
ASSESSMENT AND DIAGNOSIS



Overview

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Pain: Underreported, Underdiagnosed and Undertreated

- Ongoing pain has been **underreported**, **underdiagnosed**, and **undertreated** in nearly all health care settings
- Individuals with pain that reduces quality of life should be encouraged to seek help
- Comprehensive assessment and treatments likely to produce best results

Importance of Pain Assessment

Pain is a significant predictor of morbidity and mortality.

- Screen for red flags requiring immediate investigation and/or referral
- Identify underlying cause
 - Pain is better managed if the underlying causes are determined and addressed
- Recognize type of pain to help guide selection of appropriate therapies for treatment of pain
- Determine baseline pain intensity to future enable assessment of efficacy of treatment

Comprehensive Pain Assessment

**Assess effects of pain
on patient's function**

**Characterize pain
location, distribution,
duration, frequency,
quality, precipitants**

**Complete risk
assessment**

**Take detailed history
(e.g., comorbidities,
prior treatment)**

**Clarify etiology,
pathophysiology**

**Conduct physical
examination**

Nociceptive vs. Neuropathic Pain

	Nociceptive	Neuropathic
Definition	Pain caused by physiological activation of pain receptors	Pain initiated or caused by a primary lesion or dysfunction in the peripheral or central somatosensory nervous system
Mechanism	Natural physiological transduction	Ectopic impulse generation, central sensitization, and others
Localization	Local + referred pain	Confined to innervation territory of the lesioned somatosensory nervous structure
Quality of symptoms	Ordinary painful sensation	New strange sensations
Treatment	Good response (conventional analgesics)	Poor response (conventional analgesics)

Nociceptive Pain

Somatic



Musculoskeletal injury



Trauma



Post-operative pain

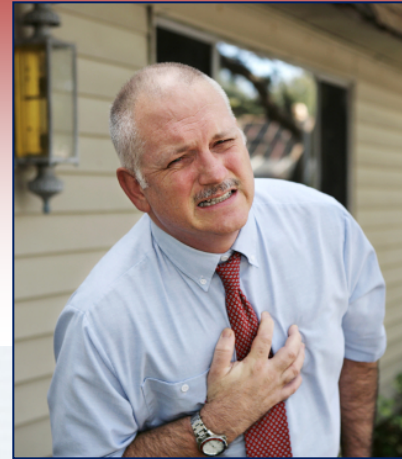


Burn pain

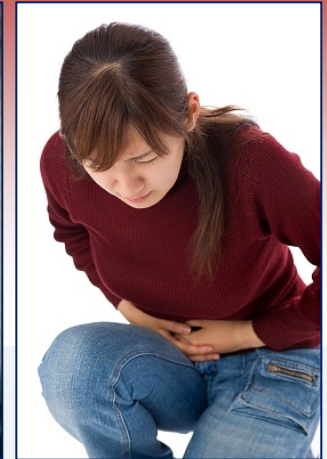
Infection, e.g.,
pharyngitis



Visceral



Ischemic, e.g., myocardial
infarction



Abdominal colic



Dysmenorrhea

Recognizing Neuropathic Pain



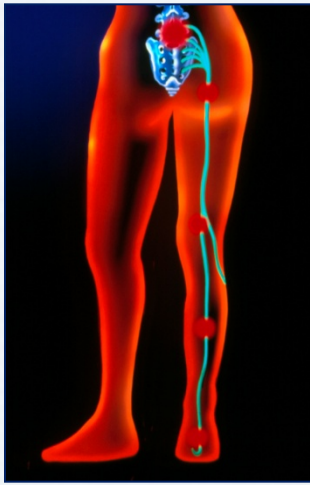
Post-stroke pain



Diabetic peripheral neuropathy



Postherpetic neuralgia



Lumbar radicular pain

Common descriptors

Shooting

Electric shock-like

Burning

Tingling

Numbness



Chronic post-surgical pain

History

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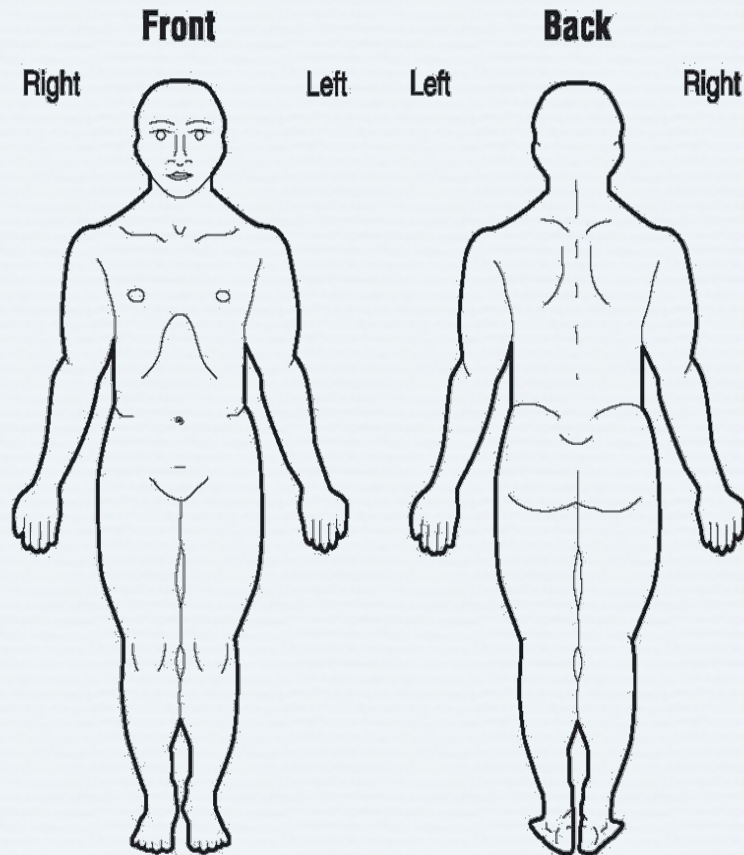
Pain History

- Location/distribution
- Onset
- Frequency/variation
- Intensity
- Type
- Aggravating and relieving factors
- Impairment and disability
- Previous pain treatments
- Other conditions/treatments
- Response to treatment
- Meaning of pain

Pain History Worksheet

- Site of pain
- What causes or worsens the pain?
- Intensity and character of pain
- Associated symptoms?
- Pain-related impairment in functioning?
- Relevant medical history

Locate the Pain



Body maps are useful for the precise location of pain symptoms and sensory signs.*

***In cases of referred pain, the location of the pain and of the injury or nerve lesion/dysfunction may not be correlated**

Gilron I *et al.* CMAJ 2006; 175(3):265-75; Walk D *et al.* Clin J Pain 2009; 25(7):632-40.

Clinical Assessment of Pain

Functional Assessment



Does the pain interfere with activities?

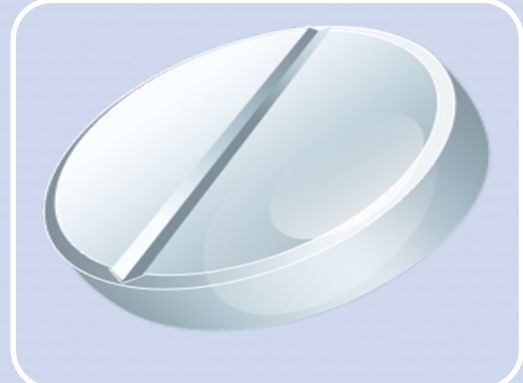
Psychological Assessment



Does the patient have concomitant depression, anxiety, or mental status changes?

Does the patient have sleep disorders or a history of substance abuse/dependence?

Medication History

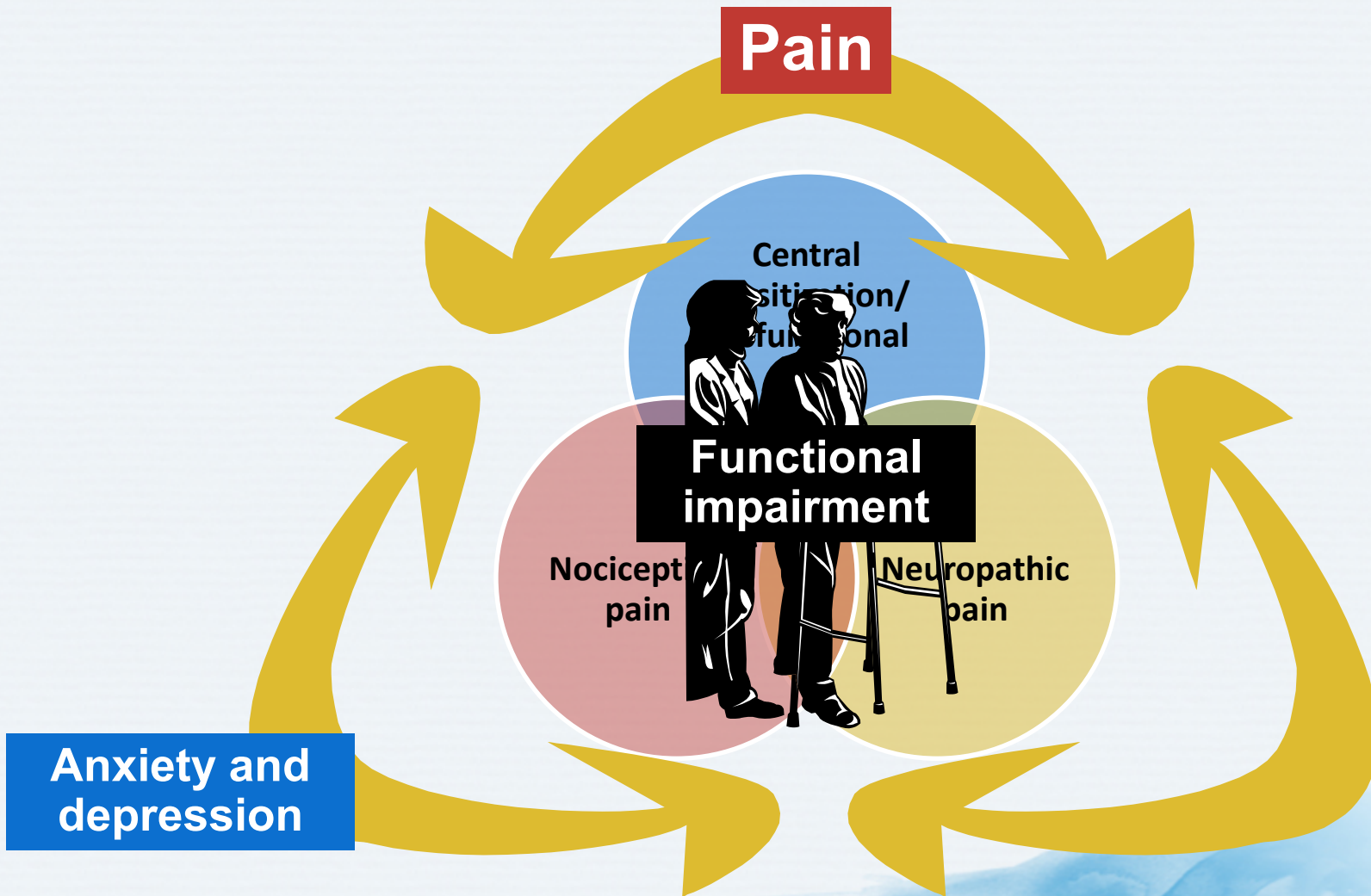


What medications have been tried in the past?

Which medications have helped?

Which medications have not helped?

Evaluate Impact of Pain on Functioning



Pain Assessment: PQRST Mnemonic

- Provocative and Palliative factors
- Quality
- Region and Radiation
- Severity
- Timing, Treatment

Pain Assessment Tools

Unidimensional Tools

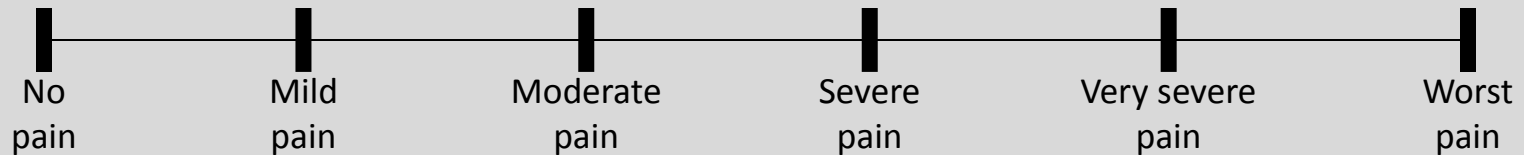
- Visual Analog Scale
- Verbal Pain Intensity Scale
- Faces Pain Scale
- 0–10 Numeric Pain Intensity Scale

Multidimensional Tools

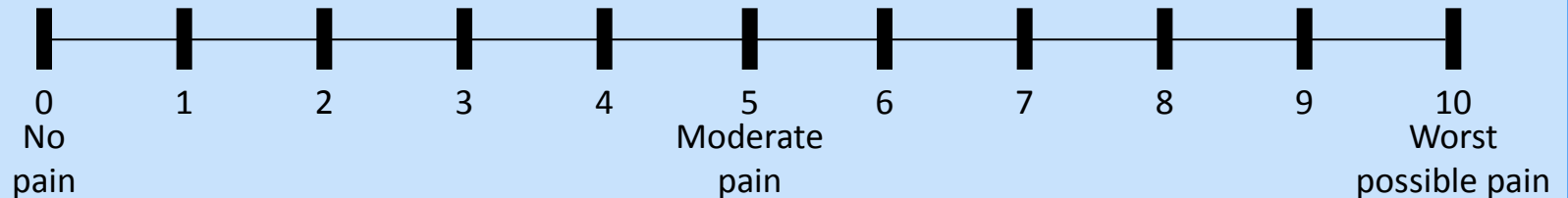
- Brief Pain Inventory
- McGill Pain Questionnaire

Determine Pain Intensity

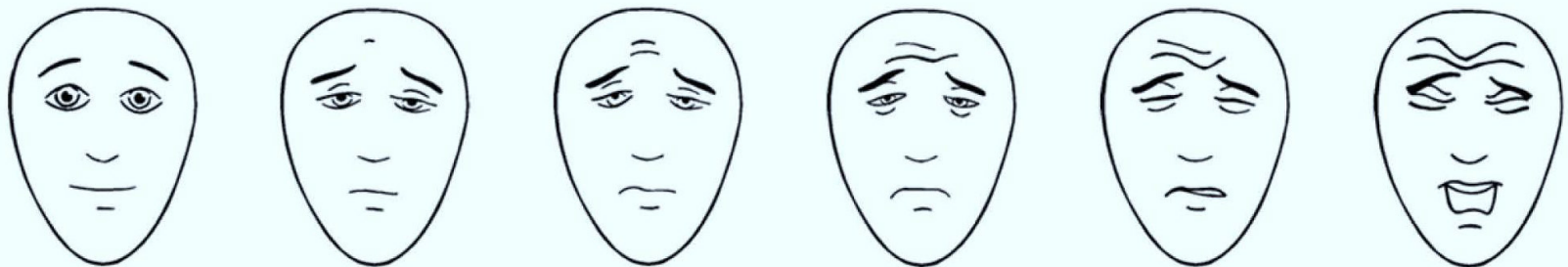
Simple Descriptive Pain Intensity Scale



0–10 Numeric Pain Intensity Scale



Faces Pain Scale – Revised



Brief Pain Inventory

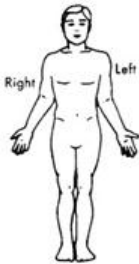
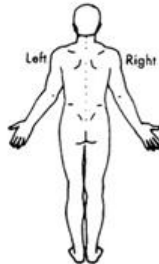
FORM 3.2 **Brief Pain Inventory**

Date: ____/____/____ Time: ____

Name: _____
Last First Middle Initial

1) Throughout our lives, most of us have had pain from time to time (such as minor headaches, sprains, and toothaches). Have you had pain other than these everyday kinds of pain today?
 1. Yes 2. No

2) On the diagram shade in the areas where you feel pain. Put an X on the area that hurts the most.

3) Please rate your pain by circling the one number that best describes your pain at its **worst** in the past 24 hours.

0 1 2 3 4 5 6 7 8 9 10
 No pain as bad as you can imagine

4) Please rate your pain by circling the one number that best describes your pain at its **least** in the past 24 hours.

0 1 2 3 4 5 6 7 8 9 10
 No pain as bad as you can imagine

5) Please rate your pain by circling the one number that best describes your pain on the **average**.

0 1 2 3 4 5 6 7 8 9 10
 No pain as bad as you can imagine

6) Please rate your pain by circling the one number that tells how much pain you have **right now**.

0 1 2 3 4 5 6 7 8 9 10
 No pain as bad as you can imagine

7) What treatments or medications are you receiving for your pain?

8) In the Past 24 hours, how much **relief** have pain treatments or medications provided? Please circle the one percentage that most shows how much relief you have received

0% 10 20 30 40 50 60 70 80 90 100%
 No Complete relief

9) Circle the one number that describes how, during the past 24 hours, pain has **interfered** with your:

A. General activity

0 1 2 3 4 5 6 7 8 9 10
 Does not Completely interfere

B. Mood

0 1 2 3 4 5 6 7 8 9 10
 Does not Completely interfere

C. Walking ability

0 1 2 3 4 5 6 7 8 9 10
 Does not Completely interfere

D. Normal work (includes both work outside the home and housework)

0 1 2 3 4 5 6 7 8 9 10
 Does not Completely interfere

E. Relations with other people

0 1 2 3 4 5 6 7 8 9 10
 Does not Completely interfere

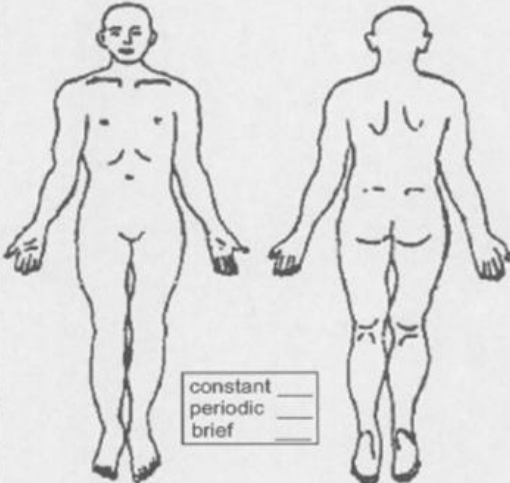
F. Sleep

0 1 2 3 4 5 6 7 8 9 10
 Does not Completely interfere

G. Enjoyment of life

0 1 2 3 4 5 6 7 8 9 10
 Does not Completely interfere

McGill Pain Questionnaire

1 flickering	11 tiring	PPI _____ Comments:																																						
quivering	exhausting																																							
pulsing	12 sickening																																							
throbbing	suffocating																																							
beating	13 fearful																																							
pounding	frightful																																							
2 jumping	terrifying																																							
flashing	14 punishing																																							
shooting	gruelling																																							
3 pricking	cruel																																							
boring	vicious																																							
drilling	killing	<table border="1"> <tr> <td>constant</td> <td>_____</td> </tr> <tr> <td>periodic</td> <td>_____</td> </tr> <tr> <td>brief</td> <td>_____</td> </tr> </table>			constant	_____	periodic	_____	brief	_____																														
constant	_____																																							
periodic	_____																																							
brief	_____																																							
stabbing	15 wretched																																							
lancinating	blinding																																							
4 sharp	16 annoying																																							
cutting	troublesome																																							
lacerating	miserable																																							
5 pinching	intense																																							
pressing	unbearable																																							
gnawing	17 spreading																																							
cramping	radiating																																							
crushing	penetrating																																							
6 tugging	piercing	<table border="1"> <tr> <td>accompanying symptoms:</td> <td>Sleep:</td> <td>Food intake:</td> </tr> <tr> <td>nausea</td> <td>good</td> <td>good</td> </tr> <tr> <td>headache</td> <td>fitful</td> <td>some</td> </tr> <tr> <td>dizziness</td> <td>can't sleep</td> <td>little</td> </tr> <tr> <td>drowsiness</td> <td>Comments:</td> <td>none</td> </tr> <tr> <td>constipation</td> <td></td> <td>Comments:</td> </tr> <tr> <td>diarrhea</td> <td></td> <td></td> </tr> <tr> <td>Comments:</td> <td>Activity:</td> <td>Comments:</td> </tr> <tr> <td></td> <td>good</td> <td></td> </tr> <tr> <td></td> <td>some</td> <td></td> </tr> <tr> <td></td> <td>little</td> <td></td> </tr> <tr> <td></td> <td>none</td> <td></td> </tr> </table>			accompanying symptoms:	Sleep:	Food intake:	nausea	good	good	headache	fitful	some	dizziness	can't sleep	little	drowsiness	Comments:	none	constipation		Comments:	diarrhea			Comments:	Activity:	Comments:		good			some			little			none	
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pulling	18 tight																																							
wrenching	numb																																							
7 hot	drawing																																							
burning	squeezing																																							
scalding	tearing																																							
searing	19 cool																																							
8 tingling	cold																																							
itchy	freezing																																							
smarting	20 nagging																																							
stinging	nauseating																																							
9 dull	agonizing																																							
sore	dreadful																																							
hurting	torturing																																							
aching	PPI																																							
heavy	0 no pain																																							
10 tender	1 mild																																							
taut	2 discomforting																																							
rasping	3 distressing																																							
splitting	4 horrible																																							
	5 excruciating																																							

Neuropathic Pain Screening Tools

	LANSS	DN4	NPQ	painDETECT	ID Pain
<i>Symptoms</i>					
Pricking, tingling, pins and needles	X	X	X	X	X
Electric shocks or shooting	X				
Hot or burning	X				
Numbness		X	X	X	X
Pain described as lightning	X				X
Painful touch					
<i>Clinical examination</i>					
Brush allodynia	X	V			
Raised soft touch threshold					
Altered pin prick threshold	X				

Neuropathic pain screening tools rely largely on common verbal descriptors of pain

Select tool(s) based on ***ease of use*** and ***validation in the local language***

Some screening tools also include bedside neurological examination

Sensitivity and Specificity of Neuropathic Pain Screening Tools

Name	Description	Sensitivity*	Specificity*
Interview-based			
NPQ	10 sensory-related items + 2 affect items	66%	74%
ID-Pain	5 sensory items + 1 pain location	NR	NR
painDETECT	7 sensory items + 2 spatial characteristics items	85%	80%
Interview + physical tests			
LANSS	5 symptom items + 2 clinical exam items	82–91%	80–94%
DN4	7 symptom items + 3 clinical exam items	83%	90%

Tests incorporating both interview questions **and** physical tests have higher sensitivity and specificity than tools that rely only on interview questions

*Compared with clinical diagnosis

DN4 = Douleur neuropathic en 4 questions; LANSS = Leeds Assessment of Neuropathic Symptoms and Signs;

NPQ = Neuropathic Pain Questionnaire; NR = not reported

Bennett MI *et al. Pain* 2007; 127(3):199-203.

LANSS Scale

THE LANSS PAIN SCALE
Leeds Assessment of Neuropathic Symptoms and Signs

NAME _____ DATE _____

This pain scale can help to determine whether the nerves that are carrying your pain signals are working normally or not. It is important to find this out in case different treatments are needed to control your pain.

A. PAIN QUESTIONNAIRE

- Think about how your pain has felt over the last week.
- Please say whether any of the descriptions match your pain exactly.

1) Does your pain feel like strange, unpleasant sensations in your skin? Words like pricking, tingling, pins and needles might describe these sensations.

a) NO - My pain doesn't really feel like this. (0)

b) YES - I get these sensations quite a lot. (5)

2) Does your pain make the skin in the painful area look like mottled or looking more red or white than the surrounding skin?

a) NO - My pain doesn't affect the colour of my skin. (0)

b) YES - I've noticed that the pain does make my skin look like this. (5)

3) Does your pain make the affected skin abnormally sensitive to touch or pressure? Words like stinging, burning or itching might describe the abnormal sensations.

a) NO - My pain doesn't make my skin abnormally sensitive to touch or pressure. (0)

b) YES - My skin seems abnormally sensitive to touch or pressure. (5)

4) Does your pain come on suddenly and in bursts? Words like electric shocks, jumping or shooting pains might describe these sensations.

a) NO - My pain doesn't really feel like this. (0)

b) YES - I get these sensations quite a lot. (5)

5) Does your pain feel as if the skin temperature is abnormal? Words like hot and burning or cold and numb might describe these sensations.

a) NO - I don't really get these sensations. (0)

b) YES - I get these sensations quite a lot. (5)

B. SENSORY TESTING

Skin sensitivity can be examined by comparing the painful area with a contralateral or adjacent non-painful area for the presence of allodynia and an altered pin-prick threshold (PPT).

1) **ALLODYNIA**

Examine the response to lightly stroking cotton wool across the non-painful area and then the painful area. If normal sensations are experienced in the non-painful site, but pain or unpleasant sensations (tingling, nausea) are experienced in the painful area when stroking, allodynia is present.

a) NO, normal sensation in both areas. (0)

b) YES, allodynia in painful area only. (5)

2) **ALTERED PIN-PRICK THRESHOLD**

Determine the pin-prick threshold by comparing the response to a 23 gauge (blue) needle mounted inside a 2 ml syringe barrel placed gently on to the skin in a non-painful and then painful areas.

If a sharp pin prick is felt in the non-painful area, but a different sensation is experienced in the painful area e.g. none / blunt only (raised PPT) or a very painful sensation (lowered PPT), an altered PPT is present.

If a pinprick is not felt in either area, mount the syringe onto the needle to increase the weight and repeat.

a) NO, equal sensation in both areas. (0)

b) YES, altered PPT in painful area. (3)

SCORING:

Add values in parentheses for sensory description and examination findings to obtain overall score.

TOTAL SCORE (maximum 24)

If score < 12, neuropathic mechanisms are **unlikely** to be contribution to the patient's pain

If score ≥ 12, neuropathic mechanisms are **likely** to be contributing to the patient's pain

- Completed by physician in office
- Differentiates neuropathic from nociceptive pain
- 5 pain questions and 2 skin sensitivity tests
- Identifies contribution of neuropathic mechanisms to pain
- Validated

NPQ

Neuropathic Pain Questionnaire

In order to assess and treat your pain problem, we need to thoroughly understand just exactly what type of pain you have, and how it may or may not change over time. You may have only one site of pain, or you may have more than one.

Please name the site of pain which is *most severe or disturbing* for you (eg, arm, foot, etc):

For all of the following questions, please rate your pain at the site you just listed.
Please use the space below to describe your pain in your own words:

Please use the items below to rate your pain as it *usually* feels. Indicate a number which represents your pain on each scale. For example, if you have no burning pain, you would rate the first item "0". If you have the worst burning pain imaginable, you would rate it "100". If neither of those fits your pain because it is in between, choose a number which *fits* your pain.

1. Burning Pain
0 ← → 100
No Burning Pain Worst Burning Pain Imaginable

2. Overly Sensitive to Touch
0 ← →
No Over-sensitivity

3. Shooting Pain
0 ← →
No Shooting Pain

4. Numbness
0 ← →
No Numbness

5. Electric Pain
0 ← →
No Electric Pain

6. Tingling Pain
0 ← →
No Tingling Pain

7. Squeezing Pain
0 ← →
No Squeezing Pain

8. Freezing Pain
0 ← → 100
No Freezing Pain Worst Freezing Pain Imaginable

9. How unpleasant is your usual pain?
0 ← → 100
Most Unpleasant Pain Imaginable Worst Unpleasant Pain Imaginable

10. How Overwhelming is your usual pain?
0 ← → 100
Most Over-whelming Pain Imaginable Worst Over-whelming Pain Imaginable

We are also interested in learning what circumstances cause changes in your pain. Please write the number that indicates the amount you experience each of the following:

11. Increased pain due to touch
0 ← → 100
No Increase At All Greatest Increase Imaginable

12. Increased pain due to weather changes
0 ← → 100
No Increase At All Greatest Increase Imaginable

Scoring Worksheet

Instructions: For each of the twelve items below, copy the subject's score into the first column. Multiply by the coefficient in the second column, and write the product in the third column. Total all the figures in the third column, including the constant. The resulting total represents the discriminant function score.

Subjects with scores below 0 are predicted to have non-neuropathic pain, while those with scores at or above 0 are predicted to have neuropathic pain.

	Score	Coefficient	Product
1. Burning Pain	_____	× 0.006	= _____
2. Overly Sensitive to Touch	_____	× 0.005	= _____
3. Shooting Pain	_____	× 0.005	= _____
4. Numbness	_____	× 0.020	= _____
5. Electric Pain	_____	× -0.008	= _____
6. Tingling Pain	_____	× 0.010	= _____
7. Squeezing Pain	_____	× -0.004	= _____
8. Freezing Pain	_____	× 0.004	= _____
9. How unpleasant is usual pain?	_____	× 0.006	= _____
10. How overwhelming is usual pain?	_____	× -0.005	= _____
11. Increased pain due to touch	_____	× 0.006	= _____
12. Increased pain due to weather changes	_____	× -0.005	= _____
Constant			= -1.408
TOTAL DISCRIMINANT FUNCTION SCORE:			= _____

Check one of the following boxes:
 Discriminant Function Score Below 0 Predicts Non-neuropathic Pain
 Discriminant Function Score at or Above 0 Predicts Neuropathic Pain


- The NPQ has been developed to assess patients' neuropathic pain symptoms and to discriminate between neuropathic and non-neuropathic pain
- The NPQ measures similar items to the other questionnaires, but also assesses circumstances that cause change in pain (e.g., touch)
- Further research is required to determine its clinical usefulness and distinguish it from the other questionnaires

NPQ = Neuropathic Pain Questionnaire

Bennett MI *et al.* *Pain* 2007; 127(3):199-203; Krause SJ, Backonja MM. *Clin J Pain* 2003; 19(5):306-14.

DN4

- Completed by physician in office
- Differentiates neuropathic from nociceptive pain
- 2 pain questions (7 items)
- 2 skin sensitivity tests (3 items)
- Score ≥ 4 is an indicator for neuropathic pain
- Validated



Neuropathic Pain Diagnostic Questionnaire (DN4)¹

Please complete this questionnaire by ticking one answer for each item in the four questions below. A YES score of ≥ 4 is diagnostic of Neuropathic Pain.

Patient Name _____

Gender ☐ M ☐ F Date of Birth _____

Date _____ Time _____

Interview of the patient

Question 1. Does the pain have one or more of the following characteristics?

	YES	NO
1. Burning	<input type="checkbox"/>	<input type="checkbox"/>
2. Painful Cold	<input type="checkbox"/>	<input type="checkbox"/>
3. Electric Shocks	<input type="checkbox"/>	<input type="checkbox"/>

Question 2. Is the pain associated with one or more of the following symptoms in the same area?

	YES	NO
4. Tingling	<input type="checkbox"/>	<input type="checkbox"/>
5. Pins and Needles	<input type="checkbox"/>	<input type="checkbox"/>
6. Numbness	<input type="checkbox"/>	<input type="checkbox"/>
7. Itching	<input type="checkbox"/>	<input type="checkbox"/>

Examination of the patient

Question 3. Is the pain located in an area where the physical examination may reveal one of more of the following characteristics?

	YES	NO
8. Touch Hypoaesthesia	<input type="checkbox"/>	<input type="checkbox"/>
9. Pricking Hypoaesthesia	<input type="checkbox"/>	<input type="checkbox"/>

Question 4. In the painful area, can the pain be caused or increased by:

	YES	NO
10. Brushing (e.g. using a Wet Dry hair or brush)	<input type="checkbox"/>	<input type="checkbox"/>

Patient score _____ / 10

DN4 = Douleur neuropathique en 4 questions

Bouhassira D et al. Pain 2005; 114(1-2):29-36.

painDETECT

painDETECT PAIN QUESTIONNAIRE

Date: _____ Patient: _____ Last name: _____ First name: _____

How would you assess your pain now, at this moment?

min. 0 1 2 3 4 5 6 7 8 9 10 max.

How strong was the strongest pain during the past 4 weeks?

min. 0 1 2 3 4 5 6 7 8 9 10 max.

How strong was the pain during the past 4 weeks on average?

min. 0 1 2 3 4 5 6 7 8 9 10 max.

Mark the picture that best describes the course of your pain.

Persistent pain with slight fluctuations ☐

Persistent pain with pain attacks ☐

Pain attacks without pain between them ☐

Pain attacks with pain between them ☐

Does your pain radiate to other regions of your body? ☐ yes ☐ no

If yes, please draw the direction in which the pain radiates.

Do you suffer from a burning sensation (e.g., stinging nettles) in the marked areas? ☐ never ☐ hardly noticed

Do you have a tingling or prickling sensation? ☐ never ☐ hardly noticed

Is light touching (e.g., a blanket) painful? ☐ never ☐ hardly noticed

Do you have sudden pain attacks in this area? ☐ never ☐ hardly noticed

Is cold or heat (both water) in this area painful? ☐ never ☐ hardly noticed

Do you suffer from a sensation of numbness in this area? ☐ never ☐ hardly noticed

Does slight pressure in this area, e.g., when sitting, cause pain? ☐ never ☐ hardly noticed

☐ x 0 = 0 ☐ x 1 = 1

painDETECT SCORING OF PAIN QUESTIONNAIRE

Date: _____ Patient: _____ Last name: _____ First name: _____

Please transfer the total score from the pain questionnaire:

Total score

Please add up the following numbers, depending on the marked pain behavior pattern and the pain radiation. Then total up the final score:

Persistent pain with slight fluctuations 0

Persistent pain with pain attacks -1 If marked, or

Pain attacks without pain between them +1 If marked, or

Pain attacks with pain between them +1 If marked

Radiating pain? +2 If yes

Final score

Screening Result

Final score

negative	unclear	positive
0 1 2 3 4 5 6 7 8 9 10 11 12	13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38	

A neuropathic pain component is unlikely (< 15%)

Result is ambiguous, however a neuropathic pain component can be present

A neuropathic pain component is likely (> 90%)

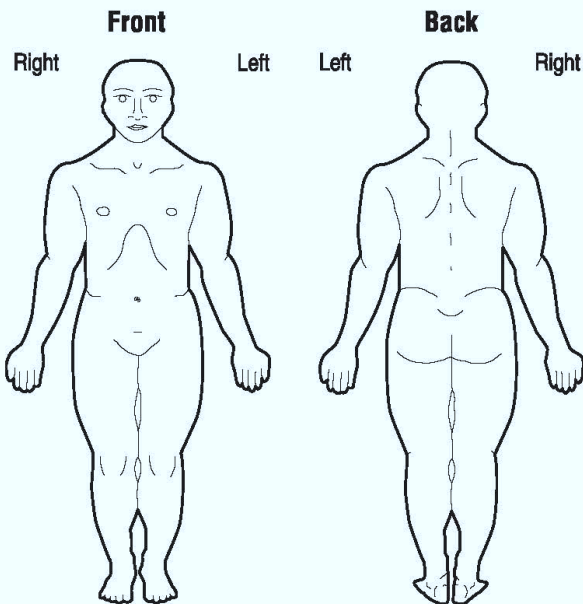
This sheet does not replace medical diagnostics. It is used for screening the presence of a neuropathic pain component.

- Patient-based, easy-to-use screening questionnaire
- Developed to distinguish between neuropathic pain and non-neuropathic pain*
- Validated: high sensitivity, specificity and positive predictive accuracy
- Seven questions about quality and three about severity of pain
- Questions about location, radiation and time course

*Validation was in patients with low back pain
 Freynhagen R et al. *Curr Med Res Opin* 2006; 22(10):1911-20.

ID Pain

On the diagram below, shade in the areas where you feel pain. If you have more than one painful area, circle the area that bothers you the most.



Mark 'Yes' to the following items that describe your pain over the past week and 'No' to the ones that do not.

Question	Score	
	Yes	No
1. Did the pain feel like pins and needles?	1	0
2. Did the pain feel hot/burning?	1	0
3. Did the pain feel numb?	1	0
4. Did the pain feel like electrical shocks?	1	0
5. Is the pain made worse with the touch of clothing or bed sheets?	1	0
6. Is the pain limited to your joints?	-1	0

- Patient-completed screening tool
- Includes 6 yes/no questions and pain-location diagram
- Developed to differentiate between nociceptive and neuropathic pain
- Validated

Physical Examination

A decorative blue watercolor splash is located in the bottom right corner of the slide, blending into the light blue background.

Comprehensive Physical Examination Is Important

- Conduct comprehensive physical and neurological exams when evaluating and identifying patient's subjective complaints of pain¹
 - Should serve to verify preliminary impression from history and guide the selection of laboratory and imaging studies²
- Confirm or exclude underlying causes

1. American Society of Anesthesiologists Task Force on Pain Management, Chronic Pain Section. *Anesthesiology* 1997; 86(4):995-1004;

2. Brunton S. *J Fam Pract* 2004; 53(10 suppl):S3-10.

Examples of Bedside Tests for Neuropathic Pain

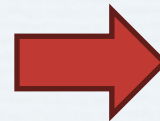
- **Touch tests can detect**
 - Differences in skin temperature
 - Hypersensitivity
 - Unpleasant abnormal sensations
 - Sensory deficit
- **Tests to evoke pain**
 - Response is the presence of positive sensory symptoms
 - Examples include touch, pinprick, pinch, and etiology-specific tests

Look: Simple Bedside Tests

Stroke skin with brush,
cotton or apply acetone

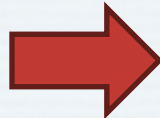


Sharp, burning
superficial pain

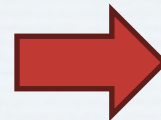


ALLODYNIA

Light manual pinprick with
safety pin or sharp stick



Very sharp,
superficial pain



HYPERALGESIA

Imaging and Other Tests



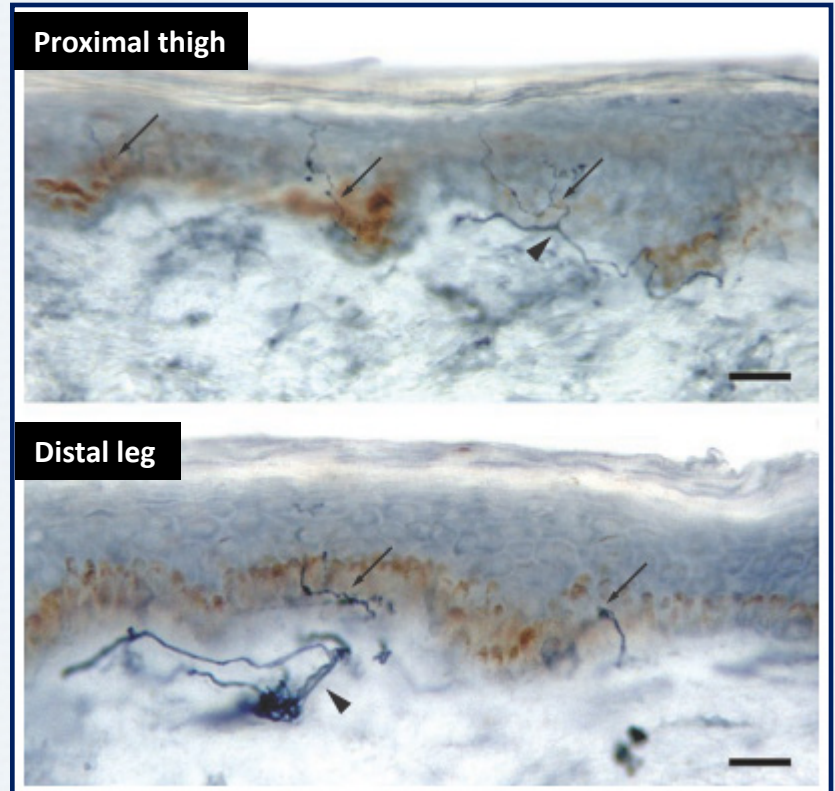
Pain Diagnostics

- Plain X-rays with multiple views
- MRI
- CT
- CT myelogram
- Nerve conduction velocity
- Electromyography

Newer Neuropathic Pain Assessment Techniques

- Newer, more objective assessment techniques for neuropathic pain include:
 - Laser-evoked potentials
 - Skin biopsy
 - Quantitative sensory testing

Patient with diabetic small-fibre neuropathy³



Arrows = IENFs, arrowheads = dermal nerve bundles. Bright-field immunohistochemistry in 50 μ m sections stained with anti-PGP 9.5 antibody. Bar = 80 μ m.

IENF = intra-epidermal nerve fiber

Jovin Z et al. *Curr Top Neurol Psychiatr Relat Discip* 2010; 18(2):30-7; Lauria G, Devigili G. *Nature Clin Practice Neurol* 2007; 3(10):546-57.

Laser-Evoked Potentials

How They Work

- Detect dysfunction of pain and temperature pathways, which are the basis of neuropathic pain development²
- Laser-generated radiant heat pulses selectively excite free nerve endings in the superficial skin layers³
- Brain responses are recorded⁴
- Late laser evoked potentials reflect activity of A δ nerve endings in superficial skin layers¹
- Laser evoked potential magnitudes may accurately gauge subjective experience of pain⁴

Potential Place in Practice

- Easiest, most reliable, and most sensitive neurophysiological way to assess the function of nociceptive pathways¹
- EFNS has recommended the use of laser evoked potentials as an ancillary tool in the evaluation of neuropathic pain²
- Use in diagnosis currently limited by availability of equipment²

EFNS = European Federation of Neurological Societies

1. Cruccu G *et al. Eur J Neurol* 2010; 17(8):1010-8; Garcia-Larrea L, Godinho F. *Eur Neurolog Disease* 2007; 2:39-41;

2. Truini A *et al. Clin Neurophysiol* 2005; 116(4):821-6; Garcia-Larrea L *et al. Brain* 2002; 125(Pt 12):2766-81.

Skin Biopsy

- Circular punch is used to excise a hairy skin sample, usually from distal part of the leg
- Lidocaine used as a topical anesthetic
- No sutures are required
- No side effects
- Wound heals quickly



Quantitative Sensory Testing

How It Works

- Involves measuring the responses evoked by mechanical and thermal stimuli of controlled intensity²
- Stimuli are applied to the skin in ascending and descending order³
 - Mechanical sensitivity: assessed using plastic filaments and pin prick sensation with weighted needles³
 - Vibration sensitivity: assessed using an electronic vibrometer³
 - Thermal sensitivity: assessed using a probe that operates on a thermoelectric principle³

Limitations

- Relies on the patient's subjective assessment of pain³
- Outcomes of quantitative sensory testing and bedside testing do not necessarily coincide²
- Quantitative sensory testing abnormalities cannot be taken as conclusive demonstration of neuropathic pain⁴ because they also occur in other conditions, such as rheumatoid arthritis³
- Time consuming and requires expensive equipment⁴
- Results can be influenced by various factors (e.g., model or make of equipment, room temperature, site of stimulus, patient characteristics)²

1. Rolke R *et al.* *Pain* 2006; 123(3):231-43;

2. Hansson P *et al.* *Pain* 2007; 129(3):256-9;

3. Jovin Z *et al.* *Curr Top Neurol Psychiatr Relat Discip* 2010; 18(2):30-7;

4. Cruccu G, Truini A. *Neurol Sci* 2006; 27(Suppl 4):S288-90.

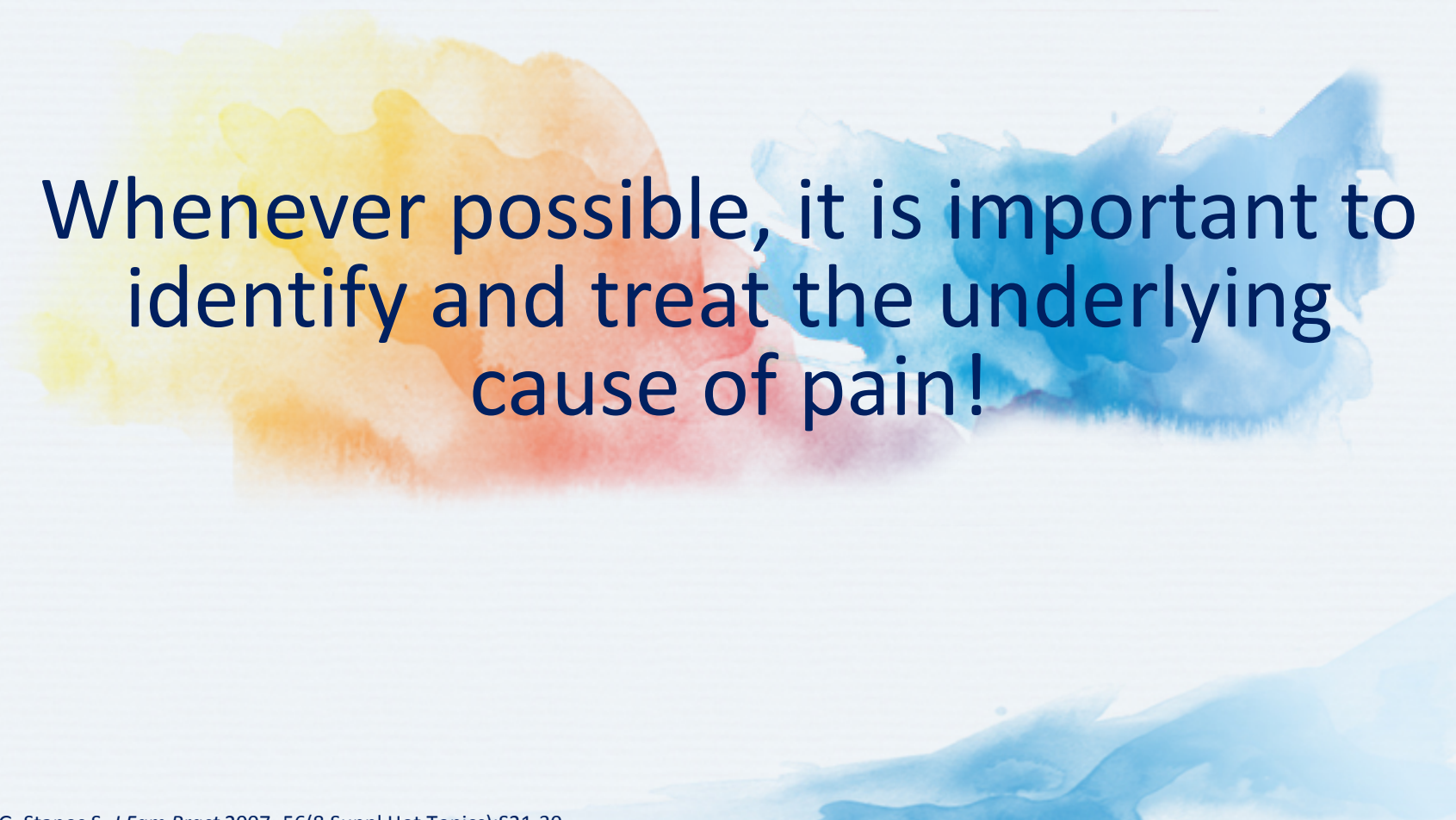
Diagnosis

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Pain Diagnosis

- Confirm or exclude underlying causes
- There is no single diagnostic test for pain
- Multiple tests may not be helpful

Identify and Treat Underlying Cause



Whenever possible, it is important to identify and treat the underlying cause of pain!

Be Alert for Red Flags

Evaluate for patients
presenting with pain the
presence of **red flags!**



Initiate appropriate investigations/
management or refer to specialist

Summary

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Assessment and Diagnosis: Summary

- Assessment of pain is critical and should include:
 - Location, duration, frequency, quality, severity, etc.
 - Medication history
 - Physical exam
 - Assessment of patient function
 - Psychological assessment
 - Risk assessment
 - Comorbidities
 - Determination of type(s) of pain
- 