

Psychological approaches to chronic pain management: evidence and challenges.

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## Abstract

Psychological interventions are a mainstay of modern pain management practice and a recommended feature of a modern pain treatment service. Systematic reviews for the evidence of psychological interventions were summarized. The evidence for effectiveness is strongest for cognitive behavioural therapy with a focus on cognitive coping strategies and behavioural rehearsal. Most evidence is available for treatments of adult pain, although adolescent chronic pain treatments are also reviewed. It is clear that treatment benefit can be achieved with cognitive behavioural methods. It is possible to effect change in pain, mood and disability, changes not achieved by chance or by exposure to any other treatment. However, the overall effect sizes of treatments for adults, across all trials, are modest. Reasons for the relatively modest treatment effects are discussed within the context of all treatments for chronic pain being disappointing when measured by the average. Suggestions for improving both trials and evidence summaries are made. Finally, consideration is given to what can be achieved by the pain specialist without access to specialist psychology resource.

## 1. Introduction

Pain has the unusual ability to teach one about human limits, or more precisely one's own forbearance, resilience, and tolerance of threat. Pain, especially chronic pain, challenges our ability to behave in a coherent and consistent way when threatened by harm. Patients report living with chronic pain to be dissembling: the experience of chronic pain goes beyond an acute experience of aversive sensation, and is better thought of as a prolonged experience of immiserating and disabling disease (1).

It is rare to see a simple pain presentation. People with chronic pain typically present to pain clinic with multiple and overlapping problems: depression, anxiety, sleep disorder, disability, relationship distress, social role loss, isolation, and a concerning overuse of medicine (2). Anaesthetists in pain clinic are used to meeting patients who report complex disability and distress narrated as being caused by stubborn pain. Psychological treatment either alone, in combination with a physical or pharmacological treatment, or as a part of a rehabilitation package, is a relevant and promising option for many chronically distressed pain patients. There is a growing acceptance that these treatments have a place in the optimized pain clinic (3, 4). The importance of the role they play depends largely on the evidence of their effectiveness in reducing disability and emotional distress, and in improving quality of life.

In what follows the evidence for the effectiveness of psychological therapies for the management of chronic pain is reviewed. We provide a summary of recent secondary data analyses and evidence syntheses of psychological treatments offered for common chronic pain conditions, in particular musculoskeletal, rheumatological and cancer pain. We report data on adolescence as well as adults

but we do not focus on older adults as they are the subject of a separate contribution in this volume (5). Throughout we have a concern for the quality of primary trials and the quality of the reviews. Where possible we report evidence from a Cochrane review. Where no Cochrane review is available we report an existing meta-analysis, and failing this resort to the narrative review.

Following the evidence summary we discuss key trends in the data and suggest areas for improvement and development of psychological treatments. Finally, given the reality of most anaesthetic pain practice, we discuss good psychological practice for the non-psychologist.

## 2. The normal psychology of chronic pain

Psychology is concerned with the prediction and control of behaviour. In chronic pain behaviour is defined broadly to include private events such as thoughts and feelings that initiate, maintain, or exacerbate suffering. The psychology of chronic pain is a psychology of the normal (6,7). Patients reactions to both acute and persistent pain can be understood in terms of normal psychological processes. We do not have to invoke pathological explanations. People typically draw upon the coping skills and resources they have available to them, and they have used successfully for other threatening or aversive life events, but in chronic pain find them wanting. What can appear abnormal is the stubborn perseverance in using techniques that have proven inadequate, unfitting, and ultimately unhelpful to the problems of chronic pain (8). Academic psychology is interested in this 'pain perseverance paradox'. Understanding how and why self-defeating behaviour occurs is important and will give insight into the prevention of disability and distress (9). However, at present the majority of treatments are designed for those already

struggling to make sense of chronic pain, and attempting to adjust to a life lived in pain.

Psychological treatments are best characterized as cognitive or behavioural strategies aimed at reducing mental suffering and promoting active engagement with life. Early psychological treatments had roots in behaviour theory and were focussed on identifying the antecedents and consequences of behaviour, and in particular on the broad contextual determinants of those behaviours. Later, treatments aimed directly at altering the self-defeating thoughts that rendered people helpless (10). From these behavioural and cognitive beginnings, varieties of treatment have been developed and tested, and most fall broadly under the rubric of 'Cognitive Behavioural Therapy' or CBT. Today it is perhaps easier to think of CBT as a broad family of therapies: they share the same roots but have different strengths and applications (11).

### 3. Effectiveness of Cognitive Behavioural Therapy

There is no shortage of innovation in psychological therapies. It is an area rich in development. In 2012 we summarized the effectiveness of treatments for adult chronic pain (12) and in a separate review for adolescent chronic pain (13).

In the review of treatments of adults we included only randomized controlled trials of a reasonable size, defined as having 20 patients assigned to each arm of the trial. Although not particularly stringent as a criterion of entry 20 did mean a loss of ten trials from the previous version of this review (14). The majority of treatments were labelled as behavioural or cognitive behavioural. Other psychological treatments were identified in the literature, such as psychodynamic treatments or acceptance based treatments, but they did not survive the selection as they were often poorly

specified or inadequately examined. The current evidence base consists of 42 separate studies reported in the literature, 35 of which provided data from 4788 participants, which could be combined and analysed.

Treatments were labelled as either behavioural (typically relying on technologies of relaxation, biofeedback, contingency management, or exposure) and cognitive behavioural (typically programmes with components of education, coping strategies training, cognitive therapy). It is rare to find a treatment that is not programmatically organized, and without home practice. Patients were all suffering from pain, disability, and mood disorder, with samples of patients with visceral pain, musculoskeletal pain, or facial pain. Many studies had samples with mixed chronic pain patients.

This Cochrane review is the most stringent review of this topic ever published and reports its conclusions only after full consideration of bias in primary studies. Where the findings of studies were likely to be too unstable they were excluded from the review, principally for being too small, using a treatment that was not credible, or for failing to control for non-specific effects. The included studies were coded for multiple markers of quality and any further risk of bias. As a consequence we can be confident that the results are conservatively reached.

CBT is effective in reducing pain immediately after a treatment compared to doing nothing, but this effect is slight. Behaviour therapy has no effect on pain. However, CBT is effective in reducing disability immediately after treatment, although there is no evidence for this effect at long term follow-up. Behaviour therapy has no such effects. Similarly some effects of CBT on mood, typically depression, are reported at a moderate level, and persisted at six months. Behaviour therapy has no such

effects. Finally, a smaller number of treatments, typically more modern treatments, targeted highly anxious patterns of worry dominated thinking (called catastrophizing). Eleven comparisons were possible for CBT, with either an active other treatment or a no treatment control. CBT is an effective treatment in reducing highly anxious thinking about pain and future pain. The findings for behavioural treatments were also promising, surprisingly since there appeared to be no effects on the primary target of disability. In summary, CBT can produce real improvements in problems arising from highly disabling and long lasting chronic pain in adults. Modern treatments focused on specific problems where patients are highly anxious about pain related movement look particularly promising. The primary finding of this review is that improvements in mood and disability status not possible through any other means are possible with psychological treatment.

A similar picture emerges with other reviews focused on musculoskeletal pain. Hoffman and colleagues, using a fairly liberal inclusion strategy and going beyond the strict RCT found an overall omnibus effect size on all treatments for all outcomes of 0.48 (15). Dixon and colleagues analysed 27 trials of psychosocial treatments for painful rheumatological conditions and found similar effect sizes, with coping interventions emerging as most promising. Bernardy et al published a non-Cochrane review specifically on fibromyalgia (16). The effects were promising but confidence is undermined by the poor quality of studies. These authors promise a broader review on psychosocial treatments, including CBT, for fibromyalgia for the Cochrane Library (17).

Pain is a major feature of cancer and modern cancer treatment and non-pharmacological treatments have been an increasingly common feature of modern multidisciplinary oncology practice over the last thirty years, made more important as

the number of people surviving with cancer increases, shifting the emphasis of care to post treatment symptom management. Gorin and colleagues reported a meta-analysis of psychosocial interventions for pain management, which in cancer are dominated by psycho-educational packages and coping skills training (18).

Combining across all treatments and conditions, they reported a global effect size for pain of 0.34, and for interference (disability) of 0.40.

There is one exception in the literature to this general pattern of modest findings of the effectiveness of CBT, which is for paediatric chronic pain. In the updated Cochrane Systematic Review of psychological interventions for children and adolescents we identified 37 studies, 21 of which were in headache. Most trials are of simple interventions, and rarely included non-pain outcomes. More recently developed interventions are multicomponent and give promising results for disability and depression (19, 20). However, the earlier studies focused primarily on pain. For headache the findings are consistent: brief psychological interventions, delivered by trained non-psychologists, have a relative risk for 50% pain relief of 2.9 which is an NNT of 2.72 immediately post treatment, improving to 2.01 at follow up, making it one of the most successful treatments for paediatric chronic pain ever described (13).

Leaving aside the exception of CBT for adolescents with chronic pain, a general pattern emerges from systematic review and meta-analyses of CBT for adults with chronic pain. Where there is sufficient evidence from which to summarise, CBT leads to marked improvements in quality of life indexed by positive changes in disability, psychological distress (principally depression) and to a lesser extent pain. We can say confidently that these changes do not occur by chance, and are not due simply to the experience of being in a treatment of any kind. Coping skills training

with a focus on cognitive skill development and practice appears to be the most promising treatment. However, and herein lies the problem with the above, the effect sizes across all meta-analyses and all outcomes are modest, ranging from small to medium, only rising above medium as one relaxes the quality of the review. We consider next the reasons for this pattern of findings and areas for future development.

#### 4. The next generation of CBT for chronic pain.

Small to medium general effect sizes might at first appear disappointing. However three important related considerations should be taken into account. First, chronic pain is a difficult problem. The behaviours targeted are established often over many years, reinforced by multiple interacting influences, obtain across many domains of life, and are not easily extinguished (21). Second, success in any treatment for chronic pain, whether pharmacological, surgical, physical or rehabilitative, is unlikely. The most likely outcome of any treatment is failure (22). We need to get used to the idea that most analgesic interventions are ineffective for the majority, although individual responders can have very satisfactory improvements. Third, talk of average effects hides important detail, and tells us little about the likely response of the individual patient to a specific treatment. Individual trials often have heterogeneous samples of patients. Meta-analyses and systematic reviews often combine studies and so report heterogeneous samples of both patients and treatments. Systematic reviews are normally designed to determine the overall effectiveness of a treatment, not its utility in practice for specific outcomes and specific individuals. Fourth, many meta-analyses have had liberal entry criteria, and standards for both individual trials and for meta-analyses have been rising. However, poor quality studies are associated with the over-estimation of individual treatment

effects, but when combined in a review that attempts to control for quality and bias, the effects are often reduced.

The challenge for the next generation of pain treatments, including psychological treatments, is to move away from the question “do these treatments work?” for which the answer is “yes”, and ask the question “when and for whom do these treatments work?”. In order to achieve this, a number of changes in trial design and treatment development should be considered. First, studies should be simpler in design, with only one active treatment offered in comparison to either a placebo, active, or no-treatment comparator (in that order of preference). Second, trials should be adequately powered with ideally at least 200 patients in each arm (23). Third, the quality of critical delivery variables such as manualization of treatment, training of therapists, blindness of assessors, should be improved (24). Fourth, outcome variables should be standardized and where possible dichotomous outcomes should be established to clearly communicate clinically relevant improvements (10, 25). Treatment content should be made available to enable replication and, where possible, comprehensive description of the patient sample should be given, to enhance knowledge transfer (26). Fifth, critical underlying common processes influenced by a range of different techniques should be identified (27). Finally, psychological treatment research should be mainstreamed out of the ghetto of behavioural health academic circles. Although the specific psychological treatment under investigation is often of interest to professional psychologists, the scientific, methodological and practice considerations are common across pain management technologies and exchange of knowledge and practice across trials of pharmacological and non-pharmacological interventions would be invaluable.

5. Psychology for the non-psychologist.

Our final consideration is for the anaesthetist working in pain practice who does not have access to the resources needed to deliver one or a range of psychological treatments that have been reviewed here. There are essentially three main areas of consideration for improving practice. First, developing a non-pathological formulation. Assessment starts with formulation of a problem. In chronic pain this involves seeking explanations of behaviour in normal psychology. Patients appear obsessed with pain and resistant to alternative explanation often because they have significant attentional problems due to the repeated interruption by pain which makes complex cognition difficult (28). Similarly, patients might appear over-focused on a list of previous doctors, treatment, and medications, but it may simply be due to the intractability of the problem. Multiple medical visits over many years have shaped expectations of any clinical encounter, and patients may attempt to make the process more efficient with memory aids such as paper records of treatments. What appears unusual behaviour can best be explained by recourse to an understanding of what a normal person might do faced with intractable pain and unsuccessful attempts to resolve it (8). Second, learning to harness the power of words. Beliefs about the cause, meaning and consequence of pain are often at stake in any consultation. The pain doctor is a powerful co-creator of beliefs about pain, which can endure and drive disability behaviour. Practicing narrative, metaphor and style of delivery for persuasive communication can radically improve patient satisfaction and choice of treatment outcome. Listening non-judgementally to patients' own fearful explanations of the cause of pain, explanations which to the health professional can seem outlandish and obscure, can give valuable insight into what is causing distress and halting progress. Health professionals often miss valuable opportunities to disconfirm disabling beliefs. Too often the dominant cultural view that patients want

confident certainty and reassurance can lead to the opposite outcome of suboptimal practice (29), and increased patient anxiety (30). Third, ensuring safe and effective practice. Being chronically confronted with the complaint of pain, misery, and disability is challenging to one's own mental health. Sole working is discouraged. Case review and supervision are encouraged. However, perhaps the most important professional mental health habit is to establish an understanding of any failure in empathy, followed quickly by remedial action in seeking professional support. Loss of interest, cynicism, interpersonal distance, over-objectification, and anger, are all early signs of distress that should not be ignored. Finally, chronic pain practice can bring significant personal reward. Improving patients' ability for independent action in the context of persistent pain, and giving freedom from the fear of further disability and loss, can be rewarding anaesthetic practice.

## 6. Conclusion.

People whose lives are disrupted by the occurrence and persistence of pain react as they would to any other threat, with fear and active attempts to escape or avoid it. Chronic escape and avoidance can lead to severe disability and depression. For those with complex disability, psychological treatments are well developed and evaluated. Comparative effectiveness reviews have established that cognitive behavioural therapy is an effective treatment for adult chronic pain. However, the field is not yet able to determine which specific treatment is most effective for which particular patient under what specific conditions. For those anaesthetists without access to programmatic and multidisciplinary treatments, the practice of simple psychological principles and techniques offers the possibility of diverting some patients from the course of increasing disability.

## References

- (1) Chapman CR, Gavin J. Suffering: the contributions of persistent pain. *The Lancet*, 1999;353:2233-2237.
- (2) Breivik H, Collett B, Ventafridda V, Cohen R, Gallacher, D. Survey of chronic pain in Europe: prevalence, impact on daily life and treatment. *European Journal of Pain*, 2006; 10:287–333.
- (3) Donaldson L. 150 years of the Annual Report of the Chief Medical Officer: On the State of Public Health 2008 (pp.32–39). London: Department of Health.
- (4) IASP. Recommendations for Pain Treatment Services. Online at [http://www.iasp-pain.org/AM/Template.cfm?Section=Pain\\_Treatment\\_Facilities&Template=/CM/HTMLDisplay.cfm&ContentID=9218](http://www.iasp-pain.org/AM/Template.cfm?Section=Pain_Treatment_Facilities&Template=/CM/HTMLDisplay.cfm&ContentID=9218). Last accessed February 2013.
- (5) Keefe F (this volume)
- (6) Morley S. Psychology of Pain. *British Journal of Anaesthesia* 2008; 101: 25-31.
- (7) Eccleston C. The normal psychology of pain. *The Psychologist* 2011; 24: 422-425.
- (8) Eccleston C, Crombez G. Worry and chronic pain: a misdirected problem solving model. *Pain* 2007; 132: 233-236.
- (9) Eccleston C. A normal psychology of everyday pain. *International Journal of Clinical Practice*; 2013: 178: 47-50.
- (10) Morley S. Efficacy and effectiveness of cognitive behaviour therapy for chronic pain: Progress and some challenges. *Pain* 2011; 152(3, Supplement 1): S99-S106.
- (11) Turk DC, Meichenbaum D, Genest M. *Pain and behavioural medicine*. Guildford Press, New York, 1983.
- (12) Williams ACDC, Eccleston C, Morley S. (2012). Psychological therapies for the management of chronic pain (excluding headache) in adults. *Cochrane Database of Systematic Reviews*; 2012: Art. No.: CD007407. DOI: 10.1002/14651858.CD007407.pub3.
- (13) Eccleston C, Palermo TM, Williams AC de C, Lewandowski A, Morley S, Fisher E, Law E. Psychological therapies for the management of chronic and recurrent pain in children and adolescents. *Cochrane Database of Systematic Reviews*; 2012: Issue 12. Art.No.: CD003968. DOI: 10.1002/14651858.CD003968.pub3.
- (14) Eccleston C, Williams AC de C, Morley S. Psychological therapies for the management of chronic pain (excluding headache) in adults. *Cochrane Database of Systematic Reviews*: 2009: Issue 2. Art. No.: CD003968. DOI: 10.1002/14651858.CD003968.pub2.

- (15) Hoffman BM, Papas RK, Chatkoff DK, Kerns RD. Meta-analysis of psychological Interventions for chronic low back pain. *Health Psychology* 2007;26:1-9.
- (16) Bernardy K, Füber N, Köllner V, Häuser W. Efficacy of cognitive-behavioral therapies in fibromyalgia syndrome- a systematic review and metaanalysis of randomized controlled trials. *Journal of Rheumatology* 2010;37(10): 1991–2005.
- (17) Bernardy K, Klose P, Busch AJ, Choy EHS, Häuser W. Cognitive behavioural therapies for fibromyalgia syndrome. *Cochrane Database of Systematic Reviews* 2012, Issue 4. Art. No.: CD009796. DOI: 10.1002/14651858.CD009796.
- (18) Gorin SS, Krebs P, Badr H, Janke EA, Jim HSL, Spring B, Mohr DC, Berendsen MA, Jacobsen PB. Meta-Analysis of Psychosocial Interventions to Reduce Pain in Patients With Cancer. *Journal of Clinical Oncology* 2012; 30: 539-547.
- (19) Kashikar-Zuck S, Ting TV, Arnold LM, Bean J, Powers SW, Graham TB, Passo MH, Schikler KN, Hashkes PJ, Spalding S, Lynch-Jordan AM, Banez G, Richards MM, Lovell DJ. Cognitive behavioral therapy for the treatment of juvenile fibromyalgia: a multisite, single-blind, randomized, controlled clinical trial. *Arthritis and Rheumatism* 2012; 64: 297-305.
- (20) Kashikar-Zuck SM. Psychological interventions for pediatric chronic pain--the good news and the challenges ahead. *Pain* 2010;148:361-2.
- (21) Crombez G, Eccleston C, Van Damme S, Vlaeyen JWS, Karoly P. The Fear Avoidance Model of chronic pain: the next generation. *The Clinical Journal of Pain* 2012; 28: 475-483.
- (22) Moore RA (this volume)
- (23) Moore RA, Gavaghan D, Tramèr MR, Collins SL, McQuay HJ. Size is everything—large amounts of information are needed to overcome random effects in estimating direction and magnitude of treatment effects. *Pain* 1998;78:209-216.
- (24) Yates S, Morley S, Eccleston C, Williams A. A scale for rating the quality of trials of psychological trials for pain. *Pain*, 2005; 117: 314-325.
- (25) Dworkin RH, Turk DC, Farrar JT, Haythornthwaite JA, Jensen MP, Katz NP, et al. Core outcome measures for chronic pain clinical trials: IMMPACT recommendations. *Pain* 2005;113: 9-19.
- (26) Thorn BE, CrossTH, Walker BB. Meta-Analyses and Systematic Reviews of Psychological Treatments for Chronic Pain: Relevance to an Evidence-Based Practice. *Health Psychology* 2007; 26: 10-12.

(27) Burns JW, Day MA, Thorn BE. Is reduction in pain catastrophizing a therapeutic mechanism specific to cognitive-behavioral therapy for chronic pain? *TBM* 2012;2: 22-29.

(28) Van Damme S, Crombez G, Eccleston C. Coping with pain: a motivational perspective. *Pain* 2008; 139: 1-4.

(29) Shields CG, Finley MA, Elias CM, Coker CJ, Griggs J, Fiscella K, Epstein RM. Pain Assessment: The Roles of Physician Certainty and Curiosity. *Health Communication*, in press; DOI: 10.1080/10410236.2012.715380.

(30) Linton SJ, McCracken LM, Vlaeyen JWS. Reassurance: help or hinder in the treatment of pain. *Pain* 2008;134: 5-8.