The Mechanics of Swimming
Treating Swimmers With Painful Shoulders
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Note to Participants: There are interactive pop-up questions throughout this lecture. If you choose to pause the lecture and return at a later time, a natural break time would be after answering the interactive questions. (You are able to pause at any time and the presentation will “remember” where you were. It’s just a more natural time to pause after the interactive questions.) For your convenience, this outline reflects where/when within the lecture the interactive questions occur.

This lecture has 141 slides and is 161 minutes in duration.

I. Introduction
   A. Case study approach
   B. Whole body mechanics
   C. Patterns of injury in the shoulder
   D. Myths about swimmers
   E. Our case study: Jettie

II. Pain versus soreness
    A. Defining pain and soreness
    B. Measuring pain
       1. Traditional pain scales
       2. Swimmer Functional Pain Scale
    C. Myths
    D. Risk factors
    E. Sub-classification systems
       1. Treatment based on sub-classification systems
       2. Creating a sub-classification system for swimmers

III. A sub-classification: NSSP: Non-specific shoulder pain in the absence of trauma
    A. The pathway to injury for competitive swimmers
    B. Defining the sub-classification of NSSP
       1. Predisposition
       2. Fatigue
       3. Faulty mechanics
       4. Tendinopathy
    C. Applying these categories to Jettie’s case study: Where does she fall?

Interactive Questions – slide 34 @ 45 minutes

IV. Swim biomechanics
    A. Relating mechanics to injury
B. The freestyle stroke
   1. Injury-related mechanics
      a. High exit
      b. Narrow recovery
      c. Body is rotated into the catch
   2. Focus points
   3. Fatigued stroke
   4. Muscle activity in the freestyle shoulder
      a. The normal and painful shoulder during freestyle swimming
      b. Patterns to look for
      c. Comparing muscle firing in normal and painful shoulders

C. Comparing the muscle activity of three other strokes to that of the freestyle stroke
   1. The butterfly stroke
   2. The backstroke
   3. The breaststroke

Interactive Questions – slide 83 @ 85 minutes

V. Swimming volume
   A. The sport is changing: Typical workouts are decreasing in yardage.
   B. Why is this important? Because many articles from the last 10 – 15 years cite much longer workouts for swimmers.
   C. Injuries in swimmers: Kerr study, 2015.
   D. Things to consider about yardage
      1. Will vary based on level and swimmer’s ability.
      2. Get to know the coach to know more.
   E. Case study: What is Jettie’s swim volume?

Interactive Questions – slide 1110 @ 116 minutes

VI. Assessment strategies
   A. Common strategies
   B. Let’s assess Jettie’s pain: What can we learn about her?
      1. Dry land program
      2. Physical examination
      3. Treating Jettie
      4. Revamping her dry land program
   C. Encourage swimmers to use a dynamic warm-up

VII. Treatment strategies for the four sub-classifications
   A. Fatigue
      1. STM—to involved structures
      2. Address weakness/muscle imbalance
      3. Address segmental motion of the cervical, thoracic and lumbar spine
   B. Predisposition
      1. Instability
      2. Neuromuscular re-education
      3. Mobility
C. Faulty mechanics
D. Tendinopathy
   1. Employ eccentric training
   2. Anti-inflammatory modalities
   3. Review training regimen
E. Examples
F. Return to swim: Establish benchmarks to ensure a safe return to swimming
G. Case study: Jettie’s modified training

VIII. Conclusion
A. Recap: Turn myths into facts
B. Risk factors which can lead to injury

Interactive Questions – slide 138 @ 156 minutes

C. Marketing your skills
D. Jettie’s case study