

# **Common Core Lecture 1**

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# **Common Core Lecture 1**

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Level 4  
⌘ The Coaching Process  
⌘ Flexibility Training  
⌘ Strength and Endurance Training



## **A Coaching Philosophy**

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- ⌘ Should be thought out by each individual coach
- ⌘ Should be written down in the coaching portfolio
- ⌘ Motives
- ⌘ Attitudes
- ⌘ Objectives, long term and short term
- ⌘ Commitment
- ⌘ Personal standards of behaviour and integrity



## **Characteristics of a Performance Coach**

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- ⌘ Read and understand scientific literature and principles
- ⌘ Work with various experts
- ⌘ Understand and identify the profile of performers
- ⌘ Identify and solve problems
- ⌘ Understand and deal with growth and maturation issues
- ⌘ Be able to listen, observe and question
- ⌘ Empower the gymnast
- ⌘ Self reflection



## **Activity One**

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- ⌘ Try to write down a brief outline of your coaching philosophy
- ⌘ Why is it important the coach understands scientific principles?
- ⌘ What are the benefits to self reflection to you as a coach?



## **Training Principles**

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**Flexibility**

## **Limiting Factors of Movement**

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- ⌘ Bone Structure
- ⌘ Muscles
- ⌘ Connective Tissues
- ⌘ Ligaments
- ⌘ Tendons



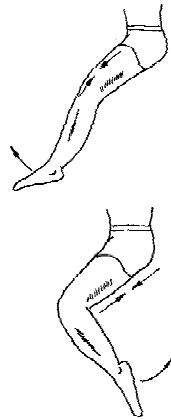
## **Inter relationship of Muscles**

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- ⌘ Muscles are stimulated by impulses from the nervous system
- ⌘ Contract to cause limb movement in a joint complex
- ⌘ Muscles generally work in pairs
- ⌘ A contracting muscle is called Agonist
- ⌘ A relaxed muscle is called Antagonist



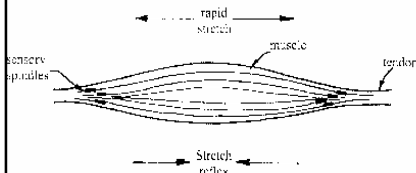
## Reciprocal Innervation



- ⌘ The muscle pairs react as opposites
- ⌘ As one muscle contracts
- ⌘ Its pair relaxes
- ⌘ This phenomenon is utilised in stretching technique
- ⌘ Encouraging the the muscle to be stretched to relax



## Stretch Reflex



- ⌘ The muscles safety mechanism
- ⌘ Inhibits the stretching of a muscle if stretch too far or too fast
- However a strong muscle contraction prior to stretching inhibits the Stretch Reflex mechanism
- ⌘ Also called Myotatic Reflex



## Myotatic Reflex

- ⌘ When the full range or rapid stretch is sensed the muscle will tend to contract to protect itself
- ⌘ Rapid or bounce type stretching will induce a strong reflex
- ⌘ A slow progressive stretch will not incur such a great reaction

Slow progressive and prolonged stretching exercises are recommended



## Improving Flexibility

- ⌘ Muscles can expand beyond 50% of its normal length
- ⌘ To improve the joint flexibility it is necessary to improve the Habitual length of the muscle
- ⌘ The associated tendons, ligaments and connective tissues need also to be stretched
- ⌘ A plastic deformation of the fibrous materials occurs
- ⌘ Growth takes place at the ends of the muscle fibres

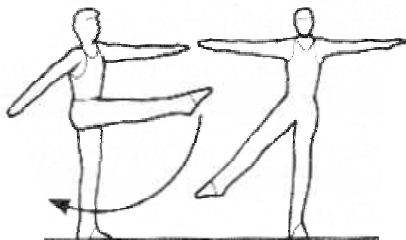


## Methods of Improving Flexibility

- ⌘ Ballistic Stretching
- ⌘ Passive Stretching
- ⌘ Active Stretching
- ⌘ Passive PNF Stretching
- ⌘ Active PNF Stretching



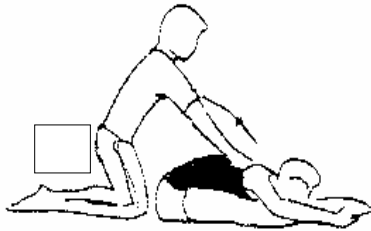
## Ballistic Stretching



- ⌘ Involves acceleration of the limb
- ⌘ Leg swing, arm swing or bounce stretching
- ⌘ Creates a strong Muscle Stretch Reflex
- ⌘ May result in muscle soreness caused by small muscle fibre tears
- ⌘ Effect in joint warm ups prior to stretching



## Passive Stretching



- ⌘ Relax the muscle to be stretched
- ⌘ Apply a gradual external force
- ⌘ Prolonged hold will cause the sensory devices to accommodate the stretch reflex action
- ⌘ Hold for between 20 second to 1 minute



## Active Stretching



- ⌘ Actively contract one muscle group
- ⌘ Causing the muscle being stretched to relax
- ⌘ Stretch is enhanced through Reciprocal Innervation technique
- ⌘ Hold between 6 – 30 seconds

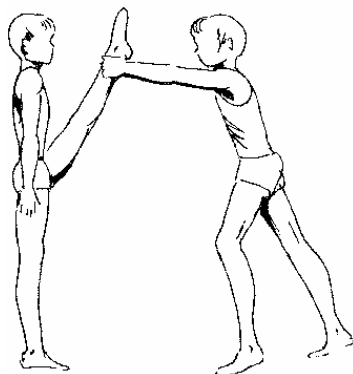


## PNF Stretching

- ⌘ Proprioceptive Neuromuscular Facilitation
- ⌘ Stretching can be Active or Passive
- ⌘ Combined with Isometric Contractions
- ⌘ PNF Stretching improves both range of movement and also muscular strength simultaneously



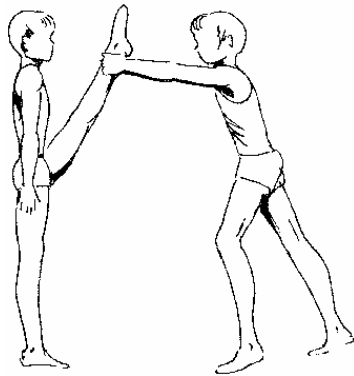
## Passive PNF Stretching



- ⌘ Partner raises leg passively
- ⌘ Isometric contraction
- ⌘ Relaxation of contraction
- ⌘ Passive elevation of the limb
- ⌘ Repeat 3 times



## Active PNF Stretching



⌘ Active Lift

⌘ Isometric Contraction

⌘ Active Lift

⌘ Repeat 3 times



## General Comments

- ⌘ Always thoroughly warm up the muscle
- ⌘ Use slow, progressive and prolonged exercises
- ⌘ Stretch both sides equally
- ⌘ Ensure correct alignment of the body and limbs at all times
- ⌘ Flexibility should be maintained throughout the gymnasts career



## **Activity Two**

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⌘ What is meant by the term

Agonist

Antagonist

⌘ What is the 'stretch reflex'?

⌘ What is the difference between 'active' and 'passive' stretching?



## **Training Principles**

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### **Strength and Endurance**

## **The Elements of Physical Preparation**

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- ⌘ Muscular Strength
- ⌘ Muscular Endurance
- ⌘ Power
- ⌘ Co Ordination
- ⌘ Cardio Respiratory Endurance
- ⌘ Flexibility
- ⌘ Relaxation



## **Muscular Strength**

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- ⌘ The amount of tension a muscle or group of muscles can exert in a single maximum contraction
- ⌘ The maximum effort of force produced against a load
- ⌘ This basic strength is essential in all aspects of Gymnastics



## **Muscular Endurance**

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- ⌘ Repeat and Exercise or exert a force over a long period of time
- ⌘ Essential ingredient in Gymnastics
- ⌘ Early Fatigue will reduce accuracy and numbers
- ⌘ Rate of recovery is also a key aspect of physical fitness



## **Power**

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- ⌘ The ability of a muscle or group of muscles to contract rapidly to produce an explosive force

$$\text{Power} = \text{Work Done} / \text{Time Taken}$$



## **Co Ordination**

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- ⌘ Communicated through the Neuro muscular system
- ⌘ Producing complex and controlled movement of the body
- ⌘ Gymnastic skills are learnt through combining coordinated movement and powerful muscular contractions



## **Cardio Respiratory Endurance**

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- ⌘ The ability to sustain the Heart rate, Blood Pressure and Breathing rate to provide the oxygen necessary for energy conversion over an extended period
- ⌘ Necessary in Aerobic Exercise
- ⌘ The majority of Gymnastics activity is Anaerobic
- ⌘ Recovery rate will improve



## **Cardio-respiratory fitness**

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- ⌘ Gives enhanced provision of oxygen to muscles – needed in prolonged periods of exercise – over 45 secs
- ⌘ Achieved through aerobic exercise – repetitions of routines or exercises
- ⌘ Improves work capacity and recovery rate



## **Strength Training Principles**

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- ⌘ The human body 'Specifically Adapts to Imposed Demands' ( SAID)
- ⌘ This is the basis of any conditioning Programme
- ⌘ Continually increase demands on muscles through progressive resistance



## Development of Strength and/or Endurance

- ⌘ To achieve this aim we must train the muscle in the Fatigue zone
- ⌘ Overload Principle
- ⌘ Exercising the muscle at a percentage of the maximum load over a number of repetitions



The percentage of maximum load and number of repetitions is selected according to the type of strength desired to improve

The following chart is related to a weight training session

	<b>Muscle Endurance</b>	<b>Power</b>	<b>Maximal Strength</b>
<b>% Max Load</b>	25 - 50	50 - 80	80 - 100
<b>No of Reps</b>	More than 20	Approx 10	1 to 6
<b>No of Sets</b>	5	4	3

In gymnastics, however, relate the conditioning exercise more specifically to the gymnastics skills and use the body as resistance



## Methods of Strength Training

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⌘ Maximum Strength

☒ Progressive Resistance

☒ Pyramid Training

⌘ Power and Speed Training

⌘ Strength Endurance Training



## Progressive Training

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⌘ Performance of 3 Sets

⌘ Around 6 Repetitions

⌘ Near maximum load

⌘ Progressively increased over a period of time

⌘ Maximum strength will increase

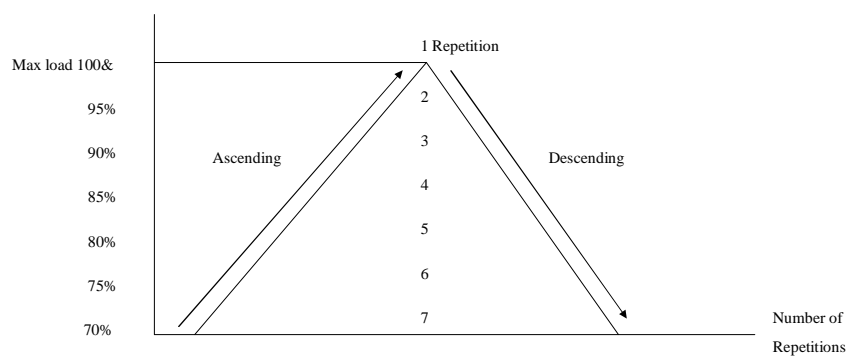


## Pyramid Training

- ⌘ 70% of maximum load
- ⌘ Between 5 -7 repetitions
- ⌘ Load Progressively Increased
- ⌘ Repetitions Decreased
- ⌘ Can be reversed
- ⌘ Greatly increases Maximum Strength



## Pyramid Training



## **Power and Speed**

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- ⌘ Power is the ability to produce an explosive force to rapidly move a load or the body
- ⌘ Speed requires the efficient and rapid co ordination of the neuro muscular system
- ⌘ Best developed through 6 - 10 explosive repetitions
- ⌘ Between 50 - 80% of maximum load
- ⌘ 4 - 5 sets
- ⌘ Rest / recovery period of 1 -2 minutes



## **Plyometric Training**

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- ⌘ Extensively used technique to develop Speed and Power
- ⌘ Care should be taken to avoid over use injuries
- ⌘ Should not be used intensively in pre pubescent children
- ⌘ Should not be used in very weak performers

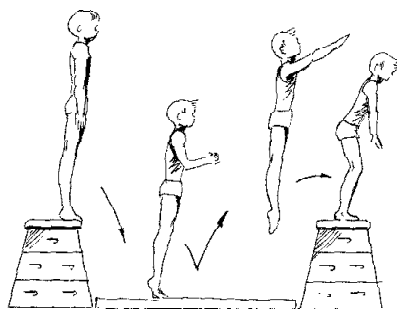


## Plyometric Training

- ⌘ If a muscle is pre stretched prior to being shortened the muscle will contract with greater force
- ⌘ Approximately 30% more energy can be gained through pre stretch reflex action from the elastic energy stored within the tendons, muscle cell tissues and the myofibrils within the muscle as a result of the elastic qualities



## Simple Example of Plyometrics



- ⌘ Commence from an elevated position
- ⌘ Step down, the quadriceps are pre stretched upon landing to store elastic energy in the muscles and tendons
- ⌘ The quadriceps are rapidly contracted and gain the elastic energy to increase the height in elevation of the jump



## **Strength Endurance Training**

- ⌘ The ability to sustain an exercise over a high number of repetitions or long period of time
- ⌘ Best developed through a method called Interval Training
- ⌘ High repetitions with a low load
- ⌘ Develops both Strength Endurance and Cardiovascular Endurance simultaneously
- ⌘ No of reps and duration is increased whilst rest is decreased
- ⌘ Where possible relate to a specific skill
- ⌘ The Gymnast should use their own body weight as a resistance



## **Guidelines to the design of a Conditioning Programme**

- ⌘ Must be designed to meet the needs of an individual
- ⌘ Sufficiently demanding to take the individual into the fatigue zone
- ⌘ Exercise must be performed with correct technique
- ⌘ Choose exercises that develop strength that relate the performance of a gymnastic skill
- ⌘ When structuring a circuit select those elements which involve the greater muscle groups first and then add the specific groups
- ⌘ Do not use consecutive groups which use similar muscle groups
- ⌘ Be aware of:

Age of the gymnast  
Maturation stage of a Gymnast  
Specific Needs of a Gymnast



## **Activity Three**

- ⌘ What is SAID?
- ⌘ What is muscular endurance?
- ⌘ What are the benefits of good muscular endurance in gymnastics?
- ⌘ What is meant by the overload principle?
- ⌘ What is plyometric training?

