



Functional Diagnostics

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Disclosures

- 1. I have nothing to disclose
- 2. There is no commercial support for today's activity.



The Issues

- Need for a more structured work up among providers
- Need for more conformity among providers
- Overuse of nonspecific injections
- Overreliance on imaging



The proposal

(Functional Diagnostics)

- Use the following to further narrow the patient's possible pain generator(s):
 - Symptom-driven work up (as opposed to an imaging driven workup)
 - Evidence-based physical exam composites
 - Evidence-based **diagnostic blocks** determined by this work up – as an extension of the PE – to help further define the pain generator
 - Use diagnostic radiology as a correlation tool



What is a “diagnostic block”?

- “A diagnostic block is a procedure where only local anesthetic agent is injected into or onto a structure in order to anesthetize it, or onto the nerve or nerves that innervate the structure to determine the pain generator.” Engel, McVicar, Bogduk, Pain Med, 2014



How is this made “functional”?

- This is made functional by talking to the patient and performing provocative maneuvers before and after the block.



Principles of diagnostic blocks


- Face Validity (target specificity): “Block does what it is supposed to do in the anatomical or physiological sense” [at the target] [Aided by fluoroscopic or ultrasound guidance]
- Construct Validity: “it establishes that test actually achieves what it is supposed to do” [the procedure blocks the pain at the target]
- Predictive validity: “ability of blocks to predict successful outcome from treatment” [by knowing the pain generator, the pain will be more easily managed - > is this going to help my medical management?]

Bogduk N, Interventional Spine, an algorithmic approach, 2008.



False positives

- False positive: “relating to or being a test result ...that is erroneously classified in a positive category (as of diagnosis) because of imperfect testing methods or procedures (e.g. *a false–positive pregnancy test*).” *Merriam-Webster Dictionary*




Common causes of false positives

- 1) Expectation bias: The block is more likely to work if the patient believes that the block will work.
- 2) Imperfect techniques: “These include local anesthetic spread to adjacent structures, overzealous use of superficial anesthesia, vascular uptake, and systemic absorption.” Milan, Pain Medicine 2015



Avoiding false positives

- 1) Narrow the differential by non-invasive means
- 2) If you are going to do a diagnostic block you must satisfy Face and Construct Validity
- 3) Try to avoid expectation bias:
 - a) comparative blocks: two or more blocks with different local anesthetics (different time frames of action)
 - b) placebo blocks (ethical?, good use of resources?)



Don't forget the value of Negative responses

- -> This is very helpful information as this knowledge can help rule out pain generators.
- -> Keep in mind that this could be a false negative (“the target structure is, in fact, the pain generator, but the test fails to identify it as such” Milan, Pain Medicine 2015 *This could be from poor technique or patient malingering.*



Example of a composite of physical examination tests:

Sacroiliac joint (SIJ) Dysfunction

Composite of tests:

when a cut off of 3 positive tests out of 6 is used for a dx of SIJ dysfunction

SENSITIVITY = 0.94

SPECIFICITY = 0.78

Distraction	Compression	Thigh thrust
Gaenslen's (right)	Gaenslen's (left)	Sacral Thrust

M. Laslett et al, Manual Therapy 10 (2005) 207-218



Using evidence to justify the use of diagnostic blocks: e.g. lumbar medial branch blocks

- “Lumbar medial branch blocks are the single most validated diagnostic test in interventional pain medicine”. Bogduk / Evidence-informed management of chronic low back pain with facet injections and radiofrequency neurotomy *The Spine Journal* 8 (2008) 56–64
- “the only means of diagnosis (lumbar z joint pain) is by diagnostic blocks” N. Bogduk / *The Spine Journal* 8 (2008) 56–64
- “..controlled lumbar medial branch blocks have been validated, and now constitute the best available criterion standard for lumbar Z joint pain”. N. Bogduk / *The Spine Journal* 8 (2008) 56–64
- “ The evidence for diagnostic lumbar facet joint nerve blocks and diagnostic sacroiliac intraarticular injections is good” Manchikanti et al, *Pain Physician* 2013; 16:S49-S283 [Systematic assessment of the literature]



Using evidence to guide the technique: e.g. lumbar medial branch blocks (LMBB)

- Location of needle tip: “At typical lumbar levels, the target point lies on the neck of the superior articular process, which the medial branch crosses” *N. Bogduk / The Spine Journal 8 (2008) 56–64*
- Amount of local anesthetic: “A volume of 0.3 ml is sufficient” *N. Bogduk / The Spine Journal 8 (2008) 56–64*
- Time frame for block: ISIS guidelines require that patients be evaluated for a minimum of 2 hours after the block, or until relief ceases, whichever is sooner. *ISIS Guidelines, 2nd Edition.*
- Amount of relief for a positive block: 80% and restoration of activities. *N. Bogduk / The Spine Journal 8 (2008) 56–64*



Summary of this discussion

- 1) We discussed the proper utilization of diagnostic blocks
- 2) We discussed validity checks for disagnostic blocks
- 3) We discussed false positives, false negatives, and bias involved in diagnostic blocks
- 4) We discussed the use of negative results
- 5) We discussed some evidence base examples of this approach



Thank you!!

- Questions??

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