Sailing Injuries

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Overview

Sailing Injuries

• What injuries are most common?
• What are the most severe injuries?
• How do they occur?
• Fatalities / Case reports

Oracle pitch-poling In S.F. Bay
Sailing is Multifaceted

Solo Circumnavigation

Volvo Ocean Race

49er One Design Racing

Foiling Catamaran
## Injury Rates /1,000 Days*

<table>
<thead>
<tr>
<th>Sport</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rugby</td>
<td>69</td>
</tr>
<tr>
<td>Football</td>
<td>33</td>
</tr>
<tr>
<td>Soccer</td>
<td>18</td>
</tr>
<tr>
<td>Surfing</td>
<td>6.6</td>
</tr>
<tr>
<td>Baseball</td>
<td>5.8</td>
</tr>
<tr>
<td><strong>Sailing</strong></td>
<td><strong>0.29 – 4.6</strong>#</td>
</tr>
<tr>
<td>Tennis</td>
<td>0.2</td>
</tr>
</tbody>
</table>

#Schaefer O, *Sportverletz Sportschaden* 2000

*Or Athlete Exposures
Fatality Rate
(In USA)

Sailing
1.19 Deaths per Million sailor/days

Alpine Skiing/Snowboarding
1.06 Deaths per Million skier/days

Total Fatalities USA 2000 – 2011
271 Sailing
197 US Football

# Most Common Acute Injuries

**N = 1,226**

Top 3: Leg Contusion 11%, Hand Laceration 8%, Arm Contusion 6%

<table>
<thead>
<tr>
<th>Type</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contusion</td>
<td>40%</td>
</tr>
<tr>
<td>Laceration</td>
<td>26%</td>
</tr>
<tr>
<td>Sprain/Strain</td>
<td>17%</td>
</tr>
<tr>
<td>Fracture</td>
<td>6%</td>
</tr>
<tr>
<td>Concussion</td>
<td>2.5%</td>
</tr>
<tr>
<td>Dislocation</td>
<td>2%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Anatomic Location</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower Extremity</td>
<td>38%</td>
</tr>
<tr>
<td>Hand</td>
<td>23%</td>
</tr>
<tr>
<td>Upper Extremity</td>
<td>17%</td>
</tr>
<tr>
<td>Head/Neck</td>
<td>11%</td>
</tr>
<tr>
<td>Trunk</td>
<td>11%</td>
</tr>
</tbody>
</table>

Nathanson, Mello, Baird “Sailing Injuries and Illness – Results of an Internet-based survey” *Wild Env Med* 2010
Mechanisms of Injury

N = 1,226

- Falls 30%
  - Deck
  - Hatch, Companionway
- Lines 22%
- Hit by Object 21%
  - Boom, Spinnaker Pole
  - Clew
  - Crew mate
- Winches 8%

Poor Ergonomics

“One hand for the ship
One hand for yourself”

Nathanson, Mello, Baird “Sailing Injuries and Illness – Results of an Internet-based survey” Wild Env Med 2010
What are Contributing Factors?

N= 1,226

• Heavy Weather  23%
• Tacking        17%
• Jibing         13%
• Sail Change    12%
• Alcohol        7%

Nathanson, Mello, Baird “Sailing Injuries and Illness – Results of an Internet-based survey” Wild Env Med 2010
Injuries, Sea Sickness, and Weather
Newport to Bermuda Race 1998 - 2006

2002 race was stormy

Contusions 40% of all injuries

Clipped by spinnaker pole during jibe

Hit by Clew on foredeck
Lacerations 26% of all injuries

Puma’s Bowman Knocked over by a wave during a sail change
Cut by wind generator while removing sea weed from rudder
Hand Injuries 23% of all injuries

Another Grateful E.R. Patient
(Finger crushed in winch)

Released Spinnaker Halyard
(Not wearing gloves)

Wear sailing gloves!
Head Injuries 10% of Injuries, but 25% of all Severe Injuries

Fischer EG. “Fatal head injuries in sailing”
Seahorse Int Sail. 2001

34 Severe Head Injuries:

• > 50% fatal
• 70% caused by a “flying boom”
• Boom related injuries responsible for 80% of head-injury deaths
Sailing Fatalities
USCG Data 2000 – 2011
271 Deaths
(~23 deaths /year)

Primary Event Leading To Death

- Fall Overboard: 111
- Capsize: 78
- Departure from Vessel: 21
- Swamp/Sink: 19
- Collision: 13
- Fire/Electrocution: 5
Cause of Death

- Drowning: 198
- Trauma: 21
- Hypothermia: 11
- Cardiac Arrest: 6
- Carbon Monoxide: 4

77% Not wearing lifejacket
Primary Contributing Factors

- Weather: 51
- Alcohol: 33
- Operator Inexperience: 21
- Operator Inattention: 20
- Hazardous Waters: 13
- Equipment / Engine: 12
- Overloading: 8

35% Operator Preventable Factors
Fatal Sailing Accidents

3 Case Histories
Case #1

*Aegean*, Hunter 37’ 2011 Newport-Ensenada

- On autopilot
- Calm Night
- 5 mile visibility
- 4 – 6 foot swell
- Experienced Crew
- Next day boat wreckage debris found
- 3 of 4 bodies recovered
Aegean Newport-Ensenada

- Inadequate Lookout
- Poor Navigation
- ? Set waypoint for Ensenada
- No Lifejackets
Case #2
ABN Amro Two, 2006 Volvo Ocean Race

- North Atlantic
- Wind speed 20 – 25 knots
- Boat speed 20+ knots downwind
- 15 foot seas
- Trimming Asymmetrical Chute
- Night

Hans Horroevets
ABN Amro Two

- “Stuffed” bow
- No Harness
- Swept overboard
- Water Temp 55° F
- GPS triggered
- Spinnaker doused
- Retrieved 40 minutes later - pulseless

“Stuffing” the bow on Groupama a Volvo 70
Case #3

*Wingnuts, Kiwi 35  Chicago – Mackinac Race*

- Severe Thunderstorms forecast....
- Crew is well prepared, drops mainsail
- All crew harnessed & tethered
- Squall with wind gusts 60 mph, lightning
• Poor lateral stability boat capsizes
• 2 Tethered crew could not free themselves - drowned
• Other crew cut free using single-hand-opening knives
• Whistles worked to alert rescuers
Summary

• Though sailing has a low injury rate, the fatality rate is on-par with other extreme sports
• Most Common: Contusions and Lacerations
• Most Severe: Head and Hand injuries
• Alcohol, High Winds/Seas risk factors
• Falls overboard often result in fatal drowning
Questions / Comments

“Il Mostro”, built in Bristol, RI
Case #4
Low Speed Chase, 2011 Farallon Island Race
Low Speed Chase
2011 Farallon Island Race

- Reaching off a lee shore
- 20 – 25 knots, in control
- 10 – 12+ foot swells
- 120 yards upwind of whitewater
- Hit by “Giant Cresting Wave”
- 7 Crew washed overboard
- Boat got rolled
Low Speed Chase, 2011 Farallon Island Race

- No one was clipped in
- Fallacy: “I’ll clip in when I need to clip in”

- Sailor managing to hold onto boat to shore survived
- 2 Survivors in water wearing lifejackets survived
What Types Of Injuries Most Severe?  

N = 70

- **Head/Face** 25%
  - Laceration
  - Concussion
  - Fracture

- **Leg/Foot** 20%
  - Laceration
  - Fracture

- **Hand** 10%
  - Fracture
  - Finger Amputation, Dislocation

Puma’s Bowman knocked over by a wave, struck shroud.
Where do Injuries Occur?
(N = 1,228)

- Cockpit: 46%
- Amidships: 22%
- Foredeck: 25%
- Below deck: 3%
- Off boat: 1%
Severe Injuries (N = 70)
“Hospitalized and/or Evacuated”

Injury Patterns:

- Planned or accidental high-wind jibes, sailor struck by boom, mainsheet, or spinnaker pole
- Collisions with other boats
- Catastrophic rig failure – high wind
- Falls down companionway or through open hatch
- Burns when cooking
What **Activities** Result In Injury?

N = 1,226

- Tailing /Grinding 19%
- Sail change 18%
- Tacking 17%
- Walking 8%
- Helm 8%

Crushed in winch