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# LECTURE 01: INTRODUCTION TO S&C

## What is Strength & Conditioning?

- Integral part of development of athletes
- Provides services for speed, agility, endurance, strength, stability, flexibility, injury prevention, management & rehab → enhance performance
- ROLE: use exercise to improve performance & help injury prevention & proper mechanics
- Improve physical performance: plyometrics, speed & agility, endurance, stability & strength

## S&C Sport Science Industries

- Certification & training:
  - NSCA, ASCA, ESSA & SMA
- Tertiary education courses:
  - Weigh up risks & benefits of exercise
  - Minimise risk & maximise performance

## Roles of an S&C Practitioner

***Key role: develop physical capabilities to ↑ performance & optimise health & wellbeing levels of athlete***

- Develop athletic readiness
- Training prescription & training load monitoring
- Acute & long-term athlete development
- Develop ability to train & compete (↑ load)
- Injury prevention, rehab & recovery
- Mentor training habits & converse with coach

## What is Physical Capacity & Fitness?

- FOCUS: on 'fitness' of 'physical capacities'
- Individual characteristic → ability to perform
- Perform =specific & relevant to max potential
- Sport demands: Physical, Mental, Emotional, Social & Spiritual Factors → interrelate
- Performance provides functional qualities → participate in activities with ↑ power, strength, skill, speed, agility & endurance

## Athletic Health & Wellness

- This assesses adaptive responses to training
- Non-invasive way of determining soreness, pain, fatigue, recovery & overall state of health
- Responses to fluctuations in training & loads

## Physical Capabilities & Sports Performance

- Physical: flexibility, power, strength, speed, agility, coordination, acceleration, aerobic
- Sport-Specific Skill
- Opposition & External Environment
- Sports Performance
- Factors affect performance: illness/injury, tired, motivation, sleep, fatigue, overtraining, stress

## Theoretical Factors Affecting Performance

*Age*

- Effects are slow & consistent
- Inappropriate lifestyle outweigh effects of aging
- Chronical vs. Physiological Age

*Health status*

- Illness/wellbeing affects fitness

*Training status*

- Training exposure/history/type/focus
- State of fatigue

*Body composition*

- Excessive energy store
- Power:weight ratio

*Genetics*

- Nature vs. Nurture

## Why are Physical Capacities Important?

- ↑ ability to tolerate training load
- Improve preparation for competition
- Build resistance to fatigue
- ↓ injury risks
- Long-term training development
- ↑ sport performance

*Physical Fitness vs. Skill*

- Match demands, position, age, level of comp
- Better teams run less, but run more with ball at ↑ speed

*Match-Fatigue Resistance*

- Pre-post change MVC conditions

*Performance Evolution = Athlete Gets Better*

- Constant need improve within & between seasons & over generations

## Why Perform Fitness Testing?

Testing assists with:

- Ensures athletes cope & adapt to training
- Evaluate effectiveness of training programs
- Provide motivation to athletes
- Attempt to predict performance

## Issues to Consider in Training

- Testing information provides:
  - Direct measure of physical capacity
  - Reference for trainers in event for injury
  - Assist current & future training programs
  - Compares against normative scores & criterion scores between athlete testing
- Consider: reliability/validity, health & safety, order & use of tests, costs vs. benefits of tests

## Exercise Prescription Variables

*It's All About the Training*

- Prescription by sport demands & identifies strengths & weaknesses from testing
- Prescribes exercise in terms of:
  - **F**requency: How often (times per week)
  - **I**ntensity: How hard (HR, $VO_2$, %1-RM etc.)
  - **T**ype: Mode of exercise (run, cycle, swim, etc.)
  - **T**ime: Duration (mins, sets)
  - **A**dherence: Strategies to keep participants at it
  - **P**rogression: How do you progress from session to session?
- *FITTAP:* "art" of being an exercise professional based on the "science" → develop training prescription based on competition demands guided by results of testing

# LECTURE 02: WHY TEST & WHAT TO DO WITH DATA?