Dear ImPACT Client,

The past year has been one of significant strides in the management of mild traumatic brain injury in both athletes and non-athletes. Currently there are state-wide initiatives being considered in a number of states in the US and over 500,000 baseline tests have been completed. We at ImPACT have been proud to be at the forefront of both national and international efforts to improve care for people both in and outside of sports. Our primary missions continue to be twofold: 1) to develop the best computer-based neuropsychological platforms and; 2) to train as many professionals as possible to implement concussion management programs in their communities.

ImPACT is now available internationally in 13 languages and we plan on expanding availability during 2009. ImPACT will also releasing a “next generation” software package within the next year that maintains many of the advantages of our current program while adding test modules and features.

Over the past year the ImPACT team has worked particularly hard to provide both live and web-based training sessions to build on the skill level of our clients. This will continue to be a high priority for 2009. We plan on offering regular monthly training seminars that address both the technical and clinical components of ImPACT. Based on feedback from our clients, we also plan to add regular advanced level interpretation workshops in both live and web-based formats.

Dr. Mark Lovell, Chairman
ImPACT Applications, Inc.
“Best In Show”

Congratulations to ImpACT Concussion Management on being the WINNER of the Software product category at the 2008 National Athletic Trainers Association Trade Show!

The Pediatric version of ImpACT (ImpACT PEDS) is currently in its final stages of development. The test is built for ages 5-12 years with test stimuli and instructions that are appropriate for younger children. Normative data has been collected and test validation is being completed with children with concussions/ mild TBI. Recently, Dr. Gerard A. Gioia, from the Children’s National Medical Center in Rockville, MD, presented findings at two international conferences (2008 Concussion in Sport Group consensus meeting, Zurich; 2009 International Neuropsychological Society, Atlanta). Pediatric ImpACT shows appropriate internal consistency and temporal stability, while remaining sensitive to developmental changes in children 5 to 12 years. Differences between normal controls and children with mild TBI were demonstrated, providing the first evidence of validity for use with concussion/mTBI. Selected subtests were sensitive to slower and more variable response times on processing speed and memory retrieval tasks, characteristic of children with concussions/ mTBI. Planned completion is the Summer of 2009.
Active: Web-Based Sports Concussion Training for Youth Sports Coaches

“Last night at football practice we had a player who took a pretty good blow to his head … I evaluated him using some of the tools found in the ACTive course…and noted several red flags which led me to believe this player may have suffered a mild concussion. Obviously, he did not continue to practice even though he protested. Furthermore, I was able to inform his parent intelligently of my findings…I am so glad I participated in the concussion [training program].”

—Dan, youth sports coach

Coaches play a critical role in reducing the risks associated with concussion in young athletes. In addition to using effective cognitive assessment tools like ImPACT and educating players and parents about concussion, coaches need to stay current with evidence-based concussion management on the field (recognizing concussive symptoms, utilizing standard protocols for decision-making during games, and recommending medical referrals).

**ACTive (Athletic Concussion Training using Interactive Video Education)**, a new training program developed through a partnership with the Oregon Center for Applied Science and ImPACT researchers, covers all these topics in a web-delivered training program for youth coaches. Based on recommendations of the National Athletic Trainers’ Association and the International Conference on Concussion in Sport, the program’s 3 modules include:

(a) information about youth sports concussion
(b) prevention
(c) recognition and management

The 20-minute program uses video, case examples and brief quizzes to present practical guidelines for recognizing and managing concussion.

Results from a research study with 75 youth sports coaches showed that the coaches who viewed the ACTive program showed significantly greater improvement than those in the control group in their knowledge of concussion symptoms, their confidence regarding recommended actions following concussion, and their intention to take action in situations like those presented in the scenarios.

**How to Purchase ACTive**

For a single copy of the program, go to http://athleticconcussion.com/ and register for a username and password. Afterwards, click on the “Course Catalog” to enroll in the twenty minute course. The training costs $20. For multiple licenses at a discounted cost, please contact sales@orcasinc.com or call toll free 866-846-4800.
Billing Guide:  
A Collection Of Billing FAQ’S By ImPACT Clients

Q: How should we bill our ImPACT testing using cpt codes?

Answer from Dr. Kenneth Podell:
Billing for the assessment of a sports related concussion typical falls under neuropsychological services. This article is intended to serve as a primer on how to bill neuropsychological services when performing a sports related concussion evaluation or return to play assessments. This article will include a very brief review of the new CPT codes for neuropsychological services, the rule governing billing, and end some common errors one can run into when dealing with a regional insurance company.

“The New Procedure Codes for Neuropsychological Testing”
The Center for Medical Services, or CMS, is the governing agency that sets the CPT codes and how they are used. Regional or local insurance companies such as Medicare, Blue Cross/Shield or the large managed care companies often follow these rules but there are often regional differences. The CPT codes used for neuropsychological testing were recently overhauled by CMS. The good news is that the codes now have RVUs (relative value units); see table 1. The bad news is that it can be very confusing and financially detrimental depending upon how your practice is set up. In essence professional and technical codes were separated out and now each has their own CPT code.

The CPT code 96118 is the “professional” code and can only be used by a full licensed psychologist or physician. It entails all aspects of your evaluation including preparation time, testing time, scoring time, report writing and any other time directly related to your evaluation (e.g., communicating information to a athletic trainer or parent). There is a separate interview code (96116), however, there is strict time and procedures that must be part of the interview in order to use it (e.g., fully documented mental status examination). Alternatively, if the interview does not reach the 96116 threshold the time can be billed using 96118. Both are time based codes where one unit equals one hour of time spent performing the service and the reimbursement is higher for 96118. The general rule is to round to the nearest hour. If you do 70 minutes of testing you bill for one hour or one unit. If you tested for 91 minutes you bill for two hours or units.

The CPT code 96119 is the “technical” code and is used for face-to-face testing only. This CPT code is for an individual who performs direct administration of neuropsychological tests that is less than fully licensed at the Ph.D. level. There is no minimal educational requirement so it would include post-doctoral fellows, interns, and psychometrists (at either the Master’s level or Bachelor’s degrees). The operative phrase is “face-to-face.” One can only bill for the time the technician actually administers the tests. Scoring time is not billable, unless the scoring is done in the same room when the patient is completing something else (such as a questionnaire or computerized testing). While this may seem counter-intuitive (or even a complete contradiction in terms), the technician is still “face-to-face” and as such could bill for time scoring when the patient is completing a form and being supervised by the technician. Otherwise, non-face-to-face scoring time (for example: when done after the patient has left) is not billable. Also, any preparation time, interviewing or report writing done by the technician (if they were a psychology intern or post-doctoral fellow, for example) is not billable. CPT code 96119 is a time based code identical to 96118.

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Billing Guide: A Collection Of Billing FAQ’S By ImPACT Clients, continued from page 4

There is one other neuropsychological testing code, 96120, that is used for any unsupervised computer based testing. It is a one time charge that is not time based. Please note that if the technician or psychologist is in the room while the athlete is testing you would bill the time it took the athlete to complete ImPACT using either 96119 or 96118 (depending upon who is in the room) rather then the computer code. You can not bill for both. It is more financially advantageous to be in the room while the athlete completes ImPACT, as the reimbursement rate is higher (see below for rational).

Matching CPT Codes with Diagnosis
The CPT procedure code and the diagnosis codes (ICD-9 and not DSM-IV) need to “match.” By that I mean whether or not they are either mental health codes or medical codes (terms used by the insurance companies and not meant to be pejorative). Diagnosis codes are easily divided into mental health codes (290.0 – 319) or medical codes (all others with nervous system codes ranging from 320 – 389.9).

The designation of the neuropsychological procedure codes as being either medical or mental health based is tricky and often idiosyncratic and dependent upon the individual insurance company. For example, some insurance companies consider neuropsychological testing a mental health service and as such will only allow for a mental diagnosis when billing. Other insurance companies consider it a medical procedure and require a medical diagnosis (non-mental health). Still for some companies it goes either way but the coverage for neuropsychological testing is drastically different. Even more confusing is the fact that the same insurance company offers different coverage depending upon the patient’s individual policy and plan. Simply put, you need to contact the patient’s insurance company and determine the benefits for that given policy and plan. For example, some policies might say that if a medical diagnosis is used (for example ICD-9 850.X or Concussion diagnosis) that neuropsychological testing would fall under the medical benefit and no preauthorization is required and testing is covered at X%. Other insurance companies might say that neuropsychological testing is a mental code and one must use a mental health diagnosis (in that case use ICD-9 310.2 code of post concussion syndrome) and that pre-authorization is required or that benefits are only covered at X%.

Reimbursement
Bottom line is that reimbursement is a very fickle thing and often without a consistent pattern. For example, my regional Blue Cross Blue Shield in 2005 always allowed for neuropsychological testing of sports concussion as long as I used a diagnosis of “Concussion” (ICD-9 850.X). However, in 2006 they are reversing this and saying I need to use a mental health diagnosis (ICD-9 310.2 post-concussion syndrome). In my experience, I have found that most carriers will cover neuropsychological testing for sports-concussion as long as you know their rules.

One can bill all they want, but the question I am sure everyone has is it profitable? Again that depends on the reimbursement rates of the individual carriers you deal with. However, CMS set the rate for CPT procedure codes (see table 2), which is used by commercial FFS (fee for service) insurance companies when setting their own rates. Please note that there are different reimbursement rates depending upon if you are a hospital based or out-patient based facility. The distinction may not be that simple. Many out-patient clinics part of a larger health care organization may be designated as a hospital facility even if they are not attached to a hospital. For example, I work within a large non-profit hospital system. My clinic is in a building several blocks from the hospital. There is only

Table 1. Relative Value Units (RVU) for The New CPT Codes

<table>
<thead>
<tr>
<th>Code</th>
<th>RVU</th>
<th>IMR</th>
</tr>
</thead>
<tbody>
<tr>
<td>96116</td>
<td>2.68</td>
<td>2.87</td>
</tr>
<tr>
<td>96118</td>
<td>2.67</td>
<td>3.43</td>
</tr>
<tr>
<td>96119</td>
<td>0.92</td>
<td>1.75</td>
</tr>
<tr>
<td>96120</td>
<td>0.70</td>
<td>1.27</td>
</tr>
</tbody>
</table>

Table 2. Reimbursements Rates set by CMS

<table>
<thead>
<tr>
<th>Code</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>96116</td>
<td>$96.95/unit</td>
</tr>
<tr>
<td>96118</td>
<td>$124.09/unit</td>
</tr>
<tr>
<td>96119</td>
<td>$63.31/unit</td>
</tr>
<tr>
<td>96120</td>
<td>$45.94 (flat rate)</td>
</tr>
</tbody>
</table>

continued on page 6
one outpatient clinic in our building with the rest being administration. However, all buildings within our system are designated as hospital-based and as such receive the lower reimbursement rate. The reason for the lower reimbursement rates for hospital-based facilities has to do with CMS’s Medicare payments that cover resident training and care of Medicare patients.

Some of you may be having trouble with individual carriers telling you that these new codes are not reimbursable. Federal law states that all carriers must acknowledge these codes (i.e. reimbursable). Whether an insurance company includes it in their policy is a different matter. An example of a carrier incorrectly excluding the codes is Wisconsin Medicare, which covers Wisconsin, Illinois, Minnesota and Michigan, whose current policy states that 96119 is not a reimbursable code. This is wrong and there is a lot of political and legislative action to correct this. Michigan Blue Cross and Blue Shield acknowledged the codes as of January 2006, but decided not to reimburse them until starting April 1, 2006 and making it retroactive.

Relationship of When Services Were Rendered and Date of Service for Billing Purposes
The answer to this problem is rather simple. Use the last date of rendered services as the date of service (DOS) for billing. Often times it has been my experience that our professional services rendered for a sports concussion evaluation can extend beyond the evaluation date. There are telephone calls with athletic trainers, referring physicians and parents. Often times I like to follow up with a call to the parents. All of this is billable time, but you can not bill for 10 minutes on one day and 25 minutes on another. However, you can combine them into the testing time with the DOS being the last date of services rendered. You might want to explain this to the parent so they do not think you billed incorrectly.

Example
The example below is a common scenario encountered in my practice and is for descriptive purposes only. They are not meant to indicate the exact amount of time one needs to spend on a particular case. All cases are different and some can take much longer.

Technically I would bill for two (2) units of 96118 (rounding to closet hour) and all billed on the last date of service.

### Scenario 1:

<table>
<thead>
<tr>
<th>Activity</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Interview &amp; brief neurological and balance exam with athlete</td>
<td>40 minutes</td>
</tr>
<tr>
<td>2. Brief interview with parent (if a minor)</td>
<td>15 minutes</td>
</tr>
<tr>
<td>3. Brief discussion with athletic trainer</td>
<td>10 minutes</td>
</tr>
<tr>
<td>4. ImPACT testing (in the room)</td>
<td>30 minutes</td>
</tr>
<tr>
<td>5. Review results and discuss concussion and return to play with athlete and parent</td>
<td>20 minutes</td>
</tr>
<tr>
<td>6. Brief report (dictated)</td>
<td>20 minutes</td>
</tr>
</tbody>
</table>

Total Time = 135 minutes

### Scenario 2:

Imagine if we take scenario 1 and in this case the post-concussion scores were at baseline but the athlete was still symptomatic. Often times I would continue to work with the athletic trainer and family tracking symptom scores and helping explain symptoms to parents and how to avoid exacerbation of symptoms. Sometimes I need to write a letter to the school excusing the player from school work. If all this took an additional 30 minutes over several days it would increase my billable time to 165 minutes. I would document my time spent and in this case submit for three (3) hours of 96118 (rounding to nearest hour) on the last date I did any service on the case (e.g., talking with the athletic trainer about exerting the athlete once his symptoms resolved).
scenario 3:
Let’s take scenario 1 but instead of being in the room while the athlete completed ImPACT, I decided to be in my office doing other work. This would change my billing to the following: two hours or units of 96118 and one unit of 96120. See below for the difference in reimbursement using CMS rates for an outpatient facility.

<table>
<thead>
<tr>
<th>In the room during testing</th>
<th>Not In The Room During Testing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Three units of 96118 = $372.27</td>
<td>Two Units of 96118 = $248.18</td>
</tr>
<tr>
<td>One unit of 96120 = $45.94</td>
<td></td>
</tr>
<tr>
<td><strong>Total = $372.27</strong></td>
<td><strong>Total = $294.12</strong></td>
</tr>
</tbody>
</table>

One can see that it is financially better to be in the room during the testing. One could be doing work while the athlete takes the test but as long as you are in the room supervising the testing it is billable at the higher 96118 rate.

There are times when additional neuropsychological testing is required. The same scenario holds in that the reimbursement is higher when the fully licensed neuropsychologist or physician performs the testing, plus scoring time is billable. Compared to when a technician tests and the rate is lower (almost half) and scoring time may not be billable if done away from the patient.

Summary
The recent overhaul of CPT codes used for neuropsychological testing has substantially changed how we perform our evaluations and bill for them. I see the biggest conflict in large medical institutions that historically use interns and post-doctoral fellows. Such hospitals have been detrimentally hurt by the 2006 CPT changes in that reimbursement rate for interns and post-doctoral fellows has been drastically reduced and a lot of their time is no longer billable making it difficult to cover costs. On the other hand, if the fully licensed Ph.D./M.D. does all of the work the reimbursements are much more favorable then in the past (about 30-40% better).

One needs to pay close attention to the details of the new CPT codes (The National Academy of Neuropsychology has very useful information: www.nanonline.org/paio/cpt.shtm) to help better understand the nuances and follow the procedures correctly.

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Billing Guide: A Collection Of Billing FAQ’s By ImpACT Clients, continued from page 7

**Q: We are an ImpACT CIC but are having trouble getting reimbursed for neurocognitive testing. What can we do?**

**Answer from Dr. Mark Hallett:**
I use CPT 96120, and generally combine that with E&M or Consult codes for billing. I generally have not used 96116 or 96118 because these are time based codes and I think I can do better and am more familiar with E&M or Consult codes for billing. The CPT explanation for these codes does however indicate “...per hour of the psychologist’s or physician’s time...”.

In terms of getting 96120 paid for, I’ve attached a copy of a letter that I’ve had to send to a couple insurers, which you are free to adapt to include the CIC process. Early on, I explained the CIC process, and I believe that the CIC process/credentialing holds the key to getting paid for it, emphasizing the additional training you have had to specifically interpret this test. (See Dr. Hallett’s letter on page 9.)

**Answer from Dr. Michael Lee:**
There are many different ways to bill for ImpACT. I have, with great difficulty, managed to have most of the payers in Connecticut pay for the ImpACT test code 96120, which I charge at each visit. On the initial visit, I bill a 99244 or 99245 for all patients referred to me that are not my patients. I then send those physicians or athletic trainers a cover letter and copies of my note and ImpACT test. Follow-up visits are billed as a 99214. Patients that I have seen before I bill as a 99215 with no cover letter (obviously) and follow-ups as a 99214. Other than one or two MCOs I have been paid reasonably well for these visits.

**Q: Do you get paid if you use code 96120? Do you bill the 96120 with a qualifier?**

**Answer from Dr. Mark Hallett:**
All insurers except for one (ironically, the one that serves the self-insured teachers union of Wisconsin) pay for this code. This includes big hitters like United Healthcare, which is the dominant insurance in our market. 96120 has no time value or parameter. It is merely for the testing and interpretation of the testing. The only thing I’ve encountered in the use of this code previously, is that somewhere along the line, some of the coders understood that this was to be a one-time use code. Because on average I’ll ordinarily do just over two tests per concussion, I have essentially ignored the one-time use advice, and to my knowledge have consistently gotten paid for it. I think it would be a problem if people overtested in an attempt to “ring the bell” on productivity.

**The are saying we are not the specialty for the 96120 code.**

**Answer from Dr. Mark Hallett:**
CPT 96120 indicates that one needs to be a “qualified health care professional” to bill for an “interpretation and report”. It does NOT indicate that one needs to be a neuropsychologist to use this code. (It also doesn’t indicate that it is a one time use code as many coders will assume.) Successful reimbursement in this case is often a matter of establishing you are “qualified”. That would most easily be substantiated by showing them a certificate of completion from an ImpACT training course or achieving CIC status as determined by ImpACT and listed on www.impacttest.com.
To whom it may concern:

The letter is to summarize the medical justification of and insurance coverage for use of the software product ImPACT in the identification and management of mild traumatic brain injury, commonly referred to as concussion.

A complete listing of the peer-reviewed reliability, sensitivity, specificity, and validity data in ImPACT is available at www.impacttest.com. Diagnosis of concussion is difficult, because concussed individuals are either unable or unwilling to be reliable historians. Concussed individuals can be compared to drunk drivers; they cannot accurately self-assess and frequently do not understand the extent of their impairments. Studies have shown that current guidelines based on symptoms often prematurely clear athletes to return to contact, significantly increasing the risk of successive injuries and post-concussive disability. The accompanying article indicates that reliance on post-concussive symptoms alone in diagnosis of concussion is only 64% sensitive, and the combination of symptoms and ImPACT neurocognitive testing increases the sensitivity of diagnosis to 95%.

In our concussion program, we have developed an algorithm that minimizes the number of ImPACT tests done, because excessive testing does not add additional value to justify the costs involved and may slow recovery. We test as soon as possible after the injury, to confirm the diagnosis, assess the severity of the injury, assess reaction time relative to driving safety, and provide objective data to allow us to proactively advocate for the individual in their school or work environment. This proactive advocacy not only protects the individuals’ interests, but also facilitates a more rapid recovery by lessening the demands on the brain-injured individual.

If an individual has been determined unsafe to drive, typically by reaction time greater than 0.70 seconds, they are brought back in 5–7 days to retest and reassess for driving clearance. Otherwise, individuals are typically advised to return for retesting and reevaluation when they have been asymptomatic for 24–48 hours at rest, with light activity, and with academic/mental exertion. The purpose for retesting at that time is to identify the minority of patients who have an "asymptomatic impairment" in which they are asymptomatic but not yet neurocognitively recovered. If an individual is not yet neurocognitively recovered, they are allowed to carefully begin progressive non-contact activities as tolerated by symptoms, but are not cleared for unrestricted activities until they are asymptomatic at rest and with exertion and back to baseline or expected neurocognitive status based on ImPACT testing.

Please consider insurance coverage of this test. The emerging science of concussion indicates this is an invaluable tool, like an "EKG for the brain", which helps clinicians properly evaluate and manage this common but enigmatic injury.

Sincerely,
I need evidence that the ImPACT test is actually a neurocognitive test

ImPACT yields objective, reliable, valid, normed data on verbal and visual memory, processing speed, and reaction time, all of which are parameters of neurocognitive/psychological performance or functioning.

http://www.aetna.com/cpb/medical/data/100_199/0158.html

“Psychological tests assess a range of mental abilities and attributes, including achievement and ability, personality, and neurological functioning. Psychological testing, including neurocognitive assessment, utilizes a set of standardized tests, whose validity and reliability have been established empirically. They allow for an assessment of a patient’s cognitive and behavioral functioning and an analysis of changes related to mental or physical disease, injury, or abnormal development of the brain. Research has shown that the scores from these tests are reproducible and can be compared to those of normal persons of similar age, sex and demographic background to yield valid conclusions.”

Dr. Paul Ostergaard’s Experience as a Solo Family Physician (Non-Clinic)

<table>
<thead>
<tr>
<th>Established Patient</th>
<th>Code</th>
<th>Charge</th>
<th>Unite/Oxford</th>
<th>Aetna</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial Visit Interview</td>
<td>96118</td>
<td>$135.00</td>
<td>$111.82</td>
<td>$107.63</td>
</tr>
<tr>
<td>ImPACT Test</td>
<td>96120</td>
<td>$125.00</td>
<td>$42.49</td>
<td>$49.86</td>
</tr>
<tr>
<td>Medical Evaluation</td>
<td>99213</td>
<td>$70.00</td>
<td>$41.35</td>
<td>$37.39</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>$330.00</strong></td>
<td><strong>$195.66</strong></td>
<td><strong>$194.88</strong></td>
</tr>
</tbody>
</table>

If you use 96116 Aetna will give $115.93 for initial interview:

<table>
<thead>
<tr>
<th>New Patient</th>
<th>Code</th>
<th>Charge</th>
<th>Unite/Oxford</th>
<th>Aetna</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial Visit Interview</td>
<td>96118</td>
<td>$135.00</td>
<td>$111.82</td>
<td>$107.63</td>
</tr>
<tr>
<td>ImPACT Test</td>
<td>96120</td>
<td>$125.00</td>
<td>$42.49</td>
<td>$49.86</td>
</tr>
<tr>
<td>Medical Evaluation</td>
<td>99203</td>
<td>$135.00</td>
<td>$49.35</td>
<td>$55.89</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>$395.00</strong></td>
<td><strong>$203.66</strong></td>
<td><strong>$213.38</strong></td>
</tr>
</tbody>
</table>

If you see a patient in consultation for another physician and write a consult letter:

<table>
<thead>
<tr>
<th>Consult</th>
<th>Code</th>
<th>Charge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial Visit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mid-Level Interview</td>
<td>99244</td>
<td>$235.00</td>
</tr>
<tr>
<td>High-Level Interview</td>
<td>99245</td>
<td>$310.00</td>
</tr>
</tbody>
</table>

Use these codes in place of 99203 or 99213 (May use high-level if complete Comprehensive physical is done)
ImpACT Database Results Site

ImpACT Database Features
Password protected using SSL 128 bit security
Retrieve, Save, Print ImpACT reports
Administer Baseline and Post-Injury ImpACT tests
Generate ImpACT Reports sorted by team, school, sport, date

Find Test Results / Generate Reports / Administer Post Injury Tests
Please enter your user name and password to sign in.

Sign In

[Form fields for Login and Password]

Data encrypted with 128-bit keys.

Where to find your log in information
+ Our system has automatically sent you an e-mail with your user name and password when we registered you.
+ If for some reason you can’t find the e-mail we sent you, please contact us at support@impacttestonline.com.

Forgot Your Password?
Enter your user name and we’ll e-mail you your password.

[Form field for User Name]

Retrieve Password
Main Page
Menu screen providing access to Database functions

Welcome to ImPACT Test Center Demo2!
This site has been created to assist you in easily locating test results, administering new tests, and managing your ImPACT concussion.

Test Lookup
This page allows you to lookup all tests associated with a given individual.
Go

Test Administration
This page allows you to administer new tests.
Go

Organization Reporting
This page lets you to generate reports with test related information for your organization (how many people took the test, etc.).
Go

Injury Report
An injury report is a brief document that supplements post injury data with concussion details. This page lets you write.
Go

Corrections and Transfers
This page lets you to correct common mistakes (name mispellings, date of birth errors, etc) and allows for transfer between.
Go

Change Your Personal Information
This section allows you to change your e-mail address and password.
Go

continued on page 13
ImpACT Database Results Site, continued from page 12

Test Administration
Authorized database users can administer baseline and post-injury tests to either first-time or previously tested individuals

Test Administration

This section allows you to administer new tests for individuals who have never taken the test before and for those who have.

A. First Time Test Takers - if the person you would like to test has NEVER taken a test before please click this button: First Time

B. Previously Tested Individuals - For previously tested individuals, please click this button: Previously Tested

Test Lookup
Search for test results by entering the letters of the last name of test taker.
When the correct name appears in dialog box, click the name and hit the search button.
All previous tests are displayed and can be reviewed by clicking either “Generate Report” buttons

Please Start Typing Your Patient’s Last Name

Patient Name: Doe, John
Date of Birth: 01/02/1991

Test Type
Baseline

Date Test Was Taken
10/18/2007

Add this Test to Report

Generate Report Without

continued on page 14
Tech Support FAQ

Q: How do I add/remove an authorized user from my Online ImpACT account?
A: Any changes to the authorized user list must be done by the Primary or Secondary contact. That person emails the change request to support@impacttestonline.com. List the name and email of the person to be added/removed. If you are not the Primary or Secondary contact, ImpACT will provide that contact information.

Q: I lost my Online ImpACT password, how can I get a new one?
A: Go to the results site login page, www.impacttestonline.com/results. In the lower right hand corner is a lost password retrieval box. Type your email address and the new passcode will be emailed.

Q: My supervisor signed me up as an Online ImpACT authorized user, but I never received the login information.
A: The login information will be sent to only the email provided. If you didn’t get the email please check the spam filter. The message will come from the account registration@impacttestonline.com.

Q: I have Desktop ImpACT, how do I convert to Online ImpACT?
A: All you have to do is call or email that you would like to switch (doug@impacttest.com or 1.800.942.8632). ImpACT will send the online registration forms to start the process. Currently we do not have a way to convert your old data into the new system, but you can run both systems at no extra charge until all your athletes have cycled through the old system.
**Injury Report**

Authorized database users can add additional injury information to the ImpACT report.

Please start typing the last name of the patient you'd like to test.

Patient Name: Doe, John  
Date of Birth: 02/01/1991

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<td><strong>Date Test Was Taken</strong></td>
</tr>
<tr>
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**Error Correction and Transfers**

Authorized database users can correct the most common data-entry errors committed by test takers.

Please start typing the last name of the patient you'd like to correct.

Patient Name: Doe, John  
Date of Birth: 02/01/1991

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<th>Organization</th>
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</thead>
</table>
| Baseline  | 10/18/2007| Football | ImpACT High School
|           |           |       |              |
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COLLABORATION TAKES CONCUSSION ‘EPIDEMIC’ HEAD ON:
Statewide Group to Improve Education, Identification, Diagnosis and Treatment.

Seven medical organizations in Wisconsin, along with several advocacy groups and sports organizations, have created a statewide voluntary group committed to improving concussion care for athletes in the state. The Wisconsin Sports Concussion Collaborative (WSCC) aims to promote the health, safety and academic performance of Wisconsin student-athletes and others by improving the education, identification, diagnosis and treatment of concussions.

“This collaboration is a national model,” said Kevin Walter, MD, program director of pediatric and adolescent sports medicine at Children’s Hospital of Wisconsin and a member of the medical advisory board for WIAA and the National Federation of State High School Associations. “It is exciting to work with other doctors who are very interested in concussions. In high school football in Wisconsin, 15 percent of the athletes will suffer a concussion in one year. That is about 4,000 to 5,000 kids, and that does not include other contact sports like soccer, wrestling, hockey or basketball. A concussion is a brain injury; injured athletes need to be seen by a doctor.”

continued on page 17

Written by ImPACT’s Joseph Maroon, MD

A groundbreaking examination of new scientific research that holds the secret to weight loss, increased strength, endurance, memory, and a healthier, longer life.

In The Longevity Factor, noted neuroscientist and surgeon Joseph Maroon, M.D., offers the definitive look at recent scientific breakthroughs identifying a group of natural substances — including the much-publicized molecule resveratrol — that can actually activate a specific set of genes in humans that promote a longer, healthier life. These substances, which make red wine, dark chocolate, and green tea good for us, appear to stave off a wide array of age-related diseases and keep us feeling young and vital.

Resveratrol is the centerpiece of headline-making research being conducted at the Harvard Medical School and elsewhere. Only recently, however, have scientists discovered how to isolate resveratrol and concentrate it into an affordable and safe supplement. Already, more than 200 supplements featuring resveratrol have flooded the market, and there are countless more on the way. But which ones work best? What is a consumer to look for on the label? Since resveratrol is a natural substance, can you get enough of it through diet alone, or should you combine diet with a supplement? And what lies on the horizon from the pharmaceutical industry? All those questions and many more are answered in this immensely informative and practical book.

Joseph Maroon offers the first-ever inside look at the amazing research that has led to the discovery of resveratrol and similar substances with the miraculous ability to activate our own longevity genes. He also offers his own diet plan and sound, reader-friendly advice for living a longer, healthier, and more balanced life with or without supplements. The Longevity Factor promises to be the authoritative source for everyone who wants to know more about how we can shift from the current paradigm of aging to a disease-free golden age of health, longevity, and fitness.
The WSCC founding members include ThedaCare Orthopedics Plus in Appleton; UW Health-Sports Medicine in Madison; Children’s Hospital of Wisconsin in Milwaukee; Gundersen Lutheran in LaCrosse; Bellin Health-Sports Medicine in Green Bay; Froedtert Health-Sports Medicine in Milwaukee; and Ministry Health Care-Sports Medicine in Stevens Point. Recently the Collaborative added new members from Menomonie, Eau Claire and Wausau, and would like to add more members. Information on the group can be found at www.WIsportsconcussion.org on the web.

“Concussions in athletes are a much more serious problem than has been recognized in the past,” said Mark Hallett, MD, director of sports medicine for ThedaCare Orthopedics Plus. “We now recognize that getting your ‘bell rung’ is a brain injury that can take several days or more to heal. Recent studies show that they are more common and take longer to heal than previously thought; it is an epidemic. This can result in an increased risk of repeated concussions, prolonged symptoms, decreased academic performance, and potentially permanent disability. This should concern everyone associated with sports as well as organizations that deal with brain injuries.”

In addition to educational resources and a listing of trained health care providers, the Collaboration offers an online ImPACT™ concussion test readily available for use for baseline testing prior to an athlete’s participation. ImPACT is a computerized series of neurocognitive tests that help medical staff determine the severity of concussions and when it is safe for injured athletes to return to play. The ImPACT program has been adopted by team doctors and certified athletic trainers for numerous top sports leagues in the world, including the National Football League, National Hockey League and Major League Soccer.

Concussion is any change in mental status caused by a sudden violent rocking back and forth of the brain inside of the skull due to a blow to the head or upper body. Symptoms can include headache, amnesia, dizziness, confusion, lack of hand-eye coordination, and in some cases, loss of consciousness. Generally, an athlete can safely recover from an initial concussion as long as the brain has had time to heal. If a second concussion occurs prior to full recovery from the first, an athlete may experience long-term symptoms in the form of chronic headaches, sleep difficulties, personality changes or memory problems. In rare cases, a second concussion may even result in death from second impact syndrome.

“This innovative tool is extremely beneficial to soccer athletes, coaches and parents and can help us objectively determine when full recovery from concussion has occurred,” said Peter Mariahazy, president of Wisconsin Youth Soccer Association. “By getting the baseline test of each athlete, the coaches and the parents know when it is safe to send the athlete back out onto the field. They may think they know, but this will tell them for sure. If an athlete had a sprained ankle, a coach would not send him or her out to play too soon and risk aggravating the injury. That should be the same with a concussion. You want to make sure the athlete is healed.”

ImPACT objectively measures multiple aspects of brain functions, including verbal memory, visual memory, processing speed, reaction time and post-concussive symptoms. In the pre-season, each athlete should take 20-30 minutes to complete a baseline test, which shows how the athlete’s healthy brain processes information. When a concussion is suspected, a follow-up test can be administered to see if the results have changed from the baseline. This comparison helps to more accurately diagnose and manage the concussion. Follow-up tests can be administered over days or weeks so that medical professionals and clinicians are able to continue to track the athlete’s recovery from the injury.

“It is important to obtain accurate baselines so we understand where the athlete functions during normal day-to-day activities prior to sustaining a head injury,” said David Bernhardt, MD, with UW-Health’s Department of Pediatrics/Ortho & Rehab, Division of Sports Medicine. “If the athlete subsequently sustains a head injury, we can compare the two studies, which will not only help in determining clearance for return to play decisions but may also give us a picture of how the athlete may function in the classroom after the head injury.”

The Wisconsin Sports Concussion Collaborative and WIsportsconcussion.org is co-lead by Dr. Hallett, who serves as the medical director and lead physician, and Tracy McCormick, who serves as a concussion program consultant, sales and support specialist, and web master for the organization. For more information, MEDIA may contact Megan Wilcox (megan.wilcox@thedacare.org), public relations specialist for ThedaCare, at (920) 830-5847, or pager (920) 554-0730, or Tracy McCormick (tracy.mccormick@WIsportsconcussion.org) at (920) 380-1541. ###
Indiana Sports Concussion Network Update

Indiana Sports Concussion Network (ISCN) has been hard at work further developing the program details, expanding the network of clinicians, and increasing awareness of the importance of proper concussion management. Recently, there have been two major accomplishments in ISCN’s program.

First, ISCN now has a website up and running. Visit www.IndianaSportsConcussionNetwork.com to check it out. Visit often as updates will be made regularly. While there are still some updates and changes that need to be made, this website provides information about the program as well as contact information for ISCN staff—valuable information for parents and athletes looking to post-concussion care.

Secondly, we’ve got you covered! ISCN now has at least one ImPACT trained clinician (physician or psychologist) within sixty miles of nearly every location in Indiana. To find an ImPACT trained-ISCN participating clinician in your area, visit our website and click on “ISCN Clinicians” or contact the ISCN staff.

ISCN is proud to be using ImPACT in helping high school athletes return to sports safely. ISCN is able to offer ImPACT baseline testing to all IHSA high schools. These baseline tests have been donated by Clarian Health. The program continues to grow, adding more Indiana high schools to the program through the winter and spring. If you are interested in registering your high school for baseline tests, or joining the network of clinicians trained to interpret post-tests, please contact Kirsten Bondy, Program Coordinator for ISCN. (317) 437-2002 or iscn.kbondy@gmail.com. Please help Indiana in “Increasing awareness and promoting proper management of sports related concussions.”

Indiana Sports Concussion Network

Phone: (317) 571-8233
Fax: (317) 272-6491
E-mail: iscn.staff@gmail.com
Dan Rather Reports…

HDNet’s “Dan Rather Reports” Investigates the New Epidemic of Head Injuries Among Today’s Student Athletes

“Dan Rather Reports: Knocking Heads” shows the depth of this problem and how simple changes can save lives — aired on Tuesday, March 3 at 8:00 p.m. ET

“Dan Rather Reports” will present a special investigation into what The Centers for Disease Control is calling an epidemic among children in sports — head injuries.

It is believed that an alarming 41% of high school athletes who suffered an initial concussion are returned to active play too soon. Last year, five high school football players died during games, or at practices, from getting a concussion on top of another concussion—a condition known as "second impact syndrome." Countless children also suffer the very serious side effects of second impact syndrome.

One of those children is Zack Lystedt of Seattle. With his parents watching in the stands, Zack suffered two concussions in the same football game. As a result of these injuries, he was airlifted from the football field to Seattle’s Harborview Medical Center where he spent a week in the ICU, three months in a coma and had surgeries on both sides of his brain.

"Most of what we know about concussions we’ve learned in the last five years," said Dr. Mark Lovell the Founding Director of the Concussion Program at the University of Pittsburgh and one of the leading sports concussion experts in the country. "You know, the CDC has called it an epidemic, and has put forth major effort over the last five or six years into getting the word out to coaches, parents, athletes. That definitely needed to be done. Because there's still people out there, even in the medical community, who don't see this as being a serious issue."

While football has the highest rate of concussions by far, athletes in baseball, softball, soccer, basketball, hockey, wrestling, gymnastics, lacrosse, volleyball and cheerleading all have more concussions than are generally realized.

"Dan Rather Reports - Knocking Heads" can also be downloaded onto your iPOD from the iTunes store for $1.99 Episode 44

transcript available for Dan Rather Report at www.hd.net/transcript.html?air_master_id=A5875&pd=danrather

Throughout the years, ImPACT has been a part of many media segments on concussion and concussion management. This segment by Dan Rather’s team is by far one of the best pieces that we have seen. The ImPACT team highly recommends you download this segment and show it to everyone in your network: your medical staff, coaches, athletes, and parents. This is an extremely powerful one-hour special on concussion in athletes. This comprehensive report details the personal stories of a number of athletes at different stages of recover from concussion and is an excellent educational tool for those of you who provide care to athletes of all ages.
A look at ImPACT’s Training Webinars…

**GETTING STARTED with ImPACT:**

30 minutes of Demonstration of the Online System
30 minutes of Baseline Testing Recommendations
30 minutes of Open Forum for Q&A

**KEYS TO CLINICAL INTERPRETATION:**

30 minutes of Keys to Clinical Interpretation
30 minutes of Case Presentations
30 minutes of Open Forum for Q&A

**BILLING THRU INSURANCE COMPANIES FOR ImPACT:**

30 minutes of Terminology and Descriptions, Review of CPT Codes & Diagnosis Codes, & Documentation
30 minutes of Common Testing and Billing Scenarios for ImPACT
30 minutes of Open Forum for Q&A

For a list of webinars that are currently available, please visit our website @ http://www.impacttest.com/workshops.php
## Training Workshop in Conjunction with the NATA Conference

**June 17, 2009, Sample Agenda, San Antonio, TX NATA**

<table>
<thead>
<tr>
<th>Time</th>
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<tr>
<td>8:30 – 8:50 am</td>
<td>Registration</td>
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<tr>
<td>8:50 – 9:00 am</td>
<td>Introduction and Overview</td>
<td>Labiba Russo</td>
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<td>9:00 – 9:30 am</td>
<td>Concussion 101: Biomechanics, Pathophysiology, Topics of Concern</td>
<td>Micky Collins, PhD</td>
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<tr>
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<td>History of Neuropsych Testing &amp; Development of ImPACT</td>
<td>Mark Lovell, PhD, ABPN</td>
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<tr>
<td>10:00 – 10:30 am</td>
<td>Development of ImPACT</td>
<td>Mark Lovell, PhD, ABPN</td>
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<tr>
<td>10:45 – 11:15 am</td>
<td>On-Field Management of Concussion</td>
<td>Mark Lovell, PhD, ABPN</td>
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<tr>
<td>11:15 – 11:45 am</td>
<td>Research: Rates of Recovery, Risk Factors, New Frontiers</td>
<td>Micky Collins, PhD</td>
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<td>Break, Grab Lunch and Proceed Back to the Classroom for a Working Lunch</td>
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<td>Baseline Testing Recommendations from a Technical Perspective</td>
<td>Doug Tauchen</td>
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<tr>
<td>12:45 – 1:15 pm</td>
<td>Baseline Testing Recommendations from a Clinical Perspective</td>
<td>Micky Collins, PhD</td>
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<tr>
<td>1:15 – 1:45 pm</td>
<td>Keys to Clinical Interpretation</td>
<td>Mark Lovell, PhD, ABPN</td>
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<td>Break</td>
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<td>2:00 – 4:00 pm</td>
<td>Case Presentations and Open Forum</td>
<td>Mark Lovell, PhD, ABPN         and Micky Collins, PhD</td>
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<tr>
<td>4:00 pm</td>
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Case Presentation “M”

Presented by: Penn State Concussion Program

The Penn State Concussion Program is located in Hershey, PA and is part of Penn State Children’s Hospital at Penn State Milton S. Hershey Medical Center. The program was founded in the fall of 2005 by Dr. Harry Bramley at the request of the Pediatric Trauma Program. Dr. Bramley joined Hershey Medical Center in 2005 as a pediatric hospitalist and pediatric rehabilitation physician. He is a graduate of the Philadelphia College of Osteopathic Medicine, completed his osteopathic internship at Geisinger Medical Center, and pediatric residency at Hershey Medical Center. Prior to joining Penn State, Dr. Bramley was a pediatric hospitalist and pediatric trauma consultant at Wellspan. He is board certified in Pediatrics. Dr. Bramley’s interests include caring for children with complex health care needs, severe brain injury and concussion management. He also was a collegiate athlete, and is active in the community as a youth baseball and hockey coach. He has given lectures regarding youth athletics, and has held positions on multiple youth athletic boards. The Penn State Concussion Program provides consultative services to local schools and youth athletic programs. The program is supported by members from the departments of Neurology, Neurosurgery, Neural and Behavioral Sciences, Orthopaedics and Rehabilitation (including sports medicine), Pediatrics, and Surgery (including trauma services).

Kristine Harclerode assisted with the preparation of this case report. Kristine is a graduate of Penn State University, was a member of the Penn State Women’s Tennis Team, and is currently applying to nursing schools. She worked with Dr. Bramley while completing her college internship during the summer of 2007.

Injury Description and Patient Background

“M” is a 17 year old high school junior who is an elite hockey player who aspires to play collegiate hockey. He was referred by the primary care physician due to ongoing symptoms related to a concussion sustained 2 months prior to evaluation. “M” was playing hockey when he took a hit from an opposing player. He did not sustain any loss of consciousness but does not remember the check or going to the bench. He does remember his shift prior to the hit, the coach rubbing his neck after getting to the bench, and remembers the remainder of the game of which he played. He does not recall being disoriented but recalls a headache which significantly worsened following the game. He also has a history of a significant fall during a practice 2 weeks prior where he hit his head on the ice. There was no loss of consciousness and no amnesia, but developed a headache immediately after the fall which persisted. He continued to play hockey with a headache until he took the above check. He did mention his headache to the coaches but he continued to play.

For the 2 months prior to evaluation, “M” was suffering from significant headaches and insomnia. He was not playing hockey but continued to go to school full time with a full work load, and was having significant difficulties with a large drop in grades. He was seen by a neurologist who recommended that he retire from competitive hockey, and was given amitriptyline and zonisamide for his headaches. Due to the persistent headaches, a MRI, MRV and MRA were obtained which showed a questionable stenotic area at the left MCA.

“M” does have a history of a prior concussion about 2 years prior obtained during a hockey game. Symptoms lasted for approximately one week with no interventions or treatment given. He is a “B” student with an occasional A. Family history has no history of migraine or dementia. He required an appendectomy in 1995, as well as an I and D of his ankle in 2005.
First Evaluation Day 55

“M” reported significant concern regarding headaches, difficulty sleeping and his school performance. The headaches were greatly exacerbated with reading. He indicated he was having difficulty concentrating and remembering homework assignments. “M” was also very concerned that he would not be able to play hockey in the future, and would like further information why his neurologist recommended he retire from competitive hockey. He currently is a member of an elite travel team whose purpose is to expose the players to college hockey scouts at national and international tournaments. His general physical exam was unremarkable as was his neurological exam.

“M” took the ImPACT test during the visit. His verbal memory score was <1%. His visual memory score was 16%. His visual motor speed was 31%. His reaction time was 68%.

Impression at the initial visit was that “M” had post concussive syndrome with symptoms of headaches, insomnia and memory being the most troublesome. He was neurocognitively impaired based on ImPACT. He was having difficulty in school and there was a questionable abnormal MRI. “M” and his father were also seeking advice about his future in hockey.

Recommendations:

1. “M” had indicated that the amitriptyline had helped with the headaches but the zonisamide did not. The zonisamide was discontinued and the amitriptyline was increased to 75mg per day. Melatonin was also added to assist with his sleeping.

2. Because school had become a significant issue and concern, notes were given to reduce “M’s” work load as well as instruction for “M” to take frequent breaks if he developed symptoms. The guidance counselor was contacted and was informed of “M’s” post concussion symptoms. The guidance counselor indicated concern and was uncertain as to “M’s” sudden drop in school performance, and was very appreciative of the phone call. The guidance counselor informed his teachers, principle and school psychologist as to the cause of “M’s” drop in grades, and put in place academic modifications.

3. The MRI was reviewed by our Pediatric Neurologists, Pediatric Neurosurgeons, and Neuroradiologists. It was unclear after this review if the abnormality noted on the MRA was artifact or stenosis of the left MCA. It was decided to repeat the study.

4. It was clear that both “M” and his father recognized that this was a severe concussion. It was also clear that they both recognized this severity was probably related to the fact he was playing with symptoms suggestive of a concussion when he took a second hit. However, they both were hoping “M” would be able to return to competitive hockey once symptoms resolved, even though a Neurologist recommended retiring from competitive contact hockey. A lengthy discussion was held regarding an individualized approach as to when to retire from a sport. “M” and his father were informed of issues surrounding multiple concussions and increased risk for future brain injury. No definitive recommendations were given during this visit, and the focus returned to recovering from this concussion and obtaining further neuroimaging.

5. A follow up appointment was made for 6 weeks but “M” was asked to call in 2 weeks with an update regarding symptoms and school work.

Second Evaluation Day 68

Phone call discussion with Dad indicated “M’s” headaches were improved with the increase in amitriptyline and was sleeping much better with the addition of melatonin. The school also had reduced “M’s” workload significantly and was allowing “M” to go to the nurse’s office if developing symptoms.

Phone call discussion with “M’s” guidance counselor indicated the enactment of a reduced workload and a better teacher understanding of “M’s” condition. The counselor also had been seeing “M” regularly and indicated improvement with “M’s” symptoms. There were also no reported visits to the nurse’s office over the last 5 days.

Recommendations:

1. Due to the significant improvement of symptoms it was recommended “M” could start with light physical exertion such as walking and riding a stationary bike. It was stressed to stop these activities with any return of symptoms.

2. Recommendations were made to the school to gradually increase his work load as tolerated and to call with any questions or concerns.
**Third Evaluation Day 104**

“M” indicated he was feeling back to his normal self with resolution of his headaches. He indicated his memory, cognition and concentration ability were back to his baseline. He indicated no concerns with the few days he had been in school following the recent school recess. “M” also indicated he began ice skating over the last week with no return of symptoms. Dad felt “M” was doing well and agreed that his symptoms had resolved.

His general physical exam and neurological exam remained normal. The repeat MRI and MRA were reviewed as normal with no indication of stenosis or aneurysm.

“M” retook the ImPACT test. His verbal memory was 34%. His visual memory was 60%. His visual motor speed was 5%. His reaction time was 62%. However his impulse control composite was 127. His total incorrect with module 3 (X's & O's) was 126, indicating left and right were reversed. When reversing his total correct with total incorrect, his raw score increased to 35.25, which increased his percentile to 32%.

**Recommendations:**

1. Reassurance was given regarding the MRI, MRA.
2. Due to his resolution of headache, weaning of the amitriptyline was begun. He had already stopped taking the Melatonin.
3. The school was again contacted and was informed of his recent visit. A full work load was re-instated.
4. A lengthy discussion was again completed regarding the risks of returning to competitive contact ice hockey. Both the dad and “M” seemed to recognize these risks both from discussions from the visits and from their own research. “M” indicated he would be extremely unhappy if unable to play, and again stated he would like to play college hockey.
5. Although there was not a baseline for comparison, his ImPACT scores were certainly improved. After correcting for the impulse control, and based on his academic performance, these scores could certainly be his baseline. Clearance was given for “M” to return to hockey practice. Contact was made with “M’s” hockey coach. Instruction was given to allow “M” to gradually increase his physical exertion at practice as long as there was no return of symptoms. Before adding contact, it was recommended “M” re-take ImPACT to make sure he remained neurocognitively appropriate following heavy physical exertion. The coach was also informed of concussion signs and symptoms, and was told to contact the concussion program with any questions regarding “M” or with any of his other players.

**Fourth Evaluation Day 123**

“M” indicated he was tolerating a full academic schedule at school and participating in heavy physical exertion during non-contact hockey practice with his travel team. He also was playing in a men's non contact hockey league. All medications had been stopped and he denied any return of symptoms.

“M” retook ImPACT. His verbal memory was 34%. His visual memory was 60%. His visual motor speed was 53%. His reaction time was 68%. The impulse control was 7. These score were either unchanged or improved as compared to his previous scores.

**Recommendations:**

“M” was instructed to begin full contact at practice. The coach was notified of this and instructed to stop “M’s” participation with any return of symptoms.

**Fifth Evaluation Day 125**

“M” was observed during a full contact hockey practice with his travel team. He was observed participating in full physical exertion and full contact drills. Following the practice he denied any symptoms with the exception of feeling “out of shape.” He was given a note allowing return to athletic competition with no restrictions, and instructed to call with any concerns or questions in the future. “M” was also offered to take ImPACT prior to next season as a baseline.

The coach and father were also instructed to call with any questions or concerns they may have in the future.
Key Points

1. Playing with a concussion. "M" was involved in a head to ice incident during a hockey practice which resulted in headaches. "M" reported his symptoms but the coaches continued to allow him to play. Many players recognize when they have sustained a hit to the head, but may not recognize concussion symptoms. According to an article on Under-Reporting of Concussions by D. Goodman Williamson, players who fail to report incidents of concussions and return to play while still symptomatic, may be placing themselves in a position where further injury could occur. According to this article, the most common reasons for concussions not being reported include players not thinking injury was severe enough to warrant medical attention (66%), motivation to not be withheld from competition (41.0%), and lack of awareness of probable concussion (36.1%). In this case, symptoms were reported but play continued indicating lack of awareness of concussion symptoms, lack of knowledge of risk, or feeling that the benefit of playing outweighs the risks. Concussion experts should be actively involved in youth athletics and assist athletes, coaches and parents to become aware of signs and symptoms, but also to educate about the risks of playing before a concussion is resolved. In some instances athletes may be well aware of the risks, but feel the benefits outweigh these risks. In this case, the coach was contacted and given information about concussions, and asked to call with any additional questions.

2. Retiring from a sport. "M" was informed by a neurologist that he should retire from competitive contact hockey. There are certainly times when an athlete needs to retire from their sport for medical reasons. When these instances arise, physicians need to be sensitive to the importance athletics play to many athletes. "M" is an elite athlete, who has dreams of playing at the collegiate level, and was devastated after his appointment with the physician who determined he should retire. There are times when athletes retire themselves, but there are other athletes who have such a passion that they may risk a lot to continue to play. It is with these athletes where concussion experts need to spend time discussing the known risks, and spend even more time getting to know the athlete so appropriate decisions can be made.

3. Neuroimaging. Neuroimaging has been very useful in identifying neuropathology, but there is a radiation risk with CT scans, and MRIs are expensive. In this case a MRI led to a questionable abnormality, which caused anxiety for the family and added expense with repeat imaging. It is important to recognize these issues when ordering neuroimaging.

4. Interventions. It is important concussion experts routinely contact guidance counselors, athletic trainers, school nurses, and coaches regarding treatment. In this case the school was very concerned about "M"s sudden drop in grades. They had questioned substance abuse, and other emotional and social concerns as possible causes. After informing the school of "M"s" post concussive symptoms, they were able to put an educational plan in place to better assist in "M"s" recovery. Also, the coach of "M"s" hockey team has become more aware of signs and symptoms of concussion, and all of the current members of the team have taken ImPACT as a baseline.

About Penn State Concussion Program

The Penn State Concussion Program strives to provide a comprehensive, standardized, evidence based approach to patients who have sustained a concussion. We work closely with the family, schools, employers, coaches, school nurses and referring physicians to ensure a recovery and return to full activity as quickly and safely as possible.

The medical director of The Penn State Concussion Program, Dr. Harry Bramley, is a pediatric hospitalist and pediatric rehabilitation specialist. He is board certified in pediatrics, and prior to coming to Penn State spent six years as a pediatric trauma consultant. Dr. Bramley recognizes the benefits of youth athletics. He was a collegiate athlete, and remains very active with local youth athletic programs, as a coach, official and board member.

The Penn State Concussion Program is supported by many experts in the field of brain injury. Members of the department of Pediatric Neurology, Neurology, Pediatric Neurosurgery, Neurosurgery, Neural and Behavioral Sciences, Pediatric Rehabilitation and Sports Medicine are readily available for additional consultative services if required.

Dr. Matt Silvis joined the concussion program in July of 2008. He is a family physician, fellowship trained in sports medicine, and is the team physician for the Hershey Bears and Harrisburg Senators.

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