

Full Pack

Sports engineering and performance series

DETAILED CONTENTS OF PROFESSIONALS AND ACADEMICS EDITION

The detailed full pack edition was designed for sports professionals and academics up to PhD level.

It includes all the sections of the General Public edition, with extra bonuses:

- Professional Cardiovascular Assessment
- Professional Muscular Assessment
- Professional Training Plan
- Sports Nutrition
- Basics in Cross Over Point and Lipomax

Sportsmen pictures

Complete general physiology.

Introduction

Introduction (1/2)

Introduction (2/2)

Cells

Tissues (1/7)

Tissues (2/7)

Tissues (3/7)

Tissues (4/7)

Tissues (5/7)

Tissues (6/7)

Tissues (7/7)

Organs and systems

Conventions

The Skeletal system

Introduction

Tissues of the skeletal system (1/2)

Tissues of the skeletal system (2/2)

Bone growth

Types of bones and bone structure

Types of bones and bone structure (1/2)

Types of bones and bone structure (2/2)

Joints

Synovial joints

Joint mechanics

Joint range of motion

- Forearm range of motion (front view)
- Forearm range of motion (side view)
- Shoulder range of motion (front view)
- Shoulder range of motion (side view)
- Hip range of motion (front view)
- Hip range of motion (side view)
- Knee range of motion (side view)
- Foot range of motion (front view)
- Foot range of motion (side view)

Joints

- Knee joint (sagittal section)
- Scapulohumeral joint (side view)
- Shoulder bursae (front view)
- Hip (front view)

The lymphatic system

Introduction

Lymph vessels

Lymphatic drainage

Lymph nodes

Tonsils

Spleen

Thymus

Blood

Blood plasma

Blood – White blood cells

Blood – Red blood cells

Blood – Platelets

Blood types

The digestive tract

Introduction

Upper gastrointestinal tract

Digestive processes – Deglutition

Digestive processes – The stomach

Digestive processes – Liver and pancreas

Digestive processes – The small intestine

Digestive processes – The colon (1/2)

Digestive processes – The colon (2/2)

Digestive processes – The rectum

Accessory organs of the alimentary canal – The liver (1/4)

Accessory organs of the alimentary canal – The liver (2/4)

Accessory organs of the alimentary canal – The liver (3/4)

Accessory organs of the alimentary canal – The liver (4/4)

Accessory organs of the alimentary canal – The pancreas (1/3)

Accessory organs of the alimentary canal – The pancreas (2/3)

Accessory organs of the alimentary canal – The pancreas (3/3)

The urinary system

Introduction

Kidneys

- Filtering and regulation of body fluids (1/4)
- Filtering and regulation of body fluids (2/4)
- Filtering and regulation of body fluids (3/4)
- Filtering and regulation of body fluids (4/4)
- Kidney Hormone secretion (1/2)
- Kidney Hormone secretion (2/2)
- The excretory urinary tract (1/2)
- The excretory urinary tract (2/2)

The five senses

- Introduction
- Sight (1/2)
- Sight (2/2)
- Smell
- Hearing
- Balance
- Touch
- Taste

Growth

- Introduction
- The signs of growth (1/4)
- The signs of growth (2/4)
- The signs of growth (3/4)
- The signs of growth (4/4)
- Why does growth differ across children? (1/2)
- Why does growth differ across children? (2/2)
- How does growth occur?
- Growth disorders

Nervous system

- Introduction
- Neurons
- Voluntary motor functions
- The central nervous system (1/5)
- The central nervous system (2/5)
- The central nervous system (3/5)
- The central nervous system (4/5)
- The central nervous system (5/5)
- The peripheral nervous system
- The vertebral column
- The autonomic nervous system (1/3)
- The autonomic nervous system (2/3)
- The autonomic nervous system (3/3)

Energy systems

- Introduction
- Calories basics
- Energy systems
- Respiratory quotient
- For or against the Randle effect on oxidized substrate selection
- Effect of time
- Effect of intensity
- Effect of intensity

- Effect of time
- Lactate (1/2)
- Lactate (2/2)
- Proteins
- Exercising and burnt substrates
- Comparison between trained and untrained subjects
- Definition of the “cross over” concept
- The notion of “cross over point”
- The notion of “lipomax”
- Duration of body reserve recovery

Cardiovascular system

- Introduction
- Organization of the circulatory system (1/4)
- Organization of the circulatory system (2/4)
- Organization of the circulatory system (3/4)
- Organization of the circulatory system (4/4)
- The blood vessels (1/3)
- The blood vessels (2/3)
- The blood vessels (3/3)
- Heart anatomy
- Heart valves
- Heart activity
- The heart cycle

Cardiovascular system and exercise

- Introduction
- Adaptation of cardiac output
- Heart rate development
- Resting heart rate
- Modulation of heart rate during moderate exercise
- Modulation of heart rate during strenuous exercise
- Special cases
- Mechanisms of heart rate regulation (1/2)
- Mechanisms of heart rate regulation (2/2)
- Stroke volume response to exercise
- Regulation mechanisms of muscle blood flow
- Notion of circulatory balance (1/3)
- Notion of circulatory balance (2/3)
- Notion of circulatory balance (3/3)
- Blood pressure change

Cardiovascular assessment

- Introduction
- Tests (1/2)
- Tests (2/2)
- Assessment of sportsman’s recovery following VO₂max test
- Assessment of maximum running velocity (V_{max})
- Lactic vs. Speed test (LAS)
- Body Mass Index (BMI) calculation
- BMI

Cardiovascular training – Training sessions

Introduction

Cardiovascular training

Aerobic endurance

Aerobic resistance

vVO₂max – Power at VO₂max

Reminder: cardiovascular objectives

Intensity and anaerobic dominant power (lactic power)

Speed

Muscular system

General points

Muscle tissues

Skeletal muscle structure

Muscle groups (1/4)

Muscle groups (2/4)

Muscle groups (3/4)

Muscle groups (4/4)

Muscle insertions

Forearm (front view)

Forearm (back view)

Arm (front view)

Arm (back view)

Thigh (front view)

Thigh (back view)

Leg (front view)

Leg (back view)

Hand (front view)

Hand (back view)

Foot (front view)

Foot (back view)

Endocrine system and muscle training

Introduction

Insulin

Glucagon

Cortisol

The somatotrophic axis (1/3)

The somatotrophic axis (2/3)

The somatotrophic axis (3/3)

Catecholamines (1/3)

Catecholamines (2/3)

Catecholamines (3/3)

Thyrotropin-releasing factor (1/2)

Thyrotropin-releasing factor (2/2)

Muscle and physical exercise

Muscle fiber types

Main physiological characteristics of muscle fibers

Principle of muscle contraction

The various types of muscle contraction

Summation of the various muscle fiber types

Working principle of agonist / antagonist muscles during movement

Muscle exercises

Curl-Up Abdominal Endurance Test

Biceps dumbbell exercises

Bench press

Incline bench press

Latissimus dorsi / Lats (wide grip)

Flat bench dumbbell flys

Split jerk

Oblique muscles

Shoulder press

Rower warm up

Vertical rowing with narrow grip

Rowing machine exercises

Special moves

Adductor stretch

Biceps femoris stretch

Deltoid and triceps stretch

Back stretch

Quadriceps stretch

Muscle assessment

Introduction

Measuring test with “Maximum strength” method

Measuring test with “Non maximum strength” method

Correspondence table

Measuring test with “muscle speed” method

Muscle training – training sessions

Introduction

Main workout exercises

Target: muscle bulk

Target: muscle strength

Target: muscle strength at full throttle

Target: muscle strength at full throttle (1/2)

Target: muscle strength at full throttle (2/2)

Plyometric speed – Target: muscle speed strength

Target: weight loss

Plan your training

Introduction

Yearly training plan (1/4)

Yearly training plan (2/4)

Yearly training plan (3/4)

Yearly training plan (4/4)

Draw up your physical preparation and training program (1/3)

Draw up your physical preparation and training program (2/3)

Draw up your physical preparation and training program (3/3)

Conclusion

Sports nutrition

Introduction

Proteins

Lipids

Carbohydrates

Minerals

Vitamins

Reminder: food categories (1/3)

Reminder: food categories (2/3)

Reminder: food categories (3/3)

The athlete's diet (1/7)

The athlete's diet (2/7)

The athlete's diet (3/7)

The athlete's diet (4/7)

The athlete's diet (5/7)

The athlete's diet (6/7)

The athlete's diet (7/7)

Contest diet

Strength athletes

Health foods

Dietary supplements (1/5)

Dietary supplements (2/5)

Dietary supplements (3/5)

Dietary supplements (4/5)

Dietary supplements (5/5)

Conclusion

Overtraining

Introduction

Types of overtraining

Preventing overtraining syndrome

Detecting overtraining syndrome

Handle and understand overtraining (1/5)

Handle and understand overtraining (2/5)

Handle and understand overtraining (3/5)

Handle and understand overtraining (4/5)

Handle and understand overtraining (5/5)

Conclusion

Drug use

Introduction

Non-medical drugs and major ways of taking drugs

Narcotic analgesics

Stimulant drugs

Laxatives, weight loss drugs and diuretics

Beta blockers

Corticosteroids

Anabolic-androgenic steroids (1/3)

Anabolic-androgenic steroids (2/3)

Anabolic-androgenic steroids (3/3)

Growth hormone (hGH) (1/2)

Growth hormone (hGH) (2/2)

Erythropoietin (EPO) (1/3)

Erythropoietin (EPO) (2/3)

Erythropoietin (EPO) (3/3)

What about genetics?

Summing up

First aid care

- Introduction
- Cardiac arrest
- Burns
- Heat stroke
- Suffocation
- Fainting attack in the conscious patient
- Loss of consciousness
- Nosebleed
- Wound bleeding
- Emergency phone calls

Medical examinations

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- X-ray (1/2)
- X-ray (2/2)
- Lymphography
- Scan
- MRI (magnetic resonance imaging)
- Scintigraphy
- Sonogram
- Doppler sonography
- Endoscopy
- Electrocardiogram (ECG)
- Electroencephalogram
- Mammography

PAR-Q (Physical Activity Readiness Questionnaire)

- Introduction
- Questionnaire
- Answers 1
- Answers 2
- Form

Glossary

- Glossary (1/3)
- Glossary (2/3)
- Glossary (3/3)