Course 10

Specific health considerations according to population

Learning objectives of the course

Upon completion of this course, the student will be able to:

- ✓ Adapt prevention and monitoring to the physiological specificities of the female athlete (menstrual cycle, triad, pregnancy).
- ✓ Identify the risks related to growth and maturation in children and adolescents.
- ✓ Propose suitable activities for veteran athletes (>50-60 years) taking into account cardiovascular and joint issues.
- ✓ Know the precautions and benefits of sport for people with chronic diseases (diabetes, asthma, epilepsy, heart disease).
- ✓ Know how to refer to appropriate health professionals.

Introduction

The same training session does not suit everyone. Age, sex, hormonal status, medical history and chronic diseases require individualised adaptation.

The coach must know these specificities to:

- Prevent specific risks (stress fractures in women, growth-related injuries in children, cardiovascular events in veterans).
- Promote long-term health.
- Work in collaboration with primary care physicians, gynaecologists, paediatricians, endocrinologists.

1. Female athlete

1.1 Physiological specificities

Domain	Female particularity	Implication for training
Menstrual cycle	Hormonal variations (oestrogens, progesterone) over 28 days	Possible performance impact, increased ligament injury risk (pre-ovulatory phase)
Muscle mass	Lower than males (lower testosterone)	Lower maximal power and strength for same mass
Bone density	Earlier peak, higher osteoporosis risk	Importance of weight-bearing sport (running, jumping)
Iron	Menstrual losses → deficiency risk	Fatigue, decreased VO_2max; ferritin screening

1.2 Menstrual cycle and performance

Oestrogens may have a muscle-protective effect (less damage) but may increase ligament laxity (theory, still debated). Some studies show more anterior cruciate ligament (ACL) ruptures in the pre-ovulatory phase (high oestrogens).

Advice:

- Do not stigmatise menstruation; normalise the discussion.
- Offer adaptations if bothersome symptoms (pain, fatigue).
- Encourage cycle tracking (apps).

1.3 Female athlete triad and RED-S (already seen in Course 8)

Triad: eating disorders + amenorrhoea + osteoporosis.

RED-S (Relative Energy Deficiency in Sport): broader concept including males.

Warning signs in female athletes:

- Absence of periods >3 months (excluding contraception)
- Repeated stress fractures
- Weight loss or low weight
- Food obsession
- **Action**: medical assessment (hormonal assays, bone densitometry), nutritionist consultation, training reduction if necessary.

1.4 Pregnancy and physical activity

Recommendations (CNGOF, ACOG):

- Moderate physical activity recommended (30 min/day) for uncomplicated pregnancies.
- Benefits: prevention of gestational diabetes, better weight control, reduction of low back pain.

Contraindications for PA during pregnancy:

- **Absolute**: ruptured membranes, severe pre-eclampsia, placenta praevia, preterm labour.
- **Relative** (medical advice): severe anaemia, uncontrolled heart disease, high-risk multiple pregnancy.

Adaptations for the coach (if supervising a pregnant woman):

- Avoid sports with risk of impact (skiing, horse riding, contact team sports).
- Avoid hyperthermic exertion (no intense sport in the heat).
- Avoid strict supine position after first trimester (venous return).
- Moderate intensity (able to hold a conversation).
- Strengthen pelvic floor muscles.
- Postpartum return: generally around 6 weeks (vaginal delivery) or 8-12 weeks (caesarean section), with prior perineal rehabilitation.

2. Young athletes (children and adolescents)

2.1 Physiological specificities related to growth

Particularity	Consequence
Growth cartilage (physis) present	Traumatic injuries can affect growth plates (e.g., Salter-Harris fracture)
Neuromuscular immaturity	Less fine coordination, higher fall risk
More elastic tendon tissue	Fewer tendinopathies, but more apophysitis
Less efficient thermoregulation	Higher risk of hyperthermia
Immature cardiovascular system	Training adaptations similar to adults but with cautious progression

2.2 Specific pathologies of the young athlete (apophysitis)

Pathology	Location	Typical age	Causal sport	Management
Osgood-Schlatter disease	Tibial tuberosity (knee)	10-15 y	Jumping, football, basketball	Relative rest, ice, hamstring strengthening
Sever disease	Calcaneus (heel)	8-12 y	Running, football, gymnastics	Heel raise, triceps surae stretching
Sinding-Larsen-Johansson disease	Inferior pole of patella	10-13 y	Jumping	Similar to Osgood-Schlatter

General rule: tendon insertion pain in a child = do not ignore. Reduce load, consult a doctor.

2.3 Risks of early specialisation

Specialising in a single sport before age 12-14 increases the risk of overuse injuries and psychological burnout.

International recommendations:

- Multi-sports until adolescence.
- Encourage at least two complementary sports.
- **Limit volume**: no more training hours per week than age in years (e.g., 12 years → 12 h/week max).

2.4 Prevention of head injuries

In children, concussion heals more slowly. Return-to-play protocols are stricter (prolonged cognitive rest, mandatory medical clearance).

3. Veteran athletes (>50-60 years)

3.1 Benefits of physical activity in veterans

Benefit	Evidence
Maintenance of muscle and bone mass	Prevention of sarcopenia, osteoporosis
Reduction of cardiovascular risk	↓ all-cause mortality
Improved balance	↓ falls, fractures
Mental health	Maintains cognitive function, fights depression

3.2 Specific risks

Risk	Cause	Prevention
Acute cardiovascular event	Underlying atherosclerosis	Pre-participation cardiac assessment (ECG, exercise test)
Tendinopathies	Tendon ageing (decreased elasticity)	Progressive eccentric strengthening
Meniscal lesions / early osteoarthritis	Joint wear	Low-impact sports (cycling, swimming); avoid excessive impacts
Falls	Decreased vision, proprioception, strength	Balance training, appropriate footwear

3.3 Recommendations for the coach

- Essential prior medical assessment (screening for heart disease, hypertension, diabetes).
- Very progressive progression (10% rule even stricter).
- **Mix of activities**: endurance (brisk walking, cycling) + strengthening (light weights, elastic bands) + flexibility/balance (yoga, tai-chi).
- **Listen for signs**: chest pain, abnormal shortness of breath, dizziness → stop and seek medical advice.
- **Recovery**: longer than in young athletes (allow 48-72h between intense sessions).

3.4 Should intensity be limited?

Not systematically. A well-trained veteran (e.g., marathon runner, cyclist) can maintain sustained intensity. But for a beginner, stay at moderate intensity (50-70% HRmax).

4. Sport and chronic diseases

Physical activity is beneficial and recommended in most chronic diseases, provided the type and intensity are adapted and precautions are respected.

4.1 Diabetes (mainly type 2, but also type 1)

Benefits	Risks	Adaptations
↓ insulin resistance	Hypoglycaemia (type 1, insulin)	Monitor blood glucose before/after. Have rapid-acting sugar.
↓ HbA1c	Post-exercise hyperglycaemia (if stress)	For type 1: reduce basal insulin or add carbohydrate snack.
Better overall control		Type 2: less intensive monitoring but avoid hyperthermia.

Practical tips: always have a sugar source; regular sessions rather than irregular intense sessions.

4.2 Asthma

- **Benefits of sport**: improves respiratory capacity, reduces inflammation.
- **Risk**: exercise-induced asthma (post-exercise bronchoconstriction).
- **Prevention**:
  - Good progressive warm-up (15-20 min).
  - Use of bronchodilator (ventolin) 10-15 min before if needed.
  - Avoid cold, dry air (mask, scarf).
  - Control: if uncontrolled asthma, avoid peak hyperventilation.

4.3 Epilepsy

Physical activity is recommended (improves self-esteem, may reduce seizures? not clear but beneficial).

Precautions:

- Dangerous sports in case of sudden loss of consciousness: swimming alone, climbing, diving alone.
- Avoid sports with high risk of head impact (boxing, American football).
- Inform the coach of seizure management (protocol from Course 6).
- Need for a knowledgeable companion.

4.4 Heart disease (hypertension, stable heart failure, coronary artery disease)

Major benefits (cardiac rehabilitation).

Risk: decompensation, angina, arrhythmia.

Recommendations:

- Prior cardiological assessment, maximal exercise test to prescribe intensity.
- Strict target HR (often 60-75% HRmax).
- Avoid intense static efforts (heavy weights, sports with Valsalva manoeuvre).
- Warning signs: chest pain, excessive dyspnoea, dizziness, palpitations → stop and evaluate.
- Preferred sports: walking, cycling, swimming (moderate).

4.5 Obesity

- Physical activity essential (along with diet).
- **Risks**: joint injuries (knees, hips), cardiorespiratory fatigue.
- **Adaptations**:
  - Start with non-weight-bearing activities (swimming, cycling, aqua aerobics) to protect joints.
  - Progress very slowly.
  - Strengthening to improve basal metabolic rate.
  - Avoid impacts and jumps.

4.6 Other pathologies (multidisciplinary team)

a) Cancer under treatment: light activity recommended (fights asthenia, cachexia). Ask oncologist for advice.
b) Rheumatoid arthritis: gentle activity (swimming, yoga); avoid during flares.
c) Kidney failure: moderate activity beneficial, but avoid dehydration and excessive protein.

5. Summary table for the coach – adaptations by population

Population	Main precautions	Recommendations
Pregnant woman	Avoid impacts, hyperthermia, supine position	Moderate PA, listen to body
Young (growth)	Apophysitis, growth cartilage, concussion	Multi-sports, moderate volume, prevention
Veteran	Underlying heart disease, falls	Medical assessment, slow progression, mix endurance+strength+balance
Diabetic	Hypoglycaemia	Have sugar, monitor blood glucose
Asthmatic	Exercise-induced asthma	Bronchodilator, warm-up, avoid cold
Epileptic	Seizure during dangerous sport	Avoid risky solitary sports, train bystanders
Heart patient	Cardiac arrest, angina	Medical assessment, target HR, warning signs
Obese	Joints	Low-impact sports, slow progression

Key points to remember

- ✓ **Female athlete**: monitor menstrual cycle (amenorrhoea = alert), prevent triad/RED-S, adapt practice during pregnancy.
- ✓ **Young athletes**: pay attention to apophysitis, early specialisation, and protection of growth cartilage.
- ✓ **Veterans**: prior cardiac assessment essential, slow progression, mix balance + strength + endurance.
- ✓ **Chronic diseases**: sport is beneficial in almost all, but with specific adaptations. The coach must know precautions and warning signs.
- ✓ **Multidisciplinary work**: primary care physician, specialist, nutritionist are allies.