
<tr>
<td>Prophylaxis—to prevent or minimize the</td>
<td>oxygenation.&quot;</td>
</tr>
<tr>
<td>potential effects of disease or injury.</td>
<td>&quot;To decrease myocardial work by</td>
</tr>
<tr>
<td>Example: mechanical hyperventilation</td>
<td>diminishing the work of breathing</td>
</tr>
<tr>
<td>for cranial trauma.</td>
<td>and improving ventilatory</td>
</tr>
<tr>
<td></td>
<td>efficiency.&quot;</td>
</tr>
</tbody>
</table>


measures of independence for any given patient according to that patient's particular diagnosis and needs.

In treating the ICU patient, the team members have specific roles. The physician always determines candidacy and rate of program progression. The respiratory therapist always adjusts the IMV or any other ventilator parameters as requested by the medical team. The nurse is always present and, with the therapist, monitors the patient's response. The physical therapist provides exercise; the occupational therapist provides meaningful and functional tasks such as stress management activities, ADL, or patient-selected activities. Together these team members contribute to increasing the ICU patient's independence.

Occupational Therapy Evaluation

The occupational therapy evaluation encompasses the physical as well as emotional status of the patient, and it serves as a baseline from which to establish the occupational therapy program. In the ICU, the occupational therapy program focuses on the patient's functional status.

Since a good understanding of the patient's medical status, emotional state, motor function, endurance, and cognition is preliminary to a meaningful therapeutic intervention, a thorough chart review is conducted. Primarily noted are the following: significant past medical history (including major surgeries and hospitalizations), hospital course since admission, special precautions (i.e., activity limitations), social history, prior level of function, and the patient's goals. The therapist also checks with the patient's primary nurse for any significant current information that may not yet have been written into the medical record. The nurse is also helpful in giving a general, overall picture of the patient's status, including his or her ability to participate in self-care activities.

Once a general understanding of the patient's condition is obtained from reading the chart and uncertainties are clarified by talking to the nurse, the physician, and other team members, the initial evaluation process is begun. Because of the complexity of the ICU patient's clinical condition, this process can last from 1 to 2 days (or two to four treatment sessions). During this time, the therapist remains alert to any changes in the patient's physical status caused by the evaluation itself. The values of the patient's mechanical monitors and the patient's physical signs and symptoms should be observed continuously. If in doubt, the therapist consults the patient's primary nurse before proceeding.

The Physical and Occupational Therapy Data Base (see Figure 5) is used to guide both physical and occupational therapy evaluation. The data base includes the treatment plan, a profile of the patient, a physical assessment, and a functional assessment. It is completed within 48 hours of referral. Based on the information collected during this general evaluation, specific consultations are requested for needed service. For example, an abnormal gait would indicate the need for physical therapy. Conversely, if a physical therapist notices functional limitation, the occupational therapist is consulted.

Besides completing the data base, the occupational therapist attempts to establish a strong, one-to-one relationship with the patient. Rapport between patient and therapist is crucial for open communication about changing needs and desires within the treatment process. Patients must feel the security of having control over aspects of their occupational therapy program if they are to be successful in achieving their goals.

Case Study

A description of the occupational therapy treatment of the ICU patient whose evaluation appears in Figure 3 follows. Frequency of one treatment per day was interrupted by daily dialysis, fatigue, nursing care, respiratory therapy treatment, and, occasionally, an unstable medical status. Al-
though treatment was scheduled to coordinate with treatment of other disciplines, a high flexibility in scheduling and frequent checkback visits were required to ensure that the treatment plan was implemented. Physical therapy’s treatment plan was dovetailed with occupational therapy’s treatment to serve this patient’s immediate needs in the best possible way.

**Day 1:** Initiated instruction in stress reduction. Began practice in the basic relaxation technique of deep, diaphragmatic breathing. Patient also good candidate and receptive to use of guided imagery and independent visualization of relaxing experiences to help cope with discomfort and stress. Following instruction, ventilator weaning begun.

**Day 2:** Began practice of visualization. Patient able to use technique with assist for setup. Patient up to chair with assist of four people via flat gurney, which folded into a chair so sitting posture could be graded slowly from supine. Patient’s response to position change closely monitored using heart rate, blood pressure, and physical signs and symptoms. Provided Roho cushion, seat belt, and lap tray to support patient in a semireclined position. Tolerance: 15 minutes.

**Day 3:** Patient assessed for hand splints while being prepared for dialysis. Because of limited active range of motion (ROM) and edema, resting hand splints fitted to prevent loss of ROM and to preserve tendon and joint integrity. Nursing staff instructed in the splint wear schedule and splinting augmented by physical therapy and nursing performing passive ROM.

**Day 4:** Splint checks and splint modification continued. Communication program initiated while patient sitting. Patient encouraged to mouth words and use nods for communication as well as for strengthening of head, neck, and oral musculature. Attempted use of Zygo communication board, which required patient to activate the light scanner with thumb. Finding this too frustrating, patient chose to practice oral communication. A speech therapy consultation recommended to assess patient for use of Cooper-Rand talking device.

**Day 5:** Patient taken off ventilator for part of day. Patient fatigued from dialysis earlier. Relaxation techniques reviewed while up in chair. Supports from head withdrawn to work briefly on head control.

**Day 6:** In daily sitting tolerance activity, patient able to be out of bed 45 minutes with 80° hip flexion, with head support withdrawn intermittently for 1 to 2 minutes. Introduced functional activities in chair including light self-care tasks and writing practice. An oral bulbar evaluation revealed oral weak-
Figure 5 (continued)

<table>
<thead>
<tr>
<th>Movement/Function</th>
<th>Right</th>
<th>Left</th>
<th>Strength</th>
<th>Range of Motion</th>
<th>Structural Abnormalities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arm Extension</td>
<td>10°/145°</td>
<td>0°/90°</td>
<td>Normal</td>
<td>0°/180°</td>
<td>Hyperextension</td>
</tr>
<tr>
<td>Arm Flexion</td>
<td>0°/90°</td>
<td>0°/90°</td>
<td>Normal</td>
<td>0°/180°</td>
<td>Hyperextension</td>
</tr>
<tr>
<td>Shoulder Flexion</td>
<td>0°/90°</td>
<td>0°/90°</td>
<td>Normal</td>
<td>0°/180°</td>
<td>Hyperextension</td>
</tr>
<tr>
<td>Shoulder Extension</td>
<td>10°/145°</td>
<td>0°/90°</td>
<td>Normal</td>
<td>0°/180°</td>
<td>Hyperextension</td>
</tr>
</tbody>
</table>

**Muscle Tone**
- Right UE: Normal
- Left UE: Spasticity (mild)

**Motor Function**
- Right UE: Active motor function noted at shoulder
- Left UE: No active motor function noted at shoulder

**Gait Analysis**
- Right: Hypotonic
- Left: Hypotonic

**Social History**
- 10 month history of Hodgkins Disease treated with X-Ray therapy and chemotherapy

**Admission**
- 4/2/64: Sclerosis of pleural space
- 4/27/84: Bilateral pleural effusions
- 5/22: Tracheotomy
- 5/23/84: Occupational Therapy Consult
- 5/4: To DR for retrieval of intravascular transected Swann-Gant catheter
- 5/7: Right IJ Swann-Gantz placed
- 5/10: PEEP

**Assessment**
- General Appearance: Young female, supine on clinic bed
- Mental Status: Awake, appears oriented
- Communication: Unable to understand due to trach and weakness
- Behavior: Lethargic, shows frustration
- Vision: Grossly intact
- Hearing: Appears normal
- Speech: Unable to understand secondary to trach and weakness

**Assessment Summary**
- Right UE:
  - Tolerates sitting 10 minutes at 30°
  - Flexion: 90°/90°
  - Hyperextension of MP joints
  - Marked edema in left hand
- Left UE:
  - Tolerates sitting 10 minutes at 30°
  - Flexion: 90°/90°
  - Hyperextension of MP joints
  - Marked edema in left hand

**ASSESSMENT**
- Bone and Joint: Normal
- Motor Function: Normal
- Muscle Tone: Normal
- Sensory Function: Normal
- Range of Motion: Normal
- Strength: Normal
- Balance: Normal
- Gait: Normal

**ASSESSMENT**
- Right: Normal
- Left: Spasticity (mild)

**ASSESSMENT**
- Nociception: Normal
- Autonomic Function: Normal
- Neurological Function: Normal
- Cardiac: Normal
- Respiratory: Normal
- Genitourinary: Normal
- Digestive: Normal

**ASSESSMENT**
- Wound: Decubitus on inside of buttocks and sacrum

**ASSESSMENT**
- Assistive Equipment In Use
  - Walker
  - Toilet
  - Chair

**ASSESSMENT**
- Personal Care: Out-of-town

**ASSESSMENT**
- Activity Limitations: Normal
- Participation: Normal

**ASSESSMENT**
- Medical History: Extensive
- Social History: Extensive
- Family: Out-of-town

**ASSESSMENT**
- Health Status: Overall satisfactory
- Treatment: None

**ASSESSMENT**
- Psychological: Normal
- Social: Normal
- Occupational: Normal

**ASSESSMENT**
- Employment: Unable to work
- Education: Intact

**ASSESSMENT**
- Self Care:能力有限
- Communication: Unable to understand secondary to trach and weakness

**ASSESSMENT**
- Social and Economic Status: Normal

**ASSESSMENT**
- Mental Status: Awake, appears oriented
- Communication: Unable to understand due to trach and weakness
- Behavior: Lethargic, shows frustration
- Vision: Grossly intact
- Hearing: Appears normal
- Speech: Unable to understand secondary to trach and weakness

**ASSESSMENT**
- Right UE:
  - Tolerates sitting 10 minutes at 30°
  - Flexion: 90°/90°
  - Hyperextension of MP joints
  - Marked edema in left hand
- Left UE:
  - Tolerates sitting 10 minutes at 30°
  - Flexion: 90°/90°
  - Hyperextension of MP joints
  - Marked edema in left hand

**ASSESSMENT**
- Bone and Joint: Normal
- Motor Function: Normal
- Muscle Tone: Normal
- Sensory Function: Normal
- Range of Motion: Normal
- Strength: Normal
- Balance: Normal
- Gait: Normal

**ASSESSMENT**
- Nociception: Normal
- Autonomic Function: Normal
- Neurological Function: Normal
- Cardiac: Normal
- Respiratory: Normal
- Genitourinary: Normal
- Digestive: Normal

**ASSESSMENT**
- Wound: Decubitus on inside of buttocks and sacrum

**ASSESSMENT**
- Assistive Equipment In Use
  - Walker
  - Toilet
  - Chair

**ASSESSMENT**
- Personal Care: Out-of-town

**ASSESSMENT**
- Activity Limitations: Normal
- Participation: Normal

**ASSESSMENT**
- Medical History: Extensive
- Social History: Extensive
- Family: Out-of-town

**ASSESSMENT**
- Health Status: Overall satisfactory
- Treatment: None

**ASSESSMENT**
- Psychological: Normal
- Social: Normal
- Occupational: Normal

**ASSESSMENT**
- Employment: Unable to work
- Education: Intact

**ASSESSMENT**
- Self Care: 能力有限
- Communication: Unable to understand secondary to trach and weakness

**ASSESSMENT**
- Social and Economic Status: Normal
ness and depressed gag reflex from presence of nasogastric tube. No other feeding problems noted. Puree diet orders recommended until tubes could be removed and oral strength was regained.

**Day 7:** Patient fatigued after dialysis and respiratory therapy treatment. Refused occupational therapy.

**Day 8:** Continued splint check and change in wearing schedule. Patient up in chair for light hygiene and writing activity. Encouraged to use Cooper-Rand talking device throughout occupational therapy treatment to express fears, frustrations, and needs. Resulted in successful communication. Patient care conference: discharge plan to transfer patient to non-ICU care closer to her home. Patient also a candidate for placement in a rehabilitation hospital in her town.

**Day 9:** Patient in chair and wheeled outdoors with O2 on trach collar and three intravenous (IV) lines with occupational therapy and nursing staff for writing activity, oral bulbar stimulation, and head and trunk control activity for 30 minutes. Heart rate and blood pressure monitored frequently.

Discharge status with regard to occupational therapy goals was as follows:
- Patient can successfully mouth words, write, and use Cooper-Rand talking device.
- Patient can perform light hygiene tasks such as oral suctioning and face and upper extremity bathing with materials setup.
- Patient can independently use breathing and visualization activities to manage stress.
- Patient can sit in a position of hips flexed at 80° for 45 minutes per day and can sit forward without back support with minimal assist.
- Patient’s head and neck ROM are within normal limits.
- Splinting program is to be continued; no loss of ROM or skin integrity has occurred throughout extremities.
- Patient is ready to begin feeding program, can manage ice chips.
- Patient can receive further occupational therapy in hometown rehabilitation facility.

**Summary**

This article identified information needed to establish an occupational therapy program in an ICU. The role of occupational therapy was described as helping patients recover from the following three common problems: (a) immobilization and bed rest; (b) sensory deprivation and stress; and (c) prolonged MV. A case study demonstrated the occupational therapy evaluation procedure and treatment program. Although special knowledge is needed to function effectively in the ICU setting, the role of the occupational therapist in this setting is similar to the occupational therapist’s role in other areas of physical disability practice. The consistent theme is the use of purposeful activity to reduce rehabilitation complications and maximize the patient’s independence.

**REFERENCES**

2. Fodero D: Occupational Therapy Orientation to Cardiac Rehabilitation. San Jose, CA: Santa Clara Valley Medical Center, pamphlet, 1983