SURVIVE THE RIDE:
Motorcycle Education and Injury Prevention Program
at the University of Miami/Ryder Trauma Center

Motorcycle Crash Pre-Hospital Provider Education Program

National EMS Week 2012 Webcast
Patricia M. Byers, MD, FACS
Professor of Surgery at the University of Miami Miller School of Medicine

From: Miami

Patricia M. Byers, MD, FACS works as a trauma surgeon at the Ryder Trauma Center in Miami, Florida. Dr. Byers has always emphasized injury prevention and has served as the Florida State Trauma Medical Director and is a past Chairperson of the American College of Surgeons Florida Committee on Trauma. She is currently the principle investigator of the Motorcycle Education and Injury Prevention Program: **Survive the Ride**, a trauma center based program with secondary and tertiary prevention strategies.
Many Thanks To:

- **Center for Urban Transportation Research/University of South Florida**
  - Jennifer Iley, Kristin Larsson, Dr. Pei-Sung Lin, Dr. Chanyoung Lee

- **University of Miami/Ryder Trauma Center**
  - Tara Irani

- **Holmes Trauma Center**

- **Lakeland Trauma Center,**
  - Janine Curlutu

- **Florida Department of Health**
  - Rebecca Cash, Chief Bixler, Desi Lassiter, Dr. Joseph Nelson, Susan McDevitt

- **Florida Department of Transportation**
  - Trenda McPherson, Edith Peters

Thank you to all of our Paramedics, Telecommunicators and Pre-hospital professionals who all make Florida a safer place
Peter A. Pappas, MD, FACS

From: Melbourne

The Trauma Center at Holmes Regional Medical Center

- Peter A. Pappas, MD, FACS is a Trauma/Acute Care Surgeon and Surgical Intensivist with the Trauma Center at Holmes Regional Medical Center in Melbourne, FL, and has an active interest in telemedicine research, medical education and injury prevention.
CEUs

- All participants should have individually completed the registration form with the presurvey questions.
- The lead educator of any group viewings must submit an attendance roster to Tara Irani (Tirani@med.miami.edu) for participants to receive credit as only one IP address will register electronically.
- The post survey will need to be completed and submitted individually to receive CEU credit.
Today’s Presenters

Patricia M. Byers, MD, FACS
Peter A. Pappas, MD, FACS
Cory S. Richter, BA, NREMT-P
Olumide Sobowale, MD, FACS
Ernest Block, MD, FACS, MBA, FCCM, EMT
Cory Richter, CCEMTP
Julie L. Bacon, BA, RNC-LRN, CPEN, N-CPT
Joe A. Nelson, DO, MS, FACOEP, FACEP
LEARNING OBJECTIVES

- To understand the magnitude of the motorcycle crash injury burden in Florida
- To gain insight into prevention program components
- To appreciate the difference in injury risk in MCCs, compared to MVCs
- To know the risk factors that contribute to MCCs
- To learn about different types of MC collisions and the mechanisms of blunt injury that may occur and how they effect triage decisions
- To review some basic and advanced skills for patient stabilization
Birth of the American Biker

THE WILD ONE  1953
Marlon Brando, Mary Murphy, Lee Marvin

EASY RIDER  1969
Peter Fonda, Dennis Hopper, Jack Nicholson

Slide courtesy of Peter A. Pappas, M.D., F.A.C.S.
In 2008–9, motorcycle fatalities made up 18% of all traffic fatalities, yet motorcycles comprised only 6% of the traffic.
MOTORCYCLE SAFETY COALITION

- A FDOT MULTIDISCIPLINARY COALITION TO DECREASE THE BURDEN OF MOTORCYCLE INJURY founded in July 2008

- 5Es:
  - **Education**: Rider education, patient education
  - **Engineering**: Road engineering project
  - **Enforcement**: Motorcycle endorsements
  - **Evaluation**: Decrease in mortality statewide in 2009
  - **Encouragement**: All stakeholders involved
The SURVIVE THE RIDE Program

- A FDOT SPONSORED PROGRAM THAT IS TC BASED
- A SECONDARY PREVENTION COMPONENT TO REACH PATIENTS
- A TERTIARY PREVENTION COMPONENT TO DECREASE THE IMPACT OF INJURY
  - Pre-hospital program to improve field assessment, treatment and triage
  - Hospital program to improve assessment, stabilization and transfer when indicated
OUR GOAL IS TO PARTNER TO DECREASE MOTORCYCLE FATALITIES

- A form of **tertiary** prevention – mitigating the effect of the injury
- Expedited triage based on mechanism and injury patterns
- Directed pre-hospital therapy
- Goal directed transport to Trauma Centers based on high suspicion of injury
The Physics of Destruction

- Motorcycle affords little protection
- Built for agility – not survivability
- Motorcycle Crashes
  - 80% injury or death
- Automobile Crashes
  - 20% injury or death

NHTSA, 2005

Slide courtesy of Peter A. Pappas, M.D., F.A.C.S.
MOST CRASHES ARE MULTIFACTORIAL, PREDICTABLE AND PREVENTABLE

- **MOTORCYCLE RIDER RELATED RISKS**

- **RISKS RELATED TO OTHER MOTORISTS**

- **ROAD AND ENVIRONMENTAL CONDITIONS**

- **EQUIPMENT FAILURE**
Florida shows a higher percentage of motorcycle crashes in all vehicle crashes compared to the national trend.

This increase is not as sharp as the motorcycle registration increased and is at a reasonably stable rate given the year-round riding conditions in Florida and the appeal to motorcycling tourists from around the nation.
Florida has a **higher** percentage of motorcycle fatalities compared to all traffic fatalities.

The Florida trend is very **close** to the U.S. trend **before** the year 2000; however, **after** the helmet law change there has been an **increasing gap** between the two trends.

In 2008, the proportion of motorcycle fatalities compared to all traffic fatalities reached an all time high of 17.8 percent in Florida, compared to the national all time high of 14.2 percent.

**Percentage of Motorcycle Fatalities to All Vehicle Crash Fatalities (1991–2008)**
Prior to the 2000 law change, Florida motorcycle fatalities as a fraction of total motorcycle crashes was very close to national trend.

However, during the post law change period (2000 to 2008) there is a nearly one percent increase in the percentage of fatality-related motorcycle crashes in Florida.

This suggests that the post-law-change period witnessed a higher percentage of motorcycle-related fatalities among all motorcycle-related crashes.
Motorcycle Traffic Crash Injuries in Florida

Fatalities, Non-Fatal Hospitalizations, and Emergency Department Visits 2007–2009

Motorcycle endorsement became mandatory as of July 1, 2008

Slide courtesy of Peter A. Pappas, M.D., F.A.C.S.
Motorcycle Injuries in Florida by Residency

Fatalities, Non-Fatal Hospitalizations, and ED Visits 2007-2009

Percent by Florida Residency

Residents  Non-Residents

2007
2008
2009

Year

0% 20% 40% 60% 80% 100%

Slide courtesy of Peter A. Pappas, M.D., F.A.C.S.
Motorcycle Fatalities in Florida by Age Group and Year, 2007–2009

Motorcycle endorsement became mandatory as of July 1, 2008

Slide courtesy of Peter A. Pappas, M.D., F.A.C.S.
### Motorcycle Crash Injuries in Florida

**Non-Fatal Hospitalizations and ER Visits, 2009**

<table>
<thead>
<tr>
<th></th>
<th>Median Admission Charge</th>
<th>Total Admission Charges</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospitalizations</td>
<td>$53,613</td>
<td>&gt; $385 million</td>
</tr>
<tr>
<td>ED Visits</td>
<td>$2,891</td>
<td>&gt; $ 43 million</td>
</tr>
</tbody>
</table>

- This does not take into account years of life lost, pre-hospital expenses, rehabilitation or long term care costs
- Over 40% of motorcyclist hospitalizations and emergency department visits were **not** covered by commercial insurance.
- 17-30% of patients are under-insured or self-pay

*Slide courtesy of Peter A. Pappas, M.D., F.A.C.S.*
Types of Common Motorcycles

SPORT BIKE

CRUISER

TOURING

STANDARD
Mechanism of Injury by Blunt Trauma

- **Shear:** When the patient experiences rapid deceleration, internal organs or parts of internal organs tear
  - Diffuse axonal brain injury
  - Thoracic aortic injury
  - Renal pedicle avulsion

- **Compression:** When the patient is crushed or squeezed between objects
  - Open book pelvis fracture
  - Pulmonary and cardiac contusions
  - Intestinal, spleen, liver ruptures
Three Major Types of Motorcycle Collisions

- **Head-on Impact**: Patient is launched over handle bars
  - **Primary injury**: brain, chest, abdomen, pelvis or femurs, depending on impact with handle bars and object
  - **Secondary injury**: Ejection Impact
    - Shear and crush depending on circumstances
    - Multiple injuries common: Brain, trunk or extremities and depend on distance launched
Three major types of motorcycle collisions

- **Angular Impact**
  - Patient is crushed between motor cycle and object
  - Extremity injuries are common

- **If the rider avoids a crash by “laying down the bike”**
  - Road rash severity will depend on protective gear
  - Hand and extremity injuries can occur
Cory S. Richter, BA, NREMT–P

From: Vero Beach

Cory S. Richter, BA, NREMT-P has been in the EMS field since 1983, and currently holds the position of Battalion Chief for Indian River County Fire Rescue. Cory is very active at the state level working on various injury prevention committees and is active in the legislative process for EMS/Fire issues. Cory is the current Chairman of the Florida EMS Advisory Council and the Florida EMS Strategic Plan. Cory has been instrumental in promoting injury prevention programs throughout Florida as past Chairman of the Florida Public Injury Education & Relations Committee (PIER).
Triage of Motorcycle Crash Victims

- DOH Florida State Trauma Triage Criteria
- Any added local Trauma Triage Criteria
- Paramedic Judgment
Paramedic Judgment

- Consider single long bone fractures
- Pelvic instability or pain or tenderness
- Abdominal or chest pain or tenderness
- Rib and sternal fractures were found to have a high correlation to serious internal injuries (Kraus JF, et al. J Trauma, 52(3):548 2002)
  - More rib fractures – more internal injuries
  - Bilateral rib fractures – more internal injuries
- High speed and frontal crashes are most dangerous
Injury Patterns

- **Orthopedic**
  - Shoulder and Pelvis most at risk
- **Soft Tissue**
  - “Road rash”
- **Facial Injuries**
- **Nerve damage**
  - “Biker’s Arm”
- **Traumatic Brain Injury**

Photo and slide courtesy of Peter A. Pappas, MD, FACS.
**Assessment of Motorcycle Crash Victims: LETHAL INJURIES**

<table>
<thead>
<tr>
<th>ANATOMIC REGION INJURED</th>
<th>FATAL (%)</th>
<th>(%) INJURIES AIS&gt;3</th>
<th>NONFATAL (%)</th>
<th>(%) INJURIES AIS &gt;3</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEAD</td>
<td>56</td>
<td>73</td>
<td>26</td>
<td>61</td>
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<tr>
<td>CHEST</td>
<td>32</td>
<td>86</td>
<td>10</td>
<td>42</td>
</tr>
<tr>
<td>ABD</td>
<td>6</td>
<td>26</td>
<td>5</td>
<td>25</td>
</tr>
<tr>
<td>SPINE</td>
<td>3</td>
<td>12</td>
<td>4</td>
<td>16</td>
</tr>
<tr>
<td>EXTREM</td>
<td>4</td>
<td>39</td>
<td>51</td>
<td>37</td>
</tr>
</tbody>
</table>

Stabilization of Motorcycle Crash Victims – Airway

- Severe brain injury will compromise airway
- Without full face helmet, facial injuries are more common and may require advanced airway techniques
  - Nasal intubation is contraindicated
  - May require needle cricothyroidotomy
- Motorcycle helmets should be removed with full inline immobilization of head and neck if airway access is needed or anticipated. Refer to your agency protocol specific to motorcycle helmets.
  - High incidence of cervical spine fractures
  - May need urgent airway access
  - Refer to agency protocols
Stabilization of Motorcycle Crash Victims – Breathing

- Patients may not be breathing due to brain injury ➔ Ventilate!
- Rib fractures are common and may result in tension pneumothorax, hemothorax and lung contusion
  - Tension pneumothorax will need emergency needle decompression
  - High association with cardiac contusion, liver and spleen injuries

GIVE O₂
Stabilization of Motorcycle Crash Victims – Circulation

- Pressure dressing to scalp
- Finger point pressure to pumpers
- Tourniquet protocol for life-threatening extremity bleeding or traumatic amputation
  - Place 5 cm proximal to bleeder or amputation
  - Make sure no distal pulse is present
  - Do not loosen or remove until definitive care available (2 hrs ideal, 6 hrs if necessary)
- Wrap unstable pelvis with binder or sheet for long transports
- Do not give excessive crystalloid, systolic BP 90/p is satisfactory
Stabilization of Motorcycle Crash Victims – Disability

- GCS
- High risk for cervical spine and thoracic spine injury – maintain back board, c-collar at all times
Stabilization of Motorcycle Crash Victims – Environment

- Keep patient warm and dry
- They will most likely need massive fluid and blood transfusion
- High risk of hypothermia induced coagulopathy
  - Warm fluids
  - Warming devices
Transport to Trauma Center

- Notify receiving hospital regarding status
- Relay full historic information to Trauma Center Team
- Relate index of suspicion regarding pelvic fractures, internal injuries (exam, mechanism)
- Identify need for thoracostomy, chest tray, large bore access, blood products, warmers, OR

Together we can save lives
Olumide Sobowale, MD, FACS
Moderator: Paramedic Judgment Case Presentations

From: Lakeland

Olumide Sobowale, MD, FACS, Trauma Medical Director, Lakeland Regional Medical Center. He received his medical degree from Howard University, conducted his residency training at the University of Florida and University of Connecticut, and was awarded a Fellowship in Surgical Critical Care at Hartford Hospital. Dr. Sobowale is Board Certified in General Surgery and Surgical Critical Care. He is a member of the Executive Committee for the American College of Surgeons/Florida Committee on Trauma, a member of the Florida Department of Health Injury Prevention Advisory Council, and an Advanced Trauma Life Support Course Director.
Motorcycle Trauma: Paramedic Judgment in Action

Motorcycle Crash Case Presentations

Ernest FJ. Block, MD, FACS, FCCM, MBA, EMT
Cory Richter, CCEMPT
Peter A. Pappas, MD, FACS

National EMS Week 2012 Webcast
Ernest Block, MD, FACS, FCCM, MBA, EMT

From: Melbourne

Ernest FJ Block, MD, FACS, FCCM, MBA, EMT is medical director of the Level II Trauma Center at the Holmes Regional Medical Center in Melbourne, Florida. After receiving his medical degree from the University of Miami, Dr. Block completed a general surgery residency at Albert Einstein Medical Center in Philadelphia, Pennsylvania and then additional training in trauma and critical care at Jackson Memorial in Miami, Florida. He is a past-president of the Eastern Association for the Surgery of Trauma, Vice Chair of the Florida Committee on Trauma, and President of the American College of Surgeons Florida Chapter. In 2002, after practicing for ten years as surgeon, Dr. Block attended night school to become an EMT to better relate to the pre-hospital team that brings the trauma center its patients. He received a Masters in Business Administration from the University of Tennessee in 2007.
Case Presentations

- Patient Number 1
- Dr. Ernest FJ. Block, MD, FACS, FCCM, MBA, NAEMT
  - Trauma Medical Director, HRMC
Patient Number 1

- 42 year old female rider
- MCC
  - Hit from right side and thrown
  - Wearing a helmet
Patient No. 1

- Palm Bay E1 first to respond
  - GCS 15
  - Denied LOC
  - Complaint of abdominal pain
  - Visible road rash to extremities
- C–Spine protection initiated
- Trauma alert called
- Brevard County Rescue alerted
Patient No. 1

- On arrival of Rescue 84
  - GCS 15
  - R 20  P 92  BP 152/112
  - Persistent RUQ and right-sided chest and abdominal pain
  - Road Rash
  - Exam otherwise benign
- Transport by ground to HRMC
  - C-spine and backboard
Holmes Regional Medical Center

- Level II Trauma Center
  - Brevard County Florida
- 514 Beds
- Flagship Hospital of Health First
- Unified Trauma/Acute Care Surgery Center
On Arrival

- Hypotensive
- Tachycardic
- FAST Exam – Positive for fluid
- To OR Emergently
In the Operating Room

- Large Grade 4 Liver Laceration
- Hemoperitoneum
- Diaphragm Injury with rib fractures
- Damage Control Surgery
  - Liver packed
  - Patient to SICU
Return to OR HD No. 3

- Liver debrided
- Diaphragm Repaired
- Abdomen Closed
Patient No. 1

- Long ICU and Hospital Course
- Discharged to Rehabilitation and Home
Panel Discussion Case No. 1

Olumide Sobowale, MD, FACS

Patricia M. Byers, MD, FACS
Julie L. Bacon, BA, RNC-LRN, CPEN, N-CPT
Joe A. Nelson, DO, MS, FACOEP, FACEP
Case Presentations

- **Patient Number 2**
- **Dr. Peter A. Pappas, M.D., F.A.C.S.**
  - Trauma Surgeon HRMC
- **Cory Richter, C.C.E.M.P.T.**
  - Flight Medic for Life Star, Martin County Fire Rescue
Cory Richter, CCEMTP

From: Hobe Sound

Cory Richter, CCEMTP, Flight Medic Martin County Fire Rescue has been employed with Martin County Fire Rescue since January 2005 as a Firefighter Paramedic. In January 2008 Cory became a Field Training Instructor for new hires and paramedics. Cory started teaching EMT/Paramedic school for Indian River State College in August 2008. Currently Cory is functioning as a Flight Paramedic with Martin County Fire Rescues aero-medical program on Lifestar.
Patient Number 2

- 31 year-old female passenger
  - Thrown from motorcycle
  - No helmet
Patient No. 2

- Osceola County Fire/Rescue at scene
  - GCS 15
  - Awake and alert
  - Crying, complaining of pain “everywhere”
  - Head and left ankle most prominent
    - Small hematoma to head
    - Abrasion left ankle
Patient No. 2

- Trauma Alert called by ground rescue
  - Paramedic Discretion
  - Martin County Life Star responded
  - Airlifted to HRMC
Patient No. 2

- **Arrival at HRMC**
  - C-spine, backboard
  - Similar complaints as in field
  - Denied LOC
  - Amnestic to events
  - GCS 15, awake, alert but agitated
  - Vital signs stable
  - Scalp hematoma and left ankle pain only
Patient No. 2

- CT Brain
  - Occipital Skull Fracture with Subdural Hematoma
- Extremity X-rays
  - Left calcaneus fracture of the ankle

Peter A. Pappas, MD, FACS
Patient No. 2

- Management
  - Admission to monitored bed
  - Neurosurgery evaluation
  - Orthopedic evaluation
Patient No. 2

- Progressed without intervention
- Discharged HD no. 3
- Outpatient rehab
  - Head injury evaluation
  - No weight bearing LLE
Panel Discussion Case No. 2

Olumide Sobowale, MD, FACS

Julie L. Bacon, BA, RNC-LRN, CPEN, N-CPT

Joe A. Nelson, DO, MS, FACOEP, FACEP
Thank you for your Participation. Please Complete the Post-Survey for 2.0 CEU credits: