One of our subjects was told by someone that the NFL told them that our group will be a site designated to do baselines for players. Have you heard anything about this?

J

Sent from my iPhone
Monty is the co chair for the 11th DFW SMS March 28-30, 2014 at the new location: Sheraton DFW on 114. He would like for you to be part of a panel discussion highlighted in yellow below. The suggestions for this topic and from came from Stanley Herring, MD last year. He felt it was good to have a “kick the tires” type discussion and engage the audience about current trends in mTBI care. While we don’t have the full line up set yet, I have attached some of the folks we are working to get on board. Please let me know if you can attend.

Thanks

Agenda - Day Two
Saturday March 29, 2014

10:15 am - 11:45 am

SESSION III:
Moderator: Jim Sterling MD
Damond Blueitt, MD       RTP progressions UPMC update
Lynn Fitzgerald, MD       Clinical care from a neurosurgeon
Hunt Batcher, MD           NFL/ Heads up program/ New technology (MRI etc)
Paul Krawietz, AT         Return to classroom
Bridget Wallace, PT       Balance, retraining and Rehab

Save the Date:
11th annual DFW Sports Medicine Symposium
March 28, 29, 30, 2014 Irving, Texas
www.texashealth.org/benhogan
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Hi Hunt,

You probably have this, but just in case....

Ira
Hunt: Several head injury articles----in case you do not get this ePublication.

Tackling Concussion Head On in the NFL

After decades of permitting on-field violent play, numerous well publicized cases of brain injury, and a multimillion dollar settlement with former players, the National Football League has begun making significant strides in improving the safety of the game and minimizing head trauma among players. Read more

Culture Shock: Web-Based Hep C Tx Guidelines

Web guidelines for hepatitis C will be a "living document" to guide doctors and patients as they surf through a tidal wave of new treatments. Read more

Study Feeds Concerns About MI Risk With
Filling a prescription for testosterone therapy was associated with a greater risk of having a nonfatal myocardial infarction in the next 3 months, a large observational study showed. Read more

This Week's Survey: Is the FDA Ignoring Its Advisers?

The FDA’s decision not to approve alemtuzumab (Lemtrada) for use in multiple sclerosis, despite solid votes in favor of the drug's efficacy and safety by an agency advisory committee, has generated fury in the MS community.

Should the FDA pay more attention to its advisory committee recommendations?

ER Briefs: Why I Disagree With ACEP’s tPA Guidelines

We reached out to Anand Swaminathan, MD, MPH, assistant residency director and assistant professor of emergency medicine NYU/Bellevue Emergency Department, for his take on the ACEP tPA guideline debate. Read more

Hot Topics 2014, Lung Cancer: Reid, Mazzone, DaSilva, Kim

What will be the most important issues to watch in lung cancer in 2014? We asked four experts in the field for their views. They highlight lung screening expansion, less invasive staging and resection, and new technology and drugs. Read more

Low Vitamin D Linked With Worse Lupus

Low levels of vitamin D among patients with systemic lupus erythematosus (SLE) were associated with greater disease activity and an increased likelihood of cardiovascular risk factors such as high blood pressure and elevated lipids, a large cohort study
Team Doctor: Can the NFL Do More?

MedPage Today asked Matthew J. Matava, MD, president of the NFL Physicians Society, head physician for the St. Louis Rams, about additional measures the league has taken or could do to further increase player safety. Here are his responses. Read more

Concussions: Numbers Game or Gaming the Numbers?

Finding a definite number of concussions in professional football players depends on who’s doing the counting and what they’re counting. Read more

NFL-GE Award $20 Million for Brain Imaging

With considerable fanfare, GE and the NFL announced 16 winners of $20 million in grants to help researchers "speed diagnosis and improve treatment for mild traumatic brain injury." Read more

Risk of Death When Waiting for a Heart Varies

The risk of dying within 90 days of being placed on a heart transplant wait-list was 10 times greater for patients with the most risk factors compared with those with the fewest, researchers found. Read more

SGR: What Went Wrong?

Medicare’s sustainable growth rate payment formula was almost certain to fail, according to those who were in positions of power at the time, because the formula had many shortcomings. Read more
ER Briefs: Open Season on ACEP tPA Guidelines

Cage match: After last year’s clot buster guidelines led to division at ACEP, the group opens the floor for discussion and possible change. Read more

Vitamin D Blog: Need a Closer Look at D’s Role in COPD?

The literature is split on whether vitamin D has any effect on chronic obstructive pulmonary disease. Read more

Heart Attack Signal Found for Spiriva in COPD

The TIOSPIR trial was used to support safety of the mist inhaler version of tiotropium (Spiriva) compared with dry powder, but the pooled data actually showed something else -- a heart attack signal, researchers argued. Read more

Striking a Nerve: HIV Drug May Help in PML

A relatively simple way to make progressive multifocal leukoencephalopathy more survivable appears to have worked in a multiple sclerosis patient taking natalizumab (Tysabri). Read more

OncoBlog: The Emotional Cost of Cancer Care

As cancer exacts a physical toll on patients, the disease’s emotional destruction touches far more people, possibly including close to a majority of oncologists, according to a study of burnout in the profession. Read more

Resources for Top Doctors

Verify or update your profile information
| Order plaques, obtain logos and other Top Doctor recognition materials |
| Access your profile and view publications where you have been included |
| Nomination instructions |

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The future of medicine, today.
Dr. Bajer,

Your thoughts?

Gregg Shields, APR
Senior Communications Specialist
UT Southwestern Medical Center
214-648-9354

-----Original Message-----
From: Kirkland, Shelly
Sent: Tuesday, January 27, 2015 11:53 AM
To: de Haro, Anna
Cc: Gregg Shields
Subject: Re: Interview with someone from Center for Brain Health

Hi Anna,

Unfortunately, Dr. Hart and our other scientists at the Center for Brain Health focused our work with NFL players are not available to meet your deadline. However, our collaborators at UT Southwestern may be, specifically Dr. Munro Cullum.

I’ve copied Gregg Shields who handles their media relations.

Please keep us in mind for future opportunities.

Best,
Shelly

Shelly Kirkland
Public Relations Director

[Description: Description: cid:88BD952F-0733-40EE-9B7A-1AD160F465B1]
Shelly,

I left you a voice mail and the number listed on the Center's website but I wanted to follow up with an email to see if someone would be available for a phone interview to talk about the work that the Center for Brain Health is doing and to talk about the NFL and the research that is coming out about retired players dealing with cognitive deficits and depression due to injuries sustained during their days playing football. The interview would be pre-recorded and air this coming Sunday, the day of the Super Bowl, February 1st, across all 6 of our DFW radio stations. I was hoping that someone would be available for an interview here at our studios in North Dallas on Thursday at noon or 12:30pm or we could always do the interview over the phone as long as the person doing the interview is on a landline so that we have the best sound quality possible.

Do you think this is something we could set up? You can reach me via email or you can call me on my cell at 214-244-2955. I look forward to hearing back from you.

Sincerely,

Anna de Haro
Public Affairs Director I On-Air
KHKS/KDMX/KDGE/KEGL/KZPS/KFXR
•214.866.8216
•14001 North Dallas Parkway Suite 300 I Dallas I Texas I 75240 iHeartMedia.com I iHeartRadio.com

________________________________
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Hi, Dr. Batjer –

I just wanted to follow up with you re: last week’s interview on the concussion settlement. My apologies – I’ve been out of the office. Did everything go well?

Also, I’m working on the Annual Review feature story about the new TBI Center. Do you have any availability the morning of Friday, Sept. 6 to meet with me and discuss/provide some insight and quotes for the article? If not, I’d be happy to discuss another time next week that will work.

Thanks very much,
Remekca

Remekca Owens
Senior Communications Specialist
Office of Communications, Marketing, & Public Affairs
UT Southwestern Medical Center
www.utsouthwestern.edu
Hi, Debbie – as noted, this is terrific & we are excited to meet with everyone (& I can’t speak for Hunt, but I’ve never been in any newsletters along with Willie!). Can you send us a reminder of the schedule of events on which we should plan - ie talks, activitie,s & times, etc. for the Sept. 20-22 visit when you get a chance?

Many thanks,

Munro

This newsletter is designed to have just a little tease on your presentation.......a special edition e-blast will go out Sept. 1 and will include full bios etc etc etc.

This was prepared by our UT College of Communications Intern Sarah Dixon...we welcome all comments and suggestions.

Please edit and approve the block on your lecture.

This is a REVIEW test
In This Issue
A Message from Edith
4th & Goal Gala Recap
Upcoming Public Lecture
Upcoming Grant Planning Meeting

Vol. 1.1 | August 2013

A Message from Edith

A wise man once said, the days seem to last forever and the years fly by. Here we are already turning the corner into the last half of 2013, the best news is that means football season is upon us. I am ready for another great year for Coach Brown and our team! The week of our great ACL party with Willie was very special with so many wonderful events. I appreciate each and every person who came to Austin, sent best wishes, and supported our DKR Fund.

Special thanks to J Frederick (Dallas) former Texas Tech player for organizing his 2nd successful July golf tournament honoring the late Sharon Dykes who suffered so long with AD and my good friend Spike. The funds received will benefit Darrell’s Alzheimer’s research fund.

I know J has plans for an even bigger and more successful event in 2014.
https://www.facebook.com/SpikeDykes

4th & Goal Gala a Touchdown

Ben-Willy- Darrell event raises almost $1 million

The first ever Ben-Willy-Darrell 4th & Goal Gala was a huge success, raising nearly $1 million during a night of music, food and revelry at the ACL Moody Theater.
Over 1600 guests attended the March 27 event, including Heisman Trophy winner Earl Campbell, Texas Attorney General Greg Abbott, professional golfer Ben Crenshaw and countless other friends and former players of Coach Royal’s.

Earl Campbell and Ben Crenshaw

In true Longhorn spirit, attendees enjoyed a live appearance by Bevo, hospitality from the Texas Cowboys and Texas Silver Spurs, and a surprise performance of “Texas Fight” and “The Eyes of Texas” by the Longhorn Alumni Band.

Members of the Longhorn Alumni Band getting their horns up

Emceed by singer Larry Gatlin, the night flowed effortlessly between cocktails, dinner, emotional tributes to Coach Royal and a live auction. The festivities concluded with an entertaining and energetic set by Texas music legend Willie Nelson.

Willie Nelson performing with his famous guitar, Trigger

Thanks to everyone involved and all who attended, the bash honored a great man and illustrious coach and marked a triumph in the fight against Alzheimer’s disease. We’re looking forward to next year’s event!

Guests paying tribute to Coach Royal
Upcoming Public Lecture

Prominent Texas scientists to discuss link between head injuries and cognitive impairment

On Saturday, Sept. 21, the DKR Fund and the Alzheimer’s Association will be cosponsor a free public lecture on the topics of head injury and brain function among athletes.

The lecture will feature two distinguished UT Southwestern scientists: Dr. Hunt Batjer, M.D., Chair of Neurological Surgery, and Dr. Munro Cullum, Ph.D., Chief of Psychology and director of the Neuropsychology program.

Before attending medical school and completing his residency at UT Southwestern, Dr. Batjer played baseball for the University of Texas at Austin. Dr. Batjer co-chairs the $100 million NFL Head, Neck and Spine Committee and President of the Neurological Society of America. In addition, he has written eight books and published almost 350 papers.

Dr. Batjer will be discussing his research on head injury in professional and amateur sports and the measures being taken to make play as safe as possible.

Dr. Cullum, a native Texan and UT Austin grad, is the senior author of a JAMA-published study on the neuropsychological status of former NFL players which included many former Dallas Cowboys. His daughter is currently attending nursing school at UT Austin and his son plays soccer at St. Edward’s University.

Dr. Cullum will present his study on the relationship between early life concussions and brain function with aging.

The lecture is a free event open to all. It will provide fascinating insight into an extremely complicated matter.

Upcoming Grant Planning Meeting

Scientific advisors to help define grant distribution process

The first DKR Fund grant process planning meeting will be held in early October.

In this meeting, a small group representing the DKR Fund Board of Advisors will meet with Dr. Ramon Diaz-Arrastia, MD, PhD, and Dr. Kirk Wilhelmisen, MD, PhD, to establish the process by which the fund will grant money to researchers.

Dr. Diaz-Arrastia is currently a Professor of Neurology at the Uniformed Services University of the Health Sciences and Director of Clinical Research at the Center for Neuroscience and Regenerative Medicine.

Dr. Wilhelmisen is a neurogeneticist in the Department of Genetics at the UNC-Chapel Hill School of Medicine.

Meeting outcomes will include the development of our process for soliciting and receiving proposals, awarding grants and monitoring progress with the
intent to begin cash awards in spring 2014.

Sarah Dixon - Communications Intern -
DKR Fund | info@dkrfund.org | PO Box 5839
Austin, TX 78703

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--
Sarah Dixon
Communications Intern
info@dkrfund.org

--
Debbie Hanna
[Redacted] cell

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--
Debbie Hanna
Sent from my iPhone

Begin forwarded message:

From: "Pash, Jeff" <>
Date: November 15, 2013 at 12:01:13 PM CST
To: "Hunt.Batjer@UTSouthwestern.edu" <Hunt.Batjer@UTSouthwestern.edu>, "bergerm@neurosurg.ucsf.edu" <bergerm@neurosurg.ucsf.edu>, Richard Ellenbogen <rge@uw.edu>, "gus@email.unc.edu" <gus@email.unc.edu>
Subject: FW: Player Health and Safety Stories-November 15, 2013

---

From: Frank, Jacob
Sent: Friday, November 15, 2013 11:30 AM
To: Frank, Jacob
Cc: Graff, Clare
Subject: Player Health and Safety Stories

Player Health & Safety Stories
November 15, 2013

Stories of note (excerpts below):

1. Tennessean—"Despite concussion risks, most Titans wouldn't stop sons from playing"
2. NFL.com—"NFL Up: Certified athletic trainer offers drills for textbook tackling"
3. ESPN.com—"Youth football participation drops"
4. Montreal Gazette—"Professor's mission: Zero tolerance for violence in sports"
5. Associated Press—"NFL will look at making QBs safer"
6. ProFootballTalk—"CTE findings create more requests for CTE assessment"
7. CSN Bay Area—"After two concussions, Reid focuses on adjusting playing style"
8. USA Today—"Memories of hits to head worry ex-NFL players"
9. WKYC Cleveland, OH—"Cleveland Clinic teams with NFLPA to assess brain health of retired players"
10. Popular Science—"Smart Foam in Football Helmets Measures Impact Of Each Hit"
11. Cincinnati Children's Hospital Medical—"Higher Altitudes Result in Reduced Concussion Rates in High School Related Sports. Especially Football"
12. EdSource—"New law raises awareness of concussions in student athletes"
Despite concussion risks, most Titans wouldn't stop sons from playing

John Glennon

Dave Ball saw his NFL career come to an end in 2012, the result of an estimated 30 concussions he suffered during all the years he played football.

Though his condition has improved in the 15 months since he last played, the former Titans defensive lineman says he’s still in the recovery process.

But despite his head injuries and the fact that concussions are an ever-growing concern on all levels of football, Ball says he’ll allow his three young boys — Mason, Cade and Grady — to play the sport when they reach high school.

“I saw one of the top concussion experts in the country after one of my final concussions in the league, and his research is that, yes, concussions are bad and you never want to get them,” Ball said. “But as far as concussions leading to all those dark and gloomy things you hear about down the road, there’s just not significant data to prove that. Talking to him kind of put my fears at ease about stuff later on, so if my kids want to play, yeah, I’ll let them.”

Whether to let kids play football is a question being raised more often. The HBO Real Sports/Marist Poll found 33 percent of the adults polled last summer said connections between concussions, football and long-term brain injury would make them less likely to allow a son to participate in the game.

NFL Up: Certified athletic trainer offers drills for textbook tackling

Greg Fischer

Each year, football players at all levels are becoming bigger, faster and stronger. As a result, players are becoming harder and harder to tackle. Have you seen Adrian Peterson run lately? The easiest way to bring down an athlete like Peterson is to execute a textbook tackle.

Not only are textbook tackles more effective, but they're also safer. This is why the NFL has teamed up with USA Football in order to teach youth how to tackle properly and safely. By training and teaching young players on proper technique, the hope is to establish proper tackling habits and make the game even safer.

USA Football has outlined five fundamentals in its USA Football Heads Up Tackling program. My goal with this article is to complement these five fundamentals with exercises/drills to enhance those movements and allow athletes to perfect the proper tackle. The fundamental part of the tackle is listed below, with the drill detailed in the subsequent paragraph.

Fundamental #1 -- “The Breakdown”

This is the starting and fundamental position for tackling. This includes having your feet be shoulder width apart, squeezing your shoulder blades and keeping them down, having your knees and hips bent with a slight 45 degree forward lean of the back and lastly, keeping your hands in front of the body. The "One-Arm Row" will help strengthen the muscles needed to get into the proper "breakdown" position. Simply extend your elbow and then pull your shoulder blade back and down as you bend your elbow. Select a weight that allows you to keep the proper position and that will fatigue you at three sets of 10 repetitions.
The nation's largest youth football program, Pop Warner, saw participation drop 9.5 percent between 2010-12, a sign that the concussion crisis that began in the NFL is having a dramatic impact at the lowest rungs of the sport.

According to data provided to "Outside the Lines," Pop Warner lost 23,612 players, thought to be the largest two-year decline since the organization began keeping statistics decades ago. Consistent annual growth led to a record 248,899 players participating in Pop Warner in 2010; that figure fell to 225,287 by the 2012 season.

Pop Warner officials said they believe several factors played a role in the decline, including the trend of youngsters focusing on one sport. But the organization's chief medical officer, Dr. Julian Bailes, cited concerns about head injuries as "the No. 1 cause."

"Unless we deal with these truths, we’re not going to get past the dropping popularity of the sport and people dropping out of the sport," said Bailes, a former Pittsburgh Steelers neurosurgeon whose 10-year-old son, Clint, plays Pop Warner outside Chicago. "We need to get it right."

The statistics, which have not been previously disclosed, are consistent with declining participation rates reported in youth football across the country. USA Football, a national governing body partially funded by the NFL, said participation among players ages 6 to 14 fell from 3 million to 2.8 million in 2011, a 6.7 percent decline.

4. 
Montreal Gazette-11/13/13
Professor’s mission: Zero tolerance for violence in sports
Karen Seidman

Neuropsychologist Dave Ellemberg just doesn’t get Quebecers’ appetite for violence in sports.

Whether it’s fighting in hockey or hits to the head in football, he worries that by not doing enough to prevent concussions, we’re endangering children who have no chance of making careers of sports.

Ellemberg, a professor at Université de Montréal, says concussions are a silent epidemic — and one that can largely be prevented.

So he has written a user’s manual — a first in French — to explain the science behind concussion research (including his own, which has focused on the brain and physical activity in sport) and to outline what kind of programs teams and parents can establish to recognize and treat concussions.

And, yes, to change the rules and establish “zero tolerance” for all violent situations in sports.

“I decided I needed to make people aware that concussions are dangerous, that there is a way to make sports safer and reduce the risk of injuries by 60 per cent,” he told The Gazette in an interview about the book, which came out last week. "People tell me they love the violence, but they need to know we urgently need to do something about it."

5. 
Associated Press-11/14/13
NFL will look at making QBs safer

Thanks to a broken collarbone on a run-of-the-mill sack, the Green Bay Packers are without Aaron Rodgers. Their rivals in the NFC North, the Chicago Bears, are without Jay Cutler thanks to a bum leg, which also wasn't the result of some sort of illegal hit.
Game after game, NFL quarterbacks get sacked, get hurt -- and miss starts. Of the 15 games on this week's schedule, nine -- 60 percent -- feature at least one team that has been forced to change its quarterback because of injury this season.

One of the two teams with a bye, St. Louis, lost its No. 1 guy, 2010 top overall draft pick Sam Bradford, for the season. Bradford, who tore a ligament in his left knee last month, is one of nine quarterbacks on injured reserve in 2013, the second most through 10 weeks in any of the past 15 seasons, according to STATS.

Amid those regular reminders of the dangers facing players at the sport's marquee position, the league's competition committee will take a look this offseason at whether to expand rules that protect the QB, NFL vice president of officiating Dean Blandino said Thursday.

6. [Link to ProFootballTalk article](http://profootballtalk.nbcsports.com/2013/11/14/cte-findings-create-more-requests-for-cte-assessment/)

CTE findings create more requests for CTE assessment

Mike Florio

Despite the fact that no one really knows what it means to have CTE, the effort — intentional or not — to create mass hysteria regarding the consequences of a potential CTE diagnosis is working.

According to ESPN's Outside The Lines, more former football players want to be tested for Chronic Traumatic Encephalopathy in the wake of recent news that the condition has been discovered in multiple former NFL players, including Hall of Famer Tony Dorsett.

The article states that researchers from UCLA and a company known as TauMark, which has developed a brain scan that supposedly spots CTE in living persons, have been "inundated" with inquiries. (Two paragraphs later, William Weinbaum of ESPN.com writes that "well over 100 former players" have contacted the program, which makes the use of the term "inundated" seem a little strong given the total number of former NFL and college football players in America.)

Regardless of the characterization, folks understandably are curious about whether they have CTE, even though no one yet knows what it actually means to have CTE.

Yes, someone finally has found a way to cash in on the CTE craze, and it's far more sustainable than a book that barely tries to mask the agenda of making its authors into a modern-day Woodward and Bernstein who bring down Richard Nixon's favorite sport.

7. [Link to CSN Bay Area article](http://www.csnbayarea.com/49ers/after-two-concussions-reid-focuses-adjusting-style)

After two concussions, Reid focuses on adjusting playing style

Matt Maiocco

Safety Eric Reid and tight end Vernon Davis are symptom-free after sustaining concussions on Sunday.

Reid sustained his second concussion of the season while colliding with Carolina Panthers 245-pound running back Mike Tolbert. Reid is on schedule to undergo a contact test later in the week to receive clearance to play in Sunday’s game against the New Orleans Saints.

“This is the NFL,” Reid said. “Guys are a little bit stronger and a little bit bigger than what I’m used to playing, so I might have to adjust the way I play a little bit.”

Reid said he will try to evaluate each situation as he comes up to make a tackle.

“Knowing the type of guy you’re going against,” he said. “How big he is? Or if it’s an angle tackle or going head up when you should cut him or hit him for roll tackle him.”

8. [Link to USA Today article](http://www.usatoday.com/story/sports/nfl/redskins/2013/11/13/christine-brennan-nfl-players-...
Memories of hits to head worry ex-NFL players

Former Super Bowl MVP Doug Williams doesn't think he has CTE, the degenerative brain condition linked to concussions. But when he can't recall the name of an opponent while reminiscing with a friend, or leaves home without his keys, or even forget his suitcase once on the way to the airport, he wonders.

"I've got two little girls, 5 and 7 years old, and when I look at what is happening with Tony Dorsett, that's my biggest concern," Williams said in a phone interview Wednesday. "If I'm still around, and they get to be older, what will I be?"

It's a question that almost every football player of a certain age is asking himself these days, especially after hearing the news last week that Dorsett, 59, a stalwart of their era, was diagnosed with chronic traumatic encephalopathy and is suffering from memory loss and depression.

"We all have some forgetfulness and we don't know what it's from," Hall of Fame cornerback Darrell Green, a businessman and TV analyst, said over the phone. "We used to never really think of it, but it's starting to be more of a conversation now at our reunions. It's starting to be something every one of us is talking about.

Cleveland Clinic teams with NFLPA to assess brain health of retired players

As the long-term effects of sports-related collisions and brain trauma continue to cause concern, the Cleveland Clinic is teaming with the National Football League Players Association to assess and improve the brain health and overall well-being of retired professional football players.

The NFLPA program, called The Trust, will offer physical and neurological evaluations to former players, followed by a comprehensive plan to relieve symptoms, restore function, improve cognitive skills and slow neurodegeneration for those who have sustained recurrent head trauma.

Cleveland Clinic will host players at three sites -- at its main campus in Cleveland, at Cleveland Clinic Florida in Weston, Fla.; and at the Cleveland Clinic Lou Ruvo Center for Brain Health in Las Vegas. Players can also choose to visit the University of North Carolina in Chapel Hill, N.C., or Tulane University in New Orleans.

"Athletic injuries and sports-related brain trauma have become part of the public consciousness and are being viewed as legitimate public health problems," said Jay Alberts, Ph.D., director of the Cleveland Clinic Concussion Center.

Smart Foam In Football Helmets Measures Impact Of Each Hit

On the football field, it can be easy to miss when a player suffers a concussion-level hit. The CDC estimates that between the 1.6 million and 3.8 million Americans suffer sports-related concussions every year; often, these concussions occur after what seems like a pretty mild blow to the head. Especially in football, where the risk of concussion has been a hot-button issue, coaches and trainers struggle to keep their eyes peeled for what seem like dangerous hits to the head, but they can't be everywhere at one time.

Sensors within helmets can catch what human eyes often miss, alerting people on the sidelines that a player may need to be taken out of play and screened for a concussion. Jake Merrell, a graduate
student in mechanical engineering at Brigham Young University, has created a smart foam that works within football helmets to measure how hard a player just got hit. Motion sensors transmit data wirelessly to a tablet or computer when the foam in the helmet is compressed by the player’s head, measuring the force and acceleration of the impact.

The helmet manufacturer Riddell debuted a similar concussion-alert product this year, called the InSite Impact Response System, which is being used by some high school teams in the 2013 season. Sensors inside the player’s helmet lining measure the severity of a head impact and send an alert to the sidelines if a player has sustained a potentially concussion-inducing hit, tallying the number of significant hits a player receives. However, the system only works in Riddell’s Revolution Speed helmet so far.

Cincinnati Children’s Hospital Medical-11/13/13
Higher Altitudes Result in Reduced Concussion Rates in High School Related Sports, Especially Football

According to a recent study done by doctors at Cincinnati Children's Hospital Medical Center, high school athletes who play collision sports at higher altitudes are less likely to suffer from concussions than those who play at lower altitudes.

The doctors who were involved in the study recognized that prior research indicated that the volume and/or pressure of intracranial fluid, which acts as a cushion to protect the brain inside of the skull, is affected by one’s altitude and that it may be associated with the likelihood and/or severity of a concussion. They hypothesized that when adjusting to higher altitudes, physiological responses increase intracranial fluid volume and these responses would provide a "tightened fit" which should help protect the brain from concussions like bubble wrap.

Data on concussions and more than 20 million athlete exposures were gathered between 2005 –2012 from nearly 500 high schools across the US. The data focused on concussion occurrence in a variety of sports including but not limited to boys’ and girls’ soccer, volleyball, basketball, cheerleading and boys’ football and ice hockey. The altitude of the participating schools ranged from 7 to 6903 ft.

EdSource-11/13/13
New law raises awareness of concussions in student athletes
Jane Meredith Adams

As the high school football season winds to a close and players prepare to put their helmets away, athletic officials are hoping that a new law requiring coaches to be trained to spot concussions in players has made the high-contact game, and all youth sports, safer.

The California law, which went into effect in January, is one of a slew of laws and initiatives across the nation intended to address under-reporting and under-treating of youth concussions, a brain injury usually caused by a blow to the head.

The law mandates that high school coaches be trained to identify and respond to the symptoms of concussion, which include dizziness, nausea, headache and light-sensitivity. While many symptoms appear to resolve quickly, the injuries have been associated with complicated and even dire outcomes in youth.
We received the following notice from the NFL. I need for each of you to sign the release form attached. I have to return these by Monday. Also please note you must complete the game day report and submit it to me after each game. I will turn that in to everyone that needs a copy for you. Please use the attached report form for all games. I will also be turning in invoices for you. Thank you!

**ADMINs** please help get your physician’s signatures and the release form back to me quickly. Thanks!!!

Begin forwarded message:

```
From: "Frank, Jacob" <Frank.Jacob@NFL.com>
Date: August 22, 2013, 8:01:08 AM CDT
To: "Frank, Jacob" <Frank.Jacob@NFL.com>
Subject: Unaffiliated Neuro-Trauma Consultant Update

To all Unaffiliated Neuro-Trauma Consultants:

Please see below for two important items regarding the UNC program:

- To get paid for your work as a UNC, please submit an invoice to my attention. You may submit invoices on a weekly basis, monthly basis, or at the end of the season. Practice groups may submit a single invoice. As a reminder, you must file a report following each game (without the report, we will not know that you covered a game) and have returned all required paperwork to get paid. Attached is a template game report. Completed reports should be sent to: 1) the Head Team Physician for the club to which you were assigned; 2) NFL Head Neck and Spine Committee (rge@uw.edu; hunt.batjer@utsouthwestern.edu); 3) NFLPA Medical Director (James.Ford@NFL.com); and 4) NFL Medical Advisor (Adam.Kuczek@NFL.com)

- We apologize for the inconvenience, but it has come to our attention that we need all UNCs to complete one additional piece of paperwork. Please sign the attached Synernet Credential Verification Release Form and return it to me **no later than Monday, August 26**.

Thank you very much.
```
UT Southwestern Medical Center
The future of medicine, today.
Scott, Jorlam I have edited but it's still too long. The NFL goes first then Vasc Mal. Once the videos are added and Jorlam has looked at it, I will time it and edit further. I have to leave Wed mid afternoon. Sorry for the short turnaround. Scott pls back everything up after you rework it. Thank you. I'll use the Cruzer but take the big guy for backup

Sent from my iPhone
Hunt

This brand new article may be of some interest. It was published in the *Journal of Legal Medicine* sponsored by the College of Legal Medicine which is an outfit that I’m affiliated with.

howard

---

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The future of medicine, today.
Dr. White & Dr. Price,

This is just a friendly reminder that you will be covering the upcoming NFL game Sunday November 3, 2013 at 12:00PM at AT&T Stadium. Cowboys v Vikings. PLEASE MAKE SURE YOU HAVE ALL PASSES NEEDED FROM ME ASAP! (I have parking passes, you both have been given credentials) Helpful documents are attached and the FAQ’s are on the UNC-DAL document. (The FAQ has helpful questions answered like what should I wear on game day? what should I do on game day? etc) It is recommended that you wear a suit and jacket w/tie. Please plan to arrive early. If you have any questions please do not hesitate to contact me. Important cell phone numbers for Sunday are listed below. Please take these with you or program them into your phone.

Thank you very much for participating this season! GO COWBOYS! ;)

Dr. Jon White
Dr. Angela Price
Jim Maurer (Head athletic trainer Dallas Cowboys) 214-437-3675
Dr. Hunt Batjer
Christina Markham

*** PLEASE NOTE – that if you are unable to make this game and you need a sub I need to be called immediately, I will help coordinate a replacement and
notify the NFL. (they have to let security know which UNC to expect or they
won’t let you in the stadium) If it is after hours my cell is listed below.

Thank You,

Christina Markham
Senior Administrative Assistant
Admin support for:
Chairman, Hunt Batjer MD
Program Director, Jonathan White MD
Neurological Surgery, MC 8855, CS7.406
University of Texas Southwestern Medical Center
Office 214-648-7617 or 214-648-9320
Cell [redacted]
Fax 214-648-2822
christina.markham@utsouthwestern.edu

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necessarily represent those of UT Southwestern. University of Texas Southwestern
Medical Center, 5323 Harry Hines Blvd., Dallas TX 75390 www.utsouthwestern.edu

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FYI


BTW,
Thanks again for having Dr. Patel call me regarding her pregnant patient.

We put it the Ch. 5 story on UTSW’s Facebook page. It generated 8,500+ organic clicks (which means people just saw it on the UTSW Facebook page, were interested, and clicked on it) rather than responding to promotion, such as digital advertising.

The Dallas Morning News has expressed some interest.

If she’s pregnant, so much the better. (only half kidding there.)

Gregg Shields, APR
Senior Communications Specialist
UT Southwestern Medical Center
214-648-9354

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The panel is actually on this Tuesday evening, Jan 27 at 7pm:

http://www.npr.org/blogs/presents/2014/12/02/367813114/01-27-15-npr-presents-michel-martin-offense-or-defense

In collaboration with NPR Member station KERA, Michel Martin brings together voices that don’t often have a chance to be heard: Former players, spouses and others, all of whom are directly affected by the sport that millions love but others have come to hate. Joining Martin on stage in Dallas will be Nate Jackson, former Denver Bronco and author of 'Slow Getting Up: A Story of NFL Survival From the Bottom of the Pile'; Melani Ismail, who was featured on VH1’s Football Wives and is married to former Dallas Cowboys player Rocket Ismail; along with Texas high school senior and star running back Nahshon Ellerbe, who plans to play football for Rice University next fall.
Sounds good

On Aug 19, 2013, at 1:47 PM, "Christina Markham" <Christina.Markham@UTSouthwestern.edu> wrote:

Go figure it would be Texas and the Dallas Cowboys that do it BIG and have the highest number of UNC’s listed at a whopping 16!!!!!! I think the next highest I see is 10 lol.

Will do CM… I will send reminders. I think to avoid last minute schedule blunders I should do reminders for the upcoming football game on Mondays prior to. That way people who may not be aware it is upon them have time to make appropriate arrangements. If it’s ok I will cc you and HB on these since you guys are the ones in charge. 😊

We should probably send out these attachments with the reminder email every week.

C

Attached please find a follow-up memo regarding the 2013 NFL Unaffiliated Neuro-Trauma Consultant Program.

Best,
Jacob

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Great! Now we just need the YES from Goodell.

Babu

Babu G. Welch, MD FAANS  
Cerebrovascular & Endovascular Neurosurgery  
Director of the Cerebrovascular Fellowship  
Associate Professor of Neurosurgery & Radiology  
University of Texas Southwestern Medical Center  
Dallas, Texas  
USA  
214-648-8779  
babu.welch@utsouthwestern.edu

On 10/21/13 9:14 AM, "Hunt Batjer" <Hunt.Batjer@UTSouthwestern.edu> wrote:  

> Outstanding! Thank you! I will let him know. Hunt  
> > Hunt Batjer  
> > > On Oct 21, 2013, at 4:38 AM, "Daniel Podolsky, M.D."  
> > <Daniel.Podolsky@UTSouthwestern.edu> wrote:  
> > >> If he is available on Friday, we would make it work  
> > >> -----Original Message-----  
> > >> From: Hunt Batjer  
> > >> Sent: Friday, October 18, 2013 11:51 AM  
> > >> To: Daniel Podolsky, M.D.  
> > >> Subject: Bass Symposium  
> > >>  
> > >> Dan, I just spoke to the NFL re Roger Goodell's availability Mar 1 (Sat  
> > >>nite). He has a conflict but Fri nite would work. Is there any chance we  
> > >>could re-arrange the schedule and have the Bass dinner on Fri nite and  
> > >>the UTSW Launch of TIBIR on Sat afternoon/ evening? An alternative might  
> > >>be to include RG in your launch event and we find another key note for  
> > >>Sat nite. Thanks for your thoughts. Hunt  
> > >>  
> > >> Hunt Batjer  
> > >>  
> > >>  
> > >> UT Southwestern Medical Center  
> > >> The future of medicine, today.
No. We have 30 min for NFL update and TIBIR. She will be represented by you or Munro

Sent from my iPhone
From: Munro Cullum
Sent: Saturday, September 20, 2014 2:16 PM
To: Hunt Batjer
Cc: Mark Goldberg
Subject: RE: Brain Injury Symposium Details

So it sounds like we should figure out what each of us is presenting & make sure we leave some time for Sandy. Hunt, have you invited her to join with us & talk for a few minutes about her center?

If we only have 30 mins total for 4 speakers, that doesn't leave much time, though.
Hunt- NFL/concussion updates/issues;
Mark- TIBIR overview;
Munro- TIBIR projects?
Sandy- CBH overview.
Dear Jim,

Thank you for including the updated schedule for the Colorado meeting. Since you would like to have some content from the NFL Committee, how about the following. I will start with 10 minutes on the NFL situation, recent data, and research agenda. Mark and Munro will then divide our TIBIR presentation between them and that should be easily done in 20 minutes. Mark
and I have been refining out TIBIR slides and updating them frequently. If that works for you, we are good to go.

Thanks,
Hunt

---

From: Kelly, James P [mailto:James.Kelly@ucdenver.edu]
Sent: Tuesday, September 16, 2014 2:19 PM
To: Hunt Batjer
Subject: Fw: Brain Injury Symposium Details

Hi Hunt,

As you'll see in the attachments, I have set aside 30 minutes for you to present on TIBIR to the group on Tuesday morning, September 30th. Please feel free to use PowerPoint slides if that works best. If you want to share time with Mark Goldberg or Munro Cullum, that's up to you.

I was also hoping that you might comment about sports concussion from your NFL committee viewpoint.

I think this is an impressive gathering and I think we have a terrific opportunity to move forward on the creation of concussion institutes.

Jim

James P. Kelly, MA, MD, FAAN, FANA
Clinical Professor of Neurosurgery
University of Colorado School of Medicine

Director
National Intrepid Center of Excellence
Walter Reed National Military Medical Center
Bethesda, MD
email: james.p.kelly.civ@health.mil
Mr Jeff Miller. Pls check with NFL to get his new title

who this guy is? (for website)
Hunt,

Thanks for your e-mail. In regards to your talk, if you would be willing to discuss the “trickle down effect,” of the NFL to college, high school, and youth sports that would be great. You will have 30 minutes to present. Munro will be speaking on his study with John H. I feel your talks will inherently complement each other. Also, I am expecting one additional speaker to confirm by tomorrow. He is a former Dallas Cowboy who asked if he could give a 15 – 20 minute testimonial about this NFL
experience but also through his role as a father. His son was in a tragic car accident resulting in a severe TBI.

We have one other speaker in question, Mike Ferrara, who is going to last minute decision. Mike was instrumental in the development of GA’s state law and is potentially going to speak on state laws. All in all, we will fill the 1.5 hour session. Following your session we will do a 30 minute question and answer session and then close followed by a speaker dinner.

I hope this e-mail helps clarify your talk. If you have any further questions, please do not hesitate to call or e-mail me. Thank you again and I look forward to our meeting on April 1st. Thanks again Hunt!

Jacob E. Resch, Ph.D., ATC
Department of Kinesiology
113 Maverick Activities Center Box 19259
Arlington, TX 76019-0259
(T) 817.272.1402
(F) 817.272.3233

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Hi Angelica,

It was good to meet with you this afternoon. I have requested Kyle Womack’s availability for September 4, and I’ll let you know as soon as I hear.

Kyle Womack is an assistant professor of neurology and psychiatry, primary appointment at UTSW, secondary at UTD.
Munro Cullum is professor of psychiatry and neurology, and head of the psychology division of psychiatry, primary appointment at UTSW.
John Hart is professor with primary appointment at UTD, he is Medical Science Director at Center for Brain Health, and has secondary appointment and clinical practice in neurology at UTSW.

The overall project on retired NFL players was initiated at Center for Brain Health and mostly paid by BrainHealth. The brain imaging was performed at our AIRC, much of the work is done by our faculty.
Hope this is helpful!

Mark

Mark P. Goldberg, MD
Department of Neurology and Neurotherapeutics
UT Southwestern Medical Center
(214) 633-0032
On May 3, 2013, at 7:18 PM, "Hunt Batjer" <Hunt.Batjer@UTSouthwestern.edu> wrote:

Sorry I did not see your earlier email. This talk is one I would love to do. Right now I don’t think I have the time to give it proper thought and planning. I have way too much on my plate with taking on a new Dept, moving [blurred], SNS responsibilities, RRC, NFL, AANS etc. I have said yes too many times. I would love to do it next year. I am honored to be invited.

Hunt

Sent from my iPhone
It’s just an idea. I understand if you don’t have time to work with me on this, or if you are concerned about unintended consequences.

But if you are interested in pursuing this, call me. I’ll be in the office at the number below until 5 or so. Then I’ll be on a DART train until about 6:30, but feel free to call tonight: [redacted]

Just so happens I’ll be in the neighborhood of your office tomorrow morning for an appointment at 10:30 if you’d like to chat about this further.

Gregg Shields, APR
Senior Communications Specialist
UT Southwestern Medical Center
214-648-9354

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Thanks Dr Sterling,

I’m sending you the SCAT 3 document. That’s all I have for post injury analysis at this point from that group. Also included is a concussion neurological assessment tool found on the NINDS website.

Dr Batjer,  
Do you know if the NFL has a tool (other than the one used at the side line) for post injury?

Thanks,  
gwen
Hi Hunt,

I've been in contact with Patrick Bellgowan at the NINDS about doing a multi-site longitudinal study in youth football (iTAKI-longitudinal) looking at the effects of subconcussive impacts on brain and cognitive development (ages 9-10, followed as a cohort for 5 years). One of the main sticking points we are trying to get past is the size of the budget. We are trying to get approval from NINDS to even submit the proposal, since it will go well over the 500K per year limit for directs. We are on the docket for our pre-proposal and budget to be reviewed by the NINDS council on January 20. But Patrick is really unhappy about the current size of the budget, and wants us to slim it down considerably. The actual grant would be submitted Feb 5.

The data acquisition sites are going to be Wake Forest and UTSW (we were planning a third acquisition site, but will have to chop it out due to the NINDS budget constraints). USC-Loni (Toga's group) will be involved for bioinformatics, and Children's National (Gerry Gioia) for the neurocognitive expertise, along with Munro and Nyaz.

Year 1 will have some significant costs from the HITs sensors. The helmet/sensors are 2K a piece, and we will need at least 150 of them (300K total). Is there any possibility that TIBIR would agree to provide funding for the HITs sensors if the grant were to be funded? In essence we would need a letter of support for the sensors. If the grant isn't funded, then the sensors wouldn't be purchased. If the grant were to be funded, then TIBIR would provide the sensors for the study.

We are looking at other sensor technologies, including mouthguard sensors, which may be viable down the road.
But right now, we need to get past a budgetary hurdle with the NINDS to even submit a proposal.

Thanks - and Happy New Year!

Joe

Joseph A. Maldjian, MD
Professor and Chief of Neuroradiology Director, Advanced Neuroscience Imaging Research Core University of Texas Southwestern Medical Center
5323 Harry Hines Blvd.
Dallas, TX 75390-8896
214 648-6751 (office)
214 648-3904 (fax)

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iTAKL_longitudinal.pdf
TIBIR_iTAKL_draft.docx
Hey Wayne! Good point. NFL thing deserves discussion over an adult beverage! Deanna is finalizing LOI as we speak. Cong Sessions here tomorrow re TBI project. We need you on our team!

Hunt Batjer

On Sep 3, 2013, at 9:05 PM, Hunt Batjer wrote:

Hello Hunt,

Hope all is well for you and your loved ones. I was just following up from our last conversation regarding the letter of intent for UTSW. It was my understanding that a letter was going to be sent to me to sign/return to you to take to the powers to be of the medical school. Is this correct, or do I generate a letter to you stating my intent to join UTSW Neurosurgery? Sorry for the confusion. I am very excited about the opportunity to join UTSW, and I thank you very much for placing the trust in me to become a member of your team.

I would like to hear your thoughts some time regarding the $765 million settlement between the NFL and the NFLPA. I hear the NFLPA wanted $2 billion. I have some difficulty with this in that I can’t imagine these guys are not intelligent enough (perhaps I am giving them far too much credit) to realize that ramming your head into an opponent’s head at high speed is unlikely to be good for your brain/spinal cord. Is there not some assumed occupational hazard from playing in the NFL a player must realize? I hope those who benefit most from this are the players from the 60’s & 70’s who made very little money as compared to today’s players.

Again, thank you for affording me this great opportunity at UTSW Neurosurgery.

Our dinner at Nick & Sam’s was fantastic our last night in Dallas. Best regards, Wayne Gluf
That all sounds great. I'll start working on looking for a course that's wide enough for our games.

--b

On Aug 19, 2013, at 6:34 PM, Hunt Batjer <Hunt.Batjer@utsouthwestern.edu> wrote:

No kidding! I would love to bring you into the NFL discussions as well as the Texas Institute for Traumatic Brain Injury and Repair (TIBIR). Let's talk on a golf course while looking for my stray drive in the rough! Hunt
Perfect thanks

Sent from my iPhone

On Jan 15, 2016, at 3:29 PM, Debra Richards <Debra.Richards@UTSouthwestern.edu> wrote:

Hi Dr. Batjer -

We’ve received an inquiry from your concussion blog post — “former NFL players are healthier overall than their non-athlete peers.” If okay with you, we’ll provide a response that references CDC and the following NFL resources:

http://www.cdc.gov/niosh/pdfs/nflfactsheet.pdf

http://static.nfl.com/static/content/public/photo/2015/08/05/0ap3000000506671.pdf (pgs 13 and 33 have good facts)

http://www.cdc.gov/niosh/pgms/worknotify/pdfs/NFL_Notification_01.pdf

Thank you,
Debra

Hi, Debra,

Could you run something by Dr. Batjer, please? He mentioned in our concussions blog interview that former NFL players are healthier overall than their non-athlete peers. We posted that fact on Twitter, and a follower is interested to know where that information came from.

Could you check in with Dr. Batjer to see if one of the links below is appropriate to cite, or if he prefers we cite a different one that he could provide?

http://www.cdc.gov/niosh/pdfs/nflfactsheet.pdf
We’d like to reply to the follower as soon as possible, if Dr. Batjer has a moment. Thank you!
Mariah

Mariah Obiedzinski
Senior Content Marketing Strategist
MedTouch
Discover Potential | Deliver Results
319-382-9868, ext. 377
888-770-5082 | fax
medtouch.com

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The Sports Neuropsychology Society is looking at Dallas as a potential meeting site for next spring & I’m on the site selection committee. This year was the first meeting of the society, & there were about 200 in attendance, with the NFL & NHL both cosponsoring, and they want to do this again –

Munro

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There is a test now for CTE on live people? your thoughts?


Ken Locker, MA, ATC
Sports Marketing Director
8198 Walnut Hill Lane
Jackson bldg Basement
Dallas, TX 75231
O: 214-345-5010
F: 214-345-5099

Save the Date:

11th annual DFW Sports Medicine Symposium
March 28, 29, 30, 2014 Irving, Texas
www.texashealth.org/benhogan

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I like it

Sent from my iPhone

On May 29, 2014, at 12:58 PM, "Munro Cullum" <Munro.Cullum@UTSouthwestern.edu> wrote:

Interesting – certainly something we could develop here:  http://tulane.edu/som/trust-tism/

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I could do the 3rd

On Aug 13, 2013, at 4:02 PM, Hunt Batjer <Hunt.Batjer@UTSouthwestern.edu> wrote:

I will take both

Here is the updated version of the schedule. I am still looking for one volunteer for Thanksgiving, and one for 12/29.

Good afternoon all! I have put together a schedule for the season and have assigned each person 1 game to work up until the final 3 game days. Attached is the DRAFT schedule. Is there anyone who would like to volunteer to work a second game? And is there anyone willing to work the Thanksgiving Day game on November 28th? (that’s included in the final 3 games, see below)

11/28 Thursday (Thanksgiving) 3:30 pm Cowboys v Oakland Raiders
Christina

UT Southwestern Medical Center
The future of medicine, today.
Can you help getting all this info from faculty and Childrens docs who will participate. One day turn-around is a bit tight of a deadline ....

CM
Hello Dr. Madden,

I left a voice message earlier regarding the need for additional neuro-trauma experts to support the upcoming football season in Dallas. I was given your name as the appropriate point of contact for your city.

In order to insure everyone is cleared for game day, we will need the personal information form, a credential verification form from MedVentive CVO and a digital headshot that we can use for badging access to NFL stadiums. I’ve attached a copy of the consultant packet with the required documents that you may have already received. Additionally, we presume that each of the doctors is a part of your practice group and will therefore be covered by the contracts already sent out. If this is not the case, please let us know.

Given the condensed timeline we are working, we will need this information faxed, emailed or mailed today to the following:

Jacob Frank
National Football League
345 Park Avenue
New York, NY 10154

Telephone 212.450.2207
Fax – 212.847.0901

Thank you for your assistance and your commitment to helping us ensure the safety of the players and the game. Please let me know if you have any questions.

Respectfully,

Mary Ricks
U.S. Army Training With Industry Fellow
National Football League | Communications & Public Affairs | 345 Park Avenue | New York, NY 10154
T: (212) 450-2279
mary.ricks@us.army.mil

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Christina – HELP! Let me know some times.

Thank you,
Debra

From: Laufenberg, Babe H
Sent: Monday, February 17, 2014 1:53 PM
To: Debra Richards
Subject: RE: UT Southwestern -- Feb. 28/Commissioner Roger Goodell
Debra,

I arrive on Monday at 5:30 but will be going straight into the station.

I could do later in the morning on Tuesday, but I will not be able to do 8:00 AM.

I could meet after the 6:00 PM show on Tuesday, but are you aware that our station is in Fort Worth? If so, we could even meet at the station in a conference room.

If none of that works, give me some Tuesday or Wednesday options between 10-2:00.

Thanks,

Babe

---

From: Debra Richards [mailto:Debra.Richards@UTSouthwestern.edu]
Sent: Monday, February 17, 2014 11:01 AM
To: Laufenberg, Babe H
Subject: RE: UT Southwestern -- Feb. 28/Commissioner Roger Goodell

Hi Babe –

What about next Tuesday (Feb. 25) at 8 am? Also, we could meet you after the news at 6 pm next Tuesday (or Monday), if that works for you – somewhere close to the studio or at UTSW. Last thing, I’m not sure if you’ll be back in town on Monday at 4 pm . . . and would have time, but that’s an option too.

We’re just getting down to the wire on the event, and want to make sure everything goes smoothly. So, please forgive my being somewhat of a pest.

No problem about Friday. I hope your son had a great game. Thank you for responding over the weekend

Last thing, you may see Hunt Batjer at the combine. He’s there through the end of the week. He’ll also be looking out for you.
Debra

_Hunt’s photo, in case you run into him:_

<image001.jpg>

From: Laufenberg, Babe H  
Sent: Sunday, February 16, 2014 11:16 PM  
To: Debra Richards  
Subject: RE: UT Southwestern -- Feb. 28/Commissioner Roger Goodell

Debra…I am returning from the combine in Indianapolis on that Monday. Does Tuesday work? And sorry you lost me on Friday… I was at my son’s basketball game...

From: Debra Richards  
Sent: Friday, February 14, 2014 3:54 PM  
To: Laufenberg, Babe H  
Subject: RE: UT Southwestern -- Feb. 28/Commissioner Roger Goodell

Well, with travel plans, it’s probably cutting close. What about Monday, February 24? The meeting can begin anytime between 9 am and 11 am, or 1-2 pm. Let me know – if possible today. Thank you, sir.

Debra

From: Laufenberg, Babe H  
Sent: Friday, February 14, 2014 3:31 PM  
To: Debra Richards  
Subject: Re: UT Southwestern -- Feb. 28/Commissioner Roger Goodell

Darn. Just set up a 9:00 am Monday meeting. I will actually be attending combine. I could get there at 10:15. Monday. Would that work?

Sent from my iPhone. Not responsible for typos!

On Feb 14, 2014, at 3:06 PM, "Debra Richards"  
<Debra.Richards@UTSouthwestern.edu> wrote:

    It looked like a great time with your coach . . . perks of the job. For me,
I’m very soft compared to some colleagues who are on email at 1 am and then again at 5 in the morning.

Speaking of early -- any chance you can meet this Monday for 30 minutes, between 8:30 am and 10:30 am? Hunt Batjer will be at the NFL Combine next week. Monday morning is the only time he’s in. The other option is the following Monday (2/24) any time before 2 pm. Sorry to be kind of pushy, but could you let me know today?

Thanks!

Debra

---

From: Laufenberg, Babe H
Sent: Friday, February 14, 2014 2:16 PM
To: Debra Richards
Subject: RE: UT Southwestern -- Feb. 28/Commissioner Roger Goodell

Ha! Thanks for watching. And I will wait to hear from you...and what were you doing up so late? I am the one who works nights...

---

From: Debra Richards [mailto:Debra.Richards@UTSouthwestern.edu]
Sent: Thursday, February 13, 2014 11:41 PM
To: Laufenberg, Babe H
Subject: RE: UT Southwestern -- Feb. 28/Commissioner Roger Goodell

Hi Babe --

Thanks so much for the follow-up -- -and taking my call. I should have known you'd be at the event. Sorry about that. By the way, the big head looked great on the air.

I'll check on schedules tomorrow and confirm with you. See you next week.

Debra

---

From: Laufenberg, Babe H
Sent: Thursday, February 13, 2014 10:58 PM
To: Debra Richards
Subject: RE: UT Southwestern -- Feb. 28/Commissioner Roger Goodell

Debra,

Sorry for the rush today. Had to get to Anatole Hotel for a
live shot.

What is best for you? Would you like me to meet you and Dr. Batjer at UT Southwestern? I can stop in most days around 9:00 AM. I figure that if we do something next week, that would give us time for adjustments the following week.

So Tuesday or Thursday would work for me next week. Let me know what you think. And anytime between 9:00-11:00 is probably fine.

Thanks, and Happy Valentine’s Day!

Best,

Babe
Hi Babe –

Again, thanks for moderating the conversation with Roger Goodell as part of the UT Southwestern symposium on TBI. Although the audience will be able to ask questions, we’ll have a list of points UT Southwestern will provide to highlight key points and help with keeping the conversation moving. We’ll have this in the next few days. Also, Greg Aiello has provided feedback on key points that should be of interest to the audience.

Drs. Hunt Batjer, Babu Welch, and Tony Whitworth are leading this initiative. As mentioned, they’d like to touch base with you on the event and key points (hopefully in person, but depending on schedules may be by phone). Will you have time early next week to discuss?

Just to confirm a few key points:

- **Event Name:** UT Southwestern Bass Symposium: A Discussion of Traumatic Brain Injury
- **Location:** Omni Hotel/Downtown Dallas (555 S. Lamar St.)
- **Event Time:** 6 pm to 9 pm
- **Attendance:** 200+ people (neurosurgeons, neurologists, athletic trainers, people interested in TBI)
- **Attire:** Business (not black tie)
- **Set-up/Stage:** 2 chairs – with you and Commissioner Goodell seated in front of audience

Also, we’ll talk with you about potential interviews (or let me know if you’d like for us to contact a producer).

Please call on my cell phone if you need anything.

Debra Richards
Marketing Department
UT Southwestern Medical Center

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The future of medicine, today.
Sanjay,

I don’t know if you remember me from last year’s Senior Society meeting at Emory but I wanted to discreetly reach out to you. Bruce Mickey and I have talked about you in the context of our sincere desire to build a nationally ranked spine division. You have a great pedigree and also a real connection to neurosurgery through your father. I know all of your partners including your Chairman pathetically well and Praveen actually did his fellowship with Steve Andre at Northwestern.
If you have any interest in living closer to your father I would be highly interested in discussing this with you. I will be staying with Dan over the weekend related to an NFL course that we are putting on and am available through my office at 214-648-9320 or [redacted] or of course email at any time.

Thanks,

Hunt

H. Hunt Batjer, M.D.
UT Southwestern Medical Center
Professor and Chairman
Lois C.A. and Darwin E. Smith Distinguished Chair in Neurological Surgery
214-648-9320
If you have received this message in error, please contact the sender by reply e-mail message and destroy all copies of the original message (including attachments).
Dr. Batjer,

These PSA’s will work well with Daryl (see attachment) -

1. His face - speaking minimally (no one will hear him anyway)
2. Use graphics to touch the high points
3. Off-site would be amazing (him getting ready to broadcast in-situ)

scott

From Bucky: “We want to air the PSA’s at the UIL State Football Championship games at AT&T Stadium in December, and the UIL State Basketball Championships at the Alamo Dome in March. We are also pursuing other venues to air the PSA's.”

PS. See Bucky’s messages below...
-----Original Message-----
From: Bucky Taylor [mailto:BTaylor@mesquiteisd.org]
Sent: Wednesday, September 24, 2014 10:42 AM
To: Scott Clamp
Subject: RE: Willingness to Do Concussion PSA

The document is attached. I really like everything that has been produced. You guys do great work!

Bucky

From: Scott Clamp [Scott.Clamp@UTSouthwestern.edu]
Sent: Wednesday, September 24, 2014 9:37 AM
To: Bucky Taylor
Subject: RE: Willingness to Do Concussion PSA

Bucky,

Can you send me the Concussion PSA.UTSW.doc that was sent to Daryl?

I am hoping to create a great video for you - we have a few ideas, but would like to see your PSA script first.

Do you like the videos we have made so far?

Thanks,

scott

-----Original Message-----
From: Bucky Taylor [mailto:BTaylor@mesquiteisd.org]
Sent: Saturday, August 23, 2014 8:54 AM
To: Daryl Johnston
Cc: Debra Richards; Scott Clamp; Hunt Batjer
Subject: RE: Willingness to Do Concussion PSA

Daryl,

Thank you for responding and agreeing to do this for us. I guess the easiest thing to do at this point would be for you to provide me with some dates that would be good for you. After I get the dates from you, I will get with the folks at UT Southwestern and schedule a time for the taping. Without talking to the TV folks at UT Southwestern, I do not know how long the taping will take, but I do not foresee it lasting more than a couple of hours.
Thank you once again and I look forward hearing from you.

Bucky Taylor

From: Daryl Johnston
Sent: Friday, August 22, 2014 12:34 PM
To: Bucky Taylor
Subject: Re: Willingness to Do Concussion PSA

Sorry for the delay getting back to you Bucky. I would still like to be a part of this project. We should be able to find time during the course of the fall to film the PSAs. Let me know what the next steps are. Hope you have had an enjoyable summer.
Daryl

On Aug 19, 2014, at 2:55 PM, Bucky Taylor <BTaylor@mesquiteisd.org> wrote:

> Daryl,
> 
> At the NATA meeting, you expressed willingness to do PSA’s for the Sports Concussion Partnership project that I oversee. I have attached a document with PSA information that we want to provide along with a video clip that I use when I do presentations on concussions or the concussion law. We would film these at the UT Southwestern TV studio. We want to air the PSA’s at the UIL State Football Championship games at AT&T Stadium in December, and the UIL State Basketball Championships at the Alamo Dome in March. We are also pursuing other venues to air the PSA’s. Both Dr. Batjer and I really would like to have you participate and do this for us. Your credibility and passion for the health and safety of young athletes makes you a perfect fit. I know that you are about to get busy with your NFL telecast duties, but I feel we can accommodate your schedule. Please let me know your thoughts on this project.
> 
> Bucky Taylor
> 
> btaylor@mesquiteisd.org
> 
> <Concussion PSA.UTSW.doc><TSCP_intro presentation-2.mp4>

---------------------------------

UT Southwestern Medical Center
The future of medicine, today.
Findings fit with what we're seeing with depressive symptoms in our aging NFL guys, to some extent, too (additional recent in-press papers John & I have done are also attached in galley-proof form, FYI, in case this is useful.
Munro
Depressive Symptoms and White Matter Dysfunction in Retired NFL Players with Concussion History

Jeremy Strain BS¹
Nyaz Didehbani PhD¹
C. Munro Cullum PhD²,³
Sethesth Mansinghani BS¹
Heather Conover BS¹
Michael A. Kraut MD¹,⁴
John Hart, Jr. MD¹,³
Kyle B. Womack MD²,³

Berman Laboratory for Learning and Memory
Center for BrainHealth¹
School of Behavioral and Brain Sciences
The University of Texas at Dallas
Department of Psychiatry²
Department of Neurology and Neurotherapeutics³
University of Texas Southwestern Medical Center
Department of Radiology⁴
The Johns Hopkins School of Medicine

Address Correspondence to: John Hart, Jr., MD
Center for BrainHealth
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Title Character length = 95
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Manuscript Word Count = 2994
Reference Count = 33
Number of Tables = 2
Number of Figures = 3
Jeremy Strain completed the statistical analysis.
Supplemental Data = 2 Figure, 1 Table

Key Words: Brain trauma [264], Depression [239], Neuropsychological Assessment [205], DWI [128], NFL
Author Contribution

Jeremy Strain: Primary author of the manuscript, processed, analyzed and contributed to interpretation of the data.

Nyaz Didehbani: Assisted in the conception and design of the study, acquired neuropsychological data, interpretation of the data, and provided insightful revisions of the manuscript.

C. Munro Cullum: Major role in the conception and design of the study and offered critical revisions of the manuscript. Supervised and constructed the neuropsychological battery that was administered to our subjects.

Sethesh Mansinghani: Responsible for acquisition of the neuroimaging data and assisted with manuscript revisions. This author also contributed to the processing of our FLAIR scans and quantification of white matter lesion burden.

Heather Conover: Primary recruiter for this study and assisted in acquiring demographic information on our subjects.

Michael A. Kraut: Provided expertise during the conception and design portion of the study and critically reviewed drafts of the manuscript. Supervised the initial creation of the neuroimaging battery for our study.

John Hart, Jr.: Primary advisor behind the conception and design of the study and performed clinical evaluations on subjects that met our criteria for depression. Provided revisions and assistance in manuscript preparation and contributed to interpretation of the data. This author also contributed to the administrative duties and obtained funding for the study.

Kyle B. Womack: Primary interpreter of the data and head of the neuroimaging portion for this study. Performed data analysis and reviewed multiple drafts of the manuscript. Contributions also include supervision of the project and assistance in administrative duties.

Author Disclosures

This study was partially funded by National Institute on Aging grant.
Mr. Jeremy Strain reports no disclosures.
Dr. Nyaz Didehbani reports no disclosures.
Dr. Munro Cullum reports no disclosures.
Mr. Sethesh Mansinghani reports no disclosures.
Ms. Heather Conover reports no disclosures.
Dr. Michael Kraut reports no disclosures.
Dr. John Hart Jr. reports no disclosures.

Dr. Womack is the primary investigator for the K23 grant.
Abstract

Objective: To determine if correlates of white matter integrity can provide general as well as specific insight into the chronic effects of head injury coupled with depression symptom expression in professional football players. Method: We studied 26 retired NFL athletes who underwent DTI scanning. Depressive symptom severity was measured using the Beck Depression Inventory II (BDI-II) including affective, cognitive and somatic sub-factor scores (Buckley 3-factor model). FA maps were processed using tract based spatial statistics from FSL. Correlations between FA and BDI-II scores were assessed using both voxel-wise and region of interest (ROI) techniques, with ROIs that corresponded to white matter tracts. Tracts demonstrating significant correlations were further evaluated using a receiver operating characteristics (ROC) curve that utilized the mean FA to distinguish depressed from non-depressed subjects. Results: Voxel-wise analysis identified widely distributed voxels that negatively correlated with total BDI-II, cognitive and somatic sub-factors, with voxels correlating with the affective component (p<0.05 corrected) localized to frontal regions. Four tract ROIs negatively correlated (p<0.01) with total BDI-II: forceps minor, right frontal aslant tract, right uncinate fasciculus and left superior longitudinal fasciculus. FA of the forceps minor differentiated depressed from non-depressed athletes with 100% sensitivity and 95% specificity. Conclusion: Depressive symptoms in retired NFL athletes correlate negatively with FA using either an unbiased voxel-wise or an ROI based, tract-wise approach. DTI is a promising biomarker for depression in this population.
Introduction

Depression after traumatic brain injury (TBI) can manifest days or years after injury, but the mechanism(s) underlying this association remains unknown. White matter damage has been described independently in both major depression and TBI, but whether such damage is etiologically associated with mood disturbance in either or both conditions has not been established.

Depressive symptoms can be quantified using self-assessment questionnaires that target defining characteristics of depression. A popular self-report instrument is the Beck Depression Inventory II (BDI-II), which consists of 21 questions, each rated on a 1-4 scale based on severity. The BDI-II provides general information regarding depressive symptoms, but can be further partitioned into sub-factors that address different constellations of symptoms. One model proposed by Buckley (2001) uses the BDI-II to categorize each item into one of three symptom groupings. The three factors are designated as affective (e.g., loss of pleasure, loss of interest), cognitive (e.g., sadness, self-criticalness), and somatic (e.g., loss of energy, irritability) symptoms.

American-style football players often sustain numerous concussive and sub-concussive impacts – head impacts that do not elicit neurological symptoms that can lead to white matter damage. We evaluated a population of retired NFL players in order to study the relationship between white matter integrity and the manifestation of depressive symptoms. Using diffusion tensor imaging (DTI) we assessed white matter integrity with the scalar value, fractional
anisotropy (FA)\(^7\) and correlated that measure with overall depression scores as well as each of the 3 sub-factors derived from the BDI-II.

**Methods**

**Subjects.** Thirty-two retired National Football League (NFL) athletes underwent detailed neurologic, neuropsychologic, and neuroimaging evaluations. Our first subject was enrolled in November 2010 and recruitment is still ongoing. Participants were recruited from a local gathering of retired NFL athletes living in the North Texas region, meetings of the NFL Athletes Association local chapter, through local advertising, and through word of mouth. A comprehensive analysis of our entire athlete cohort at an earlier recruitment stage was previously performed.\(^8\) Therefore, to alleviate complications that could misconstrue our findings subjects with a clinical diagnosis of either mild cognitive impairment or Alzheimer’s disease were excluded, resulting in a sample size of 26.

The athlete cohort ranged in age from 41 to 79 (Mean Age = 57.8, SD = 11.3), with NFL experience ranging from 2 to 15 years, \((M = 8.62, SD = 3.75)\). Sixteen were Caucasian and 10 were African-American. Demographic information is shown in Table 1 including former position played, classified based on speed, as described in Lehman et al. (2012). Concussion history was acquired from self-reports and classified using the AAN Practice Parameter guidelines for grading concussion (1997). Two subjects reported never having had a concussion, but the remaining 24 athletes reported having from 1 to 11 concussions \((M = 3.85,\)
SD = 3.02). On average all athletes were scanned 4 weeks following neuropsychological examination. An expanded profile of our subjects can be found in supplementary materials (Table e-1).

Twenty-two cognitively normal controls were recruited from prior aging studies. Subjects were excluded if they had prior history of concussion, repetitive exposure to subconcussional head injuries, participation in college or professional football, mental illness, cognitive complaints, or neurological disorders. Controls ranged in age from 41-77 (M = 59.4, SD = 11.8), with education ranging from 11 to 20 (M = 16.2, SD = 2.4). Twenty of the controls were Caucasian, and two were African American.

*Standard protocol approvals, registrations, and patient consents.* All subjects gave written informed consent in accordance with the Declaration of Helsinki and the Institutional Review Boards of the University of Texas Southwestern Medical Center and University of Texas at Dallas approved the study protocols and consent forms.

*Beck Depression Inventory II:* Depression severity was quantified using the Beck Depression Inventory II (BDI-II). Depressive symptoms were analyzed in two formats, with BDI-II total score as well as depressive domains divided into the three subcomponents of affective, somatic, and cognitive symptoms based on the 3-factor model. Total BDI-II scores were used to divide the participants into either a non-depressed group with minimal symptoms (1-12) and a depressed group with mild to moderate symptoms of depression (>12). In all cases, a clinical evaluation utilizing the Diagnostic and Statistical Manual IV-TR diagnostic criteria
agreed with the BDI-II based classification. None of the subjects had a history of depression prior to entering the NFL, and only two of the subjects were currently undergoing treatment for depression at the time of our study. Two trained neuropsychologists issued all neuropsychological testing and were blind to the imaging results at the time of testing.

*Statistical Analysis of Demographic Information.* Distribution and median differences between our depressed and non-depressed groups were assessed using a Mann-Whitney U test and Independent-Samples Median Test. Selected variables that were subjected to these analyses were age, number of concussions, white matter lesion burden, years in the NFL and mean fractional anisotropy (FA) for the entire white matter skeleton. All scans were processed and analyzed by the same individual who was not blind to the neuropsychological data.

*MRI acquisition and analysis.* Scanner specifications and acquisition of our fluid-attenuated inversion recovery (FLAIR) images and DTI scans are explained in supplementary materials along with our analytical approach to quantifying white matter hyperintensities. Preprocessing of DTI data included correction for motion and eddy current distortions followed by skull stripping using FSL 4.1.7 (www.fmrib.ox.ac.uk/fsl/). Tensors were estimated and FA maps created using the MedINRIA software package (www-sop.inria.fr/asclepios/software/MedINRIA/). The FA data were then processed using tract based spatial statistics (TBSS) in FSL, a technical white matter processing program that is used for group DTI analysis to a common template. The TBSS method aligns all subjects to MNI space by creating and applying a nonlinear matrix, using FSL’s non-linear registration tool (FNIRT). TBSS creates a study specific “group mean FA skeleton” that contains the core
central regions of white matter shared in common by the subjects. After thresholding the mean FA map at the standard value 0.2, FA values are projected onto the group skeleton from each subject for the “local center” of each tract.

We used the resultant skeletonized FA data in a series of voxel-wise correlations of depression severity with FA, looking first at the composite BDI-II score and subsequently at the Buckley 3-factor scores. The voxel-wise correlations were performed using the “Randomise” tool in FSL utilizing a permutation based Monte Carlo analysis with 5000 permutations, threshold-free cluster enhancement and correction for multiple comparisons using a family-wise error rate of $p < 0.05$. Age was treated as a covariate and extracted from each design matrix prior to the analysis. All asymptomatic athletes were compared to cognitively normal controls in a voxel-wise group comparison using age as a covariate and identical parameters as described in the previous correlation.

**Tract Level Analysis.** In addition to the voxel-wise analysis, we examined these data in a tract-wise manner by isolating portions of the TBSS-derived skeleton that fell within the boundaries of several regions of interest (ROI) representing specific white matter tracts. We recruited 9 cognitively normal college students in order to delineate the best representation of each tract from a normal population. To construct the white matter tracts we listed in Table 2, we performed a multiple ROI approach in the deterministic tractography program called MedINRIA (www-sop.inria.fr/asclepios/software/MedINRIA/). All white matter tracts were warped into common space using the same warp matrices derived from that corresponding subject’s FA map applied with FLIRT from FSL. In common space all 9 representations of the same tract
were superimposed, and the tract ROI’s we defined reflect the voxels that were present in majority of the subjects. All voxels were inspected and edited to insure that they were uniquely represented in only one tract.

The mean FA value was calculated for each tract by averaging skeletal voxels that resided within each tract ROI. Correlations were performed between tract derived FA values and depression severity defined as either total BDI-II score or sub-factors of BDI-II. The age-corrected mean FA values by tract were exported and analyzed with a bivariate Pearson correlation using the SPSS statistical program. A more stringent threshold was applied to our data to compensate for the numerous correlations performed, with $\alpha=0.01$. For those ROIs that were significantly correlated with the total BDI-II score, we plotted a receiver operating characteristics (ROC) curve to test the ability of the mean FA of these tracts to distinguish the depressed from the non-depressed athletes. The flow chart (Figure 1) demonstrates the details of the design. Sensitivity, specificity, odds ratio, positive and negative predictive values with their respective 95% confidence intervals were calculated along with a positive likelihood ratio for the best performing cut point identified by the ROC analysis.

**Voxel-Based Morphometry:** Volumetric processing was conducted using FSL-VBM within FSL. We isolated only prefrontal gray matter using the ROI available from the Harvard Center for Morphometric Analysis to quantify a metric of prefrontal atrophy for each subject in our study. These volumes were then implemented as a covariate into our voxel-wise and tract-wise designs in subsequent analyses.
Results

Five athletes were identified as depressed (Mean BDI-II = 23.6, SD = 4.28), while 21 athletes were not (Mean BDI-II = 4.32 SD = 3.61). Depressed and non-depressed athletes did not differ in age, experience in the NFL, number of concussions, or the volume of T2 weighted white matter hyperintensities on fluid attenuated inversion recovery (FLAIR) magnetic resonance imaging scans. FLAIR scans for depressed subjects are displayed in supplementary materials (Figure e-2). All depressed athletes reported at least three concussions (Table 1). Four of the five depressed athletes reported symptom onset to have occurred following retirement from the NFL and one reported depression symptoms immediately following a concussion that ended his career.

Voxel-wise correlations for all athletes revealed negatively correlated voxels dispersed throughout the white matter skeleton for FA and BDI-II total score (p < 0.05 corrected) (Figure 2A). Similar distributions were found for the cognitive and somatic Buckley factors (Figure 2C-D) but the affective component was more localized to bilateral frontal and right posterior regions (p<0.05 corrected) (Figure 2B). There were no significant differences in FA between healthy controls and nondepressed retired athletes (p > 0.05). Our results remained essentially unaffected after incorporating prefrontal atrophy as an additional covariate into the voxel-wise analysis.
Table 2 shows all of the tracts that were included in the analysis along with the corresponding Pearson coefficients. Four white matter tracts had mean FA values that were significantly correlated with the total BDI-II score (p<0.01). These tracts included the forceps minor (Figure 3A), right uncinate fasciculus (Figure 3B), right frontal aslant tract (Figure e-1A), and left superior longitudinal fasciculus (Figure e-1B). No tracts uniquely correlated with any of the sub-factors that did not also correlate with the total BDI-II score. A second correlation was performed for the forceps minor after removing the impact of prefrontal atrophy but the correlation remained significant (p<0.01, R=-0.523).

ROC curve analysis of the four tracts with significant associations between mean FA and total BDI-II score revealed that the mean FA of the forceps minor best distinguished the depressed from the non-depressed athletes with an area under the curve of 0.9712 (Figure 3C). A mean FA cut point of 0.3896 misclassified only one subject and yielded a sensitivity of 100% (95% CI 47.8-100), a specificity of 95.2% (95% CI 76.2-99.9), an odds ratio of 150.3 (95% CI 5.3-4,229), a positive predictive value of 83.3% (95% CI 35.8-99.6), a negative predictive value of 100% (95% CI 83.2-100) and a positive likelihood ratio of 21.
Discussion

Our data from this relatively small cohort demonstrated a significant association between white matter integrity, as measured by DTI fractional anisotropy, and the presence as well as severity of depressive symptoms, as measured by the BDI-II, in retired NFL athletes with a history of concussive or sub-concussive impacts. The data show that constellations of depressive symptoms are associated with general, as well as local, white matter disruption, depending on the Buckley 3-factor score used as a correlate. Using the overall BDI-II score threshold associated with clinical depression, the FA value of one specific tract, the forceps minor, resulted in 100% sensitivity and 95% specificity for identifying individuals with depression. The factor common to all of these individuals that is associated with white matter dysfunction is their remote history of concussions that occurred prior to the detection of the subjects’ symptoms.

The BDI-II is commonly used in clinical and research settings, and reliably quantifies depressive symptoms. Depression can be manifested by a variety of symptoms that span from emotional to physical as described in Buckley’s 3-factor model – affective, cognitive, and somatic. Our findings showed that depressive symptom factors in this cohort correlated differentially with FA: the affective component was associated with focal white matter regions (bilateral frontal and right posterior), and the cognitive and somatic factors with widespread white matter abnormality. Widespread white matter disruption has been reported to correspond with a prior history of depression. Interestingly, voxels that survived a more stringent threshold of p<0.02 for the BDI-II total score, cognitive and somatic factors, were
seen in frontal regions, including the forceps minor, as well as additional posterior regions for the BDI-II total score (Figure 2).

DTI measures of FA and other markers of white matter integrity are commonly used for analyses of group data, although the strong correlations obtained in this study were robust to the point that the present analyses could be applied at the single subject level. The five individuals who reported significant depressive symptoms, both as a group and individually, could be differentiated from non-depressed subjects using just their low FA values. This implies that irrespective of cause, compromised white matter integrity in the frontal lobes is strongly correlated with depressive symptom severity. Additionally, the significant association of BDI scores with FA was independent of prefrontal cortical atrophy, even for the forceps minor, making it unlikely that secondary axonal degeneration from neuronal loss rather than an intrinsic white matter process fully accounts for the findings. Frontal projections (forceps minor in particular) are not only susceptible to disruption with head injury due to its anatomical location but this dysfunction has been linked physiologically to a reduction in hemispheric synchrony.20

White matter dysfunction has been reported in concussion with both diffuse axonal injury detected pathologically21 and in DTI imaging studies.22 Most subjects in this study have histories of multiple concussions. One previous investigation has demonstrated a general association between DTI white matter abnormalities and depression severity.18 However, that study did not assess the correlations between severity of depression and abnormalities in individual white matter tracts or in focused regions of interest. White matter disruption in the
hippocampal and prefrontal regions has been implicated in treatment resistant depression\textsuperscript{23-24} and early onset depression\textsuperscript{25-26}, particularly in the frontal lobes.\textsuperscript{24} In TBI patients, connectivity within frontal networks was found to be more susceptible to damage and resulted in decreased connectivity.\textsuperscript{27} If white matter disruption is the underlying cause of impairment in TBI, it is conceivable that the decreased connectivity is secondary to primary white matter degeneration. Considering that intact frontal circuits may be important in mood stability and these circuits’ vulnerability to head injury, our findings involving the forceps minor are consistent with the literature as a plausible biomarker for depression severity in a population with a history of concussion.

It is not apparent whether the deficits described in this paper could be a result of chronic traumatic encephalopathy (CTE), since this diagnosis at present is a pathological one.\textsuperscript{28-30} The goal of this study was to address the implications of white matter impairment and depression symptom expression during the subjects’ natural lifespan and therefore any connection to CTE would be speculative. We can neither confirm nor deny CTE in any of our patients but this does not invalidate DTI as a possible tool for early detection of CTE in the future.

A limitation of our study involves the lack of a direct temporal association between concussions and depression. Concussion characterization in these studies is based on symptom recollections that were recounted years or even decades after the episode. This can lead to inaccuracies in reported number or severity of concussions. Four of the depressed subjects reported depressive complaints that did not manifest until after retirement from the NFL, whereas one subject experienced symptom onset immediately following a concussion. Head
injury alone might elicit these symptoms, or such injury might interact with other factors to contribute to a delayed response that can manifest with aging. Both of these clinical profiles could be explained by white matter disruption, and the severity and/or location of the injury might influence the timing of symptom onset. Our data do not address the issue of sub-concussive injury\textsuperscript{5-6} that is not possible to accurately quantify retrospectively. Previous studies of white matter disease and aging in depression focused on elderly adults with microvascular changes on T2 weighted FLAIR images.\textsuperscript{31} Since there was a presumed etiology for those characteristic lesions, the increased risk of depression appeared to be secondary to white matter damage related to vascular disease. With variable associations between concussion and depression in retired players, factors such as presence and duration of post-concussive symptoms\textsuperscript{32} and/or genetic profile (presence of an APoE4 allele) may contribute to a concussion leading to significant white matter dysfunction. To further determine if the present associations imply causation, future longitudinal, prospective studies are indicated.

Our main findings were supported by both our voxel- and tract-wise analyses, implicating the importance of the forceps minor in association with depressive symptoms, a region that mediates interhemispheric connections between the frontal lobes. Prior studies have alluded to the importance for cross communication between the frontal lobes in relation to the development of depressive symptoms.\textsuperscript{33-34} Decreased FA represents white matter disruption, and subjects with the most profound depressive symptoms also had the lowest FA values in this same region. While the number of subjects we studied is small, white matter integrity changes seen in these subjects with depression leads to new insights of possible markers of behavior disturbances in chronic effects of head trauma.
References


Acknowledgments

This work was possible due to support from the BrainHealth Institute for Athletes at the Center for BrainHealth, a research center at the University of Texas at Dallas. We would also like to express our sincerest gratitude to the retired NFL athletes that participated in our study. This project was partially funded by National Institute on Aging grant 5K23AG030006. We are very grateful for the training data for FIRST, particularly to David Kennedy at the CMA, and also to: Christian Haselgrove, Centre for Morphometric Analysis, Harvard; Bruce Fischl, Martinos Center for Biomedical Imaging, MGH; Janis Breeze and Jean Frazier, Child and Adolescent Neuropsychiatric Research Program, Cambridge Health Alliance; Larry Seidman and Jill Goldstein, Department of Psychiatry of Harvard Medical School; Barry Kosofsky, Weill Cornell Medical Center.
Table 1: Demographic information of our cohort for athletes with (n=5) and without depression (n=21)\(^a\).

<table>
<thead>
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<th>Asymptomatic Athletes (n=21)</th>
<th>Symptomatic Athletes (n=5)</th>
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<td>Age</td>
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<td>43-62, 54.0 (7.78)</td>
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<td>Gender</td>
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<tr>
<td>Ethnicity (Caucasian/African American)</td>
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<tr>
<td>Years in NFL</td>
<td>2-15, 8.86 (3.98)</td>
<td>5-12, 7.6 (2.71)</td>
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<td>Number of Concussions</td>
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<td>3-11, 5.6 (3.29)</td>
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<tr>
<td>Positions (Speed/Nonspeed)</td>
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<td>5/0</td>
</tr>
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</table>

\(^a\) Unless otherwise stated values are range, mean (SD).
Figure 1: Standards for the Reporting of Diagnostic accuracy studies.

Flow chart of the study to assess the diagnostic accuracy of forceps minor FA (index test) in detecting depression within profession athletes validated with the BDI-II as the reference standard.
Table 2: Association between fractional anisotropy and depression within white matter tracks.

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<th>Track</th>
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<th>Affective</th>
<th>Somatic</th>
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<td>-0.535⁰</td>
<td>-0.412</td>
<td>-0.474</td>
<td>-0.563⁰</td>
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<tr>
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<td>-0.414</td>
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<td>-0.464</td>
<td>-0.471</td>
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Abbreviations: ILF = Inferior Longitudinal Fasciculus; FAT = Frontal Aslant Tract; SLF = Superior Longitudinal Fasciculus; UF = Uncinate Fasciculus; PP = Perforant Pathway; CS = Corticospinal Tract; FOF = Fronto-Occipital Fasciculus; CC_A = Anterior Corpus Calosum; CC_P = Posterior Corpus Calosum; Cing = Cingulum; FMajor = Forceps Major; FMinor = Forceps Minor.

⁰ Data are displayed as R values.

ⁱ p < 0.01.
Figure 2: Voxel-wise correlation between white matter and depression in NFL athletes.

Each panel shows negative correlations between FA values and BDI total score (A), affective (B), somatic (C), and cognitive (D) sub-factors. Red voxels represent significant voxels at $p < 0.05$ corrected for multiple comparisons and yellow voxels represent voxels that survive $p < 0.02$ corrected for multiple comparisons. Axial slices are in radiologic orientation with the results thickened for better visibility using the “tbss_fill” script.
Figure 3: Tract-wise correlations between FA and the BDI total score.

Abbreviations: BDI = Beck Depression Inventory.

Both forceps minor (A) and right uncinate fasciculus (B) survived a statistical threshold of $p < 0.01$. Subjects classified with depression are identified in blue and non-depressed athletes are designated in red. (C) ROC curve for FA derived values from the forceps minor as a classifier for depression. The blue line is the actual classifier data plateauing at 100% sensitivity with 95% specificity.
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<th>Query No.</th>
<th>Nature of Query</th>
<th>Author’s Response</th>
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<td>Q2</td>
<td>The citations Hart et al. (in press) and Hart J (in press) have been changed to Hart et al. (2013), Dave and colleagues (2009) to Dave colleagues (2006), Kaplan (1983) has been changed to Kaplan et al. (1983), Kerr et al. (2012) to Kerr et al. (2013) to match with the reference list. Are these changes ok?</td>
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<td>Q3</td>
<td>All authors must make a formal statement indicating any potential conflict of interest that might constitute an embarrassment to any of the authors if it were not to be declared and were to emerge after publication. Such conflicts might include, but are not limited to, shareholding in or receipt of a grant or consultancy fee from a company whose product features in the submitted manuscript or which manufactures a competing product. The following statement has been added to your proof: ‘Conflict of Interest: none declared’. If this is incorrect please supply the necessary text to identify the conflict of interest.</td>
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Is it too early to start getting CVs from potential statisticians we might want to recruit for the TBI Center? I just met a wonderful person who’s in Oklahoma and might be moveable, so I encouraged her to send me her CV, but I’m not sure on timing.

Also, we have an opportunity to co-sponsor next year’s Sports Neuropsychology Society meeting (http://www.sportsneuropsychologysociety.com/sports-neuropsychology-society-annual-meeting-and-symposium/), which was this past weekend in Minneapolis & was cosponsored by the NHL and NFL and gained a lot of attention. Margot Putukian was there (she’s delightful- hadn’t met her before) & she said to say hello. Many people are quite envious that UTSW has you back, FYI!

So in thinking about next year’s meeting, you can expect to be invited to speak, and they are considering Dallas as a possible site.

Munro

UT Southwestern Medical Center
The future of medicine, today.
Wow, thanks, Hunt. I’m attaching the PDF for your convenience.

FYI, if there truly is interest, I’m sure we can get a formal presentation ready with the guys at InTouch fairly quickly.

Julian
Executive Summary

NEURO-TRAUMA TELEMEDICINE
A Proposal for the National Football League (NFL)

Julian P. Yang, MD  Hunt Batjer, MD
Assistant Professor, Neurocritical Care  Professor and Chairman, Neurological Surgery
Director of Tele-Neurology  Chair, NFL Head, Neck and Spine Medical Committee
University of Texas Southwestern  University of Texas Southwestern
Dallas, TX  Dallas, TX

Objective: We propose the use of tele-technology to streamline and to enhance the current system of evaluating and managing neuro-trauma during games in professional football.

Background: With the recent attention brought to the possible long-term consequences of closed-head injury in contact sports, the NFL has responded with the addition on-field specialist physicians, the Unaffiliated Neuro-Trauma Consultants (UNC’s). The purpose of the program is to aid team physicians by providing independent consultative expertise.

Although the value of the added on-field expertise is unquestioned, the UNC program is problematic on several levels. From an administrative perspective, the process of recruiting, credentialing, and scheduling two UNC’s per game in multiple cities is somewhat cumbersome. There is the added logistical difficulty of acquainting the local specialist physician with visiting team doctors. More significantly, UNC’s are not likely being optimally utilized. From a fixed position at field level, UNC’s have a limited vantage of game action and possible injuries. When called to render an opinion, UNC’s also do not have the benefit of prior historical information about players in question (similar to team physicians) because of rotating schedules and visiting teams. As a consultant, the primary utility of the UNC program appears to be a confirmatory exam in time-sensitive, return-to-play decisions by team physicians, who are already very skilled at managing head injury. This secondary opinion is very important, especially on behalf the players and the NFL, but it could reflect a higher quality consultation.

A centralized “Command Center” model and telemedicine, the use of high-quality, two-way audio-video communication, may be a solution to these problems. The use of telemedicine has already been very successful in the management of acute stroke (i.e. “telestroke”), another situation reflecting time-sensitive specialist decision making for brain injury. At the collegiate level, telemedicine is currently being tested at football games for Arizona State University and Northern Arizona University.

The use of telemedicine at the NFL level would be an innovative step in professional sports and tele-technology. Not only would this new system represent a world-class model for sports telemedicine, it would serve as a platform to further clinical research in head injury.

Implementation: We recommend the selection of InTouch Health (Santa Barbara, CA) to provide the tele-technology solution for this project. As the market leader in telestroke solutions, InTouch has the necessary infrastructure and experience in handling health information securely with continuous connectivity. An RP-Lite® unit, a cart-based screen-and-camera system, would be stationed in every locker room. When a specialist consultation is requested during a game, the player patient and team physician would be connected to a team of specialist physicians at a centralized location, the Command Center. The design of the Command Center will be critical with access to multiple live video feeds during game day for every game and several InTouch workstations. Instead of employing a large group of rotating specialist physicians in every city, the Command Center team would feature a much smaller group of physicians reflecting a wider breadth of subspecialty expertise (e.g. behavioral neurology, neurocritical care, neurosurgery, psychiatry, emergency medicine, etc.) Because of centralization, a database of head injuries would be able to be kept through the season.
Advantages:

• The logistical problems of the UNC program would be eliminated.
• Team physicians can expect a familiar team of consultants at every game.
• A wider range of specialist expertise would be available for every consultation. (Sub-specialty representation also does not necessarily need to be limited to neuro-trauma.)
• Specialist consultants can have a much better understanding of mechanism of injury with video review.
• Tele-consultations can be recorded for liability purposes.
• A centralized database can keep track of a players’ history of injury.
• A centralized database can be utilized for future research.

Disadvantages:

• Specialist physicians may not want to participate in a consultation system that does not have the appeal of being on-field. (Other incentives may need to be arranged.)

Timeline: With implementation during the off season, a system could be ready for the 2014 football season.

Budget: We anticipate the fees associated with the telemedicine system to be approximately cost neutral to the current stipends paid to UNC’s. The initial cost of developing the Command Center will depend on its location and planned capabilities.

Future Development: With the high visibility and deep resources of the NFL, a functioning model of tele-consultation in professional football could have wide-ranging implications in sports, sports medicine, sports law, and tele-technology. Creating a database of consultations will be at the heart of furthering knowledge in each of these fields to better protect players and the game in future years.

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10/16/13
Good afternoon all! I have put together a schedule for the season and have assigned each person 1 game to work up until the final 3 game days. Attached is the DRAFT schedule. Is there anyone who would like to volunteer to work a second game? And is there anyone willing to work the Thanksgiving Day game on November 28th? (that’s included in the final 3 games, see below)

11/28 Thursday (Thanksgiving) 3:30 pm Cowboys v Oakland Raiders

12/15 Sunday 3:25 pm Cowboys v Green Bay Packers

12/29 Sunday 12:00 pm Cowboys v Philadelphia Eagles

Christina
<table>
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<tr>
<th>Date</th>
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<th>Time</th>
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<th>UNC2</th>
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<td>Thursday</td>
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<td>9/8/2013</td>
<td>Sunday</td>
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<td>Bryan Wohlfeld</td>
<td>Howard Morgan</td>
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<td>St. Louis Rams</td>
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<td>10/6/2013</td>
<td>Sunday</td>
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<td>10/13/2013</td>
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<td>Green Bay Packers</td>
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<td>12/29/2013</td>
<td>Sunday</td>
<td>12:00 PM</td>
<td>Philadelphia Eagles</td>
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