

# The Relationship Between Head Injury and Brain Injury

## *New Treatment Options Provide Hope for Recovery*

By Dr. George B. Roth

In the July-August 2010 issue of Discover magazine, Carl Zimmer published an article which outlines the cellular and molecular consequences of head injuries. According to Mr. Zimmer, recent evidence suggests that “a blow to the head can change the neural architecture of the brain from elastic to brittle, with devastating consequences.”<sup>8</sup>

Every year approximately 1.5 million people suffer head injuries in the U.S. alone. Many of these occur in amateur and professional sports activities, such as hockey, football, soccer, and horseback riding. In addition, automobile collisions, falls, industrial injuries and other common day-to-day events can also result in head injury.



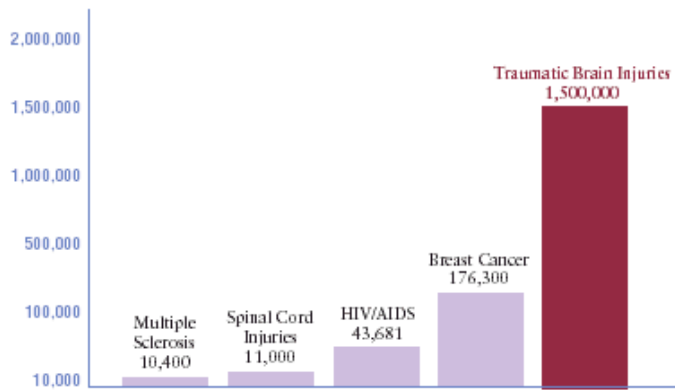
Head injuries (Traumatic Brain Injury or TBI) can lead to the neurological consequences associated with brain injury, such as cognitive deficit including memory loss, learning disorders and dementia, visual impairment, hearing loss, tinnitus, sleep disorders, headache, vertigo, seizures, depression and many other conditions affecting work performance and overall quality of life. The costs to society, both medically and economically, are enormous.

### **Cost: Human and Economic**

Traumatic brain injury is the leading cause of death and disability in persons under 45 years old, occurring more frequently than breast cancer, AIDS, multiple sclerosis, and spinal cord injury combined.

Some relevant statistics\*:

- Brain injury is suffered by someone in the U.S., every 15 seconds
- Each year, approximately 100,000 people die from TBI and 500,000 more are permanently disabled
- 80,000 people experience the onset of long-term disability following a severe brain injury annually
- Approximately 5.3 million Americans - more than 2% of the US population - are living with a disability that results from TBI
- The cost of treating, rehabilitating and caring for the victims of traumatic brain injury costs the U.S. approximately \$30 billion each year



\*Source: Center for Brain Injury and Repair

TBI is extremely common and has been referred to as a “silent” epidemic. According to a recent national survey, only 1 in 3 Americans are familiar with the term "brain injury", and very few people realize that concussion commonly results in TBI.

### Research: Evidence of Cellular Damage

TBI has been the subject of an ongoing study by Douglas Smith, MD, director of the Center for Brain Injury and Repair at the University of Pennsylvania. He and his team of researchers have discovered how even mild brain injury can cause subtle damage to the molecular structure of brain cells. Utilizing an ingenious method by which the effects of mild brain injury can be examined in great detail in a laboratory setting, Smith has been able to reproduce the effects of mild trauma. In these experiments, brain cell cultures (“miniature brains”) are exposed to gentle puffs of air. This creates the effect of a mechanical injury to the cells.

Nerve cells, like many other forms of tissue, are remarkably elastic, and can recover easily from most of these types of “injuries”. However, when the puffs of air are delivered in a more sudden and forceful manner, the cells developed more significant and permanent structural changes at the level of the microtubular structure of the cell. The cumulative effects over time, lead to tissue swelling, axonal damage and eventual death of the nerve cell. These experimental insights may provide an explanation for the some of the more serious effects of TBI, which medical researchers refer to as *diffuse axonal injury*. Recent evidence also suggests that anterior pituitary dysfunction after traumatic brain injury (TBI) is common.

### Treatment Options: New Hope

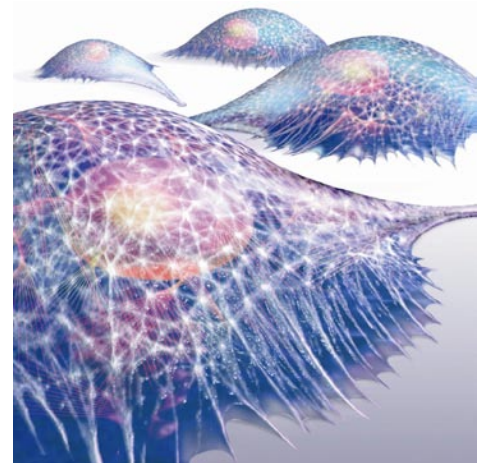
Despite the immensely important insights into the effects of TBI, most researchers and clinicians agree on one fact: there is nothing that can currently be done to reverse the effects of brain injury. Other than managing the effects of TBI through occupational retraining, family counseling and providing guidelines for assessment, medicine has very little to offer the sufferer of this devastating condition. Recently however, clinical evidence is pointing to new hope for recovery from the effects of certain types of traumatic brain injury.

Matrix Repatterning is a gentle form of structural therapy, developed by Dr. George Roth and his team of clinicians and researchers at the Matrix Institute in Aurora Ontario Canada (just north of Toronto). Therapy is based on the restoration of cellular structure and elasticity through the use of specifically targeted manual treatment, which releases mechanical tension at the cellular level by stimulating piezo-electric current<sup>3</sup>. Supportive procedures include electrotherapy and laser. Matrix Repatterning has been recognized as an effective form of therapy in sports medicine, and is currently in use with several professional sports organizations and with Olympic athletes in Canada and Great Britain. Clinical evidence has been mounting that measurable cellular improvement is being achieved through these techniques.

Matrix Repatterning is currently being practiced by chiropractors, physiotherapists, massage therapists, and various other medical specialists around the world, to treat a variety of structural conditions, including back, neck, shoulder, hip and knee pain, headache (including migraine), carpal tunnel syndrome, gastro-esophageal reflux (GERD), snoring and sleep apnea, and TMJ syndrome among others. In addition, patients who have undergone Matrix Repatterning treatment have achieved improvements in other areas of the body affected by traumatic injury, including cardiac and hepatic function, as determined by supportive hematologic evidence. Recently, clinical evidence is suggesting that Matrix Repatterning treatment for head injury, results in measurable neurological and cognitive improvement subsequent to TBI.

### **A New Understanding of the Mechanism of Injury**

Matrix Repatterning assessment and treatment is based on the alteration of the electrical properties of tissue, as a result of common strain and impact injuries. It is based on the properties of the cytoskeleton, as elucidated by researchers such as Donald Ingber, Gerald Pollack and Stephen Levin<sup>1,2,4</sup>. Impact injury, for example, is thought to be more easily absorbed by the more dense fluid-filled structures, such as internal organs and the cranium (head and brain), as well as osseous structures (bone)<sup>7</sup>. Therefore, many of the symptoms associated with the soft tissues, such as muscles, fascia and joints, may in fact be influenced by these deeper, denser structures. Recent evidence is demonstrating that cellular injury leads to electromechanical changes causing inflammation and enlargement of internal organs and bone, leading to mechanical stress on the more superficial structures, which produce symptoms. Matrix Repatterning is usually directed to the deeper structures (bone and the deep fascia associated with the internal organs), which are considered to be the source of many of clinical presentations previously thought to reside in the superficial structures alone.



Cytoskeleton

TBI often involves direct injury to the head or indirect injury by way of spinal trauma. Head injury affects the bony plates of the skull, as well as the fluid compartment surrounding the brain itself. Certified Matrix Repatterning Practitioners are trained to accurately locate the effects of these injuries and to apply a gentle and

precise form of manual pressure to create a piezo-electrical effect, which releases mechanical stress within these tissues. Matrix Repatterning has demonstrated clinical effectiveness in restoring the structural and mechanical properties of the body, including the spine and the skull, leading to a profound and lasting normalization of structure and function.

Patients from all walks of life, from professional athletes to medical professionals, and young children, have experienced significant levels of improvement in functional capacity, the reduction of pain, as well as relief from many of the consequences of traumatic brain injury. Further research to determine the potential of Matrix Repatterning is being actively pursued.

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