Treating the complicated orthopaedic patient: four cases from four practitioners

JOSH CLELAND, WILLIAM O'GRADY, LOUIE PUENTEDURA, CAROL A. COURTNEY

Disclosure

The presenters have no relevant financial or non-financial relationships to disclose.

Objectives for today's presentation

Participants will:

- explore the foundation, applied and clinical sciences relating to the complex cases
- develop an evidence-based approach to the physical therapy management of more complex clinical problems
- critically appraise the cases presented, leading to further development of clinical reasoning and decision making skills
- demonstrate a critical understanding of the foundation and clinical sciences that relate to human function through application to complex clinical problems

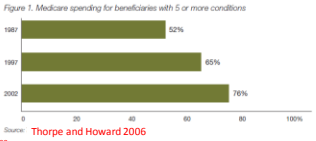
The complex patient

A high % of health care expenditures are associated with a small proportion of the population:

people with complex health care needs

Demographics

- Often are Medicare beneficiaries
- multiple chronic conditions
- frequent hospitalizations
- Limited ability to perform basic daily functions due to physical, mental and psychosocial challenges Bodenheimer and Berry Millett 2009



Thorpe and Howard 2006

Cost and quality are intertwined

- patients who require more detailed history taking, counseling, and medication-prescribing often experience **inadequate quality of care** Bodenheimer and Berry Millett 2009
- Poor quality of care =
  - more medical procedures
  - more hospitalizations

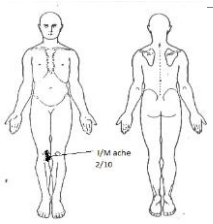
Only 30% of vulnerable older people receive adequate counseling and history taking Min 2005

29% of elderly HMO patients receive at least one potentially inappropriate drug Simon 2005

Patients with multiple medical conditions

- Often excluded from clinical trials to control confounding variables
- Leaves a void in the research literature regarding physical therapy management

Musculoskeletal pain



- May present with myriad of symptoms
- Confusing to clinician
- Leads to non-specific diagnoses (eg: Low Back Pain)

Common Comorbidities

Chronic Pain

- 100 million Americans suffer from chronic pain
- Cost = $600 billion annually Institute of Medicine 2011
- Symptom burden and # of comorbidities impact function and independence with ADLs

Common Comorbidities

Psychiatric

Changes in pain severity predicted subsequent depression severity, and vice versa Kroenke 2011

Common Comorbidities

Metabolic Syndrome

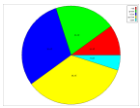
- Obesity and high BMI
  - associated with impaired functional capacity
  - reduced quality of life (QoL) in patients with chronic pain conditions
  - Systemic inflammation involved in metabolic syndrome **and** initiates/perpetuates chronic pain

Arranz 2014

How do we measure the impact of comorbidities in the complex patient?

Comorbidity Symptom Scale	Crabtree et al 2000
Geriatric Index of Comorbidity	Rozzini 2002
Total Illness Burden Index	Greenfield 1995

Clinical Reasoning



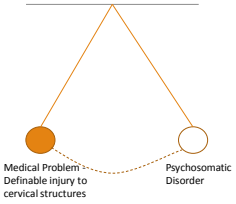
Neck Pain, Headache and Dizziness in a female patient who was involved in a MVA 2 years prior

LOUIE PUENTEDURA

Whiplash Continues Its Challenge

GWENDOLEN JULL, AO, PhD, MPhty, FACP
Physiotherapy, School of Health and Rehabilitation Sciences, The University of Queensland, Brisbane, Australia.

- "Reports on recovery rates over past 30 years have shown little if any variation"
- Approx. ½ of people who sustain an injury will recover within 3 months – rest will have ongoing symptoms for years
- To date – no management approach has made any advance on improving recovery rates
- A big problem has been extreme swings in etiological and management thoughts



The Patient

Medical History

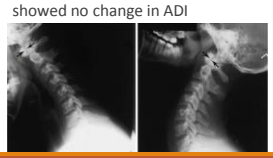
- 32 year old female receptionist - currently unemployed
- Depression
- Anxiety
- Meds: Prozac, Phenergan, Cymbalta, Vicodin

History

- Lives alone
- Rear-ended at stop light 2 years ago
- Immediate onset of severe neck pain, headache and dizziness
- X-rays and CT Scans at ER negative for fracture/ dislocation
- Diagnosed with WAD Grade III
- Given soft cervical collar (still wearing it at times)
- Referred to physical therapy and had 12 visits in 2 months
- Self-referred to chiropractor and had > 60 visits over a year

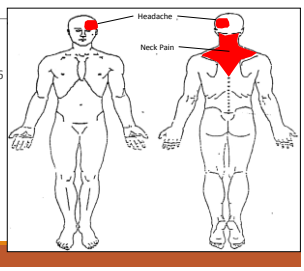
History Continued

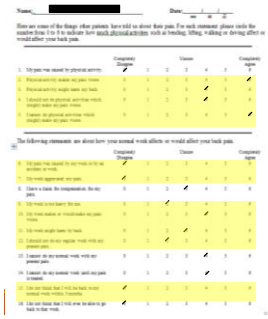
- Initial PT was modalities and exercises
- Limited progress – began to develop dizziness and headaches
- Chiropractic initially included thrust techniques to entire spine
- After 3 months, non-thrust 'adjustments' and modalities/ physiotherapy
- Saw Orthopaedic Surgeon for suspected A-A instability
- Cervical flexion – extension films showed no change in ADI



Baseline Status

NDI: 28/50 (56%)
NPRS: 4 current, 2 best, 8 worst (4.7)
Headache Disability Index: E – 36/ F – 30/ Total - 66
Cervical Flexion: 50° (50)
Cervical Extension: 29° (60)
Left Lateral Flexion: 32° (45)
Right Lateral Flexion: 38° (45)
Left Rotation: 58° (80)
Right Rotation: 65° (80)





FABQPA = 20/24

FABQW = 11/42

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Special Tests

- Compression (-)
- Distraction (-)
- Modified Sharp-Purser (-)
- Alar ligament (-)
- Cervical Flexion-Rotation Test – L 24°/ R 40°
- Blood Pressure – 130/74
- Heart Rate – 74
- Palpation – familiar neck pain reproduced with unilateral PA on left C2 and C3
- Hypomobility noted with central PA at C2, C3 and C4
- Headache aggravated by sub occipital compression and traction
- No reproduction of dizziness with special tests or palpation

5 D's	And	3 N's
Dizziness	~~Ataxia~~	~~Nystagmus~~
~~Diplopia~~		~~Numbness~~
~~Dysphagia~~		Nausea
~~Drop attacks~~		
~~Dysarthria~~		

History

AGGRAVATING

- Looking up
- Computer at home
- Reading
- Driving

RELIEVING

- Massage
- Lying on heating pad

SINSS

- Severity: Moderate
- Irritability: Non-Irritable
- Nature: MSK + Cervicogenic Headache
- Stage: Chronic
- Stability: Stable

My Thoughts?

Treatment

Visit 1: Pain Neuroscience Education, Manual Therapy and Exercise
- Explanation – why do you still hurt after 2 years?
  - Nociceptive input from upper cervical spine
  - Mild central sensitization
- Upper cervical spine non-thrust mobilization
- Thoracic spine manipulation
- Three finger cervical ROM exercise

Re-eval Visit #2

GROC: +5

NPRS: 0 current, 0 best, 6 worst (3) (4.7)

Cervical Flexion: 50° (50)

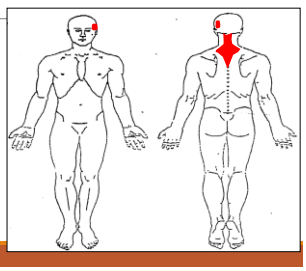
Cervical Extension: ~~29°~~ 42°(60)

Left Lateral Flexion: ~~32°~~ 38°(45)

Right Lateral Flexion: ~~38°~~ 42°(45)

Left Rotation: ~~58°~~ 68°(80)

Right Rotation: ~~65°~~ 75°(80)



Treatment

Visits 2 - 5: Pain Neuroscience Education, Manual Therapy and Exercise

- Explanation – body maps in the brain
  - Manual Therapy as homunculus refreshment
- Upper cervical spine mobilization progressed to manipulation
- Thoracic spine manipulation
- Deep neck flexor training
- Chin retractions and thoracic extension exercises
- Upper body ergometer, cable rows and lat pulls

Treatment

Visits 6 - 9: Pain Neuroscience Education and Exercise

- Explanation – pain is 'normal' and necessary in life
  - Addressing fears of return of neck pain and headache
  - Yellow flags – DIMS and SIMS
- Deep neck flexor training
- Cervical proprioceptive work with head mounted laser
- Upper cervical flexion and thoracic extension exercises
- Progressive resistance exercises for upper quarter

Re-eval and D/C Visit #9

GROC: +7

NPRS: 0 current, 0 best, 3 worst (1) (4.7)

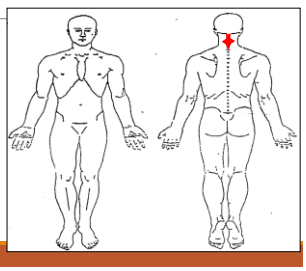
NDI: 5/50 (10%) (56%)

Headache Disability Index:

- E – 36/ F – 30/ Total – 66 (baseline)
- E – 10/ F – 8/ Total - 18

Patient started new job as receptionist at dental clinic a week after D/C from PT

Called 1 month post-D/C and reported she was doing well

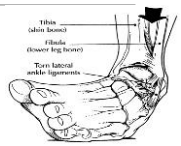


Lower Extremity Complex Regional Pain Syndrome in a Patient who had Previously Sustained an Ankle Fracture

JOSH CLELAND

Ankle Sprains

- Annual incidence 7/1000 people
- 61% due to inversion sprain
  - (Holmer et al., 1994)
- Grade I (71.3%)
- Grade II (9.5%)
- Grade III (2.9%)
  - (Fallat et al., 1998)
- Up to 72% report persistent symptoms at 6 month follow-up (Braun et al., 1999)
- Reinjury rate post inversion sprain may be as high as 80% (Smith et al., 1986)



The Patient

Medical History

- 63 year old male postal worker- currently on workers compensation
- Type II Diabetes
  - Cardiac event 3 years prior resulting in a cardiac stent
- Anxiety
- Meds: Precose, Plavix, Xanax, Aspirin

History

Lives with wife who is also employed at the postal office.

He was delivering mail in February and was running away from a dog.

Jumped off the curb and reportedly "rolled his ankle".

ORIF right fibula that night.

Placed in walking boot X 6 weeks.

After boot was removed he was referred to physical therapy.

History Continued

Initial therapist began working on increasing gait, range of motion, and strength.

2 weeks with limited progress began to develop redness, increased sudomotor activity, and swelling.

Patient became hypersensitive (allodynia) to palpation and therapist could no longer perform manual techniques.

Returned to MD and referred back to PT with diagnosis of CRPSI (2 month later).

Baseline Status

LEFS: 36

NPRS: 4 best, 8 worst

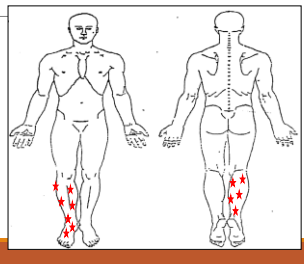
Dorsiflexion: 0 degrees

Plantarflexion: 15 degrees

Strength: unable to test

Negative SLR 65 degrees

Antalgic gait



Patient Presentation

"Over the past 2 weeks, have you felt down, depressed or hopeless?"

"Over the past 2 weeks, have you felt little interest or pleasure in doing things?"

"yes" answer: 96% Sn,

Responded- "No" to both questions

"I would like to get back into doing everything I enjoy"

"I only have 2 more years to retirement"

FABQ

	Completely Disagree		Unsure				Completely Agree
1. My pain was caused by physical activity	0	1	2	3	4	5	6
2. Physical activity makes my pain worse	0	1	2	3	4	5	6
3. Physical activity might harm my back	0	1	2	3	4	5	6
4. I should not do physical activities which (might) make my pain worse	0	1	2	3	4	5	6
5. I cannot do physical activities which (might) make my pain worse	0	1	2	3	4	5	6

20

The following statements are about how your normal work affects or would affect your back pain.

	Completely Disagree		Unsure				Completely Agree
6. My pain was caused by my work or by an accident at work	0	1	2	3	4	5	6
7. My work aggravated my pain	0	1	2	3	4	5	6
8. I have a claim for compensation for my pain	0	1	2	3	4	5	6
9. My work is too heavy for me	0	1	2	3	4	5	6
10. My work makes or would make my pain worse	0	1	2	3	4	5	6
11. My work might harm my back	0	1	2	3	4	5	6
12. I should not do my regular work with my present pain	0	1	2	3	4	5	6
13. I cannot do my normal work with my present pain	0	1	2	3	4	5	6
14. I cannot do my normal work until my pain is treated	0	1	2	3	4	5	6
15. I do not think that I will be back to my normal work within 3 months	0	1	2	3	4	5	6
16. I do not think that I will ever be able to go back to that work	0	1	2	3	4	5	6

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History

AGGRAVATING

- Tactile stimulation
- Walking
- Stairs
- Driving

RELIEVING

- Removing sock and shoe
- Elevating lower extremity

SINSS

- Severity: Moderate
- Irritability: Irritable
- Nature: MSK + CRPS
- Stage: Chronic
- Stability: Stable

My Thoughts?

Treatment

Visits 1-4: Manual Techniques Targeting Thoracic Region

- Thoracic manipulation
- Costovertebral manipulation
- Slump long sitting
  - Thoracic and CV mobilization
- Slump long sitting with sympathetic emphasis
  - Thoracic and CV mobilization
- Self mobilizations

Re-eval Status Visit #5

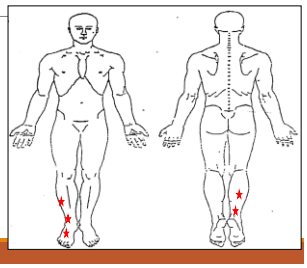
LEFS: 49

NPRS: 2 best and 5 worst

GROC: +4 Mod better

"When will I be able to return to work?"

"Able to walk for 15 mins"



FABQ

	Completely Disagree		Unsure				Completely Agree
1. My pain was caused by physical activity	0	1	2	3	4	5	6
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4. I should not do physical activities which (might) make my pain worse	0	1	2	3	4	5	6
5. I cannot do physical activities which (might) make my pain worse	0	1	2	3	4	5	6

12

The following statements are about how your normal work affects or would affect your back pain.

	Completely Disagree		Unsure				Completely Agree
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8. I have a claim for compensation for my pain	0	1	2	3	4	5	6
9. My work is too heavy for me	0	1	2	3	4	5	6
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15. I do not think that I will be back to my normal work within 3 months	0	1	2	3	4	5	6
16. I do not think that I will ever be able to go back to that work	0	1	2	3	4	5	6

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Visits 5- 14

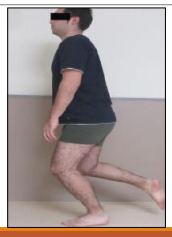
Continued with thoracic treatments

Desensitization activities

AROM right ankle

Manual therapy directed at ankle and tib/fib

Strengthening activities right ankle



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DANE K. WUKICH, MD • JOSEPH J. GODGES, DPT, MA

Ankle Stability and Movement Coordination Impairments: Ankle Ligament Sprains

Clinical Practice Guidelines Linked to the International Classification of Functioning, Disability and Health From the Orthopaedic Section of the American Physical Therapy Association

J Orthop Sports Phys Ther. 2013;43(9):A1-A40. doi:10.2519/jospt.2013.0305

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Ankle Stability and Movement Coordination Impairments: Ankle Ligament Sprains

INTERVENTION – ACUTE/PROTECTED MOTION PHASE – MANUAL THERAPY: Clinicians should use manual therapy procedures, such as lymphatic drainage, active and passive soft tissue and joint mobilization, and anterior-to-posterior talar mobilization procedures, within pain-free movement to reduce swelling, improve pain-free ankle and foot mobility, and normalize gait parameters in individuals with an acute lateral ankle sprain. (Recommendation based on moderate evidence.)

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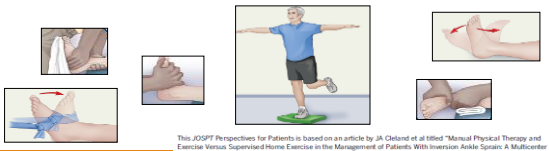
Ankle Stability and Movement Coordination Impairments: Ankle Ligament Sprains

A Clinicians should include manual therapy procedures, such as graded joint mobilizations, manipulations, and non–weight-bearing and weight-bearing mobilization with movement, to improve ankle dorsiflexion, proprioception, and weight-bearing tolerance in patients recovering from a lateral ankle sprain.

Objective

To compare the effectiveness of a manual therapy and exercise approach (MTEX=8 sessions) to a supervised home exercise program (HEP=4 sessions) in the management of individuals with inversion ankle sprain



This *JOSPT* Perspectives for Patients is based on an article by JA Cleland et al titled "Manual Physical Therapy and Exercise Versus Supervised Home Exercise in the Management of Patients With Inversion Ankle Sprain: A Multicenter Randomized Clinical Trial," *J Orthop Sports Phys Ther 2013;43(7):443-455. doi:10.2519/jospt.2013.4792.*

Final Visit (4 months)

LEFS: 69

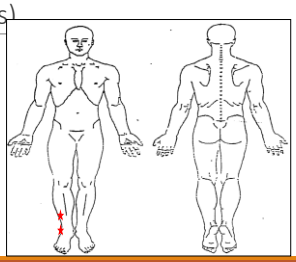
NPRS: 0 best and 2 worst

GROC: +6= Great deal better

"When will I be able to return to work?"

"Able to walk for 15 mins"

Returned to work 4 hrs per day progressing to full duty



Hip pain with radiating symptoms into the lateral thigh

WILLIAM O'GRADY

Medical History

70 y/o ex athlete and avid golfer

TURP for BPH 1 year ago

History of chronic recurrent LBP for 20 years; Recurrent SIJ issues

Positive neuro findings in L/Es

Mild to moderate hypertension; IBS/Colitis x 35 years

Treated with PT off and on for 30 years successfully with manual therapy and exercise

Meds: Vitamins, Bentyl and Ibuprofen PRN

Present complaints

C/O right hip pain radiating down lateral thigh and inability to completely off his left heel with heel raises.

Onset 1-2 months prior to visit but thinks either a change in his stair climbing ex intensity or golf as the the possible cause

Pt. is very active plays golf and works out heavily with stair climber

Pt rates his pain at 6/10 at worse and 1/10 at best

Unable to sleep a full night without waking up to move due pain

Aggravating factors

Walking slowly for more than 10 minutes at a time on hard surfaces

Sleeping on either side L>R

Sitting with legs crossed

Standing for more than a half hour in one place and shifting his weight to the right

Walking on uneven surfaces

Sitting in a bucket seat

Ascending stairs

Relieving Factors

Walking fast reduces back pain

Lying on back with pillows under legs reduces hip pain

Sitting in recliner

Ice/heat

Objective Findings

AROM hips and knees WNL

Diminished reflexes left ankle jerk

4/5 left plantar flexors

3/5 right hip abductors

Sensation WNL in both L/Es

FABER test +ve (Gordon 1961, Woodley 1985)

Single leg stance +ve (Bird 2001, Woodley 2008, Luquesne)

Radiographs of hips –ve, Low back L5-S1 facet changes and other issues. Disc spaces essentially normal

Objective Findings Continued

Slump test mildly positive for left leg pain

SLRs negative bilaterally

Palpation: Tender over L5-S1, buttocks, and over right greater trochanter and lateral thigh

Gait: slight limp on right with mild Trendelenburg adduction on that side. (Bird 2001)

Resisted de-rotation test +ve right (Lequesne 2008)

FADDIR test +ve (also used to test labrum and impingement)

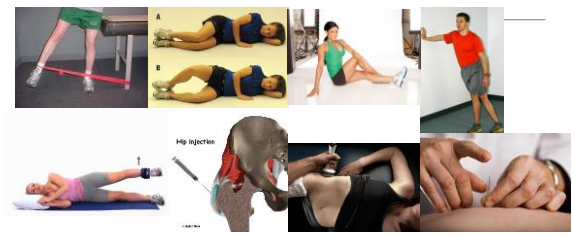
Differential Diagnoses/Risks/Comorbidities

Low back pain especially chronic LBP
Poor pelvic stability
SI Joint problems
Extra-articular problems (ie. Piriformis, sciatic nerve entrapment)
Intraarticular problems (ie. Osteoarthritis, impingement, labrum)
Pelvic morphology in women?
Bony metastasis (ie prostate)
Femoral neck fractures
Known inflammatory diseases (ie. RA)
Trochanteric bursitis

Treatment History

Manual therapy to lumbar and SIJ areas
LASER to low back
Back stabilization exercises
Dry needling 2-3 sessions over the lateral hip region
Strengthening/stretching to the left hip abductors
3 separate corticosteroid injection in about about the trochanter
Ice to the lateral hip

Typical treatment for hip abductor pain and weakness



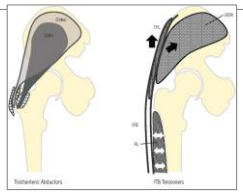
Where is the load absorbed?

Atrophy of Trochanteric abductors

Weakness in hip abductors

⬇

Unlikely a pure tensile Overload of Gluteal tendons



Grimaldi and Fearon 2016

Increase load on ITB Tensioners

⬇

Hypertrophy of the TFL

+

Increased ITB Stiffness associated with Increased HADM

Tateuchi et al 2015

⬇

Increased compression of the gluteus tendon

Allison et al 2016

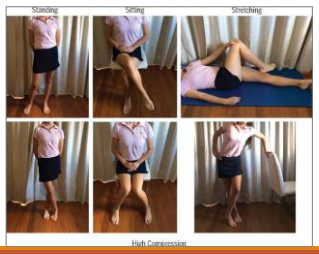
Forces that affect GM tendon compression

A: Different levels of lateral pelvic tilt that affect hip adduction resulting In increased GM compression

B:The result of increased coxa vera resulting in increased compression forces at the greater trochanter

Courtesy of Grimaldi and Fearon 2016

Positions the produce high compression over the gluteus medius



Courtesy of Grimaldi and Fearon 2016

Treatment program

Ice/heat
Lumbo/pelvic stabilization
Manual therapy
Instruction in home care/ex. (ie sleeping positions)
Instruction in low compression strengthening to hip abductors
Gait training to reduce adduction
STM to gluteal tendon

Low compression exercises for gluteus medius tendinopathy

Single leg hip hikes
Lateral walking with medicords/theraband
Prone hip extension
Squat progression from bilateral to single leg squat (Partial)
Bridging progression exs. bilateral to single leg
Double leg ball squat
Skating simulation on slide board
Lateral stepping with and without theraband
Progress to functional and plyometric exercises as appropriate

Outcome

Pt. d/c'd to HEP
Pain rating 0/10 best 1/10 at worst
Pt. back to full activity
Hip abductor strength
Low back pain only occasional
Sleep not interrupted and is controlled with positioning
No change in reflexes
Left plantar flexors 5/5

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Chronic low back pain with bilateral lower extremity numbness, tingling & pain

CAROL A COURTNEY

Hensley CP and Courtney CA, J Orthop Sports Phys Ther. 2014

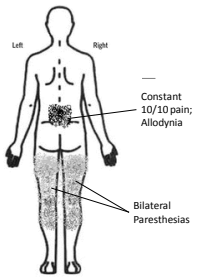
29 year-old Hispanic male with chronic LBP, bilateral lower extremity numbness, tingling & pain

History	**Subsequent medical conditions:**
Uncontrolled type I diabetes since age of 7	Stroke with L hemiparesis 5 yrs prior
Hypertension	Blindness in his R eye
Hyperlipidemia	Pancreatic-kidney transplant 2 yrs prior
Hypoglycemia	Osteoporosis 2° to hyperparathyroidism (dx 11 months prior)
Seizures	
Chronic kidney failure	

Hensley CP and Courtney CA, J Orthop Sports Phys Ther. 2014

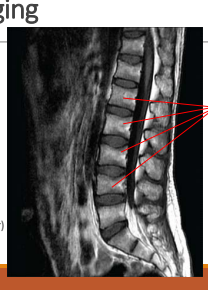
Present history

- Backseat passenger in MVA 3 yrs prior
- MRI on day of accident: "2 disc bulges"
- Previous PT, Chiropractic = yoga, E-stim, stretching, strengthening, manual therapy with no relief
- 11 months prior – incident of legs giving way = onset of leg symptoms
- Second MRI



Medication List and Imaging

Pain:	**Hydrocodone**, 325 mg every 4 h
	Tramadol, 100 mg, 4X daily
	Lidoderm patch
	Gabapentin, 100 mg, 3X daily
Bone mineral density:	Calcitonin, daily spray
	Ergocalciferol, 50K units q. 2 wk
	Actonel, 35 mg, weekly
	Reclast solution
Tissue antirejection:	**CellCept**, 500 mg, 3 times daily
	Tacrolimus, 1 mg, 2 times daily
Other:	Docusate (stool softener)
	Metoclopramide (antiemetic)
	Omeprazole (proton-pump inhibitor)
	Simvastatin (cholesterol inhibitor)
	Aspirin, 81 mg, daily



Exam Findings

DEXA: T-scores < -2.5 hip, Lx spine and forearm

Depression Screening Questions: negative; hypervigilant to pain and sx

Cord, Cauda Equina, Bowel/bladder Qs: negative

Social Hx:

Excellent family support; lived with parents/2 siblings

Studying to be a paralegal

Owned a walking stick but did not use it

Patient goals:

Walk 1 mile to school; Sit through 60 min class

LANSS:

Lower Extremity Neurological exam findings: Negative

Allodynia present at lumbar spine

Straight leg raise: positive bilaterally

Crossed SLR: negative

Management and Outcomes:
20 visits over 6 months

Biopsychosocial approach - primarily addressing central sensitization

Prevention of fracture and fall risk

Cognitive restructuring:
•Pain education

Attention diversion
Problem solving strategies

Exercise: activity pacing,
goal setting, graded exposure

Manual Therapy

Maintenance

TABLE 3 OUTCOMES

	Visit/Week							
Outcome	1/1	3/3	7/6	12/12	17/17	19/19	20/20	Weeks 24 and 46
NPRS (rest/activity)	10/10	10/10	7/10	6/6	10/10	10/10	9/9	6/6
ODI*, %	77	...	60	20	60	28	26	20
GRC	...	...	0	+5	...	...	...	+5
Gait, km	0.2	...	2	2.4	0.2	2.4	2.4	2.4
Sitting, min	15	...	15	45	60	60	60	60
Sleep disturbance from pain (wake events per night)	2-3	...	2-3	0	2-3	0	0	0
Pain medications	4	...	4	0	0	0	0	0
Bridges	0	12	50	...	0	...	50	...
Allodynia	Yes	No	No	No	Yes	No	No	...
SLR test (left/right)	60°/50°	...	60°/50°	80°/80°	82°/82°	82°/82°	82°/82°	...
Balance, s (tandem/single leg)	0/0	...	10/10	...	...	...	...	...

Abbreviations: GRC, global rating of change; NPRS, numeric pain rating scale; ODI, Oswestry Disability Index; SLR, straight leg raise.
**Modified ODI percentage score.*

Conclusion

These 4 cases illustrate the difficult decision making required with complex patients

Post-professional training such as Orthopedic residency and OMPT fellowship programs promote advanced clinical reasoning

Further research on physical therapy management of the complex patient is warranted

Thank you for attending!

QUESTIONS?