High Altitude Exercise
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Physiological Responses to High Altitude:
• ↓ Exercise Capacity (VO2 max)
• ↑ Resting/SubMax Heart Rate
• ↑ Resting/SubMax Rate & Volume of Breath (Ventilation)
• ↓ Oxygen Uptake to muscles

Dangers with Altitude:
Acute Mountain Sickness (AMS)- rapid ascent which results in nausea, vomiting, shortness of breath and trouble sleeping usually occurring to 6-96 hr

High Altitude Pulmonary Edema (HAPE)- rapid ascent above 2,700m (8,858 ft) that causes accumulation of fluid in lungs and interrupts breathing. Symptoms include shortness of breath, excessive fatigue, blue lips/fingernails

High Altitude Cerebral Edema (HACE)- usually occurs above 4,300m (14,108ft) that causes accumulation in the cranial cavity resulting in mental confusion, progressing to coma and death

Prevention of AMS:
• NO rapid ascent
• Avoid heavy physical activity for the first 24-48 hrs
• Stay hydrated

Important Altitude Information:
• Increasing altitude results in less oxygen per breath of air
• The thinner air provides less aerodynamic resistance and less gravitational pull, which could result in faster speeds
• Age is not a barrier to exercising at altitude but physical fitness level is
• Superior physical fitness or good health doesn’t make anyone less likely to get AMS
• Rapid ascent is the key factor to AMS

Acclimatization- process in which the body makes a series of physiological changes that increase delivery of oxygen to rest of body

Effects of Acclimatization:
• ↑ Oxygen delivery to muscles
• ↑ Red Blood Cells

• Allow 2 weeks for Acclimatization for competition at altitude
• Increase exercise: recovery ratios

Effects of Altitude in Different Winter Sports:
“Very High Speed Sports”
• ↓ Resistance/Drag
• Increased speeds and maneuverability

Examples of increased performance: short/long speed track speed skating, alpine skiing events (downhill, super G), and sledding events (bobsled, luge skeleton)

“High Speed Sports+Skill Component”
• ↓ Resistance/Drag
• Negative effects on motor performance and task completion

Examples of decreased performance: ski jumping, hockey, shooting in biathlon jumping in figure skating