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Rehabilitation of Swimmer's Shoulder Syndrome

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"The unexamined life is not worth living" Socrates 5th Century BC

QUESTION

"What are the best exercises for swimmer's shoulder syndrome?"

Delimitations

I. Purpose of the protocol **is** :

- To teach patient common causes of syndrome
- To develop an effective rehabilitation protocol to enable patient to return to pain free swimming

Delimitations

II. Purpose of the protocol **is not**:

- To teach the patient how to swim

Delimitations

III. Research Stroke

- Freestyle was the stroke studied

- Up to 99% of all swimmers report that they use this as their primary practice stroke

Facts Bearing on the Question

- 100m US swimmers
- 87% report shoulder pain
- Experts agree way swimmer's train is problem
- With fatigue, mechanics break down, efficiency is lost
- Competitive swimmers: train 7 days per week, 2x per day, no recovery days
- 20,000 meters per day = 16,000 arm strokes

Facts Bearing on the Question

- No EBM, meta-analysis, systematic reviews or Cochrane Collaborative reviews for best rehabilitation
- Many opinions and empirical programs available
- No other sport over trains like swimming
- Other than stroke mechanics, most training procedures are "lessons learned"
- Swimmers must have "the feel of the water" during rehabilitation

Research

Dunn, W.R. (2005). *Swimmer's Shoulder*, AOSSM Annual Meeting, Colorado.

This Level V presentation was based upon available research and case studies.

The author recommended discontinued use of:

- hand paddles
- anterior capsule stretching
- single side breathing
- elbow dropping
- overall improvement of stroke mechanics with coaching

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Research

Sein, M.L. & Walton, J. (2008). *Shoulder Pain in Elite Swimmers*, British Journal of Sports Medicine, February , 2010 p. 113-15.

This Level II research studied 80 elite swimmers 13-25 years of age with physical exam, MRI and testing for glenohumeral laxity.

- 91% reported shoulder pain
- 84% had impingement

Results:

- Supraspinatus tendionopathy is major cause of shoulder pain
- Swimmers who train more than 15 hours per week or 35 miles per week had shoulder pain

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Research

Allegrucci, M. Whitney, S.L. & Irrgang, J.J. (1994). *Clinical implication of secondary impingement of the shoulder in free style swimmers,* Journal of Sports Physical Therapy, 20 (6).

Level IV Study

Authors recommend use of phases of rehabilitation for swimmers with impingement:

- **Phase 1** – establish stable base and strengthen rotator cuff
- **Phase 2** – strengthening exercises in 0-90 degrees ROM
- **Phase 3** – functionally training to include core and lower extremity
- **Phase 4** – progressive return to swimming

Research

Pink, M.M. & Tibone, J.E. (2000). *The painful shoulder in the swimming athlete*, Orthopaedic Clinics of North America, 31(2).

Level V Research based on analysis of published literature that outlines specific muscles active in each of the 8 freestyle phases.

Authors recommend:

- Modification of training
- Elimination of anterior capsule stretches
- Eliminate use of hand paddles
- Eliminate use of vigorous partner stretches
- Eliminate use of vigorous wall stretches
- Eliminate use of float boards in the overhead position
- Start exercise in the scapula plane

Research

Heinlein, S.A. & Cosgarea, A.J. (2010),*Biomechanical considerations in the competitive swimmer's shoulder*, Sports Health, Vol 2(6), p.519-25.

Level V – 30 years of case studies from 1980 to 2010

Authors determine:

- Overuse is main cause of pain
- Most common causes of shoulder pain are supraspinatus tendinopathy, glenohumeral instability and possible labral tear

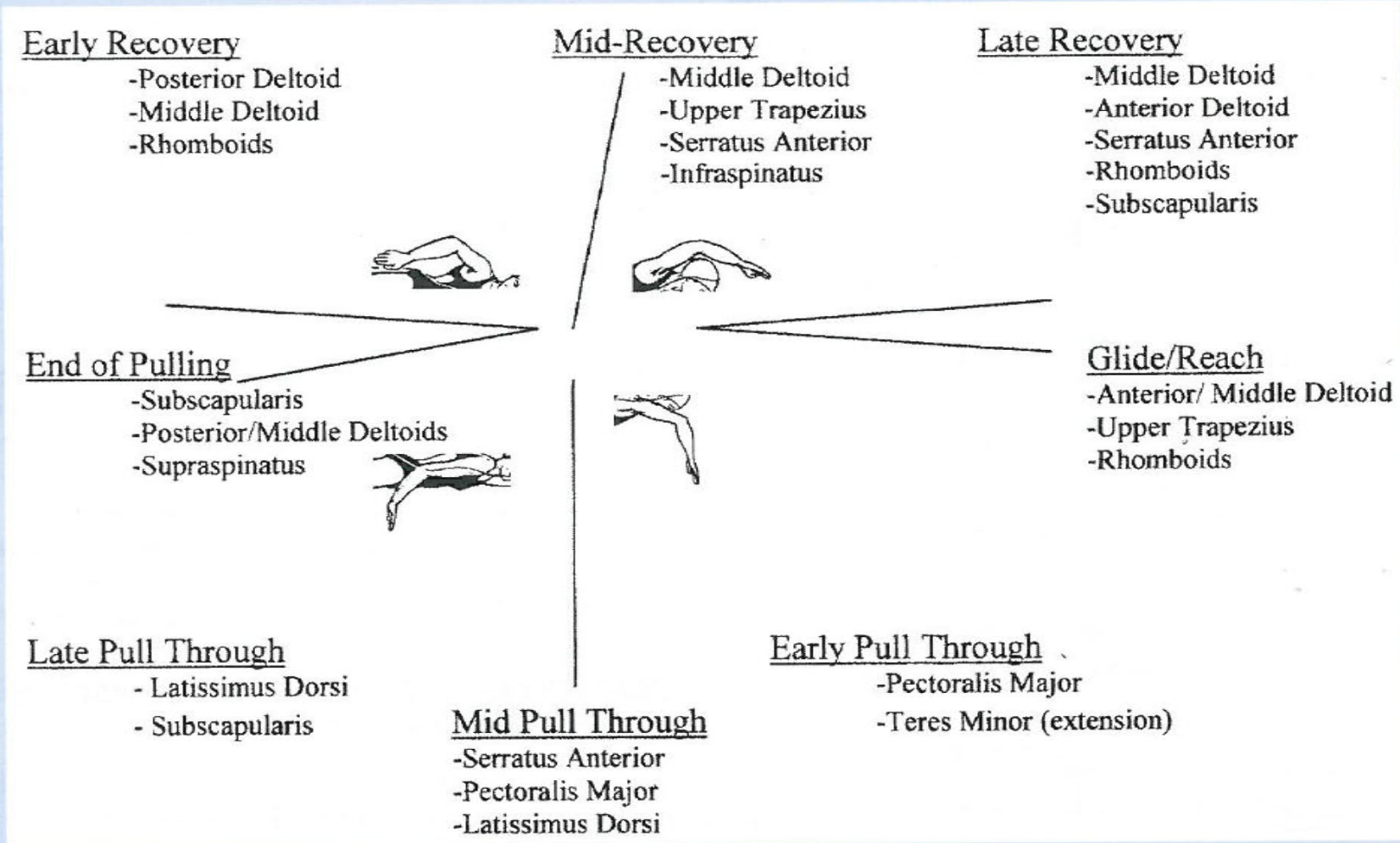
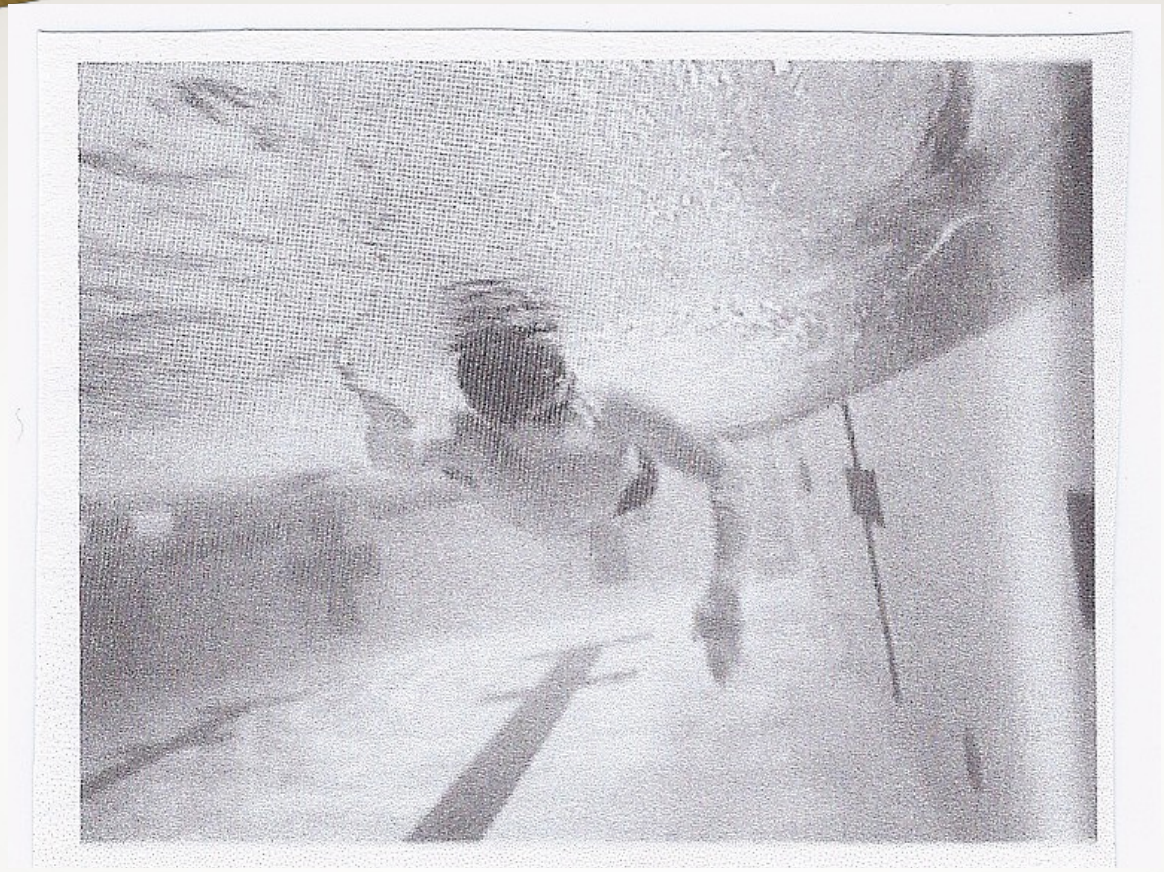


Figure 2. Muscle activity of the freestyle stroke based on electromyographic and cinematographic analysis. (Adapted with permission from Colwin CM. *Breakthrough Swimming.* Champaign, IL: Human Kinetics; 2002:50-70.) Figure copyright Scott Heinlein.



Sources of Impingement during free style stroke

During pull thru phase:

If hand enters water across the body's midline the shoulder goes into horizontal adduction and impinges the long head of the biceps against the coracroacromial arch

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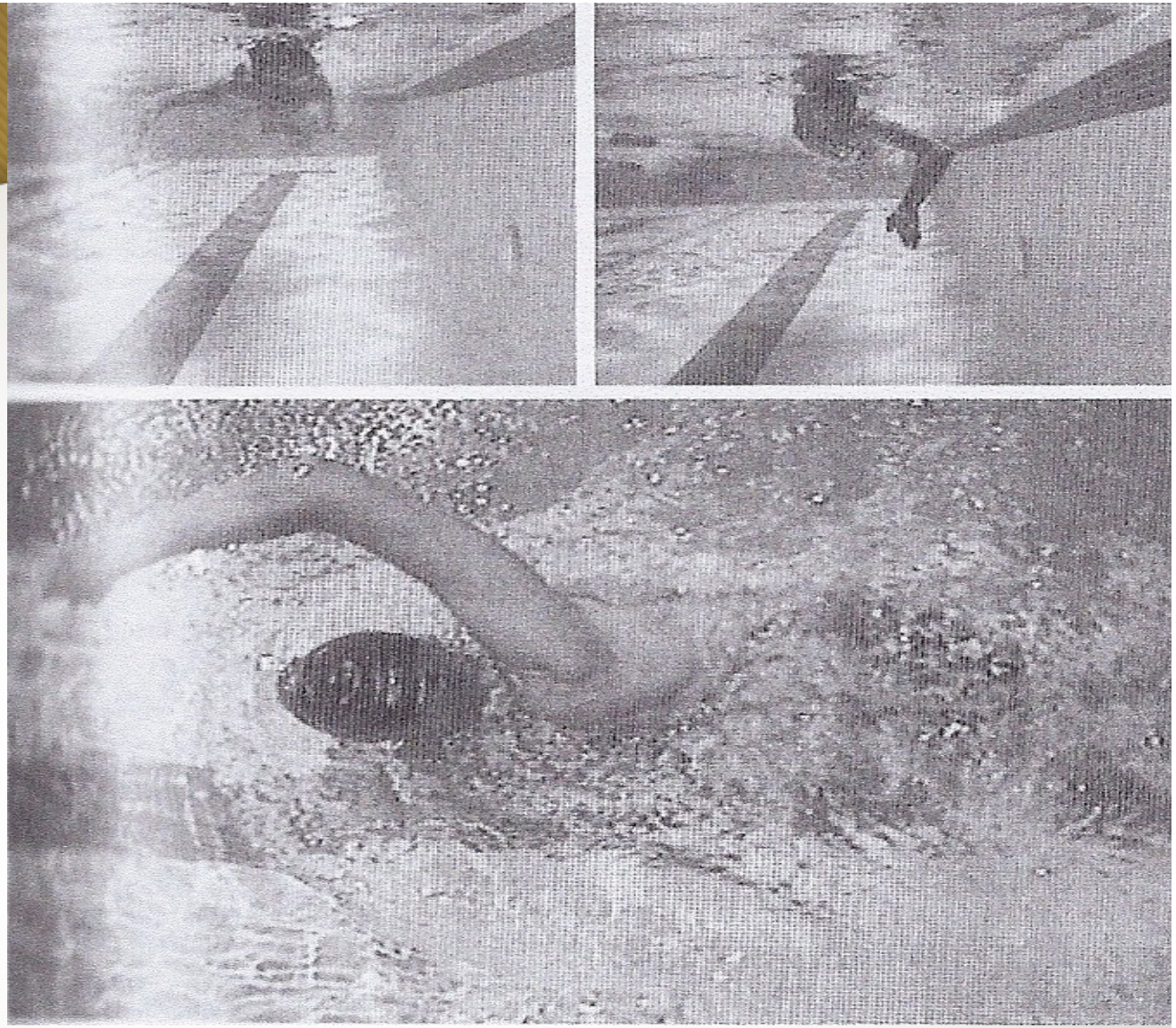

During recovery phase of the stroke

With Fatigue swimmer finds it hard to lift hand out of the water. Fatigue muscles of the rotator cuff externally rotate and depress the head of the humerus against the glenoid and becomes inefficient. The supraspanatus is mechanically impinged between the greater tuberosity and the middle part of the coracoacromial arch.

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Mechanisms of Swimmer Shoulder Pain

- Faulty stroke mechanics
- Sudden increase in training load
- Excessive use of training devices
- Higher level of swim experience
- Scapula dyskinesis
- Higher % of training time on free style
- Muscle weakness (s. anterior/lower trap)
- Capsular abnormalities: posterior, (hypomobile) and anterior (hypermobile)

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Signs of Swimmer's Shoulder

- Altered ROM arc
- Reduced ROM
- Weak supraspinatus
- Weak infraspinatus
- Weak scapulothoracic stabilizers
- Multidirectional instability
- Core deficit

Symptoms of Swimmer's Shoulder

- Progressive:
  - Pain after heavy workout
  - Pain during and after workout
  - Pain that interferes with performance
  - Pain that prevents participation
  - Pain at rest or at night
  - Dead arm feeling
  - Feeling of being unstable

Rehabilitation

Follow team approach:

Sports Medicine, swim coach, athlete

- Have athlete and coach work on stroke mechanics.
- Stop overuse in training.
- Stop equipment and stretch problems.
- Stay in water using other strokes.
- Become symptom free.
- Follow progressive return to full swimming.
- Increase strength and endurance

Davies et al, *The Swimmer's Shoulder,* Chapter 35

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VOI Swimmer's Shoulder Protocol

Phase One 0-2 weeks

- UBE
- Scapula squeeze- upper/lower trapezius
- Sleeper Stretch – posterior deltoid
- Chin tucks – scalene muscles
- IR/ER – rotator cuff
- Iso-supermans – thoracic/lumbar musculature
- Foam roller – pec stretch
- Thoracic Mobs

Phase Two 2-4 weeks

- Cable row – Lat dorsi
- SA punches – serratus anterior
- Y.W.I – mid-deltoid, rhomboids, lower trapezius
- Side lying ER – rotator cuff/ supraspinatus
- Scaption plus scapula squeeze w/ theraband –lower trapezius/ subscapularis
- Wall push-ups plus – serratus anterior
- Dumbbell shrugs – upper trapezius

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VOI Swimmer's Shoulder Protocol

Phase Three 4-6 weeks

- Lat pull down – lat dorsi
- Diagnonal 1 pattern– posterior deltoid/ subscapularis
- Chest flies – pect major
- Dumbbell one arm row– rhomboids/ posterior deltoid
- Smith press push ups – serratus anterior
- Medicine ball chops – serratus anterior
- Cable reverse fly – romboids/posterior deltoids
- High pulls – upper trap
- Prone horizontal abduction w/ER
- Abdominal planks - core

Phase Four week 6 to return to sport

- Power shrugs – core/upper trap
- Cable upright row –upper trap
- Cable high to low chops –serratus anterior
- Supine dumbbell pullovers – serratus anterior
- Seated cable row – rhomboids
- Incline bench press – pectoralis major/minor
- Dumbbell lateral raises – lateral deltoid
- Barbell push-press- quads/glute max/delt
- Power rope circuit – core stability/upper body strength
- Lower body strengthening program

SUMMARY

Use the VOI impingement protocol to supplement

Use the VOI core program to supplement

Educate your patient about mechanical problems involved

foster team work between coach and athlete

Questions?