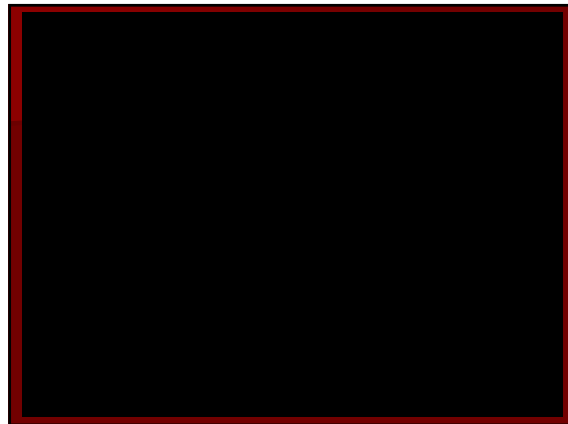


EVALUATION & REHABILITATION TECHNIQUES TO RETURN AN ELITE JUNIOR TENNIS PLAYER TO COMPETITION




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TENNIS SPECIFIC DEMANDS

- 75 % ALL STROKES IN MODERN HIGH LEVEL TENNIS – SERVE AND FOREHAND
- CONCENTRIC IR FOR UE POWER GENERATION
- LEADS TO UNILATERAL ANTERIOR UE STRENGTH DEVELOPMENT & SPORT SPECIFIC MUSCULAR IMBALANCES

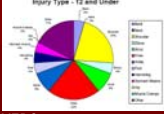

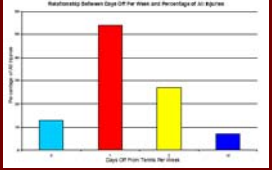




Classification of Tennis Injuries



- USTA SPORT SCIENCE COMMITTEE INJURY TRACKING STUDY
 - 861 JUNIOR TENNIS PLAYERS
 - PRIMARILY OVERUSE INJURIES
 - 41% OF ALL PLAYERS REPORTED AN INJURY
 - 1/3 OF PLAYERS REPORTING ONE INJURY SUSTAINED A SECOND INJURY

The chart shows that the percentage of injuries increases significantly with age, peaking in the 12-14 age group.


CASE STUDY: ELITE JUNIOR PLAYER WITH RIGHT SHOULDER PAIN

- RHD 15 YR OLD TENNIS PLAYER
- 1 WEEK HISTORY LOCALIZED ANTERIOR SHOULDER PAIN
- PAIN WITH FOREHANDS & SERVES
- OBSERVATION & POSTURE:
- CLINICAL EXAMINATION:
 - TYPE I KIBLER SCAP, POS SAT
 - NEG NEER, HAWKINS, YOCUM
 - NEG MDI, GRADE 2 ANTERIOR TRANSLATION
 - POSITIVE SUBLXN / RELOCATION
 - REPROD. OF PAIN & 4-/5 ER & SUPRA MMT R SHOULDER



SCAPULAR TESTS

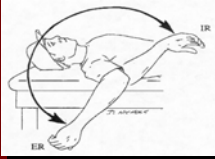

- POSITIVE
 - SCAPULAR ASSISTANCE TEST
 - FLIP SIGN
 - SCAPULAR RETRACTION TEST



KIBLER, 1998

GLENOHUMERAL JOINT RANGE OF MOTION ALTERATIONS

■ LEFT	RIGHT	
■ 95	105	ER
■ 60	30	IR
■ 155	135	TROM

ADDITIONAL MEASURES RELATED TO IR DEFICIENCY



- ANTERIOR SHOULDER POSITION
 - LEFT 110 MM
 - RIGHT 130 MM
- HORIZONTAL ADDUCTION
 - LEFT 55 DEG
 - RIGHT 35 DEG





ASSESSMENT & DIAGNOSIS

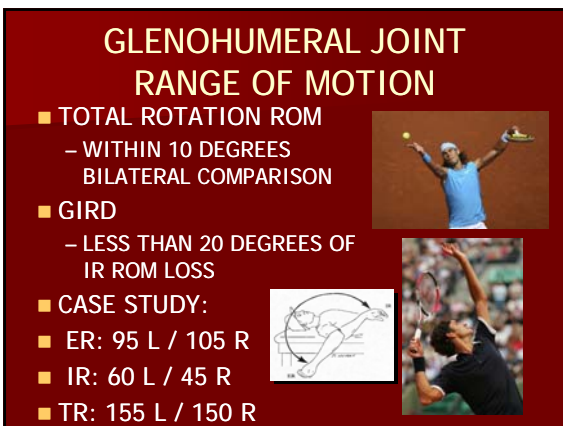
- ROTATOR CUFF TENDONITIS SECONDARY TO UNDERLYING ANTERIOR INSTABILITY, SCAPULAR PATHOLOGY AND ER/IR MUSCULAR IMBALANCE

REHABILITATION GOALS BASED ON OBJECTIVE FINDINGS FROM CLINICAL EXAM



- NORMALIZE GLENOHUMERAL ROM
 - ADDRESS GIRD
- ER/IR STRENGTH IMBALANCE
 - POSTERIOR RTC EMPHASIS
- SCAPULAR DYSFUNCTION
 - STABILIZATION PROGRAM
- INVESTIGATE MECHANICS
 - FUNCTIONAL ANALYSIS





STRENGTH TESTING

- USE OF MMT & HHD AS WELL AS ISOKINETIC TESTING
- DEFICITS OF 30 % IN RIGHT SHOULDER EXTERNAL ROTATION STRENGTH
- ER/IR RATIO – BIODEX INITIALLY 50%

ADDRESSING STRENGTH DEFICITS:

- POSTERIOR ROTATOR CUFF EMPHASIS DUE TO WEAKNESS FOUND IN EXTERNAL ROTATION
- USE OF UNILATERAL PLYOMETRICS IN 90/90 POSITION
- INTEGRATION OF SCAPULAR TRAINING
 - SERRATUS ANTERIOR / LOWER TRAPEZIUS FORCE COUPLE
- USE OF PLYOMETRICS, ECCENTRIC TRAINING, ISOKINETIC TRAINING, ELASTIC RESISTANCE / TUBING

HOW DO WE DETERMINE WHEN THE PLAYER IS READY TO RETURN TO PLAY ?



KEY OBJECTIVE FINDINGS FOR RETURN TO PLAY

- NEGATIVE CLINICAL EXAM IE (-) S/R
- NORMAL SCAPULO-HUMERAL RHYTHM
- ER/IR RATIO 66-75%
- (=) ER STRENGTH
- < 10 DEG TROM DIFF
- < 20 DEG IR ROM LOSS
- TOLERANCE OF 90/90 FUNCTIONAL EXERCISE PROGRESSION
- ADHERENCE TO ITP




EVALUATION OF MECHANICS

- 2 DIMENSIONAL VIDEO
 - PHOTOGRAPHS
 - DARTFISH ANALYSIS
 - IPHONE APPS
- COMMON FINDINGS
 - HYPERANGULATION OF THE GLENOHUMERAL JOINT ON SERVE
 - LACK OF LOWER BODY CONTRIBUTION TO SERVICE MOTION
 - LATE CONTACT POINT ON FOREHAND
 - EARLY PELVIC ROTATION LEADING TO ARM "LAG" ON FOREHAND


HYPERANGULATION







Excessive Glenohumeral Horizontal Abduction as Occurs During the Late Cocking Phase of the Throwing Motion Can Be Critical for Internal Impingement

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Conclusion: Horizontal abduction beyond the coronal plane increased the amount of overlap and contact pressure between the supraspinatus and infraspinatus tendons and glenoid.

Clinical Relevance: Excessive glenohumeral horizontal abduction beyond the coronal plane may cause internal impingement, which may lead to rotator cuff tears and superior labral anterior to posterior (SLAP) lesions.




SUMMARY

- FINAL COMMENTS ?
- OBJECTIVE TESTING FORMS PRIMARY BASIS FOR RETURN TO PLAY DECISION MAKING
- MULTIFACTORIAL
 - RANGE MOTION
 - SCAPULAR STABILIZATION
 - ROTATOR CUFF STRENGTHENING
 - EVALUATION OF MECHANICS

