Identification of maladaptive cognitive and movement strategies in pelvic girdle pain

Kieran O’Sullivan
Specialist Musculoskeletal Physiotherapist
University of Limerick

Acute pain 'adaptive'

Chronic pain 'mal-adaptive'

What is the cause of pelvic girdle pain?

It's caused by psycho-social and cognitive factors.

It's caused by physical / patho-anatomical factors.

It's caused by neuro-physiological factors.

It's caused by positional faults.

And the answer is...?

All form part of a complex picture.

Our beliefs about PGP direct our management… Linton 2000

The outcome literature suggests that for non-cancer chronic pain only the minority of patients benefit from current practice (Jamison, 2011)

• Highly resistant to change
• Does it matter what we do?
• Are underlying mechanisms addressed?
• Do we need to do something different??

Chronic PGP

The diagnostic dilemma...

No identified pathology – other factors may still be very NB

Identified pathology

Non-specific PGP
Physical Reseptors
Neuro-physiological Factors

Identified pathology

Non-specific PGP
Physical Reseptors
Neuro-physiological Factors

If you were in charge of the health budget?
Lots we do not fully understand….

BUT……….clear that PGP is not simply an anatomical / biomechanical disorder! - Same as all chronic pain disorders!

Sacrolitis

- SI joint pain
- insidious onset
- resting pain
- night pain
- am stiffness
- +ve provocation tests
- +ve compression test
- agg. with stabilisation exercises
- eased with NSAID’s
- elevated ESR
- +ve bone scan

Patho-anatomy may be a factor for some people – e.g. sacral fracture – but in no way explains all the pain / disability in PGP

Systematic review of SI movement

“…the rotational and translational movements available at the SIJ are minute.”

“High quality studies reported the lowest values available at the SIJ”

“movements in the SIJ … are so minute that external determination by manual methods is virtually impossible”

(Goode et al 2008)
Systematic review of SI movement tests

All nine of the tests for movement and palpation of the SI joint lacked sufficient reliability to be used in clinical practice (Kappa range 0.02-0.42).

Tests were also denounced for Validity.

(Van der Wurff 2006)

Pelvic motion in pregnancy

- “The overlap in the range of symphyseal motion between patients and healthy controls is too large to use motion as a diagnostic tool in individual cases”

Movement of Pubic Symphysis in PGP

Movements too small to reliably detect with radiology or palpation... Mens et al 2008
PGP = instability of the SI Jt

SI Joint Stability

Form Closure      Force Closure      Self- Locking

(Vlaeminck 1987)

Physical factors
PGP pain linked to loading:

• Static low load sustained
• High load
• Wide range of pain sensitive structures!

Normal loading of body tissues is a good idea
As long as it is actually normal, rather than “careful”, “safe”, “protective”
Peripheral nociceptive input cannot explain PGP disability on it’s own
BUT…reducing peripheral nociception could be useful if it is a factor in PGP
Language – “stability” – interpretation?

Pain Provocation Tests

Posterior Shear Test

Pelvic Torsion Test

Good reliability (Laslett et al 2003)
Predictive validity – when combined (Robinson et al 2010)

Clinical Diagnosis - Pain Provocation Tests

Compression
ASLR Test

Test of load transfer...

- "heavy" limb
- Increased abdominal EMG
- Less hip flexion force
- Less efficiency

Good reliability
Predictive validity

Motors et al; De Grood et al; Beakes et al.

Motor control factors

PGP associated with changes in motor control:

- Motor control influenced by:
  Activity levels, posture, psycho-social factors, (stress, fear, anxiety, beliefs, depression etc).
- Motor control in PGP is highly variable
- May be adaptive (protective) or mal-adaptive (provocative)
- A mechanism for pain without pathology

Motor control changes are just one dimension of PGP disorder

Diaphragmatic Excursion

Group: p=0.335 ; Conditions: p<0.001

Mean Diaphragmatic Excursion (mm)

Resting Supine ASLR ASLR With Compression

Comparison Group

Transversus abdominis and pelvic floor function in PGP?

No evidence of reduced TrA CSA (rest/contracted).
No evidence of reduced pelvic floor strength
Higher pelvic floor rest tone
Increased PF activity during IAP
Shorter PF endurance time

Neutral Sway back Lateral bend Flat back

N=766
Age = 13 years
Smith, O’Sullivan et al. 2007

Page
Physical factors: summary

- Evidence of abnormal load transfer and altered movement in PGP
- Evidence these patterns vary between patients
- No evidence that changes are isolated to one muscle (or muscle group)
- No evidence of bone/joint “upsips” etc...
- No evidence that getting all PGP patients to increase muscle tone helps
- Think of the trunk cylinder (breathing, continence, muscles, posture) rather than one muscle/structure
- And is the pain primarily “driven” by peripheral input?

Physical factors are just one dimension of PGP disorder

Lifestyle factors and LBP

- Smoking
- Sleep deficits
- Obesity / diet
- Physical activity
- Sedentary behaviour
- Stress

Severe sleep disturbances predicted work disability due to:
- mental disorders
- diseases of the nervous system
- musculoskeletal system
- circulatory system

Salo et al 2010

High levels of habitual physical activity associated with better mental health.

Salmon 2001

Risk of inactivity

No Physical Activity For 1 Day...
No Problem!

Health costs equivalent to smoking just 3 cigarettes!

K Khan 2011
Type of exercise???

How much time do we spend saying “don’t do exercise X” versus “try any exercise you like/enjoy”?

YOUR favourite exercise / physical activity?

Psycho-social factors - yellow ‘flags’
Influences pain ‘behaviors’....

Cognitive: hyper-vigilance, catastrophising, negative beliefs
Emotional: stress, fear, anxiety, depression
Behavioural: avoidance behavior, pain behaviour, poor coping & pacing
Social factors: socio-economic status, family functioning, cultural factors
Work related factors: level of support, satisfaction, compensation

Beliefs

+ve beliefs about improvement was strongly predictive of recovery 2 yrs f/up

Gutke et al 2007

Fear of movement ➔ reduced walk speed (R=.63)
Gait highly variable

Wu et al 2008

Post-partum depressive symptoms 6 X more prevalent in women with lumbo-pelvic pain (n =267)

Predictors during pregnancy.....
of having persistent PGP 3 months post partum

Widespread pain OR: 7

Work dissatisfaction OR: 10

Gutke et al 2008
Coping

Avoidance copers
Inactive
‘in cotton wool’

Endurance copers
No pacing
‘beat themselves up’

Risk of pain
Low
High

Fear avoidance behaviour
Low
High

Negative illness information

Chronic = ‘couple of steps from a wheelchair’
Instability = ‘liable to pop out – not a lot you can do’
Wear and tear = ‘something’s rotting away’

Barker et al 2009

Catastrophising:
associated with pain communicative behaviours

Grimacing
Moaning
Propping with hands
Breath holding
Touching and holding spine
Braces / sticks
Limping

Sullivan 2009

PGP & psychiatric diagnoses / sexual abuse
(Walker et al)

• 25 PGP / 30 HCs (with gynae conditions)
• All had diagnostic laparoscopy
• PGP patients - significantly higher prevalence of major depression, substance abuse, adult sexual dysfunction, somatization, and hx of childhood and adult sexual abuse
• No significant differences between groups in severity / type of pelvic pathology

Psychosocial factors

‘Perceived hope and self-efficacy appeared to be essential for developing a capacity for self-management and an enhanced ability to benefit from appropriate learning experiences.’

“With hope you can recover”
“Self-efficacy enhances functioning.”

Stuge & Berland 2011

Psychosocial Factors

• Organic v non-organic?
• Real v imaginary?
• Physical v psychological?
OR?
• Different factors, both important, and often inter-related!
Brain – responds to perception of threat

- pain is an output of the brain
- nociceptors are ‘threat’ receptors
- brain interprets input
- interpretation is context dependent
- huge variability in response to the same input
- fear, stress and pain are linked (PAG)
- for some the system is pre-sensitised

Moseley, 2006, Manual Therapy

The Role of Relaxin?

445 subjects with pelvic pain
445 pain free controls
Relaxin levels taken at 33 weeks gestation
No difference in serum relaxin levels

Albert et al. 1997

'Virtual body' map distortions with pain

We know what we see……?
Pain / fear / beliefs / culture - distorts body map

The Role of Relaxin?

445 subjects with pelvic pain
445 pain free controls
Relaxin levels taken at 33 weeks gestation
No difference in serum relaxin levels

Albert et al. 1997

PGP, menarche and BMI………?

Bjelland et al. 2011
Co-morbidities with PGP

• Other pain disorders
  – LBP
  – Headaches
  – Migraine
  – Fibromyalgia
  – Irritable bowel
  – Vulvodynia / Vaginismus

• Depression

Chronic fatigue

Sleep problems

Genetics / familial factors

What do we inherit?
• PGP clusters in families
• patho-anatomical factors
• psychological factors
• pain behaviours
• neuro-physiological factors (PPT)
• physical factors
• curly hair....

What does the evidence tell us?
• Most CPGP disorders - no patho-anatomical basis
• No single intervention is effective for all disorders
• Altered motor control - adaptive vs mal-adaptive ?
  • evidence of altered motor control in specific groups highly variable
• Mal-adaptive cognitive processes (psycho-social)
  * primary or secondary
• Associated changes in neuro-physiology / hormones?
  (peripheral & central nervous system)

Identification of maladaptive cognitive and movement strategies in pelvic girdle pain

If we don’t screen for these, we won’t identify them!

Bio – Psycho – Social screening

NOT complex!
What makes a good assessment?

Patients emphasized the importance of;
- being given an explanation of what was being done and found during phys examination
- of receiving understandable information on cause of pain
- of receiving reassurance
- of discussing psychosocial issues
- of discussing what can be done
  — most NB characteristic - specialist took the patient seriously!

http://www.ted.com/talks/abraham_verghese_a_doctor_s_touch.html

Examination process

Interview
- Pain area
- Pain history
- Pain behaviour
- Pain stage
- Level of disability
- Coping strategies
- Beliefs
- Lifestyle
- Psycho-social factors
- Screening
- Review radiology

Physical examination
- Identify pain source (provocation tests)
- Relationship between movement, loading and pain behaviours
- Analyze the functional impairments
- Tests of load transfer
- Identify excessive vs impaired force closure
- Differentiate from maladaptive patterns
- Peripheral / central NS involvement
- Visceral / central NS involvement
- Pain behaviour and radiology
- Cognitions / pain behaviour
- Identify factors, pain disorder
- Questionnaire
- Subjective v objective
- Separate?
- Objective = “real” examination?
- Subjective – only assessment? Or also treatment?

My PGP patients now compared to 10 years ago!

Why are they so different?
Summary

Acknowledgments
Peter O'Sullivan
Darren Beales
Angus Burnett
Wim Dankaerts
Kjartan Vibe Fersum
Judith Thompson