

Pain Management Review Part 2

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Objectives

- Evaluate the relationship between the two major psychologic factors of depression and anxiety and tennis elbow.
- Discuss the validity of pain maps for cervical zygapophysial joint pain.
- Discuss the findings for depression and anxiety with respect to prospective prediction of pain-related outcomes.
- Discuss myofascial trigger points, neck mobility, and forward head posture in episodic tension-type headache.
- Describe the distinct appearance an oblique view of the obturator nerve exhibited.
- List three mechanisms associated with an unruptured aneurysm.
- Differentiate between intrinsic and extrinsic factors associated with musculoskeletal disorder-related injuries.
- Differentiate between types of pacing in patient response to pain.
- Delineate the steps of the World Health Organization (WHO) analgesic ladder.
- Examine the effect of BoNT/A on pain and neurogenic vasodilation induced by application of thermal stimuli and capsaicin to the human skin.

Pain, functional disability, and psychologic status in tennis elbow.

Alizadehkhayat O et al

Journal: Clin J Pain 23(6):482-489, 2007. 55 References

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Faculty Disclosure: Abstracted by J. Joyce, who has nothing to disclose.

Tennis elbow (TE) is a painful pathologic condition with its origin in the common wrist extensor muscles at the lateral epicondyle. It is the second most frequently diagnosed musculoskeletal disorder in the neck and upper limb in a primary care setting. TE has considerable socioeconomic costs. There are at least 40

different conservative treatments for TE, but there is still insufficient evidence to support the effectiveness of any therapeutic intervention. Kinesiologic theory suggests that the upper limb operates as a single functional unit so that disorders specific to one joint may result in functional disability in other parts of the limb.

The first aim of this study was to assess pain and functional disability in TE patients against a group of healthy control participants by using both regional and joint-specific upper limb assessment tools. The second aim was to address the importance of psychological assessment in TE patients. Using self-report questionnaires is a potential way to obtain meaningful estimates of pain and functional disability. By the application of both regional and joint-specific questionnaires, this study highlighted the segmental and also the whole upper limb impact of TE.

The high level of pain and functional disability the authors found in TE patients is not surprising. However, although TE-related pain and functional disability can impair performance in work, recreation, and at home, imposing a considerable financial cost on the community, an efficient evidence-based treatment with the twin therapeutic objectives of pain relief and functional recovery is still to be identified. As pain and functional disability are the principal reasons that patients seek treatment, they are critical domains to measure before and after any intervention. Therefore, the use of appropriate standardized patient-oriented tools for the accurate measurement of pain severity and functional disability should improve not only the quality of supportive and intervention strategies but also the practicality of treatment outcome measures in TE.

Both anxiety and depression have been shown to correlate with pain. It has been suggested that examination of overuse injuries should include an assessment of possible depression and also both somatic and psychological evidence of anxiety. The critical aspect is the way that psychological factors influence the development of TE (and possibly other upper limb conditions). Interestingly, depression correlated more strongly with upper limb assessment tools than did anxiety.

More work is needed into the concepts of fear, fear-avoidance, movement/re-injury-fear, pain-related fear, and pain catastrophizing, to investigate the role of these mechanisms in chronic TE. The early identification of these factors through appropriate assessment is important so that early cognitive-behavioral intervention can be considered within treatment strategies.

Cervical zygapophysial joint pain maps.

Cooper G et al

Journal: Pain Med 8(4):344-353, 2007. 18 References

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The zygapophysial joints of the cervical spine are a common source of chronic neck pain. The diagnosis of cervical zygapophysial joint pain ultimately is based on the response to controlled, diagnostic blocks of the medial branches of the cervical dorsal rami that innervate the painful joint or joints. Medial branch blocks should completely relieve the patient's pain. When two joints are symptomatic, anesthetizing one joint should relieve the portion of the pain caused by that joint; anesthetizing the other joint should relieve the remaining pain; and anesthetizing both joints should relieve all of the pain. Medial branch blocks should not be undertaken indiscriminately. They are not indicated simply because the patient has neck pain.

This study was conducted to determine the range of distribution of cervical zygapophysial joint pain, to determine the validity of pain maps for cervical zygapophysial joint pain, to revisit the prevalence of zygapophysial joint pain in patients undergoing diagnostic blocks, and to determine the prevalence of zygapophysial joint pain at particular segments.

The prevalence of data in this study reinforces how common cervical zygapophysial joint pain is. In previous studies, pain maps were based on patterns of pain evoked by experimental stimuli, such as distending a joint or electrical stimulation of its nerve supply artificially with limited magnitude stimulation. This study determined the patterns of naturally occurring pain that was relieved by controlled blocks. Where the present maps depart from those of previous studies is the extent and variability of referral. Presumably, this difference can be attributed to patients suffering more intense pain, or pain for longer, than that evoked by temporary, experimental stimuli in normal volunteers. Thus, while confirming the general, segmental nature of referred pain from the cervical zygapophysial joints, this study provides data that are more clinically material. Practitioners should not expect ideal patterns from the cervical zygapophysial joints. Nevertheless, they should be able to discern recognizable patterns.

Areas of pain are not diagnostic of a particular source. They reflect the innervation of the source. It has been shown that patterns of referred pain from the cervical intervertebral discs closely resemble those of the zygapophysial joints of the same segment. Thus, pain patterns do not necessarily imply zygapophysial joints as the source. However, given a particular pain pattern, a zygapophysial joint becomes the foremost source because zygapophysial joint pain is more common than discogenic pain.

Symptoms of distress as prospective predictors of pain-related sciatica treatment outcomes.

Edwards RR et al

Journal: Pain 130(1):47-55, 2007. 48 References

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Sciatica resulting from lumbar intervertebral disc herniation (IDH) is among the most common causes of radicular pain. Most patients are managed conservatively. Individuals vary widely in their treatment responses following spine surgery and non-surgical approaches. Given this uncertainty about and variability in treatment outcomes, many researchers have searched for “marker variables” as a way of prospectively identifying likely treatment responders and non-responders, with the goal of developing effective screening procedures in order to optimize treatment choices.

The authors studied the impact of psychosocial factors on treatment outcomes in a more homogeneous clinical condition, in order to isolate psychosocial effects from the influence of pain etiology. The Maine Lumbar Spine Study (MLSS) was used to assess whether psychological distress prospectively predicted pain and disability in patients undergoing treatment for sciatica. The authors hypothesize that: 1) higher pre-treatment levels of distress would be associated with greater pain and disability over the 3-year follow-up, and 2) higher levels of distress would prospectively predict greater pain and disability over the course of the follow-up period.

The findings presented suggest that symptoms of depression and anxiety prospectively relate to self-reported pain and disability in patients treated for IDH-related sciatica. Analysis of global pain levels revealed that distress significantly predicted greater pain at the subsequent time point, but baseline distress failed to achieve significance as a unique predictor. Finally, when examining changes in back-specific disability over the 3-year period, baseline levels of distress were uniquely associated with greater disability.

Collectively, these findings suggest that symptoms of anxiety and depression can function as prospective predictors of pain-related outcomes both when assessed prior to initiating treatment, and when psychological distress is assessed as a time-varying factor, with levels of depression and anxiety at a given time point relating to subsequent changes in pain and disability over the course of treatment.

It is important to emphasize that the modest effect sizes observed in these data suggest that using global measures of distress as independent screening tools is unlikely to be a robustly useful strategy. Nonetheless, baseline distress and recent distress have unique, independent detrimental effects on physical function, so an individual with elevated baseline distress, whose distress continues to stay relatively high, may well be at significant long-term cumulative risk for poor physical functioning.

Myofascial trigger points, neck mobility, and forward head posture in episodic tension-type headache.

Fernández-de-las-Peñas C et al

Journal: Headache 47(5):662-672, 2007. 32 References

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Headache disorders are one of the most common problems seen in medical practice. Tension-type headache (TTH) is the most frequently seen headache in adults. The pathogenesis of TTH is not clearly understood. This paper describes the differences in the presence of trigger points (TrPs) in head and neck muscles, forward head posture (FHP), and neck mobility between episodic tension-type headache (ETTH) and healthy controls. The authors assessed the relationship between these muscle TrPs, FHP, neck mobility, and several clinical variables concerning the intensity and the temporal profile of headache.

This study is the first blinded, controlled study providing evidence that active myofascial TrPs in the upper trapezius, sternocleidomastoid, and temporalis muscles are more common in ETTH patients than in healthy subjects. ETTH subjects showed greater FHP, that is, a smaller craniovertebral angle, and lesser neck mobility than controls. Headache parameters were not significantly different between ETTH patients with active TrPs and those with latent TrPs in the same muscles. Neck mobility and FHP did not also correlate with headache characteristics.

Current findings for ETTH subjects complete these authors' previous findings for chronic tension-type headache (CTTH) subjects, in whom head and neck TrPs were also more common than in healthy controls. Peripheral and central sensitization and decreased descending inhibition induced by long-term nociceptive stimuli from TrPs may also involve referred pain to the trigeminal region from active TrPs. According to a model by Olesen, headache intensity is the sum of nociceptive inputs from cranial and extracranial tissues converging on trigeminal nucleus caudalis neurons. Convergence of the nociceptive afferents from the receptive fields of cervical roots C1-C3, which include the upper trapezius and the sternocleidomastoid muscles, and those of the trigeminal nerve, which include the temporalis muscle, occurs in the nucleus caudalis. It is possible that nociceptive inputs from head and neck muscle TrPs can produce a continuous afferent bombardment to the trigeminal nerve nucleus caudalis. Inactivation of head, neck, and shoulder TrPs in those with TTH would be expected to decrease headache parameters.

The results presented demonstrated that patients with ETTH had a greater FHP than control subjects in both sitting and standing positions. FHP has been previously related to other headache disorders. Whether FHP contributes to the origin or perpetuation of headaches must be verified by future research.

Ultrasound-guided obturator nerve block: a preliminary report of a case series.

Helayel PE et al

Journal: Reg Anesth Pain Med 32(3):221-226, 2007. 20 References

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The use of peripheral-nerve blocks is associated with decreased hospital costs and unplanned admissions in complex outpatient knee surgeries, which can be ascribed to the excellent postoperative analgesia provided by such blocks that results in decreased opioid consumption and side effects. The importance of combining obturator-nerve block with femoral block for major knee surgeries has been demonstrated. The addition of a selective obturator-nerve block assumes crucial importance for the successful perioperative management of complex knee surgeries.

The obturator nerve can be blocked by use of paresthesia elicitation or nerve stimulation. This study describes a novel ultrasound-guided technique for localizing and anesthetizing the obturator nerve. The authors obtained an oblique view of the obturator nerve exhibiting a predominantly hyperechoic flat or lip-shaped appearance with discrete internal hypoechoic dots. Sonographic visualization of the nerve depends on its depth, size, and course and on the applied insonation frequency. The suggestion has been made that lower-extremity peripheral nerves demand more challenging skills to image than the upper-extremity nerves. Despite the imaging limitations imposed by the obturator nerve and its surrounding connective tissues, the transducer used allowed the authors to visualize and guide the blocking needle quickly and precisely to the targeted nerve.

Misidentification occurred independently of the patients' thigh circumferences. Because the nerve is enveloped in the intermuscular septum, the authors believe that the anisotropic behavior of the perineural connective tissue and their early learning curve of the procedure may have caused the incorrect identifications. In this series, a small number of young healthy subjects were enrolled, so caution should be exercised when generalizing these findings to a broader and older population.

Improvement of chronic headache after treatment of unruptured intracranial aneurysms.

Kong DS et al

Journal: Headache 47(5):693-697, 2007. 26 References

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The incidence of detected unruptured aneurysms (UAs) is increasing with improved diagnostic tools and their application to a general health check-up and for the evaluation of minor trivial symptoms. A variety of clinical manifestations of UAs are reported including chronic nonspecified headache, regional headache, sudden severe headache (so-called thunderclap headache), sudden dizziness with nausea or vomiting, cranial nerve palsy (ptosis, visual disturbances, and diplopia), tingling sensation, and seizures. Chronic headache is not only the most common presenting symptom but also the most frequent symptom accompanied with other clinical findings.

The authors conducted this study retrospectively to assess the significance of chronic headache associated

with UAs, its correlation with the characteristics of each UA and with the outcome after the proper treatment of UAs. Increased detection is a consequence of development and more common use of advanced diagnostic cerebrovascular imaging techniques. Most of the prior investigations have focused on the risk of rupture and hemorrhage while aneurysms were left untreated. The risk of rupture and subarachnoid hemorrhage in UAs is of paramount importance.

It has been long recognized that UA is found in patients with the complaint of acute deteriorating headache with no signs of bleeding from the aneurysms. The mechanisms that cause an acute headache associated with an UA are thought to be due to local thrombosis in the wall of the aneurysm, but it may also include morphologic changes (stretching or dissection) in the vascular wall, intramural bleeding, and occult or sentinel hemorrhage. Rapid expansion or inflammation of the aneurysm can lead to headaches, nerve or brainstem compression, epilepsy, or ischemic events.

The findings of this study indicated that a significant number of patients experienced marked improvement in their preexisting headache after treatment of UAs, suggesting the possibility that UA is an additional important cause of chronic headache. It should be acknowledged that UAs can produce symptoms such as headache and nerve compression that can be treated with low risk interventions to relieve the patient's discomfort. The retrospective nature of patient identification is an important limitation of this study, and patient recall bias may have been a factor. Among patients with improved chronic headache, some placebo effect might have accounted for the results.

Military training and musculoskeletal disorders.

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Journal: J Musculoskel Pain 15(2):25-32, 2007. 55 References

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Musculoskeletal disorders (MSD) represent a major issue in the military setting. MSD in military personnel contribute to substantial losses of time from work and training, as well as reductions in overall military readiness. The resulting morbidity represents a substantial cost to the community. For these reasons, prevention of MSD in the military setting should be paramount. Although the exact location of MSD among soldiers may vary, body sites typically referred to physiotherapists often involve the knee joint, lumbar spine, ankle joints, and shoulder joints. It is important to understand the factors that may be associated with MSD so that prevention and management strategies can be most effectively targeted.

Risk factors for MSD can be classified as being either intrinsic or extrinsic. Intrinsic factors that have been linked to military training injuries include the level of prior physical conditioning, the soldier's physical

makeup, foot hyperpronation, female gender, tibial bone width, and cigarette smoking. Other authors have proposed links between injury and diversity of intrinsic factors, such as bone mineral density, age, height, weight/body mass index, and specific alignment characteristics of body segments. Extrinsic factors associated with MSD-related injuries have previously included training surface, exercise when fatigued, progressive training in favor of cyclical training, and the type of footwear worn.

Studies of predisposing factors for training-related injuries remain complex and multi-faceted. Variations have been found for injury profiles between males and females. Gender differences may reflect differences in both participation levels as well as the nature of physical activity undertaken by females in the military. No gender differences in injuries caused by sport or road-traffic accidents were found, but military training, work, and recreation were more likely to be the main cause of injury to females. Such hypotheses are supported by research demonstrating equivalent injury risks in male and female athletes who undertake sports.

A high proportion of physiotherapy referrals for MSD appear to involve undiagnosed conditions, which may reflect intrinsic difficulties in establishing a definitive diagnosis where musculoskeletal conditions are concerned. Diagnosis of MSD can be deferred by the delays in presentation and treatment. Joint and soft tissue injuries may have been referred more rapidly than other types of pathology.

The role of avoidance, pacing, and other activity patterns in chronic pain.

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Journal: Pain 130(1-2):119-125, 2007. 26 References

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Chronic pain can be associated with significant disruption of daily activity for the pain sufferer. Avoidance of activity has been long recognized as a contributor to chronic pain and has gained a prominent place in current research and clinical attention. There is now compelling evidence that a framework including fear, avoidance of activity, disuse, and disability constitutes a useful model of chronic disabling pain, for at least a portion of pain sufferers. The purpose of this study was to investigate multiple activity patterns of chronic pain sufferers in relation to their physical, social, and emotional functioning. The authors sought to examine patterns of avoidance, pacing activity, and high activity — patterns that are described in the literature and addressed in cognitive-behavioral treatment approaches.

This report focused on measures of these patterns simultaneously, in multivariate analysis, and attempted to identify homogeneous patient subgroups from these analyses. The prediction was that patients with chronic pain whose activity was most characterized by avoidance would demonstrate the lowest levels of functioning and the highest levels of emotional distress.

The results presented suggest that it is possible to assess patterns of avoidance, pacing, and high activity, in patients with chronic pain, and to identify distinctive subgroups with regard to these patterns. Avoidance, Pacing, and Confronting patterns appear to be constituent parts of larger configurations of activity and appear complexly interrelated for particular individuals. Contrary to their prediction, pacing activity, as assessed here, did not emerge as positively associated with levels of functioning. 'Pacing' done for purposes of reducing pain may indeed share features with avoidance, and obtain the same results as avoidance, while 'pacing' done in a way that reduces pain's influence is likely to obtain different results, and promote better functioning. A *formal* approach to pacing would require merely that a patient be trained in certain steady rates of activity, perhaps without extreme fluctuations. A *functional* approach would require that pacing be defined in a way that includes the variables that influence it, or, to put it more loosely, the purposes these authors want to serve.

The present results advocate for a functional approach to activity management in chronic pain. The authors did not find the predicted differences between the activity pattern clusters on depression or psychosocial functioning; however, they did find differences on pain-related anxiety and acceptance of pain. The results call for greater attention to treatments aimed specifically at decreasing avoidance, treatments such as exposure-based methods and contextual cognitive behavioral therapy.

The use of opioid analgesia in end-stage renal disease patients managed without dialysis: recommendations for practice.

Murtagh FE et al

Journal: J Pain Palliat Care Pharmacother 21(2):5-16, 2007. 89 References

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The number of patients with non-cancer diagnoses cared for by palliative care services remains low. End-stage renal disease (ESRD) is defined as the most advanced stage of renal dysfunction when the estimated glomerular filtration rate is less than 15 mL per minute. ESRD patients are increasingly being managed in palliative care services and comprise two groups: those who are conservatively managed without dialysis and those who withdraw from dialysis. Management of both groups can be challenging, principally because of the constraints on the use of medications by reason of the renal failure, but also because of the very high levels of co-morbidity.

This study is intended to provide a resource to those managing pain in ESRD patients managed without dialysis and those who have withdrawn from it. This study also applies to those with advanced malignancy or other pathology who develop progressive renal failure at the end of life. Careful attention must be given to the underlying cause of pain, as for any palliative patient. Many of the common causes of pain in renal

patients are long term, and this may influence both patient attitudes to the pain, and professionals' approach to identifying and addressing it.

Opioid analgesics are here categorized according to the steps of the World Health Organization analgesic ladder. This tool recommends that, if pain occurs, there should be prompt oral administration of drugs in the following sequence: Step 1: non-opioids, Step 2: mild opioid analgesics if pain persists, and Step 3: strong opioid analgesics if pain continues, until pain is relieved. To maintain freedom from pain, drugs should be given "by the clock" rather than "on demand." This three-step approach of administering the right drug in the right dose at the right time is inexpensive and has been shown to be 80-90% effective for cancer patients. Recent evaluation in ESRD demonstrates that it leads to effective treatment of pain in >90% of hemodialysis patients. The numbers of ESRD patients managed without dialysis that are currently seen by specialist palliative care services are small, but managing these patients' symptoms well can prove extremely challenging.

There is an acute need for evidence-based recommendations for practice, as awareness grows within both palliative and renal fields for active, anticipatory symptom control, as well as other palliative and supportive care provision for these patients. A detailed understanding of analgesic pharmacology in renal impairment, use of this understanding to inform practice, and collaborative working between nephrologists, palliative care teams, pharmacists, and primary care teams are the key to optimum care of these patients.

Botulinum Toxin type A reduces capsaicin-evoked pain and neurogenic vasodilation in human skin.

Tugnoli V et al

Journal: Pain 130(1-2):76-83, 2007. 56 References

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Botulinum Toxin type A (BoNT/A) is currently used for the treatment of focal muscle overactivity and spasticity, including hyperhidrosis and sicca/orra. The beneficial effect of BoNT/A is considered to result from the blockade of either neuromuscular or autonomic cholinergic junctions. Pain diseases alleviated by BoNT/A encompass two main categories: those related to muscle disorders, including dystonia, myofascial pain, chronic pelvic pain, tension-type headache, temporomandibular dysfunction, and those possibly related to neurovascular disorders, including migraine headache. The precise mechanism of the analgesic effect of BoNT/A is still poorly understood.

This study investigated the effect of BoNT/A on pain and neurogenic vasodilation induced by application of thermal stimuli and capsaicin to the human skin. Results indicate that treatment with BoNT/A attenuates both pain and neurogenic vasodilation evoked by capsaicin application, without affecting thermal-specific and thermal-pain thresholds. In the present study the inhibitory effect of BoNT/A on capsaicin-induced pain was observed solely if capsaicin was administered inside the skin area pretreated with BoNT/A, but

not if it was applied to a skin area adjacent to that pretreated with BoNT/A.

These findings show that to limit capsaicin-induced pain BoNT/A must be applied to the same skin area, suggesting that BoNT/A interferes either directly on capsaicin-induced transient receptor potential vanilloid-1 (TRPV1) activation or on the neurophysiological events that follow this activation in the nerve axon and its arborization. The hypothesis that BoNT/A alters central transmission has been proposed because the toxin reduced the inflammatory pain phase in the formalin pain model in rats by decreasing glutamate release.

Furthermore, diminished activity of nociceptive neurons after BoNT/A administration was confirmed by the reduction in *c-fos* gene and Fos protein expression. However, attempts to demonstrate a direct action of BoNT/A in nociceptive neurons have not been consistently reproduced. It is possible that BoNT/A treatment reduces neurogenic vasodilation and pain by inhibiting the release of norepinephrine. However, the contribution, if any, of BoNT/A in the regulation of transmitter release from adrenergic or neuropeptides containing nerve fibers has not been clarified yet.

Although the mechanism(s) underlying the inhibitory effects remains unknown, the proved ability of BoNT/A to inhibit neurotransmitter exocytosis and the different responses of capsaicin-induced pain and flare in relation to BoNT/A treated area could suggest that, in this study, BoNT/A could act at two different levels of capsaicin model, and more precisely at the direct nervous afferent branch that is related to capsaicin-induced pain and at the efferent branch of the axonal reflexes by inhibiting neuropeptides release and the neurogenic vasodilation.