THE COST OF MISDIAGNOSIS IN PHYSICAL THERAPY PRACTICE: A CASE REPORT ON ATHLETIC PUBALGIA IN THE POSTPARTUM RECREATIONAL ATHLETE

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OBJECTIVES

- Describe the anatomy and pathology involved in athletic pubalgia.
- Recognize anatomical changes of pregnancy that can contribute to occurrence of athletic pubalgia.
- Explain the impact of misdiagnosis on patient well-being for patients with athletic pubalgia.
- Identity tests and measures that assist in accurate diagnosis of athletic pubalgia.
- Implement an evidence-based treatment approach to improve outcomes for patients with athletic pubalgia.

KEY TERMS[1-2]

- **Definition**: "chronic lower abdominal pain and groin pain without the presence of a true hernia"[1(p31)]
- **Hallmark Symptoms**: Severe lower abdominal, pubic, or groin pain with exertion
- **Synonyms**: Gilmore's groin, sports hernia, groin disruption injury, core muscle injury

PREVALENCE/INCIDENCE[3-4]

- 10% to 13% of all injuries per year in soccer players
- Diagnosed in nearly 1/2 of 189 athletes with chronic groin pain in one study
- Identified as underlying pathology in 39% of patients in another study
- More common in men
  - Pelvic anatomy
  - Participation in competitive sports

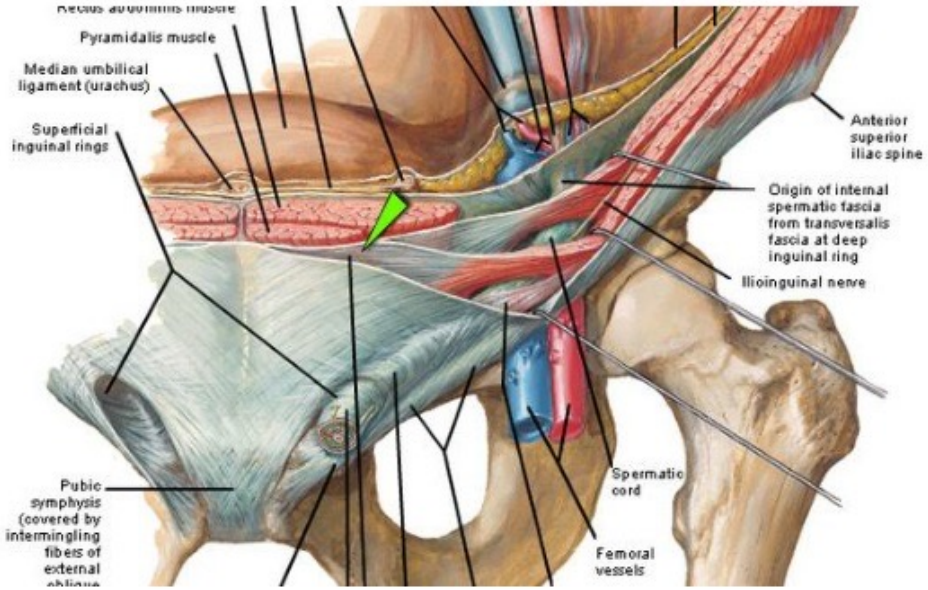
ANATOMY[1-4]

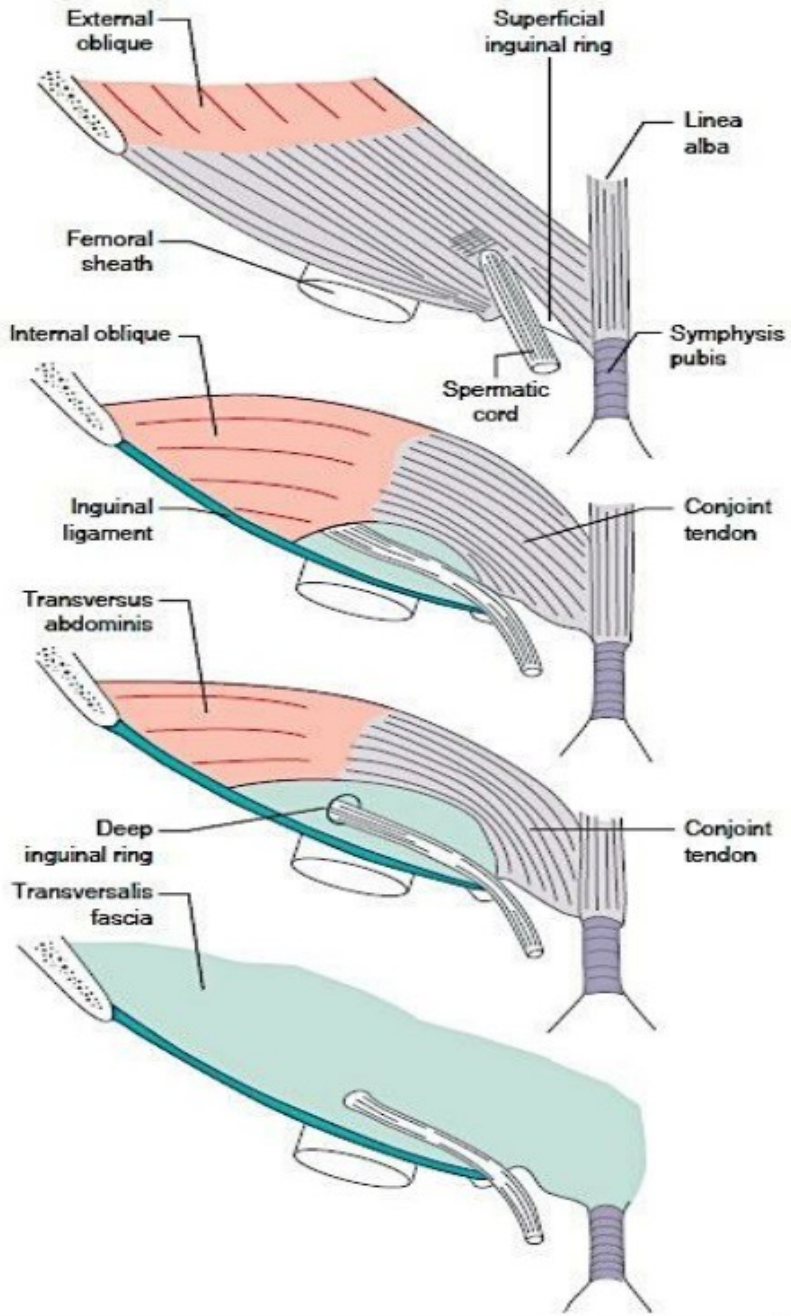
- Occurs as a result of an injury to the structures that comprise the pubic aponeurosis
- Various structures may be involved: transversalis fascia at the posterior inguinal wall, insertion of distal RA, conjoint tendon, adductors
  - Conjoint tendon formed by internal oblique and TrA

TABLE 4. Anatomical Defects Identified in 100 Consecutive MRIs of Athletic Pubalgia Patients in 2006

Structure	Incidence (%)
Pubic symphysis	93
RA	76
Adductor longus	46
Pectineus	38
Adductor brevis	20
Iliopsoas	6
Rectus femoris	2
Sartorius	1
Pubic ramus	1
Obturator ext	1
Gracilis	1
Hamstring	1
Adductor magnus	1
Hip	16

Conjoint tendon





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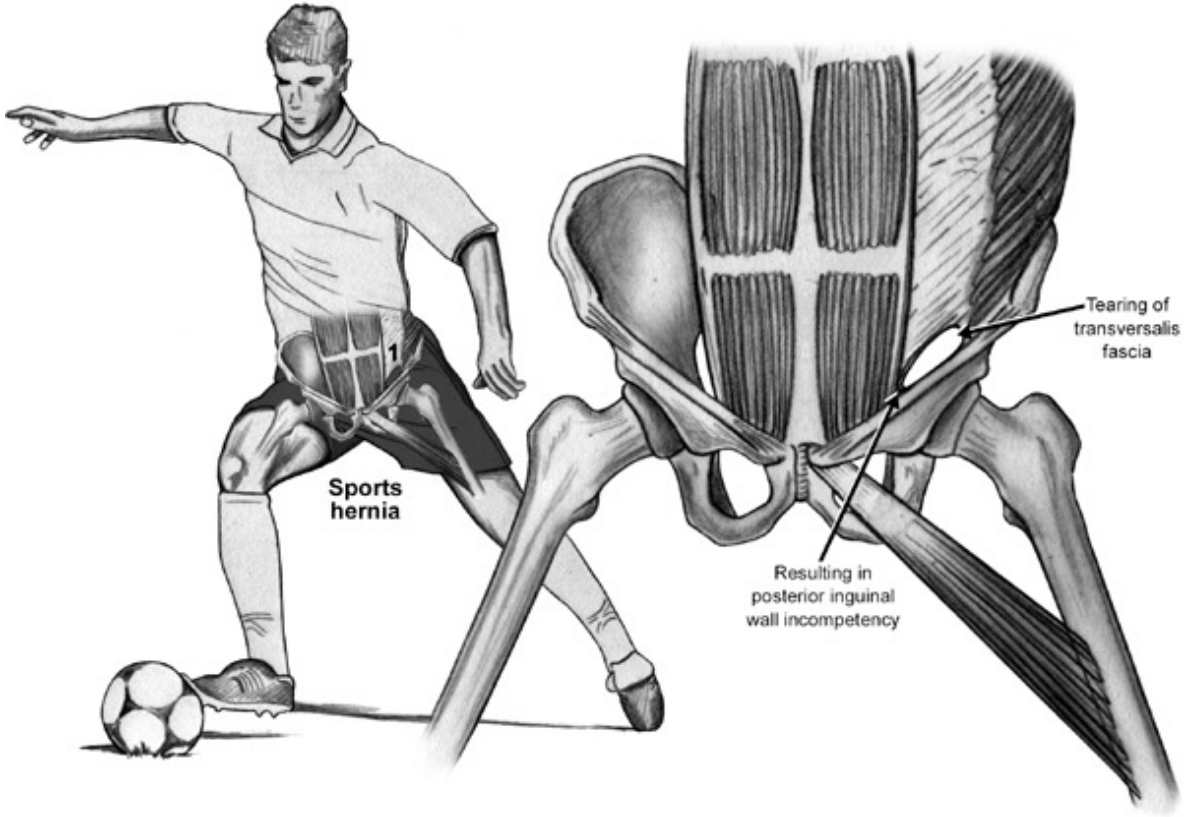
PATHOLOGY[1-3]

- Opposing forces of the rectus abdominus and adductor longus at the pubic symphysis
- When the rectus abdominus is weakened, the adductor longus pull is unopposed
- Injury often occurs during sprinting, kicking, and cutting with trunk hyper extension
- Diagnosis difficult due to complexity of anatomy involved
- Often associated with other pathology

TABLE 1
Distribution of Sports Played by Athletes who Underwent First-Time Operations in the Present Series

Sport	Patients *N* (%)
Soccer	73 (46)
Hockey	26 (17)
Football	21 (13)
Baseball	7 (4)
Track	6 (4)
Swimming	5 (3)
Basketball	4 (3)
Marathon/triathlon	4 (3)
Tennis	4 (3)
Golf	2 (1)
Other	5 (3)
Total	157 (100%)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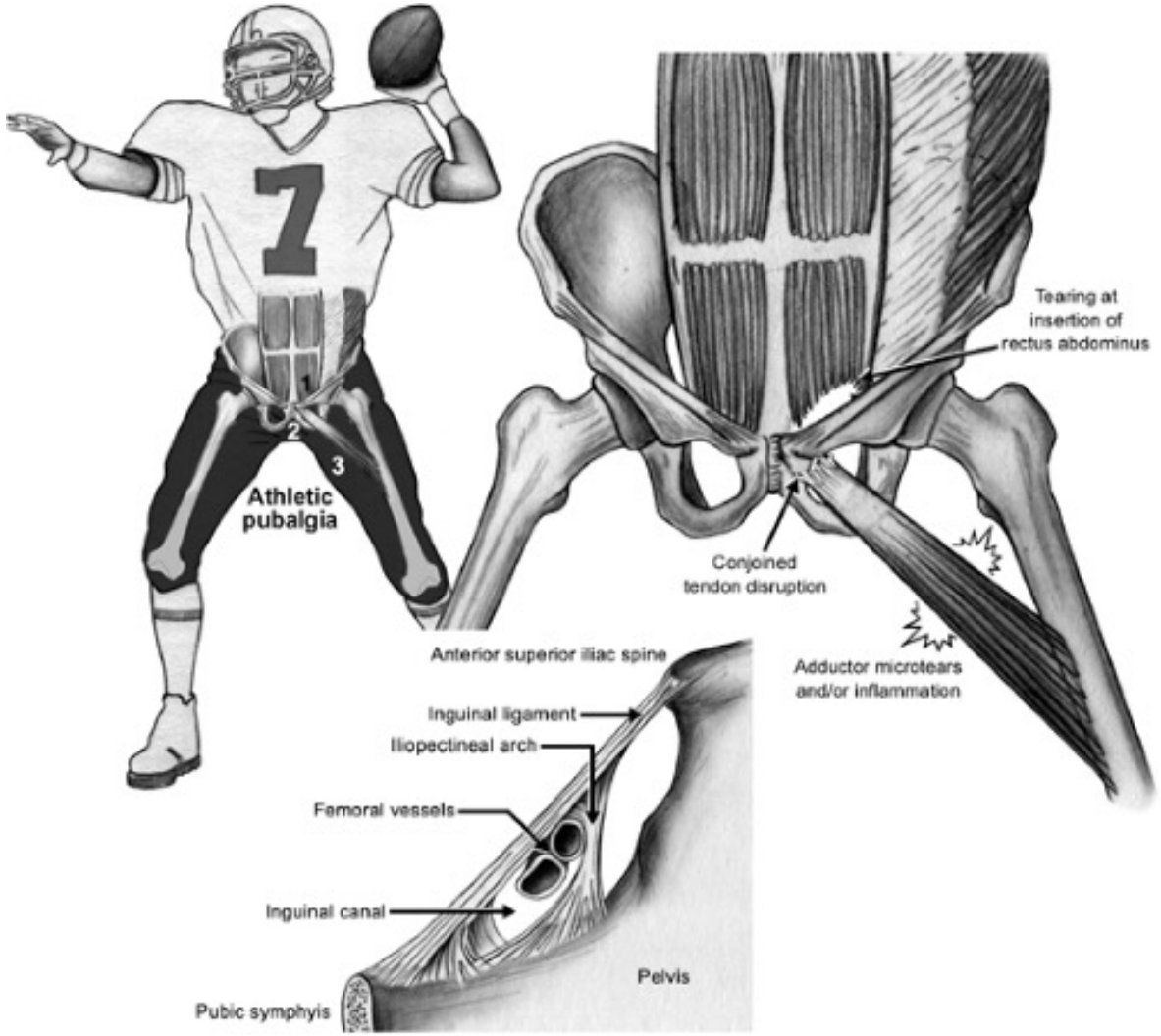
Sports hernia
Tearing of transversalis fascia
Resulting in posterior inguinal wall incompetency


7
1
2
3
Athletic pubalgia
Tearing at insertion of rectus abdominus
Conjoined tendon disruption
Adductor microtears and/or inflammation
Anterior superior iliac spine
Inguinal ligament
Iliopectineal arch
Femoral vessels
Inguinal canal
Pelvis
Public symphyis

IMAGING[1,3]

- Hip and pelvis x-ray – identify other hip pathology
- Diagnostic US becoming more common – assess relaxed and in strained position
- MRI – axial & coronal oblique sequences through the pubic symphysis
- High resolution MRI – may identify tears in RA or conjoint tendon
  - MRI 68% sensitive and 100% specific for RA pathology
  - MRI 86% sensitive and 89% specific for adductor pathology

Determining the Course of Rehab[5]

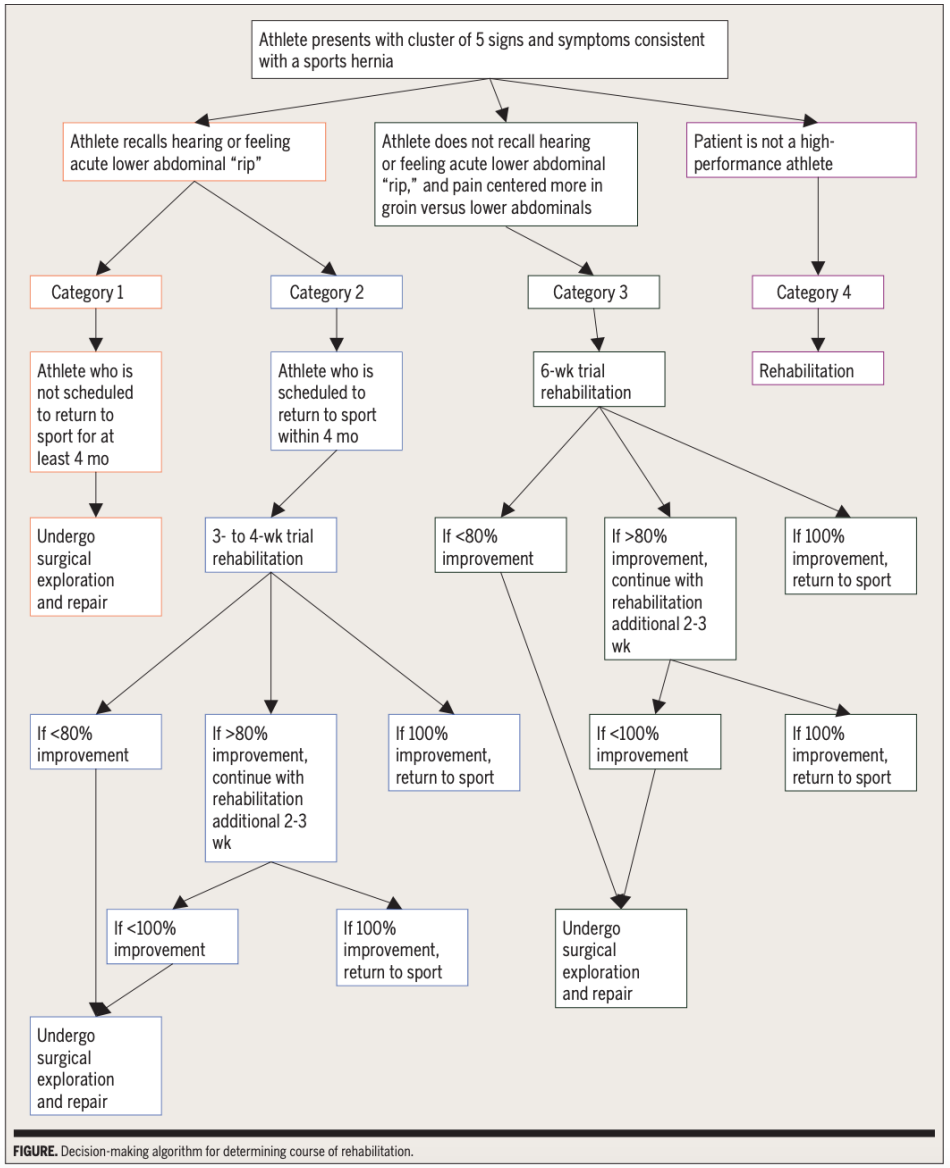


FIGURE. Decision-making algorithm for determining course of rehabilitation.

SURGICAL INTERVENTION[4]

- Adductor Release
- Pelvic Floor Repair
- With and without inguinal mesh
- 95% surgical success rate in high performance athletes

TABLE 3
Operations Performed on the 157 Athletes who Underwent Surgery in This Study[a]

Operation	Number of procedures (%)
Bilateral rectus abdominis muscle reattachment	
With unilateral adductor release	3 (2)
With bilateral adductor release	14 (9)
Without adductor release	54 (34)
Subtotal	71 (44)
Right rectus abdominis muscle reattachment	
With ipsilateral adductor release	10 (6)
Without adductor release	37 (23)
Subtotal	47 (29)
Left rectus abdominis muscle reattachment	
With ipsilateral adductor release	9 (6)
Without adductor release	33 (21)
Subtotal	42 (27)
Total	160 (100)[b]

[a] Note that three athletes each underwent two unilateral operations; each initially had surgery on one side and later had surgery on the contralateral side.
[b] The percentage totals actually add up to 101% because of rounding.

IMPACT OF PREGNANCY[6]

- Elongation of the abdominals can result in muscle weakness
- Falls occur in up to 27% of pregnant individuals
- Could joint laxity increase risk for injury??

CASE REPORT - SUBJECTIVE

- 31 year old female referred by MD for groin strain
- **MOI**: Fall into split stance while performing barefoot resisted lunges while 21 weeks pregnant -> cleared by OBGYN
- **Chief Complaint**: R lower abdominal pain and L groin pain
- **Functional Limitations**: Squatting, Walking, Household chores, Child care activities, especially rising from the ground, Urination
- "Failed" PT with dx of pubic symphysis dysfunction
- X-ray and standard MRI – negative

CASE REPORT - OBJECTIVE

- **MMT**: B hip weakness all planes, LLE weaker than RLE globally, Lower abdominals - fair
  - Pain with B resisted adduction -> worse with knees in flexion, Pain with abdominal MMT
- **AROM**: Pain with B hip flexion and trunk flexion
- **PROM**: B hip subluxation at end range ER
- **Palpation**: Painful pubic tubercle and left obturator internus
  - Urinary urgency present with palpation of right compressor urethra during internal examination
- **LEFS**: 42/80 (52.5%)

CASE REPORT – ASSESSMENT/ DIAGNOSIS[4]

Working Diagnoses

- Conjoint Tendon Pathology***
- Glenohumeral Labral Tear
- Pubic Symphysis Diastasis
- Abdominal Hernia

CASE REPORT - PLAN

- Went with patient to sports medicine physician appointment
- Referred out of state to be evaluated by a specialist
  - Cost was a significant concern
- Confirmed diagnosis of athletic pubalgia with bilateral adductor involvement

CASE REPORT – INTERVENTION/OUTCOMES

- Pt attended prehab PT 1-2x/week
  - Gentle Hip Strengthening/Motor Control, Manual Therapy
- Surgery Jan 2022
- Pt attended PT 2x/week
  - Trunk & Hip AROM, Hip & Core Strengthening/Motor Control
- D/C after 18 sessions -> insurance limitations
  - **LEFS**: 68/80 (85%)

UNFORESEEN EVENTS

- Following discharge, pt reached out to me regarding continued pain in adductors
- Several follow ups with surgeon
- Encouraged consultation with Dr. Meyers (Philadelphia)
  - Confirmed that B adductor tears were present
- Surgery Nov 2022

CASE REPORT - INTERVENTIONS

- 6 week Rehab Guidelines (Vincera Rehab)
  - 1-7 Days: walking program, isometrics, unresisted hip strengthening, core activation (supine, quadruped)
  - 8-14 Days: gentle LE stretching, resisted hip strengthening, functional hip strengthening, static single leg stance activities, modified planking, light supervised jogging
  - 15-21 Days: light agility tasks, easy plyometrics, single leg deadlifts, running

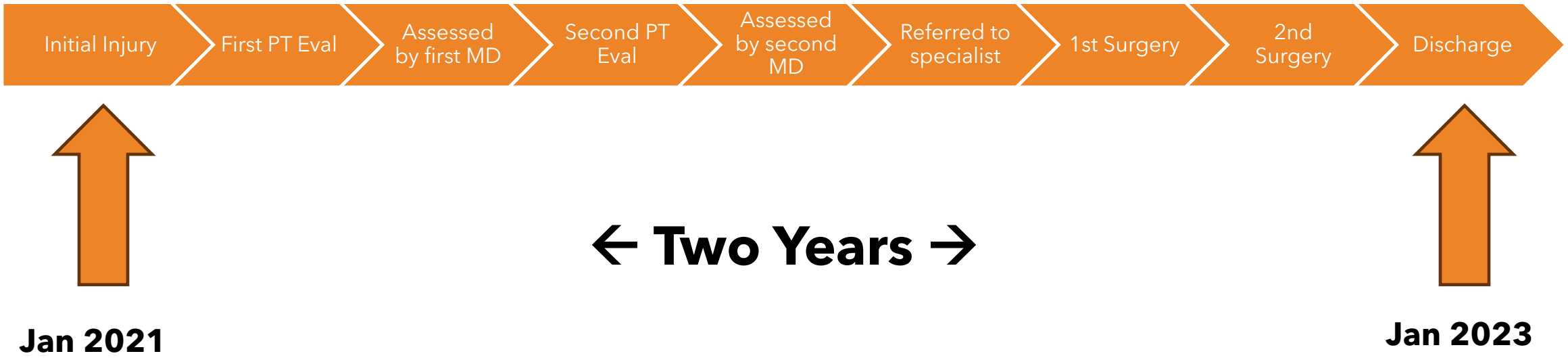
CASE REPORT - INTERVENTIONS

- 6 week Rehab Guidelines (Vincera Rehab)
  - 22-28 Days: increasing speed with agility, multi planar lunging and single leg exercises, non contact drills, limited abdominal exercises, UE weight training at 50%
  - 29-35 Days: single leg hopping, box jumps, sports specific exercises/drills & controlled sports practice
  - Day 36+: return to full activity, long term core strengthening program

CASE REPORT – OUTCOMES

- D/C after 8 sessions
  - **LEFS**: 78/80 (97.5%)
- L hip MMT: Adductors 4/5, Glute max 4/5, Glute medius 4+/5
- R hip MMT: Adductors 4-/5, Glute max 4/5, Glute medius 4+/5
- Worst pain: 2/10
- Palpation: Mild tenderness B rectus abdominus/TrA

CASE REPORT – TIMEFRAME



The National Academy of Medicine (NAM) has called diagnostic error a "blind spot" for modern medicine and improving diagnosis a "moral, professional, and public health imperative."[7]

MISDIAGNOSIS STATS[7-8]

- 1 in 18 Emergency Department patients receives an incorrect diagnosis
- 1 in 50 suffer an adverse event
- 1 in 350 suffer permanent disability or death
- Female sex and non-White race associated with 20-30% increase in misdiagnosis
  - One study showed that women with chronic conditions wait an average of 4 years for a definitive diagnosis
- Causes of diagnostic errors were mostly cognitive errors linked to process of bedside diagnosis
- 90% of malpractice claims were associated with failures of clinical assessment, reasoning, and decision making

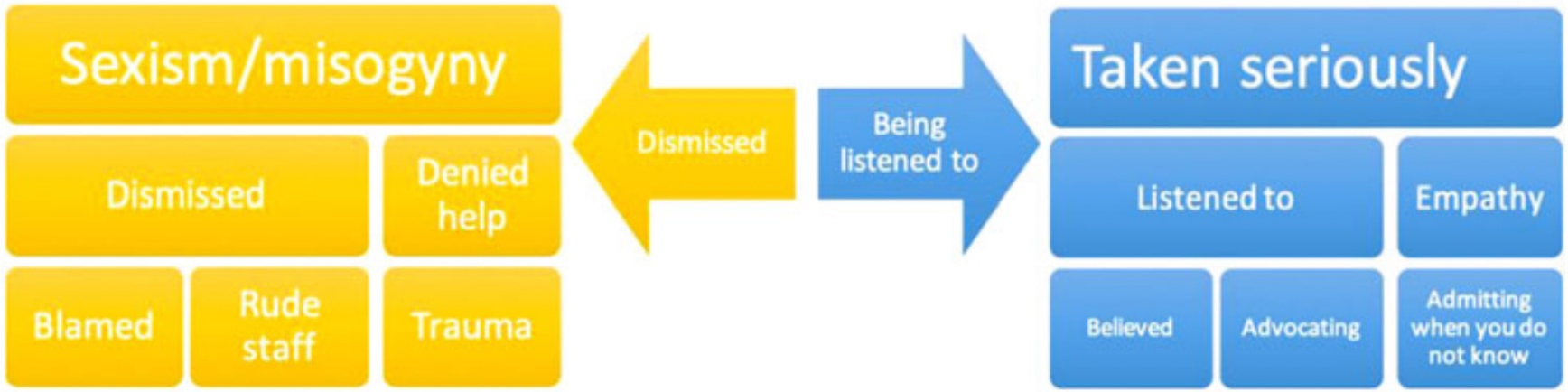
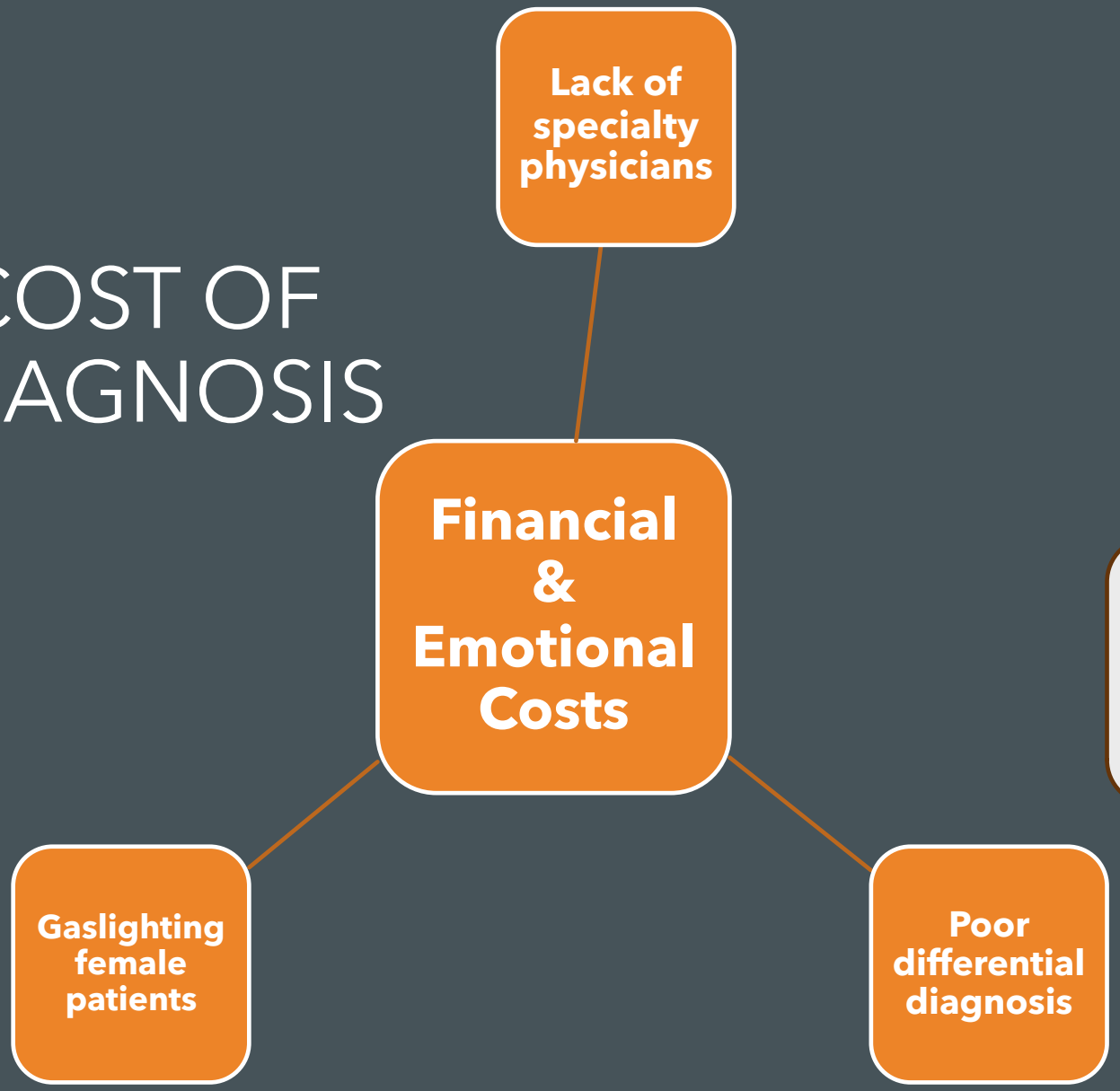


FIG. 1. Experiences as a spectrum during encounters with health care staff in Australia.[8]

THE COST OF MISDIAGNOSIS



Financial Burden

Surgery 1: $11,000
Surgery 2: $19,000
MRI 1: $700
MRI 2: ???
PT: $2,500
Hotels: $1,800
Time off work: $4,000
Total Expenses: $39,000+

"The most concerning thing to me was my mental state. I was in such a dark place. I'm not sure what would have happened to me if it weren't for my son and you saving me."

MINIMIZING DIAGNOSTIC ERROR[9]

1. Patients as partners in the diagnostic process – discuss diagnostic uncertainty

2. Seek second opinions when uncertain.

3. Use a diagnostic checklist.

KNOW THE PATIENT[9]

1

1. Never rush to fit a pattern to a particular diagnosis.

2

2. Make patients partners in their care and diagnosis.

3

3. Keep an open mind even if the patient comes in with a known diagnosis.

4

4. Revisit the diagnosis as new diagnostic tools, treatments, and conditions are described.

5

5. Do not miss conditions that can become catastrophic if delayed.

KNOW THE TESTS[9]

1

1. Know limitations of tests.

2

2. The value of a test depends on the clinical suspicion.

3

3. Tests can be performed to confirm, rule out, or differentiate between similar diagnoses.

4

4. Tests may give new information that had not been previously considered.

5

5. Use as many resources as possible.

KNOW YOURSELF[9]

1

1. Refer the patient if the case is outside of your limitations.

2

2. Learn from each case - both the ones that are diagnosed and the ones that are missed.

3

3. Be prepared to say, "I don't know."

4

4. Do not rush the thinking process.

5

5. Question the diagnosis if new signs or symptoms develop.

ATHLETIC PUBALGIA S/S[5]

- (1) a subjective complaint of deep groin/lower abdominal pain
- (2) pain that is exacerbated with sport-specific activities such as sprinting, kicking, cutting, and/or sit-ups and is relieved with rest
- (3) palpable tenderness over the pubic ramus at the insertion of the rectus abdominus and/or conjoined tendon
- (4) pain with resisted hip adduction at 0, 45 and/or 90 degrees of hip flexion
- (5) pain with resisted abdominal curl-up

SPECIAL TESTS[10]

Resisted cross body sit up	100% SN, 3% SP
Straight leg sit up	74% SN, 20% SP
External rotation Stinchfield test	15% SN, 60% SP
Adductor contracture	100% SN, 3% SP
Combined	100% SN, 0% SP

CONCLUSION

- Accurate diagnosis of athletic pubalgia can be challenging in the recreational athlete
- The complexity of pregnancy contributes to biomechanical risk factors associated with athletic pubalgia
- A thorough exam and excellent understanding of the hip and pelvic anatomy is critical to avoid misdiagnosis
- Correct diagnosis can prevent significant financial and emotional costs for patients

PATIENT PERSPECTIVE

"Having a core muscle injury during pregnancy, delivery, and the postpartum period was incredibly challenging, not only physically but mentally as well. It took nearly a year, several specialists and two physical therapists to finally receive a proper diagnosis. Finally getting the diagnosis and the treatment required through surgical intervention and physical therapy was truly life changing. It was fascinating to see my recovery regimen developed through a combination of sports medicine and pelvic health physical therapy. I have learned so much about my body throughout this process. I continue to implement that knowledge daily as I further my recovery and prevent future injury." -Anonymous

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