Injury and Illness Surveillance of Sailors at:

43rd ISAF Youth Sailing World Championship 2013

&

ISAF World Championship, Santander 2014

MARITIME HEALTH IN OCEANIC & OFF-SHORE RACING MEETING

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Funding & Authors

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Outline

• Background
• Objectives
• Study Design
• Results
• Discussion
• Recommendations
• Questions
Background - Pilot Study

• Poster at 2011 ACSM Annual Meeting

• Pilot study – March 2010

• 143 sailors from 8 MNAs – Olympic Class Sailors

• 1 month retrospective questionnaire

• Administered by MNA Doctor
Background - Pilot Study

Summary of findings:

• Injury rate **0.53 injuries per 1000 sailing hours**

• Elite adult sailors reported mainly **overuse injuries of the lower back and knee**
Current Study Objectives

• To identify the common sailing injuries and illnesses among competitive sailors participating in the Youth Sailing World Championship and Santander World Championship.

• To identify risk factors for injury in sailing

• To compare our findings in youth sailors into adult Olympic sailors.
Study Design

• **Retrospective** cross-sectional study

• **12 month** Injury & Illness Recall Questionnaire

• Study population:
  – Sailors participating in the ISAF Youth Sailing World Championships 2013 (Cyprus)
  – Sailors participating in the ISAF World Sailing Championships 2014 (Santander)
43rd ISAF Youth Sailing World Championship 2013

• Limassol, Cyprus
• 13 to 20 July 2013
• 358 youth sailors; 61 MNAs/Countries
• Springboard for Olympic classes

2013 Classes:
Laser Radial – Boys and Girls (same as Laser Olympic class)
420 – Boys and Girls (similar to 470 Olympic class)
RS:X – Boys and Girls (same as RSX Olympic class)
29er – mixed (similar to 49er Olympic class)
SL16 – mixed (similar to Nacra olympic class)
Sailing Classes

Laser Radial (same boat as Olympic Class) Dinghy

420 (similar to Olympic class 470) Dinghy, 2-person
Sailing Classes

RS:X (same as Olympic RSX)
Windsurf

29er (similar to Olympic 49er)
Skiff, 2-person
Sailing Classes

SL16 (similar to Nacra Olympic class)
Multi-hull, 2-person
Injury and Illness Definitions

• Sailors were asked to recall any injuries or illnesses in the past 12 months which arose from sailing.

• Injury details:
  – No. of injuries
  – Site; Type; Cause of Injury
  – Treatment
  – Days lost

• Sailing-specific questions:
  – Mechanism; Contributing factors; Part of boat
Results – Response Rate

May / Jun 2013
- Letter sent to MNAs
- Reminder sent

Jun – Aug 2013
- Online Questionnaire (70 [24%] respondents)
- Scanned Questionnaire

Youth Worlds (Jul 2013)
- Face to face Interviews
- Clarification

Response rate
- 287 out of 358 sailors [80%]
- 55 out of 61 countries [90%]

Note: for some countries, not all sailors responded
Injury and Illness Surveillance of Athletes at the 43rd ISAF Youth Sailing World Championship 2013 (12-month Recall Questionnaire)

This is a retrospective recall questionnaire on the occurrence of injury and illness in the past 12 months before the ISAF Youth Sailing World Championships, and the results will help the ISAF Medical Committee understand the injury patterns among our elite youth sailors.

Target sailors:
Participants in the 43rd ISAF Youth Sailing World Championship 2013, Limassol, Cyprus

Who should fill out this form:
The MNA Medical Officers or Medical Team Personnel, should fill out this questionnaire. In consultation with the sailor(s)

Confidentiality
The information you key in here will be kept confidential and the sailors’ names and ISAF ID will not be entered into the injury and illness database. The information will be used for the purpose of compiling the incidence of sailing injuries only, and will not be used for any other purposes.

Sailor’s Name

ISAF Sailor Number

Country

Home Port

Age (years)

Date of birth (dd/mm/yy)

Gender

Class (for the ISAF Youth Sailing World Championship 2013)
- Laser Radial
- 420
- RS:X
- 29er
- 49er

Position
- Helm
- Crew
Injury and Illness Patterns in Competitive Sailors of the 43rd ISAF Youth Sailing World Championship - a 12-month retrospective study

Online Version

• Go to [live form](#) (click to view)

<table>
<thead>
<tr>
<th>Question</th>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of years in non-competitive sailing</td>
<td></td>
</tr>
<tr>
<td>Number of years in competitive sailing</td>
<td></td>
</tr>
<tr>
<td>In the last 12 months, what is your duration on-water sailing season (months)?</td>
<td></td>
</tr>
<tr>
<td>In the last 12 months, what is your estimated on-water training hours per week during the sailing season?</td>
<td></td>
</tr>
<tr>
<td>Duration of dry-land training period (months)</td>
<td></td>
</tr>
<tr>
<td>Estimated dry-land training hours per week during dry-land training periods</td>
<td></td>
</tr>
<tr>
<td>Do you compete in any other sports besides sailing?</td>
<td>Yes, No</td>
</tr>
<tr>
<td>If the answer to previous question is yes, which sport(s)?</td>
<td></td>
</tr>
<tr>
<td>How much of the time do you use sunscreen when sailing?</td>
<td>0 - 25 %, 25 - 50 %, 50 - 75 %, 75 - 100 %</td>
</tr>
<tr>
<td>How much of the time do you use a life jacket when sailing?</td>
<td>0 - 25 %, 25 - 50 %, 50 - 76 %, 76 - 100 %</td>
</tr>
<tr>
<td>In the last 12 months, have you taken cannabis, hashish or marijuana?</td>
<td>Yes, No</td>
</tr>
<tr>
<td>In the past 12 months, were you suffering from any injuries not arising from sailing?</td>
<td>Yes, No</td>
</tr>
<tr>
<td>In the past 12 months, were you suffering from any injuries arising from sailing?</td>
<td>Yes</td>
</tr>
</tbody>
</table>
# Demographics

<table>
<thead>
<tr>
<th></th>
<th>All (287)</th>
<th>Injured (50)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean Age (yr)</td>
<td>16.7</td>
<td>16.7</td>
</tr>
<tr>
<td>Gender (Male %)</td>
<td>62%</td>
<td>54%</td>
</tr>
<tr>
<td>Participation in other sport</td>
<td>27%</td>
<td>20%</td>
</tr>
<tr>
<td>Sunscreen use</td>
<td></td>
<td></td>
</tr>
<tr>
<td>75 – 100% of the time</td>
<td>29%</td>
<td>38%</td>
</tr>
<tr>
<td>Life jacket use</td>
<td></td>
<td></td>
</tr>
<tr>
<td>75 – 100% of the time</td>
<td>91%</td>
<td>90%</td>
</tr>
</tbody>
</table>
# Demographics

<table>
<thead>
<tr>
<th></th>
<th>All (287)</th>
<th>Injured (50)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Years in <strong>competitive</strong> sailing</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td><strong>Non-competitive</strong> (yr)</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td><strong>Sailing hours</strong> (per year)</td>
<td>500</td>
<td>521</td>
</tr>
<tr>
<td><strong>Recreational drug use</strong></td>
<td>1%</td>
<td>2%</td>
</tr>
</tbody>
</table>
Results – Injury Prevalence

• 50 sailors (17%) reported 60 injuries
  – Multiple injuries – 8 sailors had 2 injuries, 1 had 3 injuries
• 0.42 injuries per 1000 sailing hours
• 0.21 injuries per sailor
## Injury & Illness Reporting

*Total number = 287 sailors*

*Percentages are of each sailing class*

<table>
<thead>
<tr>
<th>Class (No.)</th>
<th>All (287)</th>
<th>Laser R (82)</th>
<th>420 (95)</th>
<th>RS:X (41)</th>
<th>29er (46)</th>
<th>SL16 (23)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injury related to sailing</td>
<td>50 17%</td>
<td>14 17%</td>
<td>13 14%</td>
<td>7 17%</td>
<td>10 22%</td>
<td>6 26%</td>
</tr>
<tr>
<td>Injury not related to sailing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Illness related to sailing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Illness not related to sailing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Site of Injury

- Lower back: 24%
- Knee: 18%
- Ankle: 9%

Bar chart showing the distribution of injuries with the highest percentage occurring in the lower back.
Type of Injury

<table>
<thead>
<tr>
<th>Injury Type</th>
<th>No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concussion</td>
<td>1</td>
</tr>
<tr>
<td>Fracture</td>
<td>3</td>
</tr>
<tr>
<td>Stress Fracture</td>
<td>2</td>
</tr>
<tr>
<td>Dislocation / Subluxation</td>
<td>2</td>
</tr>
<tr>
<td>Ligament Rupture</td>
<td>2</td>
</tr>
<tr>
<td>Sprain</td>
<td>13</td>
</tr>
<tr>
<td>Muscle strain / tear</td>
<td>4</td>
</tr>
<tr>
<td>Contusion / Haematoma</td>
<td>5</td>
</tr>
<tr>
<td>Tendinosis / Tendinopathy</td>
<td>2</td>
</tr>
<tr>
<td>Arthritis</td>
<td>1</td>
</tr>
<tr>
<td>Laceration / Abrasion</td>
<td>1</td>
</tr>
<tr>
<td>Muscle Cramp / Spasm</td>
<td>10</td>
</tr>
<tr>
<td>MSK LBP</td>
<td>4</td>
</tr>
<tr>
<td>Apophysitis</td>
<td>1</td>
</tr>
<tr>
<td>Spondylolisthesis</td>
<td>2</td>
</tr>
<tr>
<td>Patellofemoral Pain</td>
<td>1</td>
</tr>
</tbody>
</table>
Injury by Site & Type

**Lower back**
- Muscle cramp/spasm – 19%
- MSK pain – 9.7%
- Strain – 9.7%
- Sprain – 6.5%

**Knee**
- Strain – 9.7%
- Sprain – 9.7%
- Muscle cramp/spasm – 6.5%

**Ankle**
- Sprain – 9.7%
- Strain – 3.2%

**Foot/toe**
- Sprain – 6.5%
- Strain – 3.2%
# Injury – Top 3 Causes

<table>
<thead>
<tr>
<th>Cause</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overuse (Gradual)</td>
<td>26</td>
<td>43%</td>
</tr>
<tr>
<td>Contact with stagnant object</td>
<td>16</td>
<td>26%</td>
</tr>
<tr>
<td>Overuse (Sudden)</td>
<td>6</td>
<td>10%</td>
</tr>
</tbody>
</table>
### Sailing-specific - Mechanism

<table>
<thead>
<tr>
<th>Mechanism</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hit part of boat</td>
<td>14</td>
<td>47%</td>
</tr>
<tr>
<td>Hit by object</td>
<td>4</td>
<td>7%</td>
</tr>
<tr>
<td>Trip/fall</td>
<td>2</td>
<td>3%</td>
</tr>
</tbody>
</table>

*Other answers: fall overboard, hiking, trapezing, pumping, hyperextension, gym exercise*
### Sailing-specific – Contributing Factor

<table>
<thead>
<tr>
<th>Contributing Factor</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heavy weather</td>
<td>23</td>
<td>38%</td>
</tr>
<tr>
<td>Fatigue</td>
<td>16</td>
<td>27%</td>
</tr>
<tr>
<td>Planned jibe</td>
<td>3</td>
<td>5%</td>
</tr>
<tr>
<td>Tack</td>
<td>3</td>
<td>5%</td>
</tr>
</tbody>
</table>

Other answers: capsized, sail change, equipment failure, docking, ground, light winds, long session, overtraining, weak back, trimming
Part of boat associated with Injury

(30 Dinghies)

- Mast – 1 (3%)
- Forestay – 1 (3%)
- Trapeze – 2 (7%)
- Deck – 1 (3%)
- Center/daggerboard – 1 (3%)
- Sheets/lines – 3 (10%)
- Hiking straps – 2 (7%)
- Boom – 1 (3%)
- Other boat – 1 (3%)
- Traveling bar – 1 (3%)
- Daggerboard case – 1 (3%)
- Not applicable – 16 (53%)

Ivy and Illness Patterns in Competitive Sailors of the 43rd ISAF Youth Sailing World Championship - a 12-month retrospective study
Severity of Injuries

• Out of the 60 injuries reported, 32 injuries (53%) required rest from sailing

• The rest period ranged from 1 to 183 days

• 24 reported that they were still suffering from the injury
Severity of Injuries

Slight = 0 days; Minimal = 1-3; Minor = 4-7; Moderate = 8-21; Severe >21
(Neville & Folland 2009)
## Illnesses

9 sailors (3%) reported 9 sailing-related illnesses

<table>
<thead>
<tr>
<th>Variable</th>
<th>No.</th>
<th>Variable</th>
<th>No.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>System</strong></td>
<td></td>
<td><strong>Treatment</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Dermatologic</strong></td>
<td>4 (44%)</td>
<td><strong>Sought med care</strong></td>
<td>5 (56%)</td>
</tr>
<tr>
<td><strong>Gastrointestinal</strong></td>
<td>2 (22%)</td>
<td><strong>Self-medicate</strong></td>
<td>2 (22%)</td>
</tr>
<tr>
<td><strong>Symptom (can be &gt;1)</strong></td>
<td></td>
<td><strong>None</strong></td>
<td>2 (22%)</td>
</tr>
<tr>
<td><strong>Sunburn</strong></td>
<td>3 (27%)</td>
<td><strong>Stopped sailing</strong></td>
<td>6</td>
</tr>
<tr>
<td><strong>Pain</strong></td>
<td>2 (18%)</td>
<td><strong>No</strong></td>
<td>3</td>
</tr>
<tr>
<td><strong>Other symptoms:</strong></td>
<td></td>
<td><strong>Yes</strong></td>
<td>20 days</td>
</tr>
<tr>
<td>Palpitations, dehydration, fever, rash, joint stiffness</td>
<td></td>
<td><strong>Duration</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Still suffering</strong></td>
<td></td>
<td><strong>Yes</strong></td>
<td>2</td>
</tr>
</tbody>
</table>
## Comparison with other sports

<table>
<thead>
<tr>
<th>Sport</th>
<th>Sailing</th>
<th>Sailing</th>
<th>Football</th>
<th>Swimming</th>
<th>Tennis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level</td>
<td>International</td>
<td>International</td>
<td>National France</td>
<td>National Finland</td>
<td>National Denmark</td>
</tr>
<tr>
<td>Youth</td>
<td>Adult</td>
<td>Youth</td>
<td>Adult</td>
<td>Adult</td>
<td>Adult</td>
</tr>
<tr>
<td>Injury rate (per 1000 exposure hr)</td>
<td>0.42</td>
<td>0.53</td>
<td>4.8</td>
<td>1.1</td>
<td>2.3</td>
</tr>
</tbody>
</table>

Our study

Pilot study (2010)
Findings & Recommendations

• Compared to adult sailors, a higher proportion of youth sailors required rest from sailing, although they had less injury per 1000 sailing hours → impact on recovery strategies

• Further studies
  – Time-loss from sailing due to injury
  – The effect of non-sailing related injuries on sailing
Limitations

• Mostly **answered by sailors** themselves
  – Not assisted by MNA medical officer
  – If assisted → coach or delegation I/C
  – Researchers on the ground had the chance to help answer queries, and to clarify with the sailors

• Some sailors actually train & compete in a **different class from the youth worlds’ class**

At the ISAF World Championship most of the surveys were conducted WITH the researchers (doctors)
Summary

• Competitive youth sailors report mainly overuse lower back and knee injuries, similar to adult sailors.

• Compared to adult sailors, a higher proportion of youth sailors required rest from sailing, although they had less injury per 1000 sailing hours.

• A small number of illnesses were mainly skin conditions related to environmental causes.

We have conducted the same study with Olympic sailors during Santander World Championships 2014. Results coming soon.
References


Muchas gracias

Thank you