Jaw Joint Science Institute, INC

WHITEPAPER-SPORTS



(see, Fig. 2.(3), which processes vision and hearing), the abducens nerve, the ear canal (see, Fig. 2.(2)), and the mastoid air cells. The following extracranial structures such as the jugular foramen, Vagus nerve, Spinal accessory nerve, and Hypoglossal nerve are within the impact striking distance of the condyles' full superior and lateral movements as they relate to head trauma and vehicular accidents. "The Injury patterns discussed herein will weaken the athlete's physical strength and enhance the onset of the cognitive symptoms of TBIs".

Upon discovering the fracture patterns in the TMJ by the utilization of 3DCT technology, see Figs. 1 & 2. Dr. Edward Williams of the Jaw Joint Science Institute (JJSI) has developed a diagnostic evaluation and treatment protocol for this newly found & diagnosed injury. The treatment protocol is non-invasive and cost-effective, that can alleviate the symptoms of TBIs in as little as four months without meds returning athletes and fighting forces to active demands. The military and impact sports are open environments for temporal mandibular disorders (TMD) and the TMJ fractures associated with traumatic brain injuries (TBIs). TBIs in this document are defined by the American Congress of Rehabilitative Medicine as being dazed or confused immediately after the injury, not remembering the injury event, or loss of consciousness (TBIs may be used interchangeably with concussions). TMJ fractures associated with TBIs can splinter and pierce the brain's temporal lobes and may be an etiology for the increase in the ideations of suicides,



The Forces of Chinstrap Constraint Pulls the Lower Jaw Up and Into the Base of the Skull's Glenoid Fossa Bone (see Fig. 2. 4.) **Enhancing the Concussive Impact Forces** Against the Base of the Brain While Irritating the Wearer

suicides, alcoholism, and mental health issues based upon this devastating and uncontrollable pain response.

2

(Addresses Vision & Hearing Processing)

Helmet design gives little to no concern to the effects of the helmet chinstrap constraints compressing the condyle into the base of the glenoid fossa, directly affecting the skull and brain, setting up the temporal lobes (like a gulf-Tee) for the impact force of concussions, see Fig. 3. The omission of the TMJ and its inseparable relationship to the base of the brains' temporal lobe must be considered as a component of brain health & safety to diminish the crisis of TMD, TBIs, and the crisis of concussions. The TMJ is the missing scientific link to a more accurate analysis of the mechanism of TBIs and concussions. Concussions are the global crisis in the world of sports and the signature injury of the military. Overlooking the TMJ which is constrained by the supporting helmet chinstrap attachments compressing the condyle into the base of the skull's glenoid fossa bone (see Figs. 4. & 5. below), is the Achilles Heel of helmet designs. This is also a segue to the escalation of TMD and TBIs (see cognitive symptoms, Fig. 8)



Chinstrap Constraint Position

The fractures found in 3D CT scans imaging are caused by head impacts that bilaterally drive the condyles of the lower jaw into the unprotected base of the glenoid bone. These concussive forces will fracture the thin bones at the base of the skull and directly traumatize the brain's temporal lobes. Medical science has overlooked the presence, complexity, and physical abuse of the crucial TMJ and its support of the brain. **Consider the following: The**

unprotected TMJ will receive a component impact force from the bodily impacts received by the carrier and those delivered by the opponent on the field of football. Studying the head impacts of concussions without considering the TMJ is like studying the impact and function of a hand with no fingers.

Chinstraps condylar repositioning produces symptoms such as headaches, irritation, fatigue, weakening of the individual's strength, and amplifies the head impact forces against the base of the skull and alongside other shared symptoms among our athletes. Releasing helmet chinstraps reduces the painful encumberment, constraint and stress opposing the TMJ. However, this behavior places athletes at risk, increasing the probability of TBI, violating the safety compliance of the helmet based on the Rolloff standard.

The rule of the NFL penalizes the opponent for impacting any component of the helmet of the quarterback: What about



the multiple helmet impacts per game against the helmet of the lineman? These multiple nose tackle impacts indiscriminately continuously concuss the base of the brain, limiting their career expectancy, and their quality of life after the games. This catastrophic mechanism of concussion must be addressed, the future of football is riding on it!

The nose tackle impact surface ranges from the frontal of the helmet to the bottom of the

faceguard: the massive linemen impacts produce an intense and repetitive forces driving the condyle (accentuated by the chinstrap constraint) into the base of the skull and brain enhancing the TMJ fractures and multiple unreported concussion issues. NFL linemen's career expectancy is approximately 3 years (with expected cognitive decline).

Healing the <u>Treatable TMJ Fractures Associated with Concussion in Athletes</u>, see Figs. 7 & 8, is a cost-effective treatment of concussions that reduces the alleviating the opioids, alleviating the cognitive suffering of concussions, TBIs and other unexplained temporal lobe issues while promoting the wellness of our athletes within a definitive period of treatment.



This soccer player had been impacted against the lower jaw by the knee of his opponent and suffered a plethora of cognitive symptoms and treatments for four years prior to being diagnosed with the fractured glenoid fossa of the TMJ, see Fig 7. Healing the glenoid bone fracture (common injuries in this population)

alleviated the tormenting cognitive symptoms, returning him back to college, (took less than four months), see Fig. 8.

Upon utilization of 3DCT technology, focusing on the lateral sagittal scan or "Williams View" of the skull reveals the vital structures of the TMJ (see Fig. 1). Many of the intracranial structures of the skull absorb the head impact energies transmitted by the condyle slamming into the skull. However, we must also consider the extracranial structures that are within striking distance of the condyles' lateral (excursion) range of motion. These kinds of head impacts, see Figs. 9, 10 & 11, and heading the ball will cause intracranial brain and extracranial head and nerve injury, triggering the tormenting symptoms of concussions. Lateral excursive movements visually occurring in soccer also occurs less visually in helmeted sports.



Lateral Excursive (Movement) of Mandibular Condyle Not Only Impacts Intercranial Skeletal Structures, But Also Slam Unsuspecting Extracranial Structures (see below).

INTRACRANIAL STRUCTURES:

- Middle cranial fossa basal surface supporting the temporal lobe of the brain
- Medial temporal gyrus of the temporal lobe
- The petrous pyramid
- Abducens nerve
- The temporal bones of the ear canal, auditory meatus, and ossicles of the inner ear
- The mastoid air cells
- Brain's temporal lobes

EXTRACRANIAL STRUCTURES:

- Condyle of the lower jaw
- The glenoid fossa bone, the ceiling of the TMJ
- Carotid Canal
- Internal carotid artery
- Jugular foramen and 4 Cranial Nerves:
- Vagus Nerve
- Spinal accessory Nerve
- Hypoglossal Nerve
- Glossopharyngeal Nerve

COGNITIVE SYMPTOMS

"Many Events of Sports and Military Operations Cause the Lower Jaw to Impact the Base of the Skull and Brain with Little to No Resistance and Absolutely No Protection, and Are the Etiologies of Many Unsolved Cognitive Problems Suffered by Our Athletes and Warfighters."



These Commonly Diagnosed Glenoid Fossa Fracture Types Found in Athletes and Military Personnel Are Responsible for the TMDs, TBIs and Concussions. *J-RES* Prevents these fractures, the Suffering, Cognitive Decline and Perhaps the Early Retirement of Many Outstanding Players, see Figs. 12 & 13

This medical assessment validating the newly discovered mechanism of brain concussion; the condyle constantly and directly impacting the base of the skull and brain, directly affecting his quality of life (see Fig. 14). How many unreported and silent concussions did this quarterback sustain in his outstanding career to create this crippling fractured pattern of the concussion at the base of the brain?

These lesions/holes in the base of the skull: the **invisible clinical TMJ fracture of concussions** are likely to occur in all athletes of contact sports, increases their vulnerability for multiple concussions and TBIs with less applied physical force, causing recurring headaches and frequent periods of other tormenting symptoms of concussions. These fractures also can produce localized brain swelling, while accelerating brain infirmity, mental decline with aging and perhaps a distressingly painful, and predictable motivation for opioid addiction, alcoholism, and suicides.

Evaluating the TMD Outcome from One of



THE SOLUTION: Preventing the Impact Load Forces of the Condyle from Being Transmitted Through the TMJ Entering the Brain's Temporal Lobe Prevents the Concussion; *J-RES* Is the Solution



teeth into *J-RES*, uncoupling the condyle out of fossa preventing concussive impact forces from entering the brains' temporal lobe **Protecting and Safeguarding Life's Most Vital Joint the TMJ,** Dr. Edward Williams of Jaw Joint Science Institute introduces an intraoral appliance, the *J-RES* (jaw-restorer), see Fig. 15. The fixed positioning of *J-RES*, securing the upper and lower teeth, disengages and locks the condyle (C) out of the glenoid fossa GF), see Fig. 16, which prevents the condyles' impact forces from ever entering or being absorbed at the base of the brain's temporal lobes. The aberrant head impact forces are absorbed, redirected, and dissipated by *J-RES*. This design-specific scenario works in tandem with helmets, mitigating headgear constraints, TMDs, fractures associated with concussions, and TBIs while enhancing headgear compliance and comfort in lengthy wearing times. *J-RES* is a cost-effective item that can be properly fitted within 3-minutes, with and without the helmet. The correlation between the

helmet, concussions, and TMJ is void of research.



The Normal Condyle (C) Position In TMJ Socket: Head Impacts, Slams The Condyle Into the glenoid fossa (GF) & base of brain: Fractures (GF) & Concusses Brain

J-RES locks and fixes the condyle (C) out of the glenoid fossa (GF) Preventing (GF) Fractures & Temporal Brain Impacts Concussions.

Mandating mouthguards has added abuse to TMDs, TBI, and Concussion injuries. The design of *J-RES* enables speech, enhancing the teeth-clenching mechanism while breathing through the mouth facilitating strength, while reducing fatigue for our athletes and fighter forces during training, aviation, and field operations. Our product is designed to prevent TMDs, alleviate direct traumatic injury against the

brain's temporal lobe and TBIs, elevate brain safety, and eliminate headgear TMJ constraint, while improving physical performance. *J-RES* prevents the harmful direct transfer of head impacts, B&B, and pulling Gs. *J-RES* contributes to the strength, stamina, brain safety, and wellbeing of our fighter forces.

THE BRAIN'S TEMPORAL LOBES CAN NO LONGER BE THE SACRIFICIAL LAMB FOR SPORTS OR THE MILITARY.

Efficacies of *J-RES* Protecting the TMJ will alleviate the following:

- Prevents jaw joint & TMJ fractures & the onset of lower jaw impact concussions

- Enables greater repetition of exercise

- Eliminates helmet straps constraint promoting wearing comfort and safety compliance of helmets

- Enhances the athlete's peak performance and muscular endurance
- Anterior airway space promotes mouth breathing & clearer speech
- Functions for many as a sleep apnea device to reduce snoring
- Absorbs the physical head impacts and minimizes the onset of CTE
- Enables mouth breathing while teeth-clenching for strength
- Diminishes headache responses while physically engaged
- Strength enhancement is a magnificent component of J-RES
- Enhances the proficiency & physical endurance of contact sport events

- Clenching & breathing through the mouth enhances strength & reduces the onset of fatigue

- Maintains stability, balance, proper fit of helmets & enhances brain safety for our athlete





TMJ protection & brain safety is most essential for those engaged in sports, particularly children engaged in early contact sports. We have no idea how early direct temporal brain impacts affect the developing mind of a child. Protecting the base of the brain; their futures weigh heavily upon this newly discovered mechanism of concussions/TBI and *J-RES*.

Note: J-RES' LOGO PAD FOR THE NAMES OF SPORTS, SCHOOLS, TEAMS AND EVENTS (see J-RES below)



Prepared by: Dr. Edward D. Williams Jaw Joint Science Institute THE FOLLOWING PHOTO EVENTS TRAUMATIZE, FRACTURE OR RUPTURES THE TMJ PRODUCING TMD, TBI, AND THE TORMENTING SYMPTOMS OF BRAIN CONCUSSIONS; THEY ARE IN NEED OF THE JJSI TREATMENT PLAN



SOCCER BALL HEAD IMPACTS

RUNNING INTO PITHCERS

RIDING, AND FALLS OF THE EQUESTRIAN



SKIING ACCDENTS

MMA KNOCKOUTS

BMX CRASHES



IMPACT FOECES OF SKATING

IMPACTS FORCES OF WRESTLING

MOUTHGUARDS PRODUCE TBI



BOXING

LACROSSE

HEAD IMPACTS, IN BASKETBALL



The vulnerability of Life's Most Vital Joint (THE TEMPORAL MANDIBULAR JOINT) Has Been Overlooked in the Protection and the Evaluation of Concussions and TBIs

