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2018 SPORTS MEDICINE
FOR THE PRIMARY CARE
PHYSICIAN

- I HAVE NO RELEVANT FINANCIAL RELATIONSHIPS WITH THE MANUFACTURERS(S) OF ANY COMMERCIAL PRODUCTS(S) AND/OR PROVIDER OF COMMERCIAL SERVICES DISCUSSED IN THIS CME ACTIVITY
- I DO NOT INTEND TO DISCUSS AN UNAPPROVED/INVESTIGATIVE USE OF A COMMERCIAL PRODUCT/DEVICE IN MY PRESENTATION.

COMMON PEDIATRIC SPORTS MEDICINE INJURIES

OUTLINE

- - BACKGROUND
- - SPECIALIZATION PHENOMENON
- - CASES & PRESENTATIONS OF COMMON PEDIATRIC SPORTS MEDICINE INJURIES
- - PHYSICAL EXAM FINDINGS
- - IMAGING
- - TREATMENT
- - PREVENTION

PEDIATRIC SPORTS MEDICINE

- - ESTIMATED THAT OVER 30-45 MILLION CHILDREN AGES 6-18 PARTICIPATE IN ATHLETICS ANNUALLY
- - NEARLY $\frac{3}{4}$ OF US HOUSEHOLDS HAVE AT LEAST ONE CHILD THAT PARTICIPATES IN ORGANIZED SPORTS
- - SPORTS PARTICIPATION IS MORE ACCESSIBLE WITH INCREASED VARIETY
 - INCREASING SPORTS SPECIALIZATION
 - MORE YEAR ROUND AND CONCURRENT SPORTS
- - DRIVE FOR SUCCESS, COLLEGE SCHOLARSHIPS, GOING PROFESSIONAL
 - NCAA STATS DEMONSTRATE THAT LESS THAN 0.5-1.6% OF HIGH SCHOOL ATHLETES WILL EARN PARTIAL SCHOLARSHIPS TO D1 SCHOOLS
 - 1% OF COLLEGE ATHLETES GO PROFESSIONAL

PEDIATRIC SPORTS MEDICINE

- - OVER $\frac{1}{2}$ OF CHILDREN UNDER AGE 14 WHO SEEK MEDICAL CARE FOR INJURIES ARE DUE TO OVERUSE INJURIES
 - MOST COMMON INJURIES
 - SPRAINS, STRAINS, BONE OR GROWTH PLATE INJURIES, REPETITIVE MOTION AND OVERUSE INJURIES, HEAT RELATED ILLNESS
 - 62% OF INJURIES OCCUR DURING PRACTICE
- - OVER 1 IN 10 WILL HAVE AN EMERGENCY ROOM VISIT FOR A SPORTS RELATED INJURY

WHAT IS SPORT SPECIALIZATION?

- ASPECTS OF TYPICAL DEFINITION
 - HIGH VOLUME AND INTENSITY OF TRAINING
 - DURATION OF TRAINING AT A YOUNG AGE
 - MINIMAL REST OR TIME OFF
 - STRUCTURED TRAINING WITH EMPHASIS ON PHYSICAL DEVELOPMENT
 - EXCLUSION OF OTHER SPORTS
- GOAL IS TO OPTIMIZE OPPORTUNITIES TO DEVELOP ATHLETIC SKILLS IN 1 SPORT TO ENHANCE CHANCE OF COMPETING AT THE NEXT LEVEL

THEORY OF SPORT SPECIALIZATION

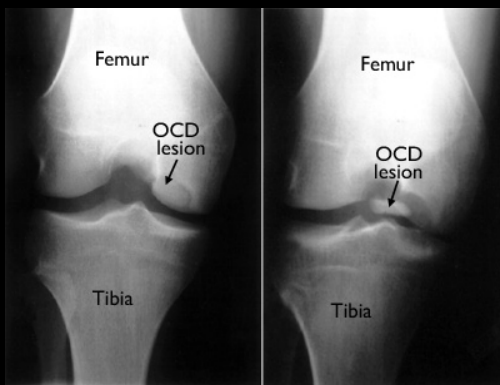
- BASED ON INTERPRETATION OF A STUDY BY ERICSSON FROM 1993
- DANIEL COYLE; THE TALENT CODE
 - GREATNESS ISN'T BORN. ITS GROWN.
- HIGH VOLUMES OF DELIBERATE PRACTICE AT A YOUNG AGE WAS THE STRONGEST PREDICTOR OF BECOMING AN EXPERT PERFORMER
- LED TO THE "10,000 HOUR RULE"
- EXPERT STATUS FOR MUSICIANS, MATHEMATICIANS, AND CHESS PLAYERS NOT ATHLETES
- NO SPECIFIC NUMBER OF HOURS WAS PROVEN AS ENOUGH TO MASTER A TASK.

STRESS FRACTURE

- DIAGNOSIS
- PAIN ON EXERTION
- TENDERNESS ON PALPATION
- IMAGING



OSTEOCHONDRITIS DISSECANS



- OCCURS IN YOUNG PEOPLE WHOSE GROWTH PLATES HAVEN'T YET CLOSED
- LOOSENING OF THE BONE AND OVERLYING CARTILAGE
- MOST COMMONLY AFFECTS THE KNEES, HIPS, ELBOWS, AND ANKLES

OSTEOCHONDRITIS DISSECANS

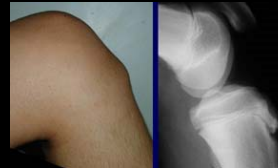
- DIAGNOSIS
 - SYMPTOMS MAY INCLUDE A JOINT THAT "LOCKS" OR "GETS STUCK"
 - X-RAYS MAY SHOW SMALL PIECES OF BONE THAT HAVE SEPARATED
- TREATMENT
 - CONSERVATIVE TREATMENT AT 1ST
 - LONG PERIOD OF REST
 - MAY REQUIRE CASTING OR BRACING
 - SURGERY MAY BE NECESSARY

CASE #1

- - 14 YEAR OLD MALE WITH L KNEE PAIN X 1 YEAR
- - PAIN IS LOCATED OVER ANTERIOR KNEE
- - HURTS MORE WITH RUNNING, JUMPING, SQUATTING
- - FRONT OF KNEE SEEMS SWOLLEN AT THE AREA OF PAIN

OSGOOD SCHLATTER (TIBIAL TUBERCLE APOPHYSITIS)

- - CASES & COMMON PRESENTATIONS
 - AGES 11-15 YEARS OLD
 - MALES>FEMALES
 - OCCURS WITH RUNNING, JUMPING OR INCREASE IN PHYSICAL ACTIVITY
 - WORSENS IF HITS/BANGS/FALLS ON TENDER AREA
- - PHYSICAL EXAM
 - TENDERNESS ON PALPATION OF TIBIAL TUBERCLE
 - MAY HAVE PROMINENCE/SWOLLEN APPEARANCE OF TIBIAL TUBERCLE



OSGOOD SCHLATTER

- - IMAGING
 - X-RAYS DEMONSTRATE AN OPEN TIBIAL TUBERCLE
 - X-RAYS ARE NOT NECESSARY
 - HELP TO EXCLUDE TIBIAL TUBERCLE AVULSION, CYST, TUMOR, INFECTION
- - TREATMENT
 - REST, ACTIVITY MODIFICATION
 - ICE
 - PATELLAR TENDON STRAP
 - INCREASE FLEXIBILITY OF HAMSTRINGS & QUADRICEPS
 - CLOSURE OF APOPHYSIS



CASE #2



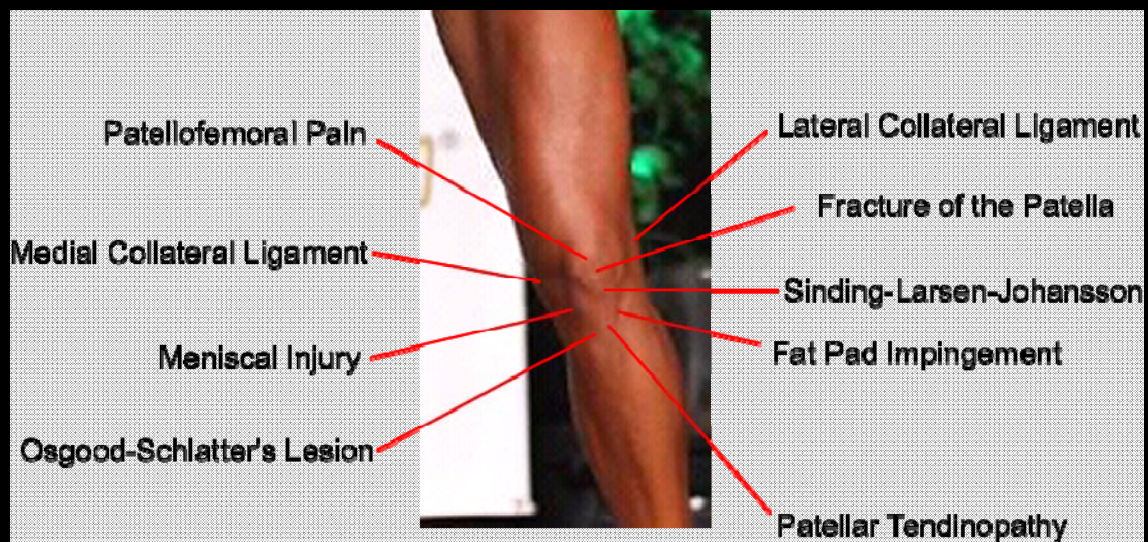
- - 10 YEAR OLD FEMALE WITH ANTERIOR KNEE PAIN X 2 WEEKS
- - PAIN OCCURS WITH RUNNING, KNEELING, CLIMBING
- - PAIN IS LOCATED AT INFERIOR ASPECT OF PATELLA (SUPERIOR TO TENDER AREA IN OSGOOD SCHLATTER)

SINDING LARSEN JOHANSEN (PATELLAR APOPHYSITIS)

- - CASES & COMMON PRESENTATIONS
 - AGES 10-13 YEARS OLD
 - PAIN PRESENT/WORSE WITH RUNNING, JUMPING, CLIMBING, KNEELING
- - PHYSICAL EXAM
 - TENDERNESS OVER INFERIOR POLE OF THE PATELLA
- - IMAGING
 - X-RAYS NOT NECESSARY
 - MAY DEMONSTRATE IRREGULAR CALCIFICATION AT INFERIOR POLE OF THE PATELLA

SINDING LARSEN JOHANSEN (PATELLAR APOPHYSITIS)

- - TREATMENT
 - SAME AS FOR OSGOOD SCHLATTER
 - REST/ACTIVITY MODIFICATION
 - ICE
 - PATELLAR TENDON STRAP
 - FLEXIBILITY OF HAMSTRINGS & QUADRICEPS
 - TIME TO CLOSE GROWTH PLATE
- - PREVENTION?
 - GOOD FLEXIBILITY
 - GRADUAL INCREASE IN ACTIVITY

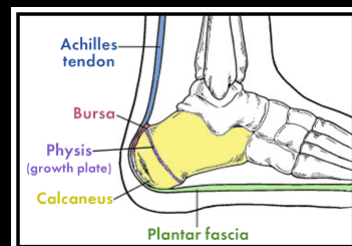


CASE #3

- - 8 YEAR OLD MALE SOCCER PLAYER WITH BILATERAL HEEL PAIN
- - HAS BEEN PRESENT FOR 2 YEARS AND IS GETTING WORSE
- - OCCURS WITH ACTIVITY AND PATIENT WILL LIMP AT THE END OF THE GAME

SEVER'S DISEASE (CALCANEAL APOPHYSITIS)

- - CASES & COMMON PRESENTATIONS
 - AGES 8-15
 - CAN BE UNILATERAL OR BILATERAL
 - USUALLY OCCURS AFTER PHYSICAL ACTIVITY BUT AS WORSENS WILL OCCUR DURING PHYSICAL ACTIVITY AND AT REST
 - MAY CAUSE LIMPING
 - MOST COMMON IN RUNNING AND HIGH IMPACT ACTIVITIES
 - WORSE WITH CLEATS, FLAT FEET
 - PAIN AT INSERTION OF ACHILLES TENDON AND PLANTAR FASCIA



SEVER'S DISEASE

- - PHYSICAL EXAM
 - TENDERNESS ON PALPATION OF MEDIAL & LATERAL ASPECT OF CALCANEUS
 - + CALCANEAL SQUEEZE
 - MAY HAVE TIGHT CALVES, FLAT FEET
- - IMAGING
 - CLINICAL DIAGNOSIS
 - XRAYS DEMONSTRATE OPEN PHYSIS
 - OFTEN LOOK IRREGULAR



SEVER'S DISEASE

- - TREATMENT
 - REST/ACTIVITY MODIFICATION
 - ICE
 - HEEL CUPS
 - CUSHION, 3/8" HEEL LIFT
 - INSERT FOR ARCH SUPPORT
 - MAY BUILD UP BACK TO LIFT HEEL
 - ACTIVITY AS TOLERATED, NO LIMPING ALLOWED
- - PREVENTION
 - ACHILLES FLEXIBILITY
 - ARCH SUPPORT



CASE #4



- - 14 YEAR OLD MALE FOOTBALL PLAYER WHO SPRAINED HIS ANKLE DURING PRACTICE
- - WASN'T ABLE TO WALK OFF THE FIELD
- - HAS BRUISING AND SWELLING OF ANKLE
- - PAIN WITH WEIGHTBEARING
- - PAIN MAINLY LOCATED OVER LATERAL ANKLE AND TENDERNESS ON PALPATION OF DISTAL FIBULA

SALTER HARRIS 1 FRACTURE OF DISTAL FIBULA

- - CASES & COMMON PRESENTATIONS
 - USUALLY INVERSION ANKLE INJURY
 - SWELLING
 - MAY HAVE PAIN WITH WEIGHTBEARING
 - ANKLE INJURY IN SKELETALLY IMMATURE PATIENT
 - MOST OCCUR AGES 8-15 YEARS OLD
 - PHYISIS IS THE WEAKEST LINK
 - OFTEN MISSED AND TREATED AS ANKLE SPRAIN
- - PHYSICAL EXAM
 - TENDERNESS ON PALPATION OF DISTAL FIBULAR PHYISIS (1CM ABOVE DISTAL TIP OF THE FIBULA)

SALTER HARRIS 1 FRACTURE OF DISTAL FIBULA

- - IMAGING
 - OBTAIN WEIGHTBEARING ANKLE XRAYS (AP, LATERAL, AND MORTISE VIEWS)
 - XRAYS OFTEN NORMAL
 - MAY DEMONSTRATE SOFT TISSUE SWELLING OR WIDENING OF PHYSIS
 - STILL TREAT FOR A SH 1 FRACTURE IF XRAYS NORMAL
- - TREATMENT
 - TALL WALKING BOOT & WEIGHTBEARING AS TOLERATED (USE CRUTCHES IF STILL HAS PAIN WHILE IN THE BOOT)
 - REPEAT EXAM IN 3-4 WEEKS
 - REFER DISPLACED FRACTURES TO ORTHO



CASE #5

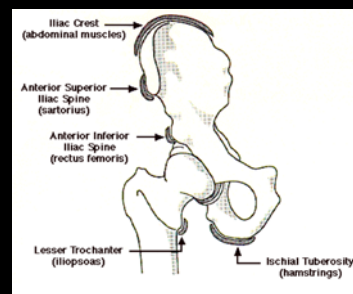
- - 16 YEAR OLD MALE SOCCER PLAYER WAS KICKING A SOCCER BALL
- - FELT AND HEARD A POP FROM HIS HIP
- - FELL TO THE GROUND AND HAD DIFFICULTY BEARING WEIGHT
- - HAS BRUISING AND SWELLING OF HIS HIP
- - TENDERNESS ON PALPATION OF ANTERIOR HIP
- - DECREASED STRENGTH & FLEXIBILITY

HIP AVULSION

- - CASES & COMMON PRESENTATIONS
 - MECHANISM OF INJURY IS SUDDEN FORCEFUL CONTRACTION OF MUSCLE
 - KICKING, SPRINTING, JUMPING
 - MOST COMMON AT ASIS, AIIS, ISCHIAL TUBEROSITY
 - ALSO CAN OCCUR AT ILIAC CREST, LESSER TROCHANTER, PUBIC SYMPHYSIS
 - USUALLY OCCURS BETWEEN AGES 14-18 YEARS OLD

HIP AVULSION

- - MUSCLE ATTACHMENTS AND MECHANISMS OF INJURY
 - ASIS (SARTORIUS) & AIIS (RECTUS FEMORIS)
 - KICKING, COMING OUT OF STARTING BLOCKS
 - LESSER TROCHANTER (ILIOPSOAS)
 - SPRINTING, HIP FLEXION
 - ISCHIAL TUBEROSITY (HAMSTRING)
 - HURDLES, SPLITS, HIGH KICK
 - ILIAC CREST (ABDOMINAL MUSCLES)
 - ABRUPT TRUNK ROTATION
 - CHANGE OF DIRECTION WITH RUNNING



HIP AVULSION

- - PHYSICAL EXAM
 - MAY HAVE BRUISING & SWELLING
 - TENDERNESS ON PALPATION OVER A GROWTH PLATE
 - PAIN WITH MOTION AND MANUAL RESISTED TESTS
 - ANTALGIC GAIT
- - IMAGING
 - XRAY AP PELVIS & FROGLEG LATERAL
- - TREATMENT
 - IF $> 2\text{CM}$ DISPLACEMENT REFER TO ORTHO
 - ACUTE: REST, CRUTCHES, ICE, ANALGESICS
 - SUBACUTE: PHYSICAL THERAPY \rightarrow ROM, STRETCHING, STRENGTHENING, THEN GRADUALLY GUIDE BACK ACTIVITIES



HIP APOPHYSITIS

- - COMMON PRESENTATIONS
 - GRADUAL ONSET PAIN OF PELVIS/HIP WITHOUT SPECIFIC TRAUMA
 - DUE TO CHRONIC TRACTION AT GROWTH PLATE WHERE TENDON INSERTS
 - SKELETALLY IMMATURE
- - PHYSICAL EXAM
 - TENDERNESS ON PALPATION AT SITE OF TENDON INSERTION
- - IMAGING
 - XRAY AP PELVIS & FROGLEG LATERAL OFTEN NORMAL
- - TREATMENT
 - REST X 4 WEEKS, PHYSICAL THERAPY, GRADUAL RETURN TO PLAY



CASE #6

- - 12 YEAR OLD LEFT HAND DOMINANT BASEBALL PITCHER HAS 2 WEEKS OF LEFT SHOULDER PAIN
- - HURTS WHEN THROWING, PARTICULARLY IF TRYING TO THROW HARD
- - HAS BEEN ICING AND TAKING IBUPROFEN BUT PAIN IS STILL PRESENT
- - HAD PAIN AT THE END OF LAST SEASON THAT WENT AWAY WHEN THE SEASON FINISHED

LITTLE LEAGUE SHOULDER (HUMERAL EPIPHYSITIS)

- - COMMON PRESENTATIONS
 - AGES 11-16 YEARS OLD
 - MECHANISM OF INJURY: REPETITIVE TORSIONAL STRESS
- - PHYSICAL EXAM
 - TENDERNESS OVER PROXIMAL HUMERUS
 - USUALLY WILL HAVE POSITIVE IMPINGEMENT SIGNS
- - IMAGING
 - XRAY SHOULDER (AP, AXILLARY, SCAPULAR Y VIEWS) MAY SHOW WIDENING OF THE PROXIMAL HUMERAL EPIPHYSIS
- TREATMENT:
 - REST & REHABILITATION: USUALLY 3 OR MORE MONTHS
 - GRADUAL RETURN TO THROWING PROGRAM



CASE #7

- - 12 YEAR OLD RIGHT HAND DOMINANT BASEBALL CATCHER WITH RIGHT ELBOW PAIN
- - 2 MONTHS OF ELBOW PAIN THAT IS GETTING WORSE
- - INITIALLY WAS A PITCHER BUT STOPPED DUE TO PAIN AND NOW CATCHING BUT CONTINUES TO HAVE PAIN

LITTLE LEAGUE ELBOW (MEDIAL CONDYLE APOPHYSITIS)

- - COMMON PRESENTATIONS
 - 8-15 YEARS OLD
 - USUALLY NO TRAUMA
 - MAY COMPLAIN OF WEAK & INEFFECTIVE THROWS
 - MOST COMMON IN PITCHERS, FOLLOWED BY CATCHERS, 3RD BASE, SS, OUTFIELD
 - MECHANISM OF INJURY= REPETITIVE VALGUS STRESS ON ELBOW FROM OVERHEAD THROWING
- - PHYSICAL EXAM
 - TENDERNESS OVER MEDIAL EPICONDYLE
 - PAIN WITH RESISTED WRIST FLEXION & FOREARM PRONATION

LITTLE LEAGUE ELBOW

- - IMAGING
 - BILATERAL ELBOW X-RAYS (AP, LATERAL & OBLIQUE VIEWS)
 - MAY SEE WIDENING OF PHYSIS
- - TREATMENT
 - REST, ICE, NSAIDS, IMMOBILIZATION (RARELY)
 - PHYSICAL THERAPY: ROM, STRENGTH (ELBOW, SHOULDER, TRUNK, LOWER EXTREMITY)



UPPER EXTREMITY INJURY PREVENTION

- - PREVENTION
 - PRESEASON STRENGTHENING AND GRADED RETURN TO THROWING PROGRAM AT LEAST 6-8 WEEKS PRIOR TO 1ST PRACTICE
 - FOCUS ON SCAPULAR STABILIZING, ROTATOR CUFF, HIP, TRUNK, & LOWER EXTREMITY STRENGTHENING
 - ADDRESS DEFICITS IN THE OFF SEASON
 - REST FROM OVERHEAD THROWING AT LEAST 3 MONTHS OUT OF THE YEAR
 - FOLLOW PITCH COUNTS & REST DAYS
 - MONITOR ALL TEAMS
 - PROPER MECHANICS
 - CLOSE ATTENTION TO TECHNIQUE & MONITORED BY COACHES
 - NO HIGH VELOCITY (>80MPH), CURVE BALLS OR SLIDERS UNTIL SKELETALLY MATURE (~14 YEARS OLD)
 - STOP IF HAVING PAIN & GET EVALUATED PROMPTLY

[HTTPS://WWW.LITTLELEAGUE.ORG/PARTNERSHIPS/PITCH-SMART/](https://www.littleleague.org/partnerships/pitch-smart/)

<http://m.mlb.com/pitchsmart/>

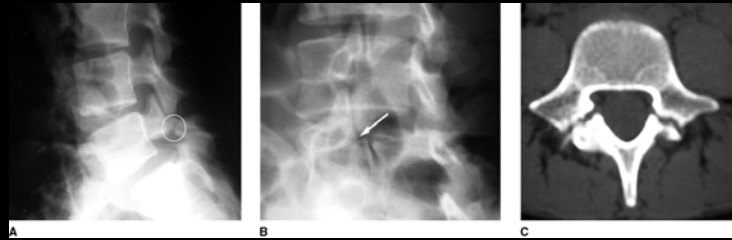
CASE #8

- - 15 YEAR OLD GYMNAST WITH RIGHT SIDED LOW BACK PAIN
- - BOTHERS HER WITH BENDING FORWARD BUT WORSENS WITH BACKWARD BENDING
- - IMPROVES WITH REST

SPONDYLOLYSIS (STRESS FRACTURE OF PARS INTERARTICULARIS)

- - COMMON PRESENTATION
 - ATHLETES WITH REPETITIVE EXTENSION OR ROTATION OF SPINE
 - GYMNASTS, DANCERS, FIGURE SKATING, FOOTBALL LINEMEN, ROWING
 - RISK FACTORS ARE FAMILY HISTORY AND SPINA BIFIDA
 - MOST COMMON AT L5 FOLLOWED BY L4
 - MAY BE SEEN IN HIGHER LUMBAR VERTEBRAE BUT MUCH LESS FREQUENT
- - PHYSICAL EXAM
 - MIDLINE TENDERNESS
 - PAIN WITH LUMBAR EXTENSION
 - POSITIVE STORK TEST
 - TIGHT HAMSTRINGS

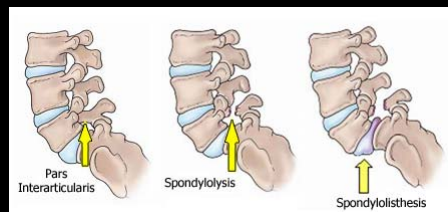
SPONDYLOLYSIS



- - IMAGING
 - XRAYS AP AND LATERAL LUMBAR SPINE
 - NO OBLIQUES
 - MRI/CT LUMBAR SPINE
 - DETERMINE WHAT IS BEST AT YOUR FACILITY & BE SURE TO TALK WITH RADIOLOGY

SPONDYLOLYSIS

- - TREATMENT
 - REST
 - BRACING CONTROVERSIAL
 - PHYSICAL THERAPY
 - AVOID EXTENSION
 - CORE STRENGTH, LOWER EXTREMITY FLEXIBILITY
- - COMPLICATIONS
 - SPONDYLOLISTHESIS: SUBLUXATION OF UPPER VERTEBRAE OF LOWER VERTEBRAE AT SITE OF BILATERAL SPONDYLOLYSIS
 - CHRONIC LOW BACK PAIN
 - NEUROLOGIC SYMPTOMS
 - SURGERY FOR WORSENING SPONDYLOLISTHESIS AND CHRONIC SYMPTOMS



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- THANK YOU TO REBECCA NORTHWAY, MARK RIEDERER & LAURIE DONALDSON

THANK YOU

• QUESTIONS?