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# Coping with Anxiety Using Behavioural Techniques on Patients with Vertebral-Medullary Injuries

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***Abstract:*** *Vertebral-medullary injury named also traumatic spinal cord injury (TSCI) is a neurological disorder consisting of damage to the spinal cord. As a result, the cord`s normal anatomic, sensory or motor functions change. It is a major life event that can lead to physical disability, which also has a great impact on the psychological function of the persons involved, altering their quality of life.*
*The most important aspect of clinical care for the TSCI patient is preventing complications and disabilities related to the medical condition, such as anxiety. This article highlights the importance of behavioural therapy including relaxation techniques, in decreasing the anxiety level related to the medical condition.*

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## I. Introduction

According to the Farlex Medical Dictionary, the traumatic spinal cord injury (TSCI) is defined as: "Any trauma to the spinal cord or cauda equina that may result in long-term neurologic deficit, which can be loosely divided into primary injury (which occurs at the time of initial injury and may include intervertebral disk herniation, vertebral fracture or luxation, penetrating injury and vascular anomalies) and secondary injury (which is multifactorial and encompasses the biochemical and vascular events that result in progression of injury)" [1].

The Frankel Grade classification provides an assessment of spinal cord function and is used as a tool in spinal cord injury, as follows [2]

- "Grade A: Complete neurological injury - No motor or sensory function detected below level of lesion
- Grade B: Preserved sensation only - No motor function detected below level of lesion, some sensory function below level of lesion preserved
- Grade C: Preserved motor, non-functional - Some voluntary motor function preserved below level of lesion but too weak to serve any useful purpose, sensation may or may not be preserved
- Grade D: Preserved motor, functional - Functionally useful voluntary motor function below level of injury is preserved
- Grade E: Normal motor function - Normal motor and sensory function below level of lesion, abnormal reflexes may persist "

The extent of injury is defined by the American Spinal Injury Association (ASIA) Impairment Scale (modified from the Frankel classification) as follows: [3]

- "A = Complete: No sensory or motor function is preserved in sacral segments S4-S5
- B = Incomplete: Sensory, but not motor, function is preserved below the neurologic level and extends through sacral segments S4-S5
- C = Incomplete: Motor function is preserved below the neurologic level, and most key muscles below the neurologic level have a muscle grade of less than 3
- D = Incomplete: Motor function is preserved below the neurologic level, and most key muscles below the neurologic level have a muscle grade that is greater than or equal to 3
- E = Normal: Sensory and motor functions are normal"
- Patients with TSCI can suffer temporary or permanent neurologic deficits and disability.

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Consequently, the level of anxiety in patients that suffered TSCI is greater than in the general population[4]. The anxiety symptoms increase with prolonging the rehabilitation time in recovery institutions.

Contractures are a common complication of spinal cord injury. They are characterized by limited joint range of motion and deformity. Contractures are undesirable because they impair mobility and function, diminish effectiveness of locomotor training programs and lead to disability and pain[5].

Patients with unstable injuries and decreased neurological status are usually subjected to surgery [6].

"The more incomplete the injury is, especially on initial examination at 72 hours to 1 week after the injury has occurred, the more favourable the potential for neurologic recovery" [7].

The patients` participation is of great importance in the rehabilitation process, the medical team facilitating this process for each patient [8,9].

## II. Diagnostic Criteria

According to the Diagnostic and statistical manual of mental disorders 4th ed. (American Psychiatric Association, 2000) diagnostic criteria for Anxiety disorder due to a general medical condition are [10]:

A. Prominent anxiety, Panic Attacks, or obsessions or compulsions predominate in the clinical picture.

B. There is evidence from the history, physical examination, or laboratory findings that the disturbance is the direct physiological consequence of a general medical condition.

C. The disturbance is not better accounted for by another mental disorder (e.g., Adjustment Disorder with Anxiety in which the stressor is a serious general medical condition).

D. The disturbance does not occur exclusively during a delirium.

E. The disturbance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning.

*Important to be noted:*

- **Generalized Anxiety**: if excessive anxiety or worry about events or activities predominates in the clinical presentation
- **Panic Attacks**: if Panic Attacks predominate in the clinical presentation
- **Obsessive-Compulsive Symptoms**: if obsessions or compulsions predominate in the clinical presentation "

## III. Comparative Study Cases

**The first case** is of -I.I., male, 39 years old, a mechanical engineer.

He was admitted to the Recovery Institute after suffering a domestic accident following witch he suffered a spinal cord injury at T11-T12 level for which he was surgically treated. He was referred for admission with the diagnosis of:

a) spastic para-paresis after being operated for vertebro-medullar trauma at T11- T12 level and of

b) anxiety disorder due to the general medical condition.

At admission time, he accused pain at the lumbar level, motor deficit at lower limbs (left > right), locomotion and self-care deficit and anxiety manifested with gastrointestinal discomfort, breathing and sleeping problems.

At the clinical examination, he was found to have: dorsal scoliosis, mechanical pain at lumbar level (VAS=5), limitation of the lumbar movement in the flexion movement, lumbar paravertebral muscular contracture and absent Dural syndrome. Regarding the lower limbs, he was found with: bilateral motor deficit (left > right), global muscular hypotrophy (left > right), muscular hypotonia (left > right), distal bilateral hypoesthesia (left > right), ablated tonic reflexes, dorsal flexion of the legs possible, impossible plantar flexion, global muscle strength diminished (3/5). The patient used a wheelchair for moving.

There was no significant medical history data prior to the spinal cord injury.

The family environment was organized, consisting of husband, wife and a child. They lived in a four-room apartment.

The wife described him as an intelligent person, ambitious, organized, with a constant tendency to try to have all things under control. He had interest in spending time with family, reading and listening to music.

**The second patient** is K. S, male, 60 years old, a professional driver.

He was admitted in the Recovery Institute after being involved in a car accident as a passenger resulting in a spinal cord injury at T4 level for which he was surgically treated. He was referred for admission with the diagnosis of: a) spastic para-paresis after vertebro-medullar trauma at T4 level and of b) anxiety disorder due to the general medical condition.

At admission, he accused paretic spastic motor deficit in both lower limbs (right > left), plantar bilateral neuropathic pains at locomotion, self-care deficit and anxiety manifested with a constant restless state, muscular pains, headaches and gastrointestinal disorders.

At clinical examination, the following were found: voluntary motor control on the left limb and absent control at distal level on the right limb (poor dorsal and plantar flexion of the toes), altered voluntary motor control on the thigh flexor muscles on the right side, spasticity on the calf extensor on the right side, clonus present in the right

limb, bilateral muscular tonus present, distal bilateral hypoesthesia (left < right) and plantar paraesthesia. The patient used a wheelchair for moving.
Regarding significant history medical data, the patient was known with acute myocardial infarction and type II diabetes.
Regarding collateral family medical history, we can mention that the patients` mother suffered a stroke and his father had arterial hypertension (AHT) and type II diabetes.
The family environment was organized, consisting of husband, wife and three children. They lived in a small house with a small garden at the city limits.
The wife described him as a very responsible husband and father, who loves his profession and to travel.
**The third case** is of B. E., female, 47 years old, a housewife with 8 elementary school classes education.
She was admitted in the Recovery Institute after being involved in an accident - fall from a height- and resulting in a spinal cord injury at C7, T1-T2 level for which she was operated. She was referred for admission with the diagnosis of: a) spastic para-paresis after vertebro-medullar trauma at C7, T1-T2 level and of b) anxiety disorder due to the general medical condition.
At the time of admission, she accused paretic spastic motor deficit in both lower limbs, paravertebral pain at C7 level, locomotion and self-care deficit, anxiety manifested with a constant restless state, respiratory, gastrointestinal and bladder disorders.
The clinical examination evidenced: paretic motor deficit at T1 level and sensitive at C7 level. At the upper limbs, a bilateral score 20 was found with dermic level paraesthesia- C6 right, without muscle strength deficiency, without spasticity and absent pathological reflexes. At the lower limbs, a bilateral score 8 was found with hypoesthesia. The patient used a wheelchair for moving.
There were no significant medical history data prior to the spinal cord injury.
As collateral family medical history, we can mention that the patients` mother had arterial hypertension (HAT) and the father had hypercholesterolemia.
The family environment was organized, consisting in husband and wife and two children. They lived in a house in a small village with a large garden and they also had arable land.
The husband and children described her as a hard-working woman, she and the children were taking care of the house and the garden and the husband of the arable land.

## IV. Assessment

The first assessment element consisted in the fact that all three patients were diagnosed with TSCI, a life changing, severe neurological disorder and with a major emotional and mental impact on patients and their family members [11].

The patients differ in sex, age, level of education and professional status. None of them had any history of mental illness and all of them denied using any other substance than prescribed by the doctors.

The patients were evaluated by using a qualitative approach: the observation technique and the interview to determine if they matched the DSM IV criteria [12].

All of them presented evident anxiety symptoms after suffering the spinal cord injury. All patients were extremely worried and had negative thoughts related to the recovery program, with little or no hopes regarding the future recovery of motor impairments, with high level of fear related to the physical therapy sessions because of the lack of confidence in themselves, fear of no improvement signs and fear of critical remarks from others [13]. Also, they feared losing the medical team`s as well as family`s support. These high levels of anxiety made them almost unable to perform many of the daily physical recovery activities [14].

## V. Intervention techniques

The first step was to make the patients understand and accept that they were experiencing high levels of anxiety, and that it is common for people to worry sometimes, however, while some worries are motivating and useful, productive worries, others are not productive and damaging.

To monitor each patient`s concerns, they were given notebooks and were asked to keep a diary of concerns. A recent meta-analysis shows the importance of the "homework" [15]. They had to note every concern, predictions of what and when something can happen, the level of anxiety for every concern (on a scale from 0 to 10), what had really happened and the level of anxiety after the stressful situation had passed [16].

The next step was to teach muscular relaxation techniques as an ability that helps patients gain more control on physiological symptoms [17]. Tensioning groups of muscle at first and then relaxing them made patients aware of the difference between tension and relaxation. Relaxation is a method of counteracting anxiety, especially the physiological symptoms [18].

Relaxing by breathing techniques are useful for patients who are not able to obtain the desired relaxation effect and for patients that manifested respiratory difficulties as an anxiety symptom [19]. At first, they learn the diaphragmatic breathing (the diaphragm is extending, pushes the abdomen and the air inhaled in the

lower part of the lungs). This exercise should be repeated several times a day inhaling and counting until 3, then stopping and counting until 3 and after that exhaling saying "I feel relaxed".

Many anxious patients cannot observe their general improvements and improved, positive behaviour. It is a circular type of behaviour, as these patients tend to ignore or overlook improvements and concentrate on failures, so they decide to punish themselves by not accepting or not giving themselves little rewards and in this way raising the anxiety level. Therefore, it is important to make them see the good part of their evolution and to encourage them to reward themselves. The rewards must be administrated immediately after the positive behaviour [20]. The patients presented in this article made a list of good behaviours and decided which were the most efficient rewards for each one (a snack, a 5 minutes break, a phone call, a messenger conversation).

Another technique is visualization, combinations of relaxing elements, as well as attention switching [21]. The patients were asked to close the eyes and encouraged to imagine a perfect place in the mountains, at the sea, in a forest or a childhood favourite place. While imaging this place the patients were asked to start to relax through muscular or respiratory techniques.

The interruption of the negative thinking technique was used aiming to eliminate negative thoughts. At first the patients were asked to think negative thoughts and while they were doing that they were suddenly stopped by saying loud the word "stop". After that, the patients were taught to stop themselves, at first saying the word "stop" loud and after that saying it only in their minds. This technique is useful whenever negative thoughts arise [22].

The grading task technique was useful for the patients that "froze" when they had to start a task (new or not) [23]. Initially, they were asked to give details related to the task, and after that they were encouraged to talk about details related to the task or to remember the previous time when they resolved that task. That was useful for all patients, as everyone had problems at the beginning of the physical therapy sessions (fear of physical therapist, of not being able to perform exercises, of the criticism of other patients) [24].

After learning the techniques, mood improvements were seen in all of them. The physiological signs of anxiety, such as breathing problems, headaches, muscular tension, muscular pains, gastrointestinal or bladder disorders diminished considerably. As a result, they got more confident in their recovery ability and in the recovery medical program and became less stressed of the physical therapy sessions [25]. Seeing the medical team and family support, they managed to escape the fear of losing their cooperation in the recovery process.

Improvements were also gained in the motor and self-care deficit, for all of them. They started to make transfers by themselves, from bed to wheelchair and back and started to walk small distances with help.

## VI. Conclusion

To overcome a psychological problem, like anxiety, psychoeducation is very important and all the patients presented in this study showed improvements in this respect.

Learning behavioural techniques helped the patients to understand that they are not the only one having anxiety problems and that with the correct help, strategy and attitude, the unpleasant symptoms caused by it can be overcome.

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