UPPER RESPIRATORY SYMPTOMS IN YOUNG ELITE FEMALE GYMNASTS

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INTRODUCTION – METHODS – RESULTS - CONCLUSION

Elite sports performance

Optimal balance

Training Load  Recovery

Performance decrements
Upper Respiratory Tract Infections / Symptoms (URTI’s/URS): most frequent illnesses in athletes

Risk factors:
- Exercise intensity/ training volume\(^1\), elite\(^2\)?
- Periods of hard training\(^3\)
- Periods of competition
  - 4 week tournaments: incidence of 6-17\(^%\)\(^4\)
  - \(\varphi > \varrho\)\(^4\)
    - After endurance events\(^5\)

Immunoglobulin A (IgA) = marker of mucosal immune system
- Lower values \(\rightarrow\) Higher infection odds\(^6\)

**AIMS**

1. To map the incidence of URS in a non-endurance sport as gymnastics.
2. To determine to which extent Immunoglobulin A (IgA) can be associated with URS in young elite female gymnasts.

\(^1\)Nieman, 1994; \(^2\)Malm, 2006; \(^3\)Svendsen et al., 2015; \(^4\)Schwellnus et al., 2016; \(^5\)Nieman et al., 2006; \(^6\)Fahlman & Engels, 2005.
Measurements

**Health and fatigue questionnaire**
- **Health and fatigue questionnaire**
  - Sore throat, mucus in the throat, runny nose, coughing, repeatedly sneezing, fever, joint aches, weakness, headache, loss of sleep
  - Severity of symptoms
    - Normal training regime (scored as 1),
    - Adapted training regime (scored as 2),
    - No training (scored as 3)
  - Doctor visits, medication use, allergy
  - VAS scale fatigue & Rested scale (worse than normal (scored as -1), normal (scored as 0), better than normal (scored as 1))

**Saliva collection and dimensions (ELISA)**
- Saliva flow rate (mL · min⁻¹)
- Absolute IgA concentration (µg · ml⁻¹)
- IgA secretion rate (µg · min⁻¹)
- Relative IgA value (%)

Subjects: 18 🌐
- **Age (years old)**: 16.6 ± 3.4
- **Height (m)**: 1.54 ± 0.07
- **Body weight (kg)**: 46.5 ± 6.7
- **VO₂max (ml·min⁻¹·kg⁻¹)**: 52.09 ± 4.63
- **Training volume (hours/week)**: 30.7 ± 1.7

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**Procedures**

- **36 h before collection**
- **Arrival at training**
- **10 min after drinking water**

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56 weeks: before every first training of the week

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Gleeson et al., 2012.
1. Descriptive values

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Mean per gymnast ± SD</th>
<th>Min : Max</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saliva flow rate (mL·min⁻¹)</td>
<td>0.99 ± 0.62</td>
<td>0.05 : 4.87</td>
<td>0.95 : 1.04</td>
</tr>
<tr>
<td>Absolute IgA (μg·mL⁻¹)</td>
<td>128 ± 75</td>
<td>6 : 607</td>
<td>122 : 134</td>
</tr>
<tr>
<td>IgA secretion rate (μg·min⁻¹)</td>
<td>116 ± 88</td>
<td>2 : 679</td>
<td>109 : 122</td>
</tr>
<tr>
<td>Relative IgA (%)</td>
<td>100 ± 48</td>
<td>4 : 336</td>
<td>97 : 104</td>
</tr>
<tr>
<td>Weekly URS (#)</td>
<td>2.72 ± 5.95</td>
<td>0 : 78</td>
<td>2.26 : 3.17</td>
</tr>
<tr>
<td>Weekly URS episodes (#)</td>
<td>0.06 ± 0.24</td>
<td>0 : 1</td>
<td>0.04 : 0.08</td>
</tr>
<tr>
<td>Fatigue score (-1/0/1)</td>
<td>0.00 ± 0.33</td>
<td>-1 : 1</td>
<td>-0.02 : 0.03</td>
</tr>
<tr>
<td>Rested VAS (/10)</td>
<td>5.55 ± 1.22</td>
<td>0.50 : 9.60</td>
<td>5.42 : 5.69</td>
</tr>
</tbody>
</table>
2. Regressions

\[ R^2 = 0.3671 \]

\[ R = -0.606 \]
\[ P = 0.022 \]

\[ R^2 = 0.4825 \]

\[ R = -0.695 \]
\[ P = 0.006 \]
3. Crosstabs

- $P = 0.847$

- $P = 0.927$
4. Differences

\[ P = 0.579 \]

\[ P = 0.002 \]

*\( P < 0.05 \)
4. Differences

\[ P = 0.535 \]

\[ P = 0.652 \]
1. IgA  ≈ Adult sailors\textsuperscript{8}
= Adult endurance athletes\textsuperscript{9}

2. Gymnasts with lower Rel IgA values are more susceptible to URS

3. Rel IgA values show significant differences between the seasons, without differences in URS

→ IgA is associated with URS in elite female gymnasts
→ IgA is not sensitive enough to predict URS in elite female gymnasts

\textsuperscript{8}Neville et al., 2008; \textsuperscript{9}Nieman et al., 2006.
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