Attributes of the cabin environment of commercial aircrafts

- the air pressure of the cabin at cruising altitude is lower than on sea (ground) level – reduced air pressure
- consequently, the partial pressure of the oxygen is much lower, than on sea level (Boyle’s law)
- the humidity in the cabin is much more lower than on the street
- the number of air contaminating particulates of the cabin are high
- movement restrictions
- high occupant density, crowd
- noise, vibration, frekvent a sudden elevating and descending movement

Biophysical changes during travel by commercial flight

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Values on sea level</th>
<th>Values on cruising speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oxygen in air</td>
<td>21%</td>
<td>15%</td>
</tr>
<tr>
<td>Partial oxygen pressure (PaO2)</td>
<td>13 Kpa</td>
<td>8 Kpa</td>
</tr>
<tr>
<td>Hemoglobin oxygen saturation (SaO2)</td>
<td>98%</td>
<td>78%</td>
</tr>
<tr>
<td>Air extension</td>
<td>0</td>
<td>25% (5 x dilatation)</td>
</tr>
<tr>
<td>Humidity</td>
<td>40 – 60%</td>
<td>5 – 15%</td>
</tr>
</tbody>
</table>

Parameter changes of inhaled air relating to the altitude

- The air pressure is decreasing
- The altitude is increasing

- take off
- ascending
- cruising altitude
- descending
- landing
Cabin pressure change

A shape of a bottle at sea level. The bottle was closed up at cruising altitude.

BARODONTALGIA

1. Gingival Abscess - pain in ascent
2. Root Abscess - pain in ascent
3. Swollen Pulp due to a Cavity or Dental Work - pain in ascent
4. Swollen Maxillary Sinus - pain in ascent or descent

Barodontalgia can pose a serious safety risk to divers, submariners, pilots and airline passengers*.

The humidity percentage can be controlled by the pilots.

Contact lenses became dry, therefore go for spectacles onboard.

Optimal humidity 40 – 60%

Moisturise
Air onboard is normally dry. Use a skin moisturiser.

No contacts
Avoid wearing contact lenses. Go for spectacles onboard.

Humidity in the cabin 20 – 30%
The sharp bulge of the popliteal vein made the circulation slow and may facilitate the development of deep vein thrombosis.

Decreasing of space for the travelers’ leg in the aircraft cabin (in inch)

**PREVENTION OF AIR SICKNESS:**
- Choosing a window seat with a view of the ground of lower clouds, such that motion can be detected.
- Choosing seats with the smoothest ride in regards to pitch (the seats over the wings in an airplane).
- Sitting facing forward while focusing on distant objects rather than trying to read or look at something inside the airplane.
- Eating dry crackers, and eat normal portion. No alcohol. Empty belly is more sensitive to the nausea.
- Use oxygen flow over the seat.
- Use medications such as antivertiginoses diphenhydramine.
Meningococcus infections

- 2 neighborhood persons

TBC infections

- 8 persons around

SARS, H1N1 infections

- all passengers!


Dr. Carlo Urbani, who discovered and identified the SARS as a highly contagious illness. He lived 46 years.

1956 - 2003

Carlo Urbani was an Italian doctor and microbiologist and the first to identify severe acute respiratory syndrome as a new and dangerously contagious viral disease. Although he himself became infected and died, his early warning to the World Health Organization (WHO) touched off a massive response that helped save the lives of millions of people around the world.

Travel related stress – air rage
Disruptive passenger incidents*

Contraindications of air - travel 1.

• newborns: in the first 2 days immediately after the delivery, after one-week after birth if it’s necessary (the airlines’ rules can be different)
• pregnancy: from 36th. week of pregnancy when the labour is the first; from 32th. week of pregnancy when the woman has already underwent a childbirth
• patient with communicable diseases
• patient with acut psychosis
• divers: within 24 hours of last ascent
• decompression injury

Contraindications of air - travel 2.

• Preexisting diseases:
  acut angina pectoris, or/and effort angina,
  anemia
  dyspnea, shortness of breath, severe pulmonary diseases
• acute illnesses
  increased brain pressure (due to trauma, infection or brain accident)
  acute myocardial infarction, acut coronaria syndrome
  danger of air trapping: after operations or trauma (opening the abdominal/thoracic cavity; craniofacial injuries, injury of the eye; eye-opening operations; operation of the skull
  pneumo/hemothorax

* Air Canada presentation: Safety Management Systems retr: 2014.03.