Thank You

• Thanks to APTA-SPTS for the kind invitation to present this information
• It is indeed an honor and privilege to be invited to participate and share information.

Kicking & Punching: Physical Therapists Working With Combat Athletes

Title: The Art and Science of Selected Combat Sports: Background, Injuries, Strength & Conditioning Programs, Specificity of Performance Enhancement, and Unique Rehabilitation Techniques

MMA

• Combat sports and specifically Mixed Martial Arts (MMA) is one of the fastest growing sports worldwide, and recently surpassed boxing as the most popular full-contact sport in the United States.

MMA


Most valuable sports franchises:

• Soccer: $3.26 billion–Real Madrid
• Football: $3.20 billion–Dallas Cowboys
• Baseball: $3.20 billion–NY Yankees
• Basketball: $2.60 billion–LA Lakers
• MMA: $4.00 billion – UFC !!!

Google Search: 2/1/17

• Although MMA is relatively new, an informal search using Google’s search engine recently and the term mixed martial arts produced 29,800,000 references!

Sports Health


Speakers
- George J. Davies
- Lieutenant Commander Charles E. Rainey, DSC, DPT, PT, SCS, OCS, CSCS, FAAOMPT. Vice-chair of the APTA Sports Section’s Tactical Athlete Special Interest Group
- Faculty Instructor and Upper Extremity Module Lead for the U.S. Military Musculoskeletal Residency Program
- Matthew Hixson, PT, SCS, CSCS, Director Cleveland Clinic Special Interest Group: Combat Sports

Educational Session Objectives
The course participants will:
- Recognize the numerous combative sports that are practiced world wide
- Describe information about the various injuries associated with participation in combat sports
- Compare and contrast some of the strength and conditioning programs utilized in training for the combative sports
- Appraise the effectiveness of unique rehabilitation interventions and criteria for return to activity for martial artists

Outline
- Part I: Introduction and Overview of Combat Sports
- Part II: Epidemiology of injuries, prevalence, types, and severity
- Part III: Science of Strength and Conditioning Programs, Performance enhancement, periodization, and unique rehabilitation interventions for return to activity
- Questions & Answers

Outline
- Part I: Introduction and Overview of Combat Sports (GJD--Moderator)
- Introduction
- Overview of Combat Sports and Martial Arts
- Examples of many of the different types of combat sports practiced around the world.
- Background information on selected combat sports

Outline
- Part II: Epidemiology of injuries, prevalence, types, and severity (CR)
- Epidemiology of selected injuries Overall Injury prevalence
- Injury patterns
- Severity of injuries

MMA Reference

Science
- However, despite the proliferation of general information on MMA, there is limited high-quality evidence available to inform clinicians and strength and conditioning specialists about the sport.
George J. Davies, DPT, ATC, CSCS
Professor-Georgia Southern University-Armstrong Campus
Sports Physical Therapist:
Coastal Therapy, Savannah, GA.,
Gundersen Health System, LaCrosse, WI.

Speakers

* Last thing you expected to see at the podium is some old, 4-eyed, skinny guy talking about martial arts!!

Science: PubMed Search: 2/1/17

- Martial arts: 2,129
- Mixed martial arts: 127
- Martial arts injuries: 415
- Mixed martial arts injuries: 53
- Martial arts training & conditioning: 27
- Martial arts psychology: 193
- Mixed martial arts competitors: 12
- Mixed Martial arts injury profile: 2

Specialist Martial Arts Conditioning (SMAC)

No Conflicts

Disclosures:
The following companies have provided research equipment support to Biodynamics & Human Performance Center-ASU:

- Gundersen, LaCrosse, WI.
- Exos/Tekna, Petaluma, CA.
- Innovative Spine Inc, Chicago, IL.
- Theramed, Hygenic Corporation, Akron, OH.

No Conflicts

Disclosures:
"Gladly accept money from anyone for Institutional Research Support...."

No Conflicts

Disclosures:
No Conflicts
Speakers-Relevant Experiences for this Presentation

- George J. Davies
- Former US Marine ("Kill Combatives")
- Black Belt – Karate (Sense)
- Point Fighting Tournaments-Competitor
- Full Contact Karate-"Corner man"
- Specialist Martial Arts Conditioning (SMAC)-ISSA
- Published – book chapters
- Published – descriptive articles
Martial Arts Publications


Black Belt Magazine

Outline

- Part I: Introduction and Overview of Combat Sports (GJD-Moderator)
  - Introduction
  - Overview of Combat Sports and Martial Arts
  - Examples of many of the different types of combat sports practiced around the world.
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Many Forms & Styles of Martial Arts

- Hundreds:
  - ~ 20

Early History

- During the Classic Greek era there existed an ancient Olympic combat sport known as Pankration which featured a combination of grappling and striking skills, similar to modern mixed martial arts. This sport originated in Ancient Greece and was later passed on to the Romans.

USA Styles of Martial Arts

- American Karate
- American Kenpo
- Chun Kuk Do
- Collegiate wrestling
- Danzan
- Emerson Combat Systems
- Gouging (fighting style)
- Jailhouse rock
- Jeet Kune Do
- Kajukenbo
- Kara Ho Kempo
- Marine Corps Martial Arts Program
- Model Mugging
- Modern Army Combatives
- Oom Yung Doe
- S.C.A.R.S. (military)
- Shootfighting
- Shuri Shuri-ryu
- Sli Beatha
- Small Circle Jujutsu
- SPEAR System
- To-Shin Do
- World War II combatives

A Greek statue, pancratium, an event showcased at the Roman Colosseum. Even as late as the Early Middle Ages, statues were put up in Rome and other cities to honour remarkable pankratists of Rome.
2020 Olympics, Tokyo, Japan
- Boxing
- Judo
- Karate (New 2020)
- Tae Kwon Do
- Wrestling – Free Style
- Wrestling – Greco-Roman

Aikido
Aikido is a Japanese martial art developed by Morihei. On a purely physical level it is an art involving throws and joint locks. Aikido focuses not on punching or kicking opponents, but rather on using their own energy to gain control of them or to throw them away from you.

Many Forms & Styles of Martial Arts
- Boxing (Sweet Science) (Olympic Sport)
- Brazilian Ju Jitsu
- Ju Jitsu means the art of suppleness or flexibility. Ju Jitsu does not use strength against strength, it uses the opponents strength and force of attack as a weapon against him, thus enabling a stronger or bigger attacker to be subdued. Ju Jitsu is one of the most complete martial arts there is. It incorporates unarmed strikes, joint locks, chokes and throws.

Mikaela Mayertle – USA Olympic Boxing Team

Many Forms & Styles of Martial Arts
- Brazilian Jujitsu

Capoeira (Brazilian “Dance”)
Many Forms & Styles of Martial Arts

- **Capoeira**
- **Capoeira** (pronounced Capo-ware), a fun and exciting sport
- Brazilian art form and self-defense; with strong aerobic and dance elements, mental physical and emotional agility.
- It is a harmony of forces that gives you power, flexibility, endurance and self-discovery.

**Dim Mak (Deadly Strikes)**

- **Dim Mak**
- Literally translated, *dim mak* (Mandarin: *dian xue*) means “touching the body’s caves,” so a dim mak practitioner uses strikes to create indentations (caves) on his opponent’s body to stop or disrupt his *chi* (qi; “life energy”). These attacks can injure, poison or kill an individual.

- **Hapkido**
- Method or Way (DO) for the coordination Harmony (HAP) of mental Energy or spirit (KI).
- One should always try to avoid violence, but if someone grabs you, attempts to strike you, or physically assaults you in any way, it has escalated beyond words, and you are left with the only option which is to defend.

- **Jeet Kune Do**
- Jeet Kune Do is the complete body of technical (physical, scientific) and philosophical (mental, social and spiritual) knowledge that was studied and taught by Bruce Lee during his lifetime.
- It is concerned solely and exclusively with Bruce Lee’s personal evolution and process of self-discovery through the Martial Art (You the individual become, through this process of self-discovery, your own best teacher).
Judo, which means the “gentle way,” is not only concerned with attack and defense techniques but the physical conditioning and total health that could be attained from its practice. The meaning of the word Ju (gentleness) denotes not resisting the strength of the opponent, but adapting to it, and taking advantage of it by turning it to one’s own advantage.

"Self-perfection as a human being".

Karate is a generic term for the various kick/punch arts which originated in Okinawa and Japan. Karate is a Japanese word that translates into English as, "empty hand." It is a martial art of unarmed self-defense in which directed blows of the hands or feet are delivered with special shouts from a poised stance. Karate stresses striking techniques, through kicks and punches. As a physical art, Karate is almost without equal. Since it is highly dynamic and makes balanced use of a large number of body muscles, it provides excellent all-around exercise and develops coordination and agility.

The major traditional styles of karate are Shotokan, Shito Ryu, Goju Ryu, and Wado Ryu.
Many Forms & Styles of Martial Arts

- **Kendo**
  - Kendo is a Japanese style of fencing
  - Kendo, which means "way of the sword," is practiced with shinai (bamboo swords), and fighters wear protective equipment covering the target areas: the head, wrists, and abdomen.
  - The weapon used in Kendo is the shinai, or bamboo sword.

- **Kickboxing**
  - Kickboxing started in the US during the 1970's when American karate practitioners became frustrated with strict controls on martial arts competitions that didn't allow full contact kicks and punches.
  - Competitors use sparring, kicks, punches, kick blocks, shadow boxing, and wood breaking that is learned and applied under professional instruction.

- **Kung Fu**
  - An extremely disciplined, powerful martial art where strength is built in low stances and powerful blocks. Some Kung Fu blocks are so powerful that it can break the arm of someone who is punching you.
  - Kung Fu is for the patient, and mentally and physically strong person.
  - Different styles such as Wing Chun, Drunken boxing and styles based on animal movements like the crane or snake.

- **Krav Maga**
  - A practical and tactical system which teaches how to prevent, deal and overcome all kinds of violence and attacks.
  - Krav-Maga was developed in Israel, under realistic demands and conditions.
  - Krav-Maga is a horizontal system with a unique and logical approach.

- **Mixed Martial Arts**

**WHAT IS MMA?—DEFINITION**

"A hybrid combat sport that uses both striking and grappling techniques from different martial arts"

Also known as
- Kickboxing
- No Holds barred
- Free fighting
Many Forms & Styles of Martial Arts

- Mixed Martial Arts (MMA)

MMA—"Cage Fighting"

- MMA is often referred to as "cage fighting" in the US as it is associated with the UFC's octagonal caged fighting area.
- "The Octagon" is trademarked by the UFC (though the 8-sided shape itself is not trademarked).

What MMA is NOT!!!

Military Combatives
Many Forms & Styles of Martial Arts

- Muay Thai (Thai Boxing)
  - Muay Thai is the oldest known form of kickboxing and is the primary building block of all other forms of kickboxing.
  - Muay Thai is the national sport of Thailand and is one of the most popular sports in the world today.

Violence in Society
Reality Based Fighting

Reality Based Training

Many Forms & Styles of Martial Arts

• Savate
  Savate takes its name from the French for old boot (heavy footwear used to be worn during fights) and is actually an amalgam of French street fighting techniques.
  A form of fighting involving high kicks

• Shotokan Karate
  Shotokan Karate is one of the four main schools of Karate in Japan.
  It is best characterized by its long and deep stances and its use of more linear movements.
  Shotokan Karate is considered by many a sports style of Karate, where tournaments and point-sparring are central to the art.
  Shotokan training is usually divided into three parts: kihon (basics), kata (forms or patterns of moves), and kumite (sparring).
  Shotokan is often regarded as a "hard" and "external" martial art because it is taught that way to beginners and colored belts to develop strong basic techniques and stances.

• Tae Kwon Do (Olympic Sport)
  Tae Kwon Do is the world's most widely practice martial art. Tae Kwon Do is a Korean fighting art that looks very similar to Japanese karate. It is an Olympic sport, an artistic discipline, a system of self-defense, and a way of life. Tae Kwon Do is an artistic discipline. The techniques are done with graceful and powerful movements.
Many Forms & Styles of Martial Arts

- **Wing Chun**

  - Wing Chun is the name of a system of martial arts developed in southern China approximately 300 years ago.
  - More recently, beginning in 1970, Bruce Lee, who trained primarily in Wing Chun but also some other arts, incorporated some of its techniques and ideas into his own Jeet Kune Do. His fame led to international interest in Wing Chun.

- **Tai Chi**:
  - An internal Chinese martial art practiced for both its defense training and its health benefits.
  - Some forms are particularly well known because of their slow movement.

- **Muay Thai**

  - The name of a system of fighting (Muay Thai) developed in Thailand.

- **Boxing**

  - The name of a system of fighting (Boxing) developed in the 17th century.

- **Wrestling**

  - The name of a system of fighting (Wrestling) that dates back to the early 20th century.

- **Wushu**

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Gracie Challenge

• Challenged anyone to a "no-holds bar" fight and see who would be the winner!

USA

• March 20, 1980, New Kensington, PA., CV Productions – held first competition: "Tough Man Contest"
• Banned contests for years
• 1993- UFC jiu-jitsu fighter Royce Gracie won the first Ultimate Fighting Championship tournament, submitting three challengers in a total of just five minutes, sparking a revolution in martial arts.
• August 23, 1996, Biloxi, Miss. First regulated MMA event

MMA-Ultimate Fighting Championship (UFC)

• UFC - Founded in 2001
• Private organization
• 31 basic rules
• Regulated in 50 states (slow adoption)
• Individual state commissions
• NO national regulatory body

UFC

• UFC - Founded in 2001
• Bought by Lorenzo & Frank Ferlitta for $2 million
• Dana White – UFC President
• 2016 – UFC sold to WME-IMG for $4 Billion

Dana White – UFC President

MMA

• Background Information

• Rules & regulations

MMA-Pre-Fight Planning/EMS

• Ringside Physicians
• Establish EMS system
• Meet Referees before fight
• Meet fighters before fights
• Understand local rules & regulations
**MMA-Pre-Fight Exam**
- Neurological testing
- Balance
- Fighting record
- History of concussions
- History of knockouts
- Hours of sparring
- Blood tests
- Check hands & feet
- Check nose & eyes
- Duck walk

**MMA-R&R-Medical Requirements**
- Medical requirements:
  - Contestants shall complete all pre-licensure medical examinations and tests required by the jurisdiction licensing the contest.
  - The jurisdiction licensing the contest shall conduct or supervise all pre-contest weigh-ins and may hold or supervise a rules meeting for all contestants and their corner-men.

**MMA-R&R-Medical Requirements**
- Post-contest medical examination:
  - Immediately following a contest, each contestant shall be given a medical examination by a physician appointed by the commission. The medical examination may include any examinations or tests the commission deems necessary to determine the post-contest physical fitness of a contestant.
  - Any contestant who refuses to submit to a post-contest medical examination shall be immediately suspended for an indefinite period.

**Local Rules & Regulations**
- Whether pre-fight exams are performed
- Whether blood tests are performed
- Whether a physician can stop a fight
- Certain states do NOT allow a physician to stop a fight

**Kicking Foot-Post Match**

**MMA-R&R-Weight Categories**
- There are 11 classes of weight for fighters:
  - Featherweight (men/women) – between 135 and 145 lbs (61.2 kg and 65.7 kg).
  - Flyweight (men/women) – between 115 and 125 lbs (56.7 kg).
  - Strawweight (women) – up to 105 lbs.
  - Atomweight (women) – up to 105 lbs.
  - Bantamweight (men/women) – between 125 and 135 lbs (56.7 kg and 65.7 kg).
  - Featherweight (men/women) – between 135 and 145 lbs (61.2 kg and 65.7 kg).
  - Lightweight (men) – between 145 and 155 lbs (65.7 kg and 70.3 kg).
  - Welterweight (men) – between 155 and 165 lbs (70.3 kg and 75.3 kg).
  - Middleweight (men) – between 165 and 175 lbs (75.3 kg and 79.5 kg).
  - Light Heavyweight (men) – between 175 and 185 lbs (79.5 kg and 83.9 kg).
  - Heavyweight (men) – between 185 and 205 lbs (83.9 kg and 92.9 kg).
  - Super Heavyweight (men) – With no upper weight limit.

**MMA-R&R-Weight Categories**
- Post-contest medical examination.
- Contestant shall be given a post-contest physical fitness examination by a physician appointed by the commission deems necessary to determine the post-contest physical fitness of a contestant.
- Any contestant who refuses to submit to a post-contest medical examination shall be immediately suspended for an indefinite period.

**MMA-R&R: Rounds**
- Every round is 5 minutes in duration with a one-minute rest period in-between rounds.
- Non-title matches must not exceed three rounds (The governing commission can grant dispensation for non-title five round bouts). Title matches can be sanctioned for five rounds.

**MMA-R&R-Judging Criteria**
- The two-point must system is used for all fights.
- Three judges score each round with two points to the winner and nine points or fewer to the other fighter.
- In New Jersey, the fewest points a fighter can receive is 7.
- If the round is even, both fighters receive tie points.
- Penalty points (usually one point for each offense, occasionally two points) decided by the referee are deducted from each judge’s score for that round for the offending fighter.
- At the end of the fight, each judge submits their total score for all rounds for each fighter, to determine the result by the following criteria:
  - Majority decision win: All three judges have the same fighter as the winner.
  - Majority decision win: Two judges have one fighter winning the fight and the third judge scores it a draw.
  - Split decision win: Two judges have one fighter winning the fight and the third judge has the other fighter winning it.
  - Unanimous draw: All three judges score it a draw.
  - Majority draw: Two judges score it a draw, and the third judge has a winner.
  - Split draw: One judge scores it a draw, and the other two judges have different winners.
**MMA Purpose**
- Knock out
- Choke out
- Submissions (Tap outs)
  - ~75% - choke holds
  - ~ 25% - joint locks
- Ground & pound
- TKO

**MMA-Golden Rule**
- If a fighter cannot defend himself, stop fight

**MMA-R&R-Fouls**
- As set out by the Association of Boxing Commissions:
  - Holding or grabbing the fence
  - Holding opponent's shorts or gloves
  - Butting with the head
  - Biting or spitting at an opponent
  - Hair pulling
  - Fish-hooking
  - Intentionally placing a finger into any orifice, or into any cut or laceration of an opponent
  - Eye gouging of any kind
  - Groin attacks of any kind
  - Downward pointing of elbow strikes

**MMA-R&R-Fouls**
- Small joint manipulation
  - Strikes to the spine or back of the head (see Rabbit punch)
  - Heel kicks to the kidney
  - Throat strikes of any kind, including, without limitation, grabbing the trachea
  - Clawing, pinching, twisting the flesh or grabbing the clavicle
  - Kicking the head of a grounded opponent (see Soccer kick)
  - Kneeling the head of a grounded opponent
  - Stomping on a grounded fighter

**MMA-R&R-Fouls**
- Fish-hooking

**MMA-R&R-Fouls**
- Spiking an opponent to the canvas on his or her head or neck (see Piledriver)

**MMA - Medical Issues**
- MMA fighters – 25% injured
- Lacerations – you will see blood (40-60%)
- Inside-outside burst lacerations
- Fractures (7-40%)
- Concussions (4-10%)
MMA - Medical Issues

- Lacerations – you will see blood (40-60%)

MMA fighters – 25% injured

- Fractures (7-40%)

- Concussions (4-10%)
MMA-Training Camps
- Traumas occur
- One of most dangerous times
- Microtraumas can occur with less close supervision
- Not observed as closely
- Need to keep training
- Bad partners
- 6 week camp: 36 + fights

Post MMA Fight Physical Exam
- Oftentimes difficult
- Amateur ranks – leave quickly
- Return to different countries
- Not structured teams with control over fighters

Post MMA Fight Physical Exam
- Pass neurocognitive tests
- Check hands
  - Not boxer’s fracture (Fx-4 & 5)
  - Fighter’s fractures (Fx-2 & 3)
  - Check Face
  - LE Compartment syndromes

Different Techniques
- Hand injuries

Post MMA Fight Physical Exam
- Pass neurocognitive tests
  - Check Face
Psychology
- Chen MA, Cheesman DJ. Mental toughness of mixed martial arts athletes at different levels of competition.
- Percept Motor Skills. 116(3):905-17, 2013

Gifted Athletes
- Psychological Considerations
- Many unique personalities
- "Thugs"
- Professional Athletes (other sports)
- School Teachers
- Business professionals
- USMC Silver Star Recipient

Brian Stann
USMC - Silver Star

MMA Purpose
- Knock out
- Choke out
- Submissions (Tap outs)
  - ~75% - choke holds
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- Ground & pound
- TKO

MMA-Choke Holds
- Rear naked choke

MMA-Choke Holds
- Triangle choke

MMA-Different Techniques
- Kimura
- Omopalata
- Elbow lock
- Knee Bar
- Heel lock
- Hand injuries
Different Techniques
- Kimura
- Omapalata
- Elbow lock
- Knee Bar
- Heel lock

Summary and Conclusions

Outline
- Part I: Introduction and Overview of Combat Sports (GJD-Moderator)
  - Introduction
  - Overview of Combat Sports and Martial Arts
  - Examples of many of the different types of combat sports practiced around the world.
  - Background information on selected combat sports

Speakers-Relevant Experiences for this Presentation
- LIEUTENANT COMMANDER CHARLES E. RAINEY, DSC,DPT,PT,SCS,OCS,CSCS, FAAOMPT
- MMA fighter
- Published – Articles on Epidemiological injuries in martial Arts
Speakers-Relevant Experiences for this Presentation

- Matthew Hixson, PT, SCS, CSCS
- Provides rehabilitation, strength and conditioning and performance enhancement programs for MMA fighters
Epidemiology of Mixed Martial Arts Injuries

by

LCDR Charles E. Rainey, PT, DSc, DPT, OCS, SCS, FAAOMPT
WHY DOES MY THERAPIST NEED TO KNOW ABOUT MMA?
MMA Popularity

• Fastest growing sport in the U.S.
• Most popular full-contact sport in the U.S.
• MMA is regulated in 46 states, and either pending regulation or legal without regulation in the remaining jurisdictions.
• UFC reported a 2015 $608M gross; up from a 2014 $449M gross
• Over 55 hours per month of television programming on US channels including ESPN, Fox, FSN, Spike TV, National Geographic Channel, and Discovery Channel.

What does all this mean?
More and more athletes are participating in MMA every year.
If you know MMA, they will come...
WHAT DOES THE RESEARCH SAY?
Scoggin et al  Prospective cohort study

• MMA competitions held in Hawaii from 1999 to 2006 (179 male MMA athletes; 116 bouts with 232 exposures)

• 55 injuries:
  • 51% / 28 injuries - **Abrasions/lacerations** (6 requiring on-site or ER suturing)
  • 20% / 11 injuries - **Concussions** (64% / 7 incidents caused brief (<15 sec) LOC; 36% / 4 incidents caused retrograde amnesia)
  • 20% / 11 injuries – **Orthopedic** (27% / 3 metacarpal injuries; 73% / 9 various ortho injuries to include AC separation, elbow subluxation, elbow MCL and LCL sprain, midfoot sprain, trapezius strain, Achilles tendon contusion)
  • 9% / 5 injuries – **Facial** (nasal fx, TMJ sprain, eardrum rupture)

* Contusions were not accessed in this study

- Overall, injury-per-exposure rate was 0.237 or **23.7 injuries** per 100 fight participations.
- MMA Injury rates are comparable to those in other striking combat arts, such as boxing and karate (Zazryn et al, 2003; Roh et al, 2002; Kazemi et al 2004, Muller-Rath et al, 2000; Johannsen et al, 1988)
- Results similar to Ngai et al (2008), which looked at professional MMA fights in Nevada from Mar 2005 to Sep 2007.
- Out of 635 MMA fights, 300 out of 1270 athletes suffered injury (23.6%)
- **23.6 injuries** per 100 fight participations with Facial lacerations and upper extremity injuries were the most common injuries.
Bledsoe (2006) et al Retrospective cohort study

- Professional MMA fights in Nevada from Sep 2001 to Dec 2004.
- 171 total MMA fights to 220 fighters
- 96 total injuries to 78 fighters (35.6% were injured)
- Overall injury rate: 28.6 injuries per 100 fight participations (12.5 injuries per 100 competitor rounds)
- Injury type: **Facial lacerations** (47.9%, most common), followed by **hand injury** (13.5%), **nose injury** (10.4%), and **eye injury** (8.3%).
- Other injuries: **shldr/arm/elbow** (8.3%); **knee/ankle/foot** (6.2%)
McClain (2014) et al  Prospective cohort study

• Amateur/Professional MMA fights (men/women) in Kansas/Missouri from 2008 to 2012
• 1422 fights participations / 2178 rounds of exposure
• Overall injury rate: 8.5% of fight participations (121 injuries) or 5.6% of rounds
• Injury type: lacerations/abrasions (38%, most common), followed by altered mental state* (21.5%), and fractures (16.5%)
• Injury rates were similar between men and women
• Rate of injury was 2 times higher in professionals (42 injuries/7.6%) vs. amateurs (79 injuries/4.9%)

* Based on ringside physician evaluation rather than standardized mental status markers.
Lystad (2014) et al  Systematic Review/Meta-analysis

• Inclusion: 6 studies; up to May 2013 (Bastidas et al, Bledsoe et al, Fields et al, Ngai et al, Rainey, and Scoggin et al)
• 4 retrospective cohort studies, 1 cross sectional study, 1 prospective cohort study
• Most common injured region: head (66.8%-78%), followed by wrist/hand (6%-12%).
• Most common Injury type: laceration (36.7%-59.4%), followed by fracture (7.4%-43.3%) and concussion (2%-20.4%)
• Losers incurred 3 times as many injuries as winners.
• Fighters suffering a KO or TKO incurred >2 times as many injuries vs. fighters suffering a submission loss.
Rainey (2009) Retrospective cohort study

• 55 amateur/professional fighters (male/females) from Mid-west (MO, KS, IL) over a 12-month period. Injuries accessed in training/competitions.

• Out of 207 injuries reported: head/neck/face (38.2%, most common), followed by the lower extremities (30.4%), upper extremities (22.7%), torso (8.2%), and groin (0.5%).

• Specific body region: Injuries to the nose (6.3%), shoulder (6.3%), and toe (6.3%) were the most common. Honorable mentions: eye, neck, knee, head, ear, and ankle (each ranging 4.8% to 5.8%)

• Injury Type: contusions (29.4%, most common), followed by strains (16.2%), sprains (14.9%), and abrasions (10.1%). Honorable mentions: joint trauma, fractures, and lacerations (each ranging 5.3% to 9.2%)

• Professional fighters had 3 times more injuries than amateur fighters (11.0 vs. 3.2 injuries per fighter)

• Experience level: low belt ranks suffered > 2 times higher injury rate than higher belt ranks (12.2 vs. 5.0 injuries per fighter)

• Equipment utilization in MMA training when deemed necessary by specific mode of training

• Most common protective equipment utilized:
  • Mouth guard (100%), followed by...
  • Groin protector (87.1%), MMA gloves (83.9%)
  • Hand wraps (64.5%), Shin guards (58.1%)
  • Boxing gloves (45.2%), Head gear (38.7%)
  • Knee pads (19.4%), Wrestling shoes (19.4%)

THIS POSES THE QUESTION???
Limited equipment use during training may lead to increased training and competition injuries.
Tale of the Tape

• Most Common Injury Type: Lacerations/Abrasions (37%-59%), followed by Fractures (7%-43%), Contusions (29%)* and Concussions (2%-22%)

• Most Common Injury Region: Head/Face (38-78%; includes Nose/Eye/Jaw), followed Lower Extremities (6%-30%; Toe/Ankle/Knee) and Upper Extremities (6-23%; Hand/Elbow/Shldr)
Wearing protective equipment in training when deemed necessary by specific mode of training may reduce training and competition injuries.
Why does all this research matter?

To hopefully prevent...
Thank you!
References


References – cont.


From the Foot to the Face
Mixed Martial Arts
Matt Hixon PT, SCS, CSCS

Why does it matter?

What's the point? Why does it matter?

“Therapists really don’t know what is going on.”
What is an MMA Athlete?

Cowboy?

Surfer & Model?
Strength + Power

Training Age
“I finally found a specialist who had me do full body workouts.”

Kinetic Chain

Myofascial Linkages
Roundhouse Kick

Pieces to the Puzzle
Lateral Agility

Diagonal Agility

Shadow Boxing
- Flow
- Technique
Power

Size Doesn't Matter

Triple Extension
Core
Transverse Plane

Body Control

Chop Variations
Contract Relax Push Up

Complex Training

75% 1RM
1-2 min
High Intensity Interval Training

No high level evidence!

Cleveland Clinic Special Interest Group
IT IS ALL OVER!!!

References

4. Naughten, K. et al. (2014). Effects of Lower Extremity and Trunk Muscles Recruitment on Serratus Anterior Muscle Activation in Healthy Male Adults. JOSPT, 8(7), 594-602
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