

Rehabilitation

FALL 2007

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A look at the risks of sports-related brain injuries and opportunities for collaborative treatment

■ **GARY N. GALANG, M.D.; MONIQUE TREMAINE, PH.D.; AND MONIKA ELLER, OTR**

Each year, an estimated 3.8 million brain injuries are incurred on athletic fields across the country, according to the Centers for Disease Control and Prevention (CDC). Most are of mild to moderate severity, but the long-term impact of such injuries can be devastating—physically, cognitively and emotionally. Recent media attention has highlighted the health implications of these sports-related mild traumatic brain injuries (MTBI), as well as the challenges involved in both diagnosis and treatment.

Often referred to as a concussion, a MTBI is a significant risk for athletes in almost every sport, including soccer, hockey and baseball. Football-related head trauma is among the most prevalent, with one injury occurring in every 5.5 games, according to a CDC study. Yet 99 percent of football players from high-school level to the professional ranks return to the game following a head injury, even when a concussion has been diagnosed. This "tough it out" attitude is common in athletic competition, but, unlike a musculoskeletal injury that individuals may attempt to play through, a brain injury cannot be so easily dismissed.

In fact, recent reports focused on several high-profile players who sustained multiple head injuries during their careers and who now suffer from depression, memory loss and early onset dementia, among other conditions. This, of course, supports the existing evidence of the relationship between MTBI and serious medical complications, a connection that the National Football League (NFL)

has attempted to downplay or even refute. But it remains critical that any individual who sustains a blow to the head be carefully evaluated, treated and monitored before being given medical clearance to return to the play.

Understanding Concussion

Although a concussion is a common injury, it also is one of the most difficult to diagnose. Caused by a direct blow or jolt to the head, MTBI disrupts normal brain function and may or may not result in a loss of consciousness. Symptoms of a brain injury are highly variable, and, unlike physical injuries, such as a fracture or sprain, there may be no immediate or outward signs of injury. Typically, those on the sidelines—team physicians, trainers, coaches, and even *(continued on page 7)*



FOCUS ON

Rehabilitation

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McMURRY



Funding Rehabilitation Research

How much is the right amount of money to spend on rehabilitation research? Should we invest 5 percent of our revenues, for example, or pick an arbitrary amount that we feel correctly reflects its value to us? Or should we create a formula based on rehabilitation-related Medicare expenditures?

Perhaps a better approach is to identify the problems we need to solve in our field and estimate how much we need to spend to solve these problems. Once we've calculated the amount of research funding we'd like to have, we're faced with yet another question: Where do we go to get this money?

There are several sources. First, a considerable amount of rehabilitation research is funded by federal grants, with the National Institute on Disability and Rehabilitation Research (NIDRR) leading the way. Although the NIDRR's 2007 budget of approximately \$105 million is small compared to that of most federal agencies, it has been the primary supporter of spinal cord injury and traumatic brain injury model systems.

A newer funding agency, created by the field of rehabilitation through legislative advocacy, is the National Center for Medical Rehabilitation Research (NCMRR), located within the National Institute of Child Health and Human Development, a part of the National Institutes of Health (NIH). NCMRR currently lists seven research priorities, including assessing the efficacy and outcomes of medical rehabilitation therapies and practices. Its budget is approximately \$45 million, but NCMRR also can make awards with other NIH programs to fund projects.

Additional federal agencies that provide some support for rehabilitation research: the Centers for Disease Control and Prevention, the Agency for Healthcare Quality and Research, the Department of Veterans Affairs and the U.S. Department of Defense. State governments also sponsor research, as do private foundations and pharmaceutical and medical device companies.

The rehabilitation field itself, through its trade organization, the American Medical Rehabilitation Providers Association, has recently targeted more than \$2 million toward research focused on the ramifications of the Centers for Medicare and Medicaid Services' 75 Percent Rule and the outcomes, costs and benefits of inpatient rehabilitation hospital services versus other settings.

The Foundation for Physical Medicine and Rehabilitation, the supporting organization for the American Academy of Physical Medicine and Rehabilitation, is another example. (In the spirit of full disclosure, I will be president of the Foundation beginning this fall.) Among other activities, the Foundation provides primarily small, start-up seed grants. For example, it was the major funding source for a soon-to-be-published study that contrasts the Medicare Benefit Policy Manual and various Fiscal Intermediaries' Local Coverage Determinations against the Academy's Standards of Medical Appropriateness.

Once these various funding organizations earmark monies for research, they must decide how to spend it. All biomedical research priority decisions are made through advocacy, whether it comes through scientific or medical groups or from the community. Individuals and organizations tell funding groups what questions they think should be studied. For example, AIDS community activists were loud and passionate about their priorities for NIH research in the 1990s and drove the direction of research funding for HIV. In the same way, advocates for rehabilitation research help set the priorities for those initiatives.

Therefore, if we care about getting critical research performed in our field, if we care about increasing the quality and effectiveness of the services we deliver, and if we think medical rehabilitation must grow and advance, then we must prioritize our needs and advocate for research funding. This doesn't happen magically; it takes people who value the importance of rehabilitation research to press for the resources that will make it happen.

Bruce M. Gans, M.D.

Turning Pain into Purpose

How one doctor's legacy shapes modern therapies

■ JOSEPH P. VALENZA, M.D.

Approximately one out of every four Americans over the age of 20 suffers from pain longer than 24 hours and 42 percent live with pain for more than a year. Associated with depression, anxiety, sleep and eating disorders, and an overall poor quality of life, chronic pain also carries a financial burden that extends beyond healthcare costs and medication to workplace absences and loss of income. Employers, families and social services are all affected when their lives are disrupted by an individual's chronic pain.

The good news is that the treatment of pain has come a long way in recent years, thanks in large part to the work of the late Kessler psychiatrist Elizabeth Narcessian, M.D. During her early years as a clinician, Narcessian was daunted by the limited methods of treating pain. At the time, opioids were used, but only to alleviate pain in cancer patients. That left many others to suffer with inadequate pain relief.

This challenge became Narcessian's quest: to develop a systematic process for both evaluating and treating pain. As a result of her and her colleagues' persistence, in 1998, the American Board of Medical Specialties began offering a subspecialty certification in pain management to psychiatrists. And today, the medical field recognizes the amount of pain a patient experiences as the fifth vital sign.

Research Leads to Practice

Developing the standards that are in place today involved taking an individualized approach to pain evaluation. Because pain is subjective, often tolerated and described differently by different people, Narcessian introduced standardized terminology to describe pain, as well as tools to help quantify its intensity. She also used drug histories, and urine and blood

screens to help differentiate pain patients from addicts.

Advocating a multidisciplinary approach to pain management, she combined medications, physical therapy, occupational therapy, structural integration, biofeedback, regional anesthetics and surgical intervention when necessary. The objective in integrating psychological, physical and pharmacological support is to restore the patient's function and resume activities of daily living.

Narcessian did not limit the pharmacological agents she used to any one drug class or route of administration. Anesthetics may have been given as an epidural injection or a nerve block, depending on the patient's condition. Drugs, such as rapid-, short- or long-acting opioids were administered, alone or in combination with other medications. Antiepileptic, antidepressant and other adjuvants were also given to manage various pain states.

As part of her determined effort, Narcessian had patients sign a Pharmaceutical Agreement in which they committed to receive controlled substances from one physician and one pharmacy. In return, she gave them her home phone number, making herself available whenever a patient needed her.

Despite precautions, being a pioneer in pain management was not without scrutiny. The New Jersey State Board of Medical Examiners investigated Narcessian for using controlled substances, putting herself and her patients under scrutiny. Fortunately, her

detailed documentation and positive outcomes swiftly convinced authorities that her methods were effective. In fact, she gained national recognition for her pain management practices.

Sharing Knowledge

Narcessian was often invited as a guest lecturer at professional meetings and symposia. It was during a lecture that she collapsed, the first sign of her impending diagnosis of brain cancer. She was only 40 years of age when she passed away in 1999.

As a tribute to her commitment to patient care, Kessler established the Elizabeth Narcessian, M.D., Memorial Pain Management Lectureship, an annual series to further the knowledge of physicians treating chronic pain. This year's speaker, **Michael Brennan, M.D.**, from the Ahlbin Centers for

Approximately one out of every four Americans over the age of 20 suffers from pain lasting longer than 24 hours.

Rehabilitation Medicine in Bridgeport, Conn., recognized Narcessian's success in treating even the most difficult cases, noting that her compassion and empathy for her patients were just as much the secret to her success as her clinical methods.

Given the efforts by Narcessian and other pioneers, pain management is now considered the fundamental "right" of every human being. Medical, legal and ethical issues have converged to expand pain management possibilities. There have been reform efforts on a state level to change prescription monitoring programs and help make opioids more available to those in need. Laws related to negligence and elder abuse have been expanded to consider the adequacy of pain management. And, especially important, public policies now support pain management.

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On Course

The direction of PM&R education

■ JOEL DELISA, M.D., M.S.



With 13.5 million jobs and 10.8 percent of all employment in the United States, healthcare is cited as the country's largest industry, according to U.S. Bureau of Labor Statistics. However, the Bureau of Health Professions says that healthcare jobs will need to grow by more than 1 million per year in the next three years just to meet national demand.

Specifically in the area of PM&R, this poses the question: How are universities preparing residents for the demands

of a field in which medical technology is advancing rapidly, the population is aging and all variety of practitioners are in short supply?



Joel DeLisa, M.D., M.S., president of Kessler Medical Rehabilitation Research

and Education Center (KMRREC), acknowledges that the way education is conducted is definitely changing. Residency programs still cover six broad areas—medical knowledge, patient care, professionalism, communications, systems-based practice and practice-based learning—but, he says, there are other important issues to consider.

Focus on Rehabilitation: The number of U.S. residents ages 65 and older is expected to increase by 19 million between 2000 and 2020. The Council on Graduate Medical Education projects this growth will outstrip the number of physicians available to treat the population, producing a possible shortage of 85,000 physicians by 2020. This would seem to favor the expansion of PM&R. Does it?

DeLisa: An aging population doesn't automatically mean that all those

people will need PM&R; but chances are, some will. In addition, we have significant needs for rehab now with our returning military. (See the Summer 2007 issue of *Focus on Rehabilitation*.)

Focus: Give us a snapshot of PM&R in general.

DeLisa: We're no longer considered a small specialty, but we have only 79 training programs, graduating about 360 residents per year. We're a fairly young specialty, designated in 1947. Not many physiatrists are nearing retirement yet; only 22 percent are age 55 or older. We're a growing, diverse specialty, with many subspecialties and services from pediatrics to geriatrics. We're also a cost-effective discipline for both hospitals and payers. Hospitals can shorten their lengths of stay by referring to physiatrists, and many of our clinical interventions can help patients avoid more costly treatments.

Focus: Yet, only 1.5 percent of all medical students choose to pursue PM&R.

DeLisa: When you have only a few training programs nationwide like we do, some students train at [medical] schools that have no PM&R [rotation]. It's a matter of awareness and exposure. All New Jersey Medical School students go through two weeks of PM&R. It takes a lot of resources and energy to teach that volume of students.

Focus: Teaching hospitals have the lowest operating margins of all hospitals, have the highest proportion of Medicare/Medicaid patients and conduct the most research. Yet, a proposed rule from the Centers for

Medicare and Medicaid Services (CMS) would cut funding for residency slots. How would the proposed cuts affect the unique abilities and resources of teaching hospitals?

DeLisa: The rule in question is CMS-2279-P. If passed, it would cut back *all* graduate funding through Medicare, which will have a tremendous effect on all specialties and the viability of their educational programs. CMS-2279-P says that graduate medical education (GME) is not a covered cost of providing hospital services and patient care under Title XIX because GME isn't broken out separately as a "health service" in Title XIX's "benefit package." This proposed ruling would reverse 40 years of history and court decisions that support GME as a covered cost of providing hospital services and patient care. Many medical associations, including the American Academy of Physical Medicine and Rehabilitation (AAPM&R), have written the CMS in protest of this.

Focus: The Department of Veterans Affairs (VA) recently approved funding for an additional 2,000 resident positions over the next five years. What could this do for PM&R?

DeLisa: PM&R departments and programs need to be made aware of this opportunity and advocate for a portion of these slots. It also appears that the VA is trying to increase its rehabilitation service capacity for veterans, which could bode favorably for PM&R.

Focus: How do you see the VA's GME enhancement program for "critical needs and emerging specialties" affecting PM&R?

The Future of PM&R Education

Joel DeLisa, M.D., M.S., offers these suggestions to help secure the future of PM&R's education programs:

- Get the word out. There's a shortage of qualified PM&R practitioners. Being tagged as a "shortage" specialty may mean more medical students might discover PM&R.
- Make hospitals aware of the shortage of PM&R programs, especially in high-demand areas like the South. For example, in academic year 2003–2004, the ACGME reported more residency programs in Ohio than Georgia, Florida, Alabama and Mississippi combined.
- Show hospitals and payers that PM&R is cost-effective medicine.
- Find innovative ways [like telemedicine] to expose medical school students to PM&R. Show the diversity and possibilities of PM&R and its subspecialties.
- Utilize opportunities like the recent VA appropriations to expand residency slots for PM&R.
- Expend effort in quantifying more outcomes in ways that are meaningful to physicians and helpful to agencies that are promoting transparency of information.

DeLisa: This program seems ideal for traumatic brain injury fellowships, which our profession has discussed for several years as the next subspecialty for PM&R.

Focus: What healthcare trends are affecting today's PM&R education?

DeLisa: Payers and the public are insisting on proof that their money is buying the best available care. This is driving the demand for objective measurements to substantiate quality outcomes. To have such proof requires massive data collection and analysis, which is possible only through electronic medical records and other infrastructure. Larger hospitals have this; outpatient centers are developing this. This puts more pressure on teaching evidence-based medicine in GME.

But our profession doesn't have as many meaningful measurements in place today as, for example, neuro-imaging or endovascular surgery do. It's difficult for PM&R to say that this intervention and that cost equal the best possible outcome and value. For example, we have all kinds of ways to improve outcomes after a stroke, but

I don't know of studies that show one way is better than another. A lot of the different therapy maneuvers are based on clinical experience but have never been evaluated for effectiveness. It's not one simple thing in isolation. All our studies are harder to put together than, say, a pharmaceutical clinical trial study. One problem is that the patient is allowed only "X" number of treatments. How many treatments are the most effective? That's hard to quantify. Even the milieu of PM&R is more diffuse than any other specialty. We're looking at many more issues per patient encounter than, say, an internist does.

Focus: Are you teaching more about the "business" of healthcare than in past years?

DeLisa: Yes—everything from how to fill out medical forms to the cost-effectiveness of medicine.

Focus: Can technology help contain the costs of training residents?

DeLisa: Technology is useful, but not as a significant cost containment measure. I see technology such as simulators

in helping trainees gain proficiency with procedures such as injections.

Focus: Explain how your Objective Structured Clinical Examinations (OSCEs) work. They seem costly in terms of time and people resources.

DeLisa: OSCE is an evaluation technique to help objectively demonstrate clinical competency by trainees in areas such as communication, history taking, physical examination, procedures and professionalism. We show them what they do right or wrong; we can determine if they'll need additional training. OSCEs are artificial encounters with real actors. I think only a few PM&R programs do this. We do nine stations per year on residents. Two are video monitored for self-reflection. It markedly improves their clinical skills.

Focus: The ACGME Outcome Project, "Advancing Education in Interpersonal and Communication Skills," notes that training residents in communication can be problematic.

DeLisa: That's true. Communication problems range from lack of self-confidence to poor modeling, and trainees' misperception that "communication" is the same as social exchanges. With respect to PM&R, residents also need to learn leadership skills for running team conferences efficiently. All these issues require explicit precepting to develop optimal results.

Focus: Continuing Medical Education (CME) has its own challenges for PM&R. What are they?

DeLisa: We need to do a better job developing our guidelines to show we're practicing at the best level. That's the hardest part of maintenance of certification. Another problem: After 20 years of practicing PM&R, I may have a very narrow practice. But I need to continue to show that I meet standards in every area. Conveniently, a lot of today's CME is done by journal reading. On-site CME training is best for procedural-based training.

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Developing an Evidence-Based Approach to Medical Necessity Determination

■ BRUCE M. GANS, M.D.

The field of medical rehabilitation has been deeply involved in discussions about the Centers for Medicare and Medicaid Services (CMS) 75 Percent Rule, Local Coverage Determination-based medical necessity denials, and related issues for several years. At the very core of these discussions lies the question of who belongs in an inpatient rehabilitation hospital or unit (IRH/U). The term IRH/U is new language we

about the field, should make these decisions. All would agree that there is a need to clarify the criteria and gather objective evidence to support that physician's decision-making process.

Research Support

This decision-making has, admittedly, a shaky scientific basis at present, and decisions are based largely on practice experience and expert clinical judgment. Considerable research is

consensus process, what the specialty of physical medicine and rehabilitation believes are the appropriate criteria for determining whether a patient should be admitted to a rehabilitation hospital for care. That document is now available on the AAPM&R website (aapmr.org/zdocs/hpl/MIRC0906.pdf).

Advocating for Patients

Why should we be so concerned about the issues of where patients should receive inpatient rehabilitation and who should make that decision? Most importantly, the well-being of patients with disabling conditions and their ability to access medical rehabilitation care at a hospital level are being challenged. There is an unprecedented level of threat through the regulatory and payment pressures that are reducing the number of beds and forcing entire hospitals to close. If this continues, and rehabilitation hospital capacity largely disappears, then the survival of the medical specialty of physical medicine and rehabilitation is in jeopardy. What's more, training programs that rely heavily on rehabilitation hospitals and units will be at risk as well.

Another reason for concern is that we want to do what we do better. Our field should take every opportunity to eliminate unhelpful practices and produce the strongest, most quantitative basis for appropriate decision-making about where patients should receive care. We need to develop the best possible ways for matching resources precisely to our patients' needs. We need to achieve the most cost-efficient and effective outcomes for patients while using the appropriate resources. Research can inform us about the *right* things to do and provide us with evidence to convert data into knowledge that, in turn, can become wisdom. With this new wisdom, we can shape public policy and its interpretation in the regulatory process so that the proper steps will be taken to ensure that medical rehabilitation services will still be available to people across our nation who need them.

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The well-being of patients with disabling conditions and their ability to access medical rehabilitation care are being challenged.

are using to help clarify that we are operating *hospitals*, not nursing homes or skilled nursing *facilities*.

While the subject of this debate is the desire by our government to spend less money on rehabilitation, the issue is being articulated as a concern over patients going to the "least intensive" setting for inpatient care. However, the real questions are:

1. What is the "correct" setting for a patient to receive inpatient rehabilitation care?
2. What is the evidence basis for substantiating those decisions about where care is received?
3. Who decides where a patient should receive inpatient rehabilitation (the physicians caring for the patient, or an uninvolved insurer)?

The house of medicine believes strongly that a physiatrist, or other physician who has become knowledgeable

currently under way to build a stronger level of evidence, however.

The most compelling recent activity was the State-of-the-Science Symposium on Post-Acute Rehabilitation, "Setting a Research Agenda and Developing an Evidence Base for Practice and Public Policy." Sponsored by the Foundation for Physical Medicine and Rehabilitation and held this past February in Arlington, Va., it led to a series of papers, now in press in the Archives of Physical Medicine and Rehabilitation, which discuss the current state of both the knowledge and the science of medical-necessity determination, as well as identify a future research agenda.

The American Academy of Physical Medicine and Rehabilitation (AAPM&R) has sponsored an additional evidence-based effort. It recently published a medical appropriateness standards document that defines, through a medical expert

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(continued from page 1) family members—will look for such signs. As a result, if a player can stand, walk, run and speak clearly, it is often assumed that he or she is capable of continuing play.

It should be emphasized that an injury to the brain renders an athlete vulnerable on a molecular level; in other words, some brain cells are damaged or destroyed upon impact, while other neurons may remain at risk for days, weeks or even longer. Because an individual's neurovascular system has been compromised, the brain may be unable to re-establish the necessary chemical and ionic balance needed for "normal" function unless it is allowed to rest. Sustained imbalances are known to negatively affect cognition, behavior and mood.

If allowed to play during this time and another head injury is sustained, the athlete may develop Second Impact Syndrome, which can exacerbate damage to the brain and, in rare cases, result in death. For those athletes whose careers span many years, there is the added likelihood of repeated injuries to the brain, leading to Post-Concussive Syndrome. This chronic condition is often associated with serious cognitive challenges, including difficulties with concentration, memory and communication, as well as with depression. In turn, this may significantly impair one's ability to compete in the classroom or workplace and can adversely impact personal and social relationships.

Diagnostic Challenges

As with any injury, early intervention is key; however, diagnosing MTBI is often complicated by a number of factors. Given the societal view of athletes and athletic competition, there is generally an overriding emphasis on success, on "winning." That places tremendous pressure on players at all levels, as well as coaches, to minimize or ignore an injury. For many teams, there is an understood code of silence, whereby players deny their own physical problems, and fail to report anything unusual with teammates who have sustained injuries. In fact, studies indicate that players, particularly on the youth level, often avoid sharing symptoms of MTBI with coaches, teammates or parents for fear of appearing

weak, letting the team down or losing their position. Among professional athletes there may be added financial pressures to reject an injury and stay on the field.

The common clinical indications of MTBI include a lack of responsiveness to external stimuli, nausea, vomiting and any loss of consciousness. But many of the symptoms of concussion are not

magnetic resonance imaging (MRI), functional MRI (fMRI) and single photon emission computed tomography (SPECT) hold promise in screening the brain and brain metabolism post-injury. For example, fMRI can distinguish post-concussive changes in glucose and oxygen utilization in the brain. And SPECT scans reveal areas of decreased brain activity that correspond with neurological

Although athletic programs around the country are instituting a baseline cognitive evaluation as part of each athlete's pre-season physical, it is not as yet a widespread practice.

as outwardly obvious. After a serious impact, for example, an injured athlete may appear confused, with impaired awareness and orientation to the surroundings. He or she may also experience amnesia, perhaps both retrograde and anterograde, in addition to headaches, vertigo and emotional disturbances. The severity of the symptoms (especially if there has been any loss of consciousness) varies greatly among individuals, as does the length of post-traumatic amnesia and the presence of such specific neurological symptoms as pupillary changes and posturing.

Close observation will help bring these symptoms to light. What is most helpful in both diagnosing and treating MTBI is a cognitive point of reference. Although athletic programs around the country are instituting a baseline cognitive evaluation as part of each athlete's pre-season physical, it is not as yet a widespread practice. This actually represents an opportunity for rehabilitation specialists to work with coaches, trainers and neurologists to encourage the adoption of these effective assessment standards.

Technology is also playing an increasingly important role in the diagnosis of brain injury. While actual changes within the brain may go undetected by computed tomography or conventional

problems, including functional deficits and mood disorders. These advanced imaging technologies may not be widely accessible, nor do all insurance companies cover their use. This makes the early intervention and comprehensive evaluation by medical and/or neurological specialists all the more critical.

Tailored Treatment

The rehabilitation team at Kessler Institute works closely with its player-patients and their physicians or trainers to ensure proper assessment and treatment of sports-related brain injuries. This typically includes evaluation by a physiatrist, neurologist or neuropsychologist, particularly when symptoms persist for more than a week or two. Experience has shown that the optimum outcomes for patients with MTBI result from a coordinated multidisciplinary approach to treatment, involving physicians and physical, occupational, speech and cognitive therapists, in concert with athletic trainers.

Because of the individual response to injury, treatment must be carefully tailored to the needs and rehabilitation goals of each athlete. As noted, rest is critical in allowing the brain to recover to the best of its ability; however, there is no definitive time frame and continued observation (continued on page 8)

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(continued from page 7) and evaluation are key. Pharmacological interventions may also be prescribed, as appropriate, particularly for management of pain, most often in the form of headaches, sleep disruption and mood changes.

An athlete is well-advised to follow a careful stepwise program to return to play once he or she is symptom-free. At that time, general conditioning and strengthening exercises are appropriate, followed by sports-specific activities and non-contact drills. Then, with full medical clearance, the athlete can advance to contact drills and eventually return to play.

As part of this program, and in particular for those athletes who experience residual or prolonged challenges,

Cognitive impairment, often manifested as difficulty with communication, concentration and memory, can be effectively addressed through specialized services like those offered in Kessler's Cognitive Rehabilitation Program (CRP). This comprehensive outpatient program, which utilizes one-on-one and group therapies, augments the recovery process and introduces compensatory strategies as warranted.

In younger, school-age players, there is the added need for clinicians to distinguish between normal adolescent challenges and post-injury deficits. Although the symptoms may look quite similar, brain injury tends to lead to a subtle combination of functional and behavioral changes. Students who have experienced a MTBI may have trouble concentrating and maintaining previous grade levels,

plan (IEP) for the student-athlete. Such plans may allow for extra time on tests or other accommodations. Similarly, rehabilitation professionals will work with employers to identify any job modifications that may become necessary.

Education and Prevention

Understanding the impact of sports-related brain injury and its long-term implications is crucial to the way we diagnose, treat and accept such injuries as a part of athletic competition.

As coaches and trainers, players and parents come to understand and embrace the implications of sports-related brain injury, our ability to diagnose these injuries will be advanced. Perhaps the so-called "code of silence" will be broken and the social mores of competition transformed. Certainly, injuries will still occur, but new technologies will enable physicians to better evaluate and treat athletes on every level of play. In addition, enhanced protective gear, such as instrumented football helmets, may prove to be helpful in detecting significant concussive events in players. As a result, the long-term health of athletes will be the real winner.

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Because of the individual response to injury, treatment must be carefully tailored to the needs and rehabilitation goals of each athlete.

a range of therapies will be prescribed. For example, if balance, movement and coordination are at issue, Kessler physicians prescribe a combination of physical, occupational and/or vestibular therapies. Patients experiencing emotional issues may need psychotherapy to deal with their deficits (e.g., impaired judgment).

and may have difficulty planning, organizing and initiating tasks as they have in the past. Enrollment in the CRP has proven beneficial in these cases.

In addition, the Brain Injury team at Kessler will work with guidance counselors and school psychologists to develop an individualized education

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