ACUTE REHABILITATION: PROGRESS THROUGH A TEAM APPROACH

SCOTT A. CAMPBELL, ASSISTANT DIRECTOR OF ADMISSIONS (LEIR)

On behalf of the panel, I'd like to thank the Conference Committee, especially Fran Houle and Ray Rempel, for asking us to participate this year. I had the pleasure of being at the Conference in St. Catharines last year and am pleased to be with you again here in Ottawa.

I'd like to introduce the individuals who will participate in today's presentation. While they come from different disciplines, they represent the Interdisciplinary Team and an approach to rehabilitation that removes the limiting boundaries of multidisciplinary focus and allows for interaction, cooperation and integration of individual skills.

Dr. Robert F. Sawicki, a Neuropsychologist, is Director of Neuropsychology at our facility. Dr. Sawicki will be presenting a contextual framework by which to understand brain function and how this relates to the rehabilitation of TBI survivors. Linda Sproat, RN, CRRN, Director of Nursing and a Certified Rehabilitation Nurse will discuss certain aspects of rehabilitation that pertain to the nursing staff but more importantly, how that nurse interacts with other team members in respect to the rehabilitation goals of the patient. Our third member of the panel is Nannette Crawford, MA, CCC-SLP, Director of Speech Language Pathology at LEIR. Nannette will share some ideas relating to early intervention through sensory stimulation as well as those specific team goals relating to speech and communication. Goals of feeding, including stimulation feeding will also be addressed.

To quote Dr. Mike Howard, a noted Psychologist in the field of Head Injury Rehabilitation: "It's not so much what we do but how we do it." This really points to the importance of the Team. The fact is that in recent years there have been no major breakthroughs in the technology of head trauma rehabilitation. However, the team can be the one tool that can be a key element to successful rehabilitation.

Today we hope to show through our presentation how this team approach encourages the sharing of information and interventions. It is this divergence from the typical discipline-oriented focus toward a person-oriented one that makes the integrated functioning of the Team ideally suited to the needs of the Head Injured.

DR. SAWICKI, NEUROPSYCHOLOGIST

Today we are going to offer a model (a way of thinking about) from which to approach the rehabilitation of traumatically brain injured persons. This model is based on one premise: ***the brain is the organ of information processing and response facilitation.*** Consider the usual kind of reports that are received in the hospital after a loved one has been traumatically brain injured. Such reports focus on structural integrity (MRI, CT scan) or gross metabolic activity (EEG, Evoked Potentials). There is relatively little consideration of the manner in which the ability to process information has changed after a severe injury. But in rehabilitation, information processing and limitations of information processing are the key issues. One cannot alter the structure of the injured organ, but one can teach compensatory reasoning and behavioural strategies.

It is amazing that an organ that looks like pinkish-gray jello and weighs approximately 1800 to 2200 grams is responsible for mediating our comprehension of what we see, hear, feel, or emotionally sense; is responsible for organizing our smallest reaction; and evolves the personality style from which we approach each other. It is also amazing that, as important as the brain is, it is left in an anatomically vulnerable position. Anyone who has quickly turned and banged their head into a door frame, a door, or a shelf understands what I am alluding to. That moment of disorientation that follows the blow is a subtle reminder that the brain, not just the skull, was involved in the shock. Not that I am in a position to give recommendations to God, but if I were redesigning the placement of the brain, I would probably hide it deep in the chest where it had some padding around it.

As I was saying, this is the organ which allows us to be who we are in the world. It mediates our personality, it facilitates our sense of humour. As I speak certain brain functions allow me to monitor what I am saying, to organize the topics I wish to present along an internal outline. Signals are being sent which let me know when to start, let me know when I get to the point that I wanted to make, and when to stop. For a moment, think about the examples that I have just given. Each one of them is an example of a brain process at work. A brain process which may be injured during a traumatic event—an accident.

After a brain injury those processes may be slowed, distorted, or altogether eliminated. It is the restoration of such processes as adaptive functions, not as anatomical structure, which is the focus of rehabilitation after traumatic brain injury.

One may use this model to define a focus for an examination which may be used to determine how information processing has changed in the injured brain. Sophisticated neuropsychological examinations are not principally necessary to start such an observational process. One merely needs to observe and to determine where performance in daily activities breaks down or is prevented. One may watch the survivor of a traumatic brain injury go through his or her morning routine and note where performance comes apart: noting particularly the commonalities among performance difficulties.

- Is the problem one of motor planning and coordination
- Is the individual grossly disoriented so that primary responses are defensive rather than coordinated, or situationally appropriate
- Is concentration so disturbed that the individual continually loses his place and appears confused
- Is the limitation primarily one of understanding what others are trying to communicate or is the limitation more of organizing and providing personal communication to others
- Is the problem more related to inability to recall information over time
- Is the problem more related to sensory distortions either in what is seen or what is heard
- Does the individual have difficulty starting, stopping, or modulating the intensity of what is done

As the observation continues the persistent question in the mind of the observer is ***"Where does the performance break down?"*** The answer to this question provides the initial points for rehabilitative intervention. Goals are then defined, not in terms of performance expectations, but in terms of compensatory strategies that are to be learned. The long term goal becomes the application of such learned strategies across a variety of situations, as independently as the individual is capable.

In such an analysis sensory processes may be grouped under the heading of *Channels* by which information is acquired. Findings may range from visual field losses, to changes in hearing threshold, to changes in skin sensation. Mental functions may be organized under the heading of Information analysis, and overt responses may be grouped under the headings of Communication, Mobility, Self-care, Social contact, and Vocational/avocational skills.

Further analysis of someone's performance may also be done along continua of the degree of selective attention required, the degree of modulation required, complexity, conscious control vs. automatic responsiveness, and concrete reasoning vs. inferential reasoning. Again, one may define where along such continua individual abilities break down. The degree to which dysfunction along such continua will be disabling will vary according to the environment in which the individual is expected to live in the long run. Therefore, the most accurate way to approach rehabilitation planning, after the initial assessment of the individual, is to work backwards from the performance expectations of the environment where he/she will be most likely residing. The accuracy of the match between a person's residual capabilities and environmental demands becomes self-evident through such a course of rehabilitation. Thus, long term planning may be readily revised as the degree to which compensatory strategies are acquired, and the external structure necessary to support and accommodate to such structure, evolves.

The slides that I will go through will demonstrate the usual brain injuries suffered consequent to a brain trauma. In a majority of cases, injuries to anterior portions of the brain: the portion which rests behind the bony orbits of the eyes; the anterior portions of the temporal lobes, which are diagonally below these frontal areas; and the brain stem, which is a connecting stalk between the cerebral hemispheres and the cerebellum are the primary sites of injury. Given these predominant sites, it is not unusual that common sequelae of traumatic brain injury include personality changes (anterior limbic injuries), memory disorders (subcortical, mesial temporal injuries), and coma (brainstem injuries).

The slides also demonstrate that injury is scattered through the brain tissue following radiations of physical force. The most common such effect is the coup (site of force) and contré coup (opposite side to where force was applied) effect. However, in all severe injuries one may find microscopic rips and tears scattered throughout brain tissue. As seen in the slides small dots of blood (punctate hemorrhages) and small tears may be observed throughout the tissue. Thus, the effects of trauma on the brain usually compromise a wider range of brain functions, than usually encountered after a stroke. Since the immediate effects of a stroke are usually restricted to an area of the brain which is primarily irrigated by the involved blood vessel, the total physical effect of the brain injury is usually not well visualized by CT scan, with only marginal improvement by MRI.

Additional slides demonstrate how performance changes during a drawing task as the site of injury is altered.

Two additional issues deserve a comment. Though it may be preferable that through some ideal compensatory strategy, the survivor of a severe traumatic brain injury somehow learns to independently get around the long term effects of his brain injuries, therefore, to independently perform in the community, this is not usually the case. Effective rehabilitation is a matter of redefinition. That is, if walking as one did before the trauma is the only acceptable goal; then, given the severity of these injuries, we will have relatively few successes. However, if

walking is redefined as MOBILITY, then successful rehabilitation becomes more likely. People can be mobile with canes, walkers, wheelchairs, even electric wheelchairs that are controlled with tongue movements. Similarly, if independent oral speech is the only way to acceptably communicate then rehabilitation may never be successful for a particular survivor. On the other hand, if talking is redefined as COMMUNICATION, then successful rehabilitation becomes more likely. Communication may be achieved through gestures, sign language, or a computer-assisted voice emulator, which can be activated by a variety of switches.

As I have been speaking you have likely noticed that a traumatic brain injury radically changes a human being and undermines his/ her ability to adaptively perform in a wide variety of functional areas. This point brings us to a second issue. No single individual, no single speciality can individually improve such a pervasive disturbance of function. There is too much specialized information in too many specialized areas, for any single profession to hope to master it all and effectively apply it, clinically. This is the primary reason that an interdisciplinary team becomes so important in rehabilitating brain injured persons. And the conceptual difference between interdisciplinary and multidisciplinary is a key element. It is crucial that the treatment team be able to interweave an approach to the survivor rather than treat that individual as if component skills and abilities could be treated from compartmentalized, discipline-oriented vacuums. The individual must act in the world as a whole person, both during rehabilitation and after rehabilitation. The rehabilitation effort directed with that individual must reflect that same unitary, whole-person approach.

LINDA SPROAT, R.N.

My name is Linda Sproat and my background is nursing. When I first began to work in the field of rehabilitation I was intrigued with the interaction that was necessary between nursing and all of the members of the rehabilitation team—the therapists, the doctors and the families. It's been an exciting experience for me and I want to share some of my thoughts while I'm with you today. Dr. Sawicki talked with you about a treatment plan for the patient; I want to give you some understanding of the members of the treatment team and a little bit about their functions and how they might work together to make the treatment plan effective.

First of all it is the team players (the people) that have the responsibility to make it work. The team is comprised of members of traditional therapy areas—occupational therapy, physical therapy, speech therapy, recreational therapy and psychology. The neuropsychologist is responsible for directing the program and identifying the kinds of things that would help that patient's behaviour improve. He determines the treatments that might be most effective for a person with given areas of disability. Other key individuals are the social worker and the families. Without the family knowing what we're doing, why we're doing it, how we're doing it, and knowing how they can help us do it, our treatment plan simply is not going to be successful. It is then this group of people that must communicate daily, weekly, ongoing, minute-to-minute, to find out what is happening with the particular patient.

In every facility there is traditionally a document that is called a care plan or treatment plan. It's very important that nursing's traditional care plan be part of the entire treatment plan. It must be integrated to assure that all team members are working on the same things. The treatment team must determine the most important problems for the patient and set appropriate team goals. What I want to do today is show you how some of this is covered, and ultimately put together. For an individual with many areas of damage to the brain, we would not have just a single area of deficit. We would rather be dealing with many interrelated areas of damage; many functions dependent on each other—none of which are working correctly. This particular team of people are then responsible for determining how to put those pieces back together.

For the sake of simplicity I will break the areas of disability into two major categories. First of all, we are dealing with a lot of cognitive disabilities in these particular patients. We are dealing with a lack of higher cognitive functions, awareness, academic skills, reasoning and memory. We also deal with the more traditional areas of rehabilitation, the physical aspects. However, even with physical restoration, it is not a simple matter. An individual who is very physically involved may also be cognitively involved. That individual will essentially appear comatose. They will be unresponsive; they will be non-moving and non-communicative. You may well have a person that has significant physical involvement, yet fairly good cognitive abilities who cannot communicate with us.

He/she could have very active thought processes but no way of letting us know that and no way of responding to us. Additionally, they may have a tracheostomy tube into the neck for adequate airway and breathing. Because of the presence of the tracheostomy, the patient will not be able to communicate with us. There are a lot of things here that become difficult when you're dealing with the head injury victim. Conversely you may have somebody who has very little physical involvement, but has severe cognitive disabilities. This patient can be difficult to deal with because they can be physically independent but still have a severe lack of awareness in their environment.

Today, I'm going to briefly address several problem areas with you. I'm going to go through them one at a time beginning first with the area of mobility/ambulation. Specifically, I want to talk about that patient who needs to use a wheelchair. First of all their skin needs to be healthy enough to tolerate their being up in a wheelchair. If you're dealing with somebody who's skin integrity is not where it should be, you can't sit them up. Along with that they have to be in a healthy condition. Their respiratory system has to be sufficient so that they can tolerate sitting up; their cardiovascular status has to at least be stable. We would perhaps start them in a lying down position. Remember, we are dealing with somebody who's been bedridden for many months, and it is going to take a very long time to get them into an upright position. You're going to have to call in members of the rehabilitation team, again, to assist in problem solving. You're going to have to call that occupational therapist to help with a proper wheelchair. What is the size of it? What extra things need to be added on to the wheelchair, arm rests, leg rests, and head rests. The occupational therapist is very important in writing that wheelchair prescription. Physical therapy—they have to maintain proper positioning. Maybe you're going to have to schedule some surgical procedures, something as seemingly simple as wheelchair position can end up being a very involved process. But it's vital to their ability to get around to the various places within the hospital, and ultimately their home and community.

Another area of mobility/ ambulation that is very important is their ability to walk. It is necessary to evaluate the patient's ability to ambulate. It's the responsibility of the rehabilitation professionals dealing with the patient to look at all the possibilities and to determine what may be possible and how you go about it. Potential ambulation would involve the physical therapist and occupational therapists for proper crutches, proper braces for the legs and an exercise program. It is very important to let the family know what's going on, they need to understand their role, the safety concerns, and also our realistic expectations for the patient.

Medical management is a vital part of head trauma rehabilitation. We have to have physicians who are committed to putting in the time and effort into the patient's plan of care. The process of de-cannulation (removal of tracheostomy) is an excellent example of team work involving physician, nurses, and speech therapists.

Loss of bladder control is another very large concern in brain trauma. Think back to what I originally said about the cognitive abilities and deficits. We may have a person who physically could be continent, but cognitively they can't quite understand the mechanisms. Or, perhaps the physical control is compromised. Intellectually they know how

to do it, and they want to be continent but physical problems exist. So, again, it's not as easy as just a couple of diagnostic studies to determine the physical abilities.

Nutrition is another large area that we tend to take for granted. If a person does not maintain adequate nutrition, they will not be able to retain optimal toleration of activity. Recall a time during your life during which you had been on a diet or a time in which you had been ill. For whatever reason your nutritional status was compromised. Do you recall being overly tired? You had no stamina. Patients having gone through an acute period of head injury recovery often suffer from a compromised nutritional status. During that period they may have experienced many complications, infections and surgical procedures—their bodies required a lot more calories than we normally do.

As professionals one of our first goals must be to assist the patient in improving their nutritional status, and get them to the point in which they're feeling well again. By doing this, we will improve their attentiveness and tolerance to the rehabilitation program. For an individual who is not an oral eater, the speech therapist must be involved to evaluate their chewing and swallowing abilities. Physical therapists and Occupational therapists have to be concerned with getting them into a proper upright position so that normal swallowing can occur. Often times the patient comes to us with a gastrostomy feeding tube. Ultimately you want to get that removed. But until such a time that removal is possible, the gastrostomy tube must be maintained properly. Is a feeding pump necessary? Should the feeding be maintained on a pump to assure administration? Is diarrhoea a problem? If not, perhaps a bolus feeding is possible. Bolus feedings will provide a more natural feeding pattern of three meals a day. The stomach can then become accustomed to receive a given amount of food at one time.

Ultimately, we want our patients to have some control over their lives. Independence is important to all of us, but there are some very important issues to discuss before this is possible. First—environmental safety. This is an important issue in head trauma rehabilitation. Many times we're dealing with a person who has some decreased safety awareness because of a lack of judgement, decrease of problem solving or distractibility. Safety must then be addressed by every member of the rehab team. It must be identified as a problem and appropriate goals set for the patient so that they can ultimately be allowed to return home to safe environment.

Medication administration is another important topic. We all receive medications through our physician. He prescribes it, we take it on a routine basis; we know why we're taking it, we know the side effects; and we know the problems that could happen. However, with the head injured victim we cannot take this for granted. Most of our patients will go home with medication, or go to another facility on medication. We are hoping that they may be able to take their medication. However, safety and good judgement are areas that certainly need to be addressed by the team.

The structuring of leisure time activities is another important area of consideration. Where will the patient live after discharge? Who will be with him? What kinds of activities might he like to be involved with? What kinds of problems will come up with regard to his or her physical handicaps? A great deal of effort must be put into looking at all these areas. This again involves all departments and centres around the patient and family. A specific program of leisure activities will be outlined in the care plan to provide an organized approach to assisting the patient in developing time management of his leisure interests.

NANNETTE CRAWFORD, MA, CCC-SLP, DIRECTOR, SPEECH-LANGUAGE PATHOLOGY (LEIR)

One area I'd like to address is the subject of feeding. Many speech pathologists and/or facilities do not feed patients at the early stages of recovery. This is an important intervention and we provide oral feedings if there is

no significant medical risk. A cookie swallow study is always done prior to oral feedings. If aspiration is not present, then a cautious oral stimulation feeding program is initiated.

During oral stimulation feedings, we closely monitor: head/ body positioning, frequency of feedings, amount per bite, amount per session, and medical status. As the patient begins to become more aware and as we note cognitive/ physical changes, adjustments are made in the feeding program accordingly, working toward oral nutritional feedings.

Following traumatic brain injury, some aspect of communication is generally affected. I am going to present examples of problems, goals, interventions and how the team works together.

LEVELS I-II (EARLY STAGES OF RECOVERY)

Problem: *Inability to Communicate*
Discharge Goal: *To develop a yes/ no communication system*
Intermediate Goal: *5-10 minutes arousal/session*
Intervention: *Sensory stimulation*

The treatment team works together by providing sensory stimulation to increase arousal. Joint sessions (Occupational Therapy/Speech) are often effective. The Occupational Therapy does range of motion to achieve arousal; the Speech Pathologist presents auditory or visual stimulation while the patient is aroused.

We encourage families to make a personalized stimulation that consists of items meaningful to the patient (e.g., photographs) smells (e.g., perfume, cologne), noisemakers.

LEVEL III (LATE, EARLY STAGE OF RECOVERY)

Problem: *Inability to communicate*
Discharge Goal: *To develop a yes/no communication system*
Intermediate Goal: *To answer familiar yes/no questions*
Intervention: *Present questions, cross-check answers*

The entire treatment team needs to ask and cross-check questions. It is important to cross-check using the same facial expressions and tone of voice. If adaptive equipment is needed Occupational Therapy would assess. Perceptual and positioning problems would be evaluated by Occupational Therapy. PT would assist with positioning as well.

LEVEL V-VI (MIDDLE STAGES OF RECOVERY)

Problem: *Comprised communication characterized by word finding deficits*
Discharge Goal: *Utilize communication strategies to compensate for word finding deficits with external cuing.*
Intermediate Goal: *Convey target information*
Intervention: *Team descriptions*

The focus at this middle level is on compensation. Environmental compensations are provided and compensatory strategies are introduced. At this level patients should not be quizzed. Instead, the information should be provided.

The treatment team interacts by following communication guidelines established by the Speech Pathologist.

LEVEL VII-VIII (LATER STAGES OF RECOVERY)

Problem: *Tangential communication, excessive talkativeness, and social cues are ignored*
Discharge Goal: *To self-monitor verbal output*
Intermediate Goal: *To recognize instances of off topic responses*
Intervention: *Tell patient when responses are off topic*

The focus of treatment is on development and use of compensatory strategies for residual deficits. Video-taping and peer influence are effective in helping with recognition of the problems. Community outings are generally provided by Occupational Therapy and Therapeutic Recreation (TR) (peer influence). Groups are conducted by Occupational Therapy, TR, Speech and Neuropsychology which all contributes to helping the patient recognize his/her problems.

Throughout all the stages of recovery the Nursing Department is helpful by providing 24 hour follow through on the nursing unit. Often the nursing unit is the most natural and spontaneous setting in the hospital. It is important to practice communication in "natural" settings.

The entire treatment team must share a similar philosophy to work together effectively. Functional, real world activities must be incorporated into therapy. Think about the things the person will need to know how to do when discharged from active rehabilitation when choosing therapeutic activities. It is the responsibility of the entire treatment team to provide cognitive retraining.

SUMMARY

We have attempted to demonstrate, in this casual setting that ***"it's not so much what we do but how we do it"*** that determines the quality of intervention in the life of the survivor of acquired brain damage. And how we do it is to provide a group of highly motivated people from a variety of disciplines to assist the person through a complex period of his/ her life.

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