# Rehabilitation - What a Coach Should Know

# Perspectives and Overview

# Viewing Training as a Continuum

Injured Developmental Emerging Elite

# Someone's Hurt - Now What?
# The Decision Making Process

# The Decision Making Process

- Immediacy is Key
- Four Key Questions
  - What is the (Anatomically Accurate and Specific) Diagnosis?
  - What Was the Mechanism of Injury?
  - To Whom Do We Refer?
  - What Treatment / Rehabilitation or Modifications to Training are Needed?

# Diagnosis

# Diagnosis - The Process

- Key Questions
  - Acute or Chronic
  - Joint or Soft Tissue?
- Joint Injury Questions
  - Anatomy of the Injury
  - Complicated by Compression or Dislocation?
  - Severity
- Soft Tissue Questions
  - Severity
  - Is There Tendinous Involvement?
  - Is Scar Tissue Present?

# Mechanism of Injury

# Figuring Out the Injury Mechanism

- The Injury and Injury Cause – Two Different Things
- Biomechanical Puzzles – Failures Here are the Reason for Setbacks
- Is the Training a Cause?
  - Technical
  - Programming

# Figuring Out the Injury Mechanism

- Key Clues
  - Immobility / Hypermobility Tandems
  - Strength and Weakness – Common Causes
- The Importance of Articular Mobility
  - Altered Patterns of Stress Transferal
  - Most Injuries are Rooted in Foot Immobility

# Referrals

# Referrals – Key Questions

- Consider the Mechanism of Injury, Not The Injury
- Is Imaging Needed?
- Will An Injection Help?
- Is Special Treatment Needed?

# Understanding Treatment / Rehabilitation Options

# Philosophical Basics

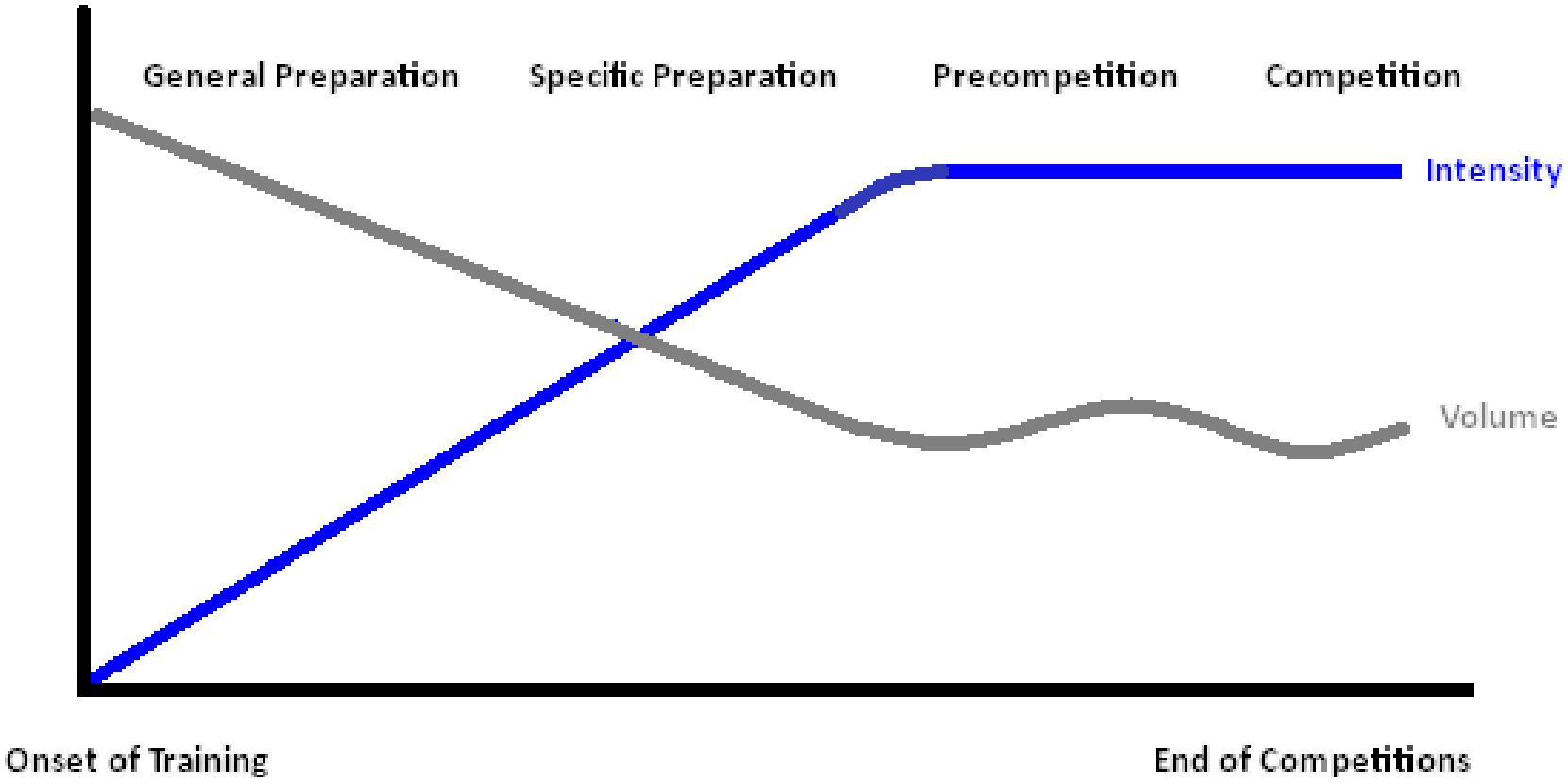
- Target the Injury Site
- Understanding Training Responses
  - Localized Responses
  - Global Responses
- How Do You Achieve Global Responses?
  - Power Output and the Case for Simplicity
  - Recruiting Muscle Mass and Endocrine Responses

# Applying Sport Science to the Rehabilitation Setting

# Understanding Volume and Intensity

- Volume and Intensity
  - Volume – The Body of Work
  - Intensity – The Difficulty

# Understanding Volume and Intensity




Simplified Graph of Typical Volume & Intensity Manipulation Over a Macrocycle

# Understanding Volume and Intensity

- The Overload Principle
  - Progressive Overload
  - Intensity as the Progressive Variable
- Intensity as…
  - Higher Speeds
  - Higher Loads
  - Higher Levels of Impact
- The Fallacy of Volume Based Progression

# Understanding Volume and Intensity

- If It Doesn't Help, it Hurts
- If You're Training, You Don't Need Rehab
- Most Traditional Rehabilitation Strengthening Exercises …
  - Don't Produce Strength
  - Result in More Tissue Assault
- Use Mobility Based Treatment Philosophies (As Opposed to Strength Based)

# Understanding Neuromuscular Integration

- What Made Them Good in the First Place?
- Neuromuscular Integration
  - Recruitment
  - Rate Coding
  - Synchronization
- Training Neuromuscular Integration
  - Speed/Power Training
  - It's the Fast Stuff

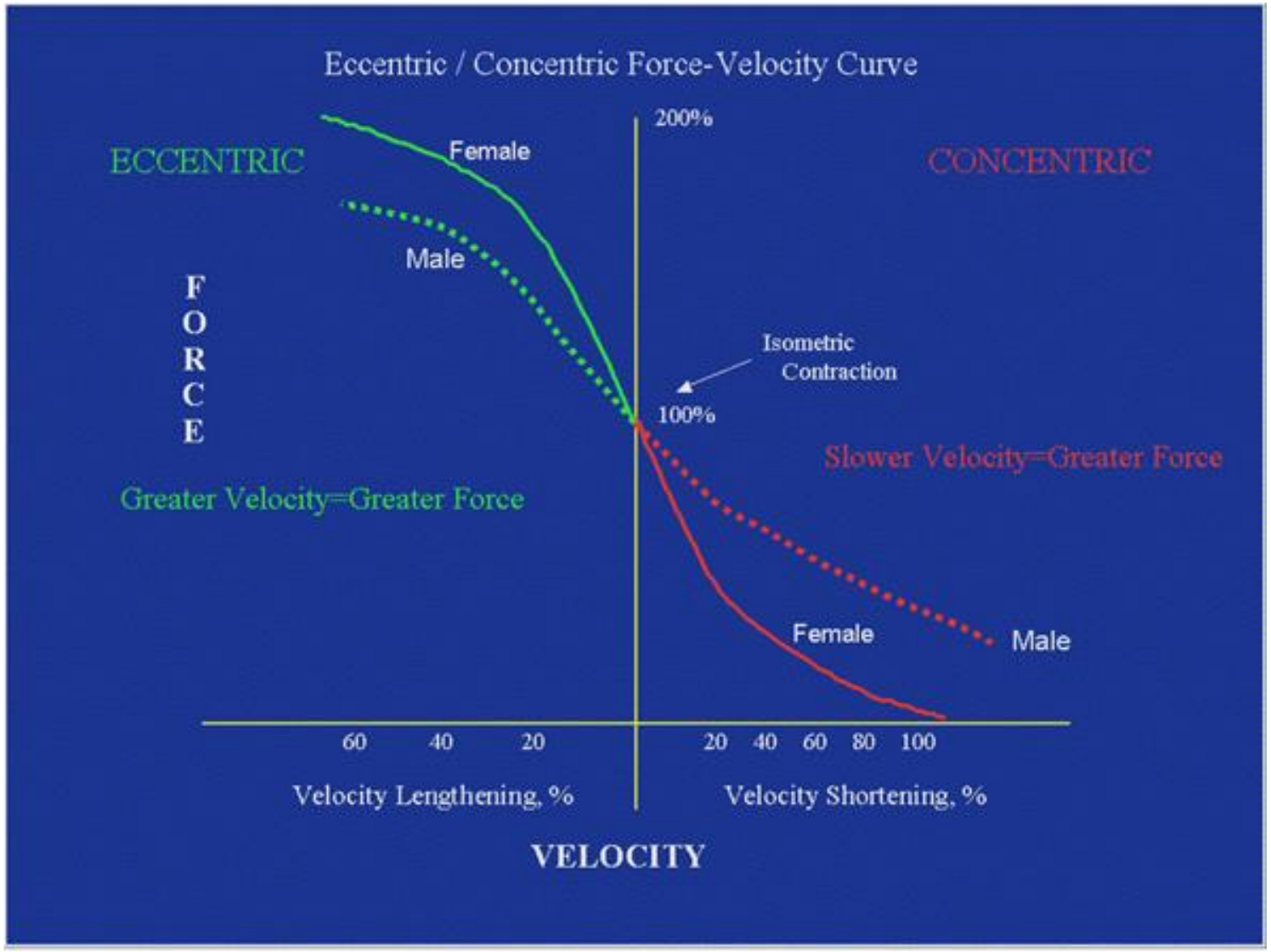
# Understanding Neuromuscular Integration

- Resultant Philosophies
  - Speed/Power is a Prerequisite to Effective Strength Training
  - Speed/Power Training Can Be Modified to be Used Safely Early in the Rehab Process
- Resultant Practices
  - Use Speed / Power Training with Uninjured Body Parts
  - Apply Modified Speed / Power Training to the Injury Site

# Understanding Elasticity

- Stretch Reflexes and the Elastic Response
- Elastic Responses
  - In Sport
  - In Rehabilitation
- Tension Levels and Application
  - Concentric Situations
  - Eccentric Situations

# Understanding Elasticity



# Rehabilitation Decelerators

- Glycolytic Training
  - High Level Glycolytic Training and Neural Shock
  - Moderate Level Glycolytic Training and the Lactate Response
- Aerobic Training
  - Aerobic Activity and Fiber Type Shifts
  - Endurance Based Exceptions

# Rehabilitation Decelerators

- Static Weightlifting Exercises
  - Squats, Deadlifts, Presses, etc.
  - Long Times Under Tension
  - Problems
    - Proprioceptive Dysfunction
    - Decelerated Neuromuscular Integration

# Specificity

- What Are the Sport's Demands?
- What Are the Available Tools?
  - Running/Sprinting
  - Jumping
  - Lifting
  - Throwing
  - Circuit Training
- Speed Power vs Endurance Based Rehabilitations

# Endurance Event Rehabilitation

- Follow the Scientific Model
- Slant Toward Strength / Speed
  - Speed Drives Strength Increases, Endurance Doesn't
- Recovering from Injury Requires Strength Reacquisition
- Mild Aerobic/Anaerobic Training - Better Biochemical Climates

# The Rehabilitation Process

# Range of Motion

- Reestablishing Range of Motion
- Range of Motion as an Irritant
- Goals
  - Appropriate Application of Tension
  - Minimizing Flexion / Extension Movements
- Training in Nonsupport

# Reimplementing Sports Skills

- Capping the Intensity
- The Backfill Philosophy

# Understanding Inhibitions

- Inhibitions Due to Injury
- Removing the Inhibitions – the Final Step
- Methods -  High Intensity, Low Density
  - Sprinting
  - Jumping
  - Lifting
  - Throwing
- Typical Time Frames

# Special Concerns for Soft Tissue Injury

- Everything is Going Your Way! – Minimalist Philosophies
- Functional Exercise - Providing a Collagen Roadmap
- Muscle vs. Tendon
- Quality vs. Quantity
  - Intensity Levels
  - Warnings on Endurance Based Rehabs

# Return to Competition

- Fact and Fantasy
- Testing Results
- Long Term Concerns - Issues with Reaccumulating Workload
- Intensity Based Rehabs Accelerate Fitness Gains
- Dare but Care -  Beware the Threes

# Training Tools

# Sprint Training

- The Problem with Jogging
- Make Every Meter Count
- Distance Choices and Progressions
- Resisted Runs - Testing and Safety
- Deceleration

# Jump Training

- A Necessary Prerequisite
  - Controlled Hops/ Bounds
  - Double Leg / Single Leg
  - Training the Deceleration Component
- Advancing to Drop Jumps
  - Drop Land and Stability
  - Drop Bounce and Elasticity
  - Drop Squat and Amortization Patterns

# Weight Training

- Resuming Olympic Lifts
  - Modified
  - Non-Modified
- Ballistic Lifting
- Squats, Presses, and Similar Tools
  - Cautions for the Rehabilitation Process
  - Placement

# Throw Training

- A Necessary Prerequisite
  - Controlled Throw/Catch
  - Double Arm / Single Arm
  - Training the Deceleration Component
- Advancing and Progressing

# Lactate Based Restoration

- Restoration Training Principles
- Circuits are Best
  - Alleviating Repetitive Movement Patterns
  - Diversity of the Training Stimulus
- Achieve Moderate Lactate Levels
- Stay Away from Injured Body Parts
- Stay Away from Pure Aerobic Training Zones

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