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Australian Pain Society NEWSLETTER

2020 AUSTRALIAN PAIN SOCIETY 40TH ANNUAL SCIENTIFIC MEETING

In the IASP Global Year for the Prevention of Pain

THE AUSTRALIAN PAIN SOCIETY

BLOG | WEB

PRESIDENT'S NOTE

Dr. Anne Burke

Hi everyone,

Welcome to this special edition of the APS eNewsletter, dedicated to the 2020 ASM that nearly was. Strap yourselves in folks because it's a jam packed edition!

This is our first opportunity to publicly honour our newest Distinguished Member, A/Prof David Champion AM, and our Rising Star Award Winner, Dr Samuel Robinson. Rest assured both David and Sam will be joining us on stage in Canberra next year to be presented with their awards, but it's fitting we acknowledge their incredible achievements here.

We also have a large range of abstracts from free papers and posters that were due to be presented at the ASM. I'm sure many of them will really pique your interest, so we've made even more information available online. A few of our rapid communication presenters were also able to prepare a video to share, details within.

We also have an update on the activities of the Scientific Planning Committee (SPC), including plans for the 2021 conference, from Kevin Keay - the fearless leader of the most amazing bunch of research enthusiasts I've had the privilege to work with.

Our AGM, which was due to be held in Hobart, will now be held online and we're seeking member feedback about new activities that you would like to see from your Society. All this and more is covered inside.

On a personal note, I know that the ASM is a much anticipated opportunity to connect with friends and colleagues, many of whom we only see once each year. Although we couldn't connect in person this year, I would like to thank all our members who have reached out in some way to support each other during these challenging times. Your commitment to each other, to the APS, and to helping individuals living with pain is phenomenal – thank you all for all of the work you do each day!

Stay healthy!

Anne

FORWARD

A/Prof Kevin Keay

Sydney, Saturday 16th November 2019, 10 am. The Scientific Program Committee (SPC) of the Australian Pain Society (APS) met for its yearly face-to-face planning meeting; the schedules, speakers, and social events of the Gold Coast Meeting were a warm fuzzy memory and we were propelling ourselves into the future...our 40th Annual Meeting in Hobart, April 2020 ... well, at least that's we thought we were doing!

Like the APS membership, our SPC is quite simply "the best". The enthusiasm, commitment, and creativity of the members make these planning meetings (and all of our meetings) incredibly productive, great fun, and result in the fantastic Annual Meetings that we all enjoy. Our focus is always on bringing the best international speakers with the most impactful messages for our pain community. We invite established and emerging national leaders to share their knowledge and practice, we involve as many of the membership that we can in the programs we create. We know from your feedback that this yearly chance to immerse ourselves in new knowledge with new opportunities for collaboration and networking is critical to the maintenance of our pain community. The social events cement these relationships and friendships even more. The impact of the challenging decision to cancel our Hobart conference was felt greatly by all of us. However, we will be back!

The SPC is working with the APS Board and DC Conferences to ensure that all of the work in preparing posters, presentations, symposia, and workshops was not in vain. This newsletter is one way in which we can showcase the great work being done by our members. During the coming months we will be exploring ways of bringing the membership together, building our clinical and scientific knowledge, fostering collaborations, and sustaining the national awareness of pain research and clinical practice across Australia and our neighbours. The SPC will be working hard to fill the gap left by our Hobart Meeting, as well as discussing our upcoming 2021 meeting, being agile and flexible in our planning. We welcome, of course, other ideas that any of you might have to help us fill the void left by the cancelled conference for the 2020-2021 year. We need to stay connected, and we need your help to achieve this!

Keep safe and well.

Kevin Keay,
SPC Chair

APS MEMBERSHIP SURVEY 2020

THE AUSTRALIAN PAIN SOCIETY

We are in unusual times. The Australian Pain Society (APS) exists to serve our members and to improve the lives of people living with pain by bettering the pain sector. As such, the APS Board is seeking member feedback to gauge preferences and inform decisions moving forward. Please tell us how you would like us to proceed.

This is a brief survey, only 12 questions, and we plan to report on the results at the AGM on 28 May 2020.

The survey link has been sent to members by separate email and can also be found on this newsletter cover email.

Thank you for your continued support and membership of the APS.

2020 RISING STAR

Dr Samuel Robinson

Dr Samuel Robinson is a Postdoctoral Research Fellow at the Institute for Molecular Bioscience, University of Queensland. He is the 2020 Australian Pain Society Rising Star Award Winner.

His research expertise is in the discovery of new plant and animal toxins and investigation of their structure, function, and potential for biomedical applications. Sam is an expert on plants and animals that sting, and the biology, chemistry, pharmacology, and pathophysiology underlying those stings.

His research is providing new understanding on the mechanisms of chemical defense and predation used by animals and plants. The new toxins he has discovered are being used as tools for improving our understanding of the human body and designing new and better treatments for certain diseases.

ABSTRACT

GAIN FROM PAIN: USING VENOMOUS ANIMALS TO EXPLORE NEW NOCICEPTIVE PATHWAYS

Animal venoms are complex mixtures that typically contain hundreds of peptide and protein toxins. A primary role of venom for many animals is predation, where specific toxins act to subjugate prey by targeting vital processes in one or all of the nervous, musculoskeletal, or cardiovascular systems. But almost all venomous animals also use their venoms for defensive purposes—many solely. Defensive envenomations are often associated with intense pain and my hypothesis is that this pain is produced by toxins that directly target sensory neurons, hijacking or overstimulating neuronal transmission. The goal of my research has been to identify the responsible pain-causing (algogenic) toxins from a range of pain-producing animal venoms and to determine their mechanism of action.

Venom samples were acquired from numerous species with characteristically painful stings and the composition of several venoms was determined using a combination of venom proteomics and venom-gland transcriptomics. High-content calcium imaging of mammalian sensory neurons was used to guide the isolation of algogenic toxins. Calcium imaging and electrophysiology were used to determine cellular and molecular mechanisms of action.

I have identified new algogenic toxins from a range of venoms. Different venomous animal lineages employ distinct structural classes of algogenic toxins. A common convergent mechanism of action is the targeting of cell membranes to generate a leak in ion conductance. In excitable cells, such as mammalian sensory neurons, this leak in ion conductance shifts the membrane potential to threshold, initiating neuronal depolarisation, an action, which on nociceptors, results in immediate pain. Other more specific mechanisms also exist, including the activation (or delayed inactivation) of specific ion channels and receptors involved in normal sensory reception and transduction.

The identification and characterisation of new algogenic toxins has provided new knowledge about methods of chemical defence by venomous animals and has the potential to elucidate new components of mammalian pain signalling pathways. A better understanding of our own pain physiology may ultimately lead to the development of new or improved pain treatments.

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Dr Cindy Wall[1]

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THE IMPACT OF CHRONIC PELVIC PAIN IN MEN: A NEW ASSESSMENT TOOL

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1. *Western Sydney University, Campbelltown, NSW, Australia*

Background

Men with chronic pelvic pain (CPP) are a heterogeneous group whose diagnoses and treatments have complex biological, psychological, and social interactions. To date, assessment tools in CPP have focused on identifying pathology, achieving diagnosis, and measuring symptoms rather than exploration of the impact that CPP has on Quality of Life. All current assessment tools were designed by clinicians without patient input and either were not developed for CPP or were restricted to specific diagnoses, limiting their generalisability to the wider CPP population.

Objective

To develop a tool that assesses the impact that CPP has on the lives of men, regardless of their diagnosis.

Methods

This study consisted of three phases. In phase one, a potential list of impacts was developed in consultation with CPP literature. In phase two, this list was sent to clinicians who treat men with CPP for refinement. In phase three, an eDelphi study consisting of three surveys presented the refined list of impacts to men with CPP with the aim of further refining the list. Survey One asked participants if each impact applied to them, with the top 50% of impacts forming Survey Two. During Survey Two, participants were asked how much a given impact applied to them. The content in Survey Three was identical to Survey Two, except participants were provided with the median scores for each impact from Survey Two and given the opportunity to change their response in light of the feedback from the rest of the group. Consensus and stability results from Survey Two and Three were used to create a tool to assess the impact of CPP on the lives of men.

Results

In phase one, a list of 101 impacts was initially identified following review of the available literature. In phase two, 23 clinicians from various backgrounds refined the list to 56 impacts. In phase three, 140 men with CPP were recruited from 39 countries. Survey One yielded a final list of 31 impacts. Participants arrived at consensus on nine of these items after Survey Two, and 15 items after Survey Three. Impacts related to mood were the most highly endorsed, with 'frustration' scoring highest (with 87.2% of participants scoring frustration 60 or higher on a 100-point scale). The final tool consisted of items related to mood, sexual function, working life, activities of daily living, and physical activity. This tool, which uses patient language and can be applied by any clinician, was termed the 'male Pelvic Pain Impact Questionnaire' (mPPIQ).

Conclusions

The impacts that CPP has on men, especially on their mood, are detrimental and far reaching. The mPPIQ has the potential to guide clinicians in their subjective assessments and can be used as a valuable outcome measure exploring the extent to which CPP affects a man's quality of life. Further research avenues can investigate the utility and psychometric properties of the mPPIQ as well as expand its use to multiple countries and populations.

FACES OF PAIN IN DEMENTIA: LEARNINGS FROM CLINICAL PRACTICE

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Background and aims

Pain is common in people with dementia (PwD), particularly in those with limited verbal skills. Facial expressions are key behavioural indicators of the pain experience in this group. However, there is a lack of real-world studies to reveal distinctive patterns of pain-relevant facial micro-expressions in PwD. The objective of this study was to investigate the presence of pain facial phenotype in PwD using an objective, valid and reliable pain assessment tool in the clinical setting.

Methods

Pain assessments were completed by a large pool of raters (n → 400) using PainChek®, which is a point-of-care medical device app linked to a central portal via cloud computing. PainChek® is a multi-domain tool, which includes a Face domain made up of nine facial micro-expressions [also known as action units: AU(s)] belonging to the Facial Action Coding System (FACS). These are: AU4 (brow lowering), AU6 (cheek raising), AU7 (tightening of eyelids), AU9 (wrinkling of the nose), AU10 (raising of upper lip), AU12 (pulling at corner lip), AU20 (horizontal mouth stretch), AU25 (parting lips) and AU43 (closing eyes). Each AU is produced by contraction or relaxation of certain facial muscle(s). PainChek® maps and identifies facial AUs using artificial intelligence (AI) and deep learning algorithms through automated facial recognition and analysis. These data are then combined with data from the other five domains covering clinical pain behaviours (e.g. vocalisations, movements) to compute the following pain intensity categories: no pain (0-6), mild pain (7-11), moderate pain (12-15), and severe pain (16-42). Using a data-driven approach, we analysed the frequency, distribution and patterns of facial AUs based on different pain intensities.

Results

More than 22,000 pain assessments for a sample of 3,407 patients with dementia and cognitive impairment (age: 83.2 ± 9.3; 59.7% female) were analysed for pain relevant facial AUs. The vast majority (98.5%) of the sample was drawn from Australian residential aged care facilities. Assessments were completed under various activities of daily living. AU7 was the most frequent facial expression (48.4%), followed by AU43 (42.9%) and AU6 (42.4%) detected during severe pain. In lower pain intensities (e.g. mild pain), AU6 is the most common (59.0%) followed by AU43 (39.9%), and AU12 (38.9%), whereas AU20 is the least common (6.1%). Further, upper face AUs (AU4, AU6, AU7, AU43; each →40%) are more frequent than lower face AUs (AU9, AU10, AU20, AU25; range of frequency=21.2-37.3%) during severe pain.

Conclusions

As far as we know, this is the first and largest clinical study that provides real-world data about facial micro-expressions of pain in PwD. The AI-based Face domain of PainChek® was able to portray distinctive patterns of facial expressions in this group. for example, eye-related AUs (AU7, AU43) are more common than mouth-related AUs (e.g. AU20, AU25) during higher pain intensities. These findings may offer a new paradigm of understanding facial expressions during clinical pain in PwD.

A NOVEL APPROACH TO REDUCE PAIN ARISING FROM THE FEMALE REPRODUCTIVE TRACT

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Background

Endometriosis and vulvodynia are gynaecological disorders affecting ~8-10% of women[1,2]. They are associated with chronic pelvic pain (CPP) and infertility as well as a combined economic burden to Australia of ~$10 billion/year[3]. Despite this, the mechanisms underlying CPP associated with these disorders remain unknown.

Aims

To determine 1) whether sensory neurons innervating the mouse vagina express channels recognized to be involved in pain sensation, such as voltage-gated sodium (Nav) channels, and 2) to examine whether pharmacological modulation of these Nav channels alters pain arising from the female reproductive tract.

Methods

Sensory neurons innervating the female reproductive tract were identified by injecting a neuronal tracer into the mouse vagina. Single cell RT-PCR determined NaV channel expression in vaginal-innervating neurons isolated from lumbosacral dorsal root ganglia (DRG). To translate expression studies to functional outcomes, we developed a novel ex vivo afferent recording preparation, to investigate the mechanosensory function of sensory afferents innervating the vagina. Furthermore, pain was measured in vivo by recording visceromotor responses (VMR) evoked by vaginal distension (VD).

Results

Nav channel mRNA was detected in retrogradely labeled vaginal neurons (from a total of n=40 vaginal neurons: Nav1.1=33%, Nav1.2=54%, Nav1.3=21%, Nav1.4=13%, Nav1.5=26%, Nav1.6=59%, Nav1.7=100%, Nav1.8=97%, Nav1.9=72%). Our novel ex vivo afferent recording preparation showed that incubation with the NaV channel blocker Tetrodotoxin (TTX), significantly reduced mechanosensitivity of pelvic afferents innervating the vagina ($P \leftarrow 0.05$, n=8). Conversely, the pan NaV channel activator Veratridine significantly increased vaginal pelvic afferent responses to mechanical stimulation ($P \leftarrow 0.05$, n=7). Translating these findings in vivo we found that intra-vaginal TTX administration significantly reduced ($P \leftarrow 0.01$, n=6) vaginal distension evoked pain; whilst intra-vaginal Veratridine administration significantly increased ($P \leftarrow 0.05$, n=9) painful sensations arising from the vagina in vivo.

Conclusion

Sensory neurons innervating the vagina are equipped with specific expression profiles for NaV channels. Activating these channels increases afferent responses and causes pain, whilst blocking TTX-sensitive NaV's decreases afferent responses and pain. Accordingly, pharmacological modulation of NaV channels could be a successful approach to inhibit pain arising from the female reproductive tract. These results create a platform for subsequent mechanistic studies into endometriosis-induced chronic pelvic pain.

1 Eisenberg VH et al. BJOG. 2018;125(1):55-62.

2 Reed BD, et al. J Women's health. 2016;25(3):276-283.

3 Asante A, and Taylor RN. Annu Rev Physiol. 2011;73: 163-82.

ANTINOCICEPTIVE ACTIVITY IN MICE OF A SYNTHETIC PEPTIDE FROM LATIN AMERICAN WASP *PARACHARTERGUS FRATERNUS*

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Background and Aims

Pain is a health problem around the world and this condition can be disabling with some patients do not responding to the treatments. Venomous animals have an arsenal of compounds with promising activities in relief of pain. The peptide Agelaia-MPI isolated from Latin American wasp Parachartergus fraternus showed antinociceptive activity in mice and to improve the activity we did structural modifications. So, the objective was to evaluate the antinociceptive activity in mice of the synthetic peptide, neuroVAL.

Methods

Male Swiss mice (n=5/group, 18-25g) were used. Assays were performed using neuroVAL at the dose of 5 µg/animal diluted in a solution of water with 5% DMSO. for writhing test, the peptide was injected via subcutaneous (s.c., 0.1 mL) and after 30 min, acetic acid (0.6%, v/v) was injected via intraperitoneal (i.p., 0.5 mL). Positive control was dipyrone (500 mg/kg, s.c., 0.1 mL). Antinociceptive activity was expressed as writhing scores over a period of 30 min. The second assay, formalin test, consisted again in s.c. injection of peptide 30 min before intraplantar injection of formalin (1.2%, v/v, 40 µL/paw). Positive control was morphine (5 mg/kg, i.p., 0.5 mL). Time of licking the injected paw was recorded in seconds (s) in neurogenic phase (phase 1; 0–5 min) and inflammatory phase (phase 2; 15–30 min). Negative control of both assays was 5% DMSO (s.c., 0.1 mL). The experiments was approved by Animal Care and Ethics Committee and is in accordance with the National Council for Animal Experimentation Control. Results expressed as mean ± SEM; ANOVA; Bonferroni; $p \leftarrow 0.05$.

Results

In writhing assay, acetic acid induced 108.8±4.3 writhing episodes in animals of negative control. Dipyrone reduced this response in 66.9% (36.0±3.8 writhing) and neuroVAL reduced 38.2% (67.3±4.6 writhing) ($p \leftarrow 0.001$). In formalin test, neuroVAL showed antinociceptive activity in both phases. In first phase, the animals of negative control licked the paw during 57.2±4.8 s, morphine reduced 90.7% of this response (5.3±0.7 s, $p \leftarrow 0.001$) and the peptide reduced 31.3% (39.3±3.0 s, $p \leftarrow 0.01$). In phase 2, the recorded data of negative control was 239.4±11.3 s, morphine almost abolished the response with 99.7% of reduction (0.8±0.6 s, $p \leftarrow 0.001$) and neuroVAL showed a little activity of 16.8% (199.1±9.2 s, $p \leftarrow 0.05$).

Conclusions

For writhing and formalin assays, we choose a via (s.c.) that is less invasive than commonly used in animal models (intracerebroventricular) and neuroVAL showed antinociceptive activity similar with the parental peptide Agelaia-MPI. These results indicate that neuroVAL has activity in neurogenic and inflammatory pain, however we do not know the mechanism of action and more assays are necessary to characterize better this activity and to understand how this peptide triggers the antinociception.

DO IMPROVEMENTS IN PAIN LAST? LONG-TERM OUTCOMES FROM A RANDOMISED CONTROLLED TRIAL OF AN INTERNET-DELIVERED PAIN MANAGEMENT PROGRAM FOR ADULTS WITH CHRONIC PAIN

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1. *eCentreClinic, Department of Psychology, Macquarie University, Sydney, NSW Australia*

Background and Aims

Internet-delivered pain management programs have considerable potential for overcoming barriers to face-to-face treatment, such as reduced stigma and cost, and increased access to evidence-based pain management. While the findings of clinical trials examining Internet-delivered pain management programs have been encouraging in the short-term, little is known about the long-term effects of these programs. The aim of the current study was to present 12- and 24-month follow-up data from a randomized controlled trial (RCT) of an Internet-delivered pain management program for adults with chronic pain.

Methods

In the original RCT, we randomised participants (n=490) with a range of chronic pain conditions to either a treatment as usual control group or 1 of 3 treatment groups, who received The Pain Course through the eCentreClinic, with differing levels of clinician support (regular weekly support, optional support, no clinician support). The initial results of the trial have been reported previously. In sum, there were significant improvements from pre-treatment to 3-month follow-up in disability, pain levels, depression, and anxiety across the 3 treatment groups, compared with the control group. The current study obtained 12- and 24-month follow-up data from 78% and 79% of participants in the 3 treatment groups (n = 397, Mage = 50 years ± 13 (range 19-86), 80% female), respectively. We conducted generalised estimation equation models to assess the percentage of change from the initial assessment for each outcome over time, and differences among the 3 treatment groups over time.

Results

We found that the clinical improvement in symptoms reported at 3-months was maintained at the 12- and 24-month follow-ups for the primary outcome of disability (average improvement from initial assessment across follow-up time points ↗27%; d ↗ .67), and the secondary outcomes of pain levels (↗21%; d ↗ .67), depression (↗36%; d ↗ .80), and anxiety (↗38%; d ↗ .66). No marked or consistent differences were found among the 3 treatment groups. Levels of deterioration (i.e., at least a 30% increase in symptoms) in disability, pain, depression and anxiety were low across all groups.

Conclusions

Adding to the considerable evidence that clinical outcomes are maintained in face-to-face pain management programs, the findings of the current study demonstrate the potential of Internet-delivered pain management programs to provide durable improvements in disability, pain, depression and anxiety over the long term. Our findings also indicate that the clinical outcomes can be maintained whether people are provided with regular clinician support, the option of clinician support, or no clinician support during treatment. This study highlights the significant public health potential of Internet-delivered pain management programs for cost effectively reducing barriers to effective long-lasting pain management.

CAN WE REDUCE THE ECONOMIC BURDEN OF PAIN IN AUSTRALIA? ASSESSING THE COST-EFFECTIVENESS OF AN INTERNET-DELIVERED PAIN MANAGEMENT PROGRAM FOR ADULTS WITH CHRONIC PAIN

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Background and Aims

The economic burden of chronic pain in Australia is extreme, with an estimated annual cost of approximately $140 billion. We know pain management programs for chronic pain, including Internet-delivered programs, are efficacious in improving physical and mental health outcomes for adults. However, less is known about their cost-effectiveness. The aim of the current study was to assess the cost-effectiveness of a randomized controlled trial (RCT) of an Internet-delivered pain management program, The Pain Course, across two domains: (1) health care use and expenditure; (2) medication use and expenditure.

Methods

This study uses the data from an already published RCT (n=490; Mage=50, SD=13; 81% female), where significant improvements from pre- to post-treatment in disability, pain levels, depression, and anxiety were observed across 3 treatment groups with differing levels of clinician support (regular clinician support, optional support, no clinician support), compared with a waitlist group. In the current study, costs were calculated using the minimal government subsidised rates of expenditure for self-reported prescription medication use and health care visits over 8-weeks at pre- and post-treatment. We analysed longitudinal changes in economic outcomes using GEE models (with Winsorizing), and employed incremental cost-effectiveness ratio (ICER) analyses to assess the cost-effectiveness of the 3 treatment conditions, compared to the wait-list, while controlling for treatment-related expenditure (e.g., clinician time, program maintenance costs).

Results

A reduction in health care use and expenditure from baseline to post-treatment was found across groups (14-19% Δ). Reductions in medication use and expenditure differed between groups, with the waitlist group illustrating a significant increase in pain (15% Δ) and mental health (25% Δ) medication at post-treatment compared to treatment groups. ICER analyses revealed significant clinical efficacy of all treatment conditions over waitlist, with the clinician-supported group offering a slight non-significant margin of increase in symptom reduction. However, after factoring in treatment-related expenditure, the clinician-supported group involved 28% higher expenditure (or 132AUD per person). This increased expenditure was not observed in the optional and no clinician support groups, both of which demonstrated significant clinical symptom reduction with negligible cost increase.

Conclusions

This study is the first in the world to assess the economic efficacy of Internet-delivered pain management program for adults with a broad range of chronic pain conditions under different support options. Preliminary evidence of cost-effectiveness was found, with greater evidence for delivery models involving optional and no clinician support on a cost basis. However, the costs associated with delivering an evidence-based 8-week Internet-delivered pain management program was low overall, costing between 9AUD and 132AUD, per person. Findings will serve to inform health service planners and decision makers about the economic benefits of Internet-delivered treatment options.

WHAT DO WE KNOW ABOUT PSYCHOLOGICAL BRIEF INTERVENTIONS FOR CHRONIC PAIN AND CO-OCCURRING PRESCRIPTION OPIOID USE AND DO PATIENTS NEED THEM?

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Background and Aims

More accessible treatments for chronic pain with co-occurring opioid use are urgently needed given the risks associated with opioid use and limited long-term efficacy. The aims of this study were to synthesize the literature examining psychological brief interventions (BIs) for chronic pain and co-occurring prescription opioid use and determine patient need.

Methods

A systematic review of peer-reviewed studies published in English between 1980-2019 was conducted using three databases (PubMed; PsycInfo; CINAHL). Studies were eligible if they included patients who were →18 years old, had chronic pain, and using prescription opioids, assessed the effectiveness of a BI, and were quantitative. The review concludes with a needs analysis survey of 164 patients (78% female; mean age 48 years; 89% response rate) diagnosed with chronic pain and using prescription opioids recruited from the community. Following completion of validated pain-related questionnaires, patients were asked about whether they would like to hypothetically receive a BI.

Results

Our search identified five included studies. Given large study heterogeneity, it was not possible to conduct a meta-analysis of treatment effectiveness. A narrative review showed three studies demonstrated some evidence of the effectiveness of BIs on opioid-related outcomes. However, these studies had methodological flaws and were rated as weak in quality. Mostly non-significant findings on opioid and pain-related outcomes were documented in two studies, both of which were randomised controlled trials and rated as moderate or strong in quality. In the needs analysis survey, 92% reported that they were interested in receiving a BI. Specifically, patients reported they would like to understand more about: their pain and opioid use symptom scores (46%); non-pharmacological management strategies (30%); latest evidence and education (28%); role of psychological factors in pain and medication use (23%); accessing more information/support (17%).

Conclusions

This analysis highlights the inconsistency between patient demand and availability of effective BI's for chronic pain and co-occurring prescription opioid use. The mixed evidence on the effectiveness of BIs warrants research to identify the specific aspects that work for people living with chronic pain. Future research should focus on designing patient-driven BIs, rapid translation for social benefit, and testing efficacy in high quality clinical trials.

SPINAL CORD INJURY IS NOT A FEATURE OF CHRONIC WHIPLASH ASSOCIATED DISORDER: A MAGNETIC RESONANCE SPECTROSCOPY STUDY

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Background and Aims

Neurophysiologic processes underpinning chronic whiplash associated disorder (WAD) are not well understood. Incomplete injury to the cervical spinal cord has been suggested as a mechanism that could underlie ongoing pain and disability in this condition, considering the traumatic mechanism, observations of widespread sensory disturbances (hypoesthesia, hyperalgesia), and reports of fatty infiltration of cervical spine muscles in this population. Tissue metabolic changes may indicate pathophysiology without detectible structural alterations. The primary aim of this study was to assess metabolite concentrations indicative of neuronal injury or pathology in the cervical spinal cord in people with chronic WAD. A secondary aim was to explore the relationship between spinal cord metabolite profiles and clinical variables.

Methods

Forty-one people with chronic Grade II WAD (mean [SD] age 39.6 [11.0] years, 25 females) and 14 healthy controls (39.2 [12.6] years, 9 females) participated in this cross-sectional study. Participants underwent cervical spinal cord magnetic resonance spectroscopy to assess metabolite concentrations: N-acetylaspartate (NAA), creatine (Cr) and choline (Cho). Chronic WAD group participants completed clinical questionnaires regarding pain (0-10 visual analogue scale [VAS]), disability (Neck Disability Index [NDI]), post-traumatic stress symptoms and pain catastrophising. Chronic WAD group participants also underwent cervical range of motion assessment and pain threshold testing to cold and pressure stimuli. Data were analysed using Wilcoxon rank-sum testing and Spearman correlations ($p \leftarrow 0.05$).

Results

Chronic WAD patients were median (IQR) 3 (1.5, 5.5) years post-injury. Mean (SD) pain intensity was 4.3 (2.0) VAS, and median (IQR) NDI was 32% (22, 44). There were no differences between the WAD and control groups for any of the three metabolite ratios assessed: NAA:Cr (median [IQR] WAD 1.73 [1.38, 1.97], controls 2.09 [1.28, 2.89], $p = 0.37$), NAA:Cho (WAD 1.50 [1.18, 2.01], controls 1.57 [1.26, 1.93], $p = 0.91$) or Cr:Cho (WAD 0.84 [0.64, 1.17], controls 0.76 [0.60, 0.91], $p = 0.33$). There were no significant correlations observed between NAA:Cr, NAA:Cho or Cr:Cho and any clinical variable ($p \nearrow 0.06$).

Conclusions

Cervical spinal cord metabolic profile did not differ between people with chronic WAD and pain-free controls, implying spinal cord injury does not underlie symptoms in this population. Metabolite ratios were not correlated with any clinical or questionnaire outcomes in the WAD group. These findings are not consistent with spinal cord metabolic changes, measured by MRI *in vivo*, providing an independent clinical grading for ongoing symptoms of patients with chronic WAD.

WHAT ROLE DOES GEOGRAPHY PLAY IN PAIN CLINIC TREATMENT: A CLINICAL COHORT STUDY

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Background and Aims

Multidisciplinary pain clinics are recommended treatment of persistent disabling pain. In Australia, however, most pain clinics are in metropolitan areas, posing a geographic barrier to access for a large proportion of the population. This project examined whether and how residential proximity to a metropolitan pain clinic, alongside other demographic and clinical factors, affect treatment attendance, intensity and profile at a single metropolitan pain clinic. In particular, we examined received.

Methods

Data from all patients attending the Caulfield Pain Management and Research Centre (CPMRC) from 01/01/2014 to 30/06/2018 aged ←70 years who completed questionnaires at referral, provided residential details, had a single treatment episode and did not die in the study period were included (N=1,690; mean age = 47.2 years, SD = 12.6; 55.5% female). Residential addresses were geocoded into latitude/longitude. Travel distance to CPMRC were calculated using the HERE Routing API (Version 7.2.105; HERE Global) based on historical travel times for the specific day of the week and time of day for each scheduled appointment. Geographic data were then linked to (a) summary data on the number, intensity and types of appointments scheduled and attended, and (b) demographic, clinical and pain questionnaire data at referral that were extracted from the electronic Persistent Pain Outcomes Collaboration epiCentre.

Results

The median travel time between home and the clinic was 27.47 minutes (IQR:12.49, 46.15). Demographics associated with longer travel time were women vs men [38.24 minutes (95%CI:32.70,43.78)], being unemployed vs employed [11.26 minutes (95%CI:1.87,20.64)], and living in areas with high vs low neighbourhood disadvantage [Index of Relative Socioeconomic Advantage and Disadvantage, ranging:32 to 79 minutes). Opioids were the only pain-related characteristic associated with increased travel time with clients on "amber" (40-99mg/day; mean=19.36 minutes, 95%CI:8.45,30.26) and "red" (→=100mg/day; 17.24 minutes, 95%CI:5.81,28.66) dose ranges travelling further than those not on opioids.

Treatment intensity (total minutes attended) decreased as distance from home to CPMRC increased (rs= -0.20, 95%CI:-0.25,-0.15), and ranged from a median of 440 treatment minutes (IQR:120,1125) for clients living ←=15 minutes of the clinic, to 128 treatment minutes (IQR:60,483) for clients living →=180 minutes from the clinic, adjusting for age, sex and opioid levels. Multinomial logistic regression showed that greater travel time was associated with lower risk of attending group programs, and higher risk of not attending any clinical appointments compared with attending medical appointments only, adjusting for age, sex and opioid levels.

Conclusions

Although most people attending a large publicly funded metropolitan pain clinic live less than thirty minutes from the clinic, those who live further away received lower intensity treatment, and predominantly received individual treatment rather than group programs. The findings indicate a need to explore the feasibility and acceptability of offering flexible service delivery models (e.g., supplementing physical attendance with telehealth-based support) for those whose treatment intensity is impacted by geography and distance. Moreover, the findings raise a question about why patients travel further if they are taking high levels of opioids, and how pain clinics can better address the treatment needs of those patients.

CLINICIAN EDUCATION TO SUCCESSFULLY REDUCE OPIOID DISCHARGE PRESCRIBING IN OPIOID-NAÏVE SURGICAL PATIENTS: A CLUSTER-RANDOMISED CONTROLLED TRIAL

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Background and Aims

Opioid analgesics are associated with harm, and prescribing variability persists. We tested whether clinician education optimised prescribing on discharge in opioid-naïve and tolerant surgical patients.

Methods

A pragmatic cluster-randomised controlled trial was undertaken of 13 surgical units of a major Melbourne hospital. Interns, residents and clinical pharmacists from intervention units received face-to-face pharmacist-led education in February 2019. Prescribing was evaluated for patients discharged home from surgical units before (baseline: February-April 2018) and after education (follow-up: February-April 2019). Patients receiving opioid agonist therapy were excluded. Opioid-naïve (no regular pre-admission opioids) and opioid-tolerant patients (↗1 regular pre-admission opioid/s) were analysed separately. The primary outcome was change in proportion of opioid-naïve patients prescribed regular opioids at discharge. The proportion of opioid-tolerant patients prescribed regular opioids above their pre-admission level was evaluated along with quantities supplied. Multivariable regression included interaction terms and confounding factors; mixed-effects models tested for variations between clusters. The study received ethics approval from the participating institution (226/18) and was prospectively registered on the Australian New Zealand Clinical Trial Registry (ACTRN-12618000876291).

Results

Overall, 4062 opioid-naïve patients were evaluated (baseline 2383; follow-up 1679). In the intervention arm, an absolute reduction in regular opioid prescribing of 15.1% was observed, compared to a reduction of 6.3% in the control arm from baseline (p=0.005). Opioid-naïve patients in the intervention group were 49% less likely to be discharged on regular opioids compared to the control group following mixed-models analysis (odds ratio (OR) 0.51, 95% confidence interval (CI) 0.28 to 0.90). Reductions were demonstrated for immediate-release/'as required' opioid prescribing (OR 0.69, 95% CI 0.51 to 0.93), regular daily dose (oral morphine equivalence (OME), mean difference -2.49; 95%CI -4.33 to -0.65), and quantity supplied (-1.18, 95%CI -2.33 to -0.04). Discharge without opioids (OR 1.7, 95%CI 1.3 to 2.4) and with documented de-escalation plans (OR 2.4, 95%CI 1.3 to 4.5) was higher in the intervention arm. There were 330 opioid-tolerant patients discharged during the period (Baseline 189; Follow-up 141). No differences were observed in the likelihood of being discharged with opioid above admission levels following the intervention (OR 0.29, 95%CI 0.07 to 1.11). No differences were observed between arms for discharge quantities (-3.01, 95%CI -11.94 to 5.91) or regular daily dose (OME, -0.16, 95%CI -16.0 to 15.7).

Conclusion

Clinician education was associated with significant reductions in discharge prescribing for opioid-naïve patients, highlighting the value of education to optimise prescribing. Lack of prescribing change in opioid-tolerant patients reflects the complexity of chronic pain management and the need for further research in this cohort.

EARLY STAGE EXPERIMENTAL OSTEOARTHRITIS ACTIVATES AND SENSITISES ARTICULAR, BUT NOT THE BONE AFFERENT NEURONS

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Background and Aims

Osteoarthritis (OA) is a chronic inflammatory condition of the joints and underlying bone characterized by swelling, stiffness and pain. Articular tissues and the underlying subchondral bone are innervated by nociceptors that respond to noxious stimuli, can be sensitized by inflammation, and are relevant to the pathophysiology of OA pain. Whilst the innervation of knee joint articular tissues has been studied extensively in early OA, much less is known about the role of the innervation of underlying bone. We propose that early and end-stage OA pain are driven by different neuronal mechanisms that could be targeted differentially for therapeutic benefit.

Methods

In this study, we exploit a highly novel in vivo electrophysiological bone-nerve preparation, which we have adapted to directly record the activity and mechanical sensitivity of bone vs joint nociceptors in animals with or without OA. OA was induced with a single intra-articular injection of monoiodoacetate (MIA, 4.5 mg/50 µl) into the left knee joint of Sprague Dawley rats. Control animals were injected with vehicle (saline, 50 µl). Recordings of bone and joint nociceptors were made early in the pathogenesis of MIA-induced OA (day 3). At this timepoint, a dynamic weight bearing assay (Bioseb, France) revealed that there is significant pain behaviour and histological examination demonstrated inflammation of the joint but no cartilage degeneration.

Results

Recordings of nociceptors isolated from the joint nerve in early OA (day 3) revealed increases in spontaneous activity (unpaired t -test; $P \leftarrow 0.05$) and in discharge frequency evoked by mechanical stimulation of the joint capsule (unpaired t -test; $P \leftarrow 0.05$), and decreases in the threshold for activation of mechanically sensitive units (unpaired t -test; $P \leftarrow 0.05$), relative to recordings made from controls animals. These are all hallmarks of peripheral sensitization and indicate that joint nociceptors are more active and sensitive in early OA. Similar findings were observed in recordings made from both AĐ and C fiber nociceptors in the nerve to the joint capsule. In contrast, recordings made from the bone nerve at the same timepoint revealed that there were no significant differences in spontaneous activity, mechanically evoked discharge frequency, or threshold for mechanical activation, between OA and control animals (unpaired t -test; $P \rightarrow 0.05$).

Conclusions

Our findings suggest that pain in early OA involves activation and sensitization of nerves that innervate the joint capsule but not the underlying subchondral bone. We are currently making recordings from animals with late stage osteoarthritis, when there is cartilage degeneration. We predict that at this late stage, there will also be changes in activity and sensitivity of the nerves that innervate the underlying bone.

EFFECT OF HAND DOMINANCE ON IMPLICIT MOTOR IMAGERY PERFORMANCE (MIP): META-ANALYTICAL REVIEW

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Background and Aims

People in pain have impaired implicit MIP for bodily images. When shown pictures of the painful body part, they are less accurate or slower at identifying left or right orientation – findings thought to indicate changes to attentional allocation and function of motor-related brain maps. Whether differences in motor function (via hand dominance) influence MIP is largely unknown. Such information is critical to untangle the effects of pain on MIP impairment. This is the first review to synthesise empirical evidence on the effect of handedness on MIP.

Methods

Databases were searched from inception to March 2018. Eligible studies evaluated a left/right hand recognition task in healthy adults. Two independent reviewers performed screening, data extraction, and critical appraisal. for each primary outcome (response time; accuracy), five meta-analyses were conducted: three between-group [(1a) left- versus right-*handers* overall; (1b) left- versus right-*handers* for right hand images; (1c) left versus right-*handers* for *left hand images*] and two within-group [(2) for *right-handers*: left versus right images; (3) for *left-handers*: left versus right images].

Results

The search identified 6867 publications with 42 studies (56 datasets) eligible for meta-analysis (n=224 left-handers; n=2545 right-handers). Risk of bias was high due to small sample size, lack of blinding, and inadequate control of previous task exposure.

Meta-analyses showed:

(1) Overall, right-handers were faster [114.47ms (95%CI: 48.81, 180.14) N=5], but less accurate [-0.92% [(95%CI: -1.51, -0.33) N=4], than left-handers. for *right hand images*, right-handers were faster than left-handers [220.05ms (95%CI: 154.56, 285.53) N=4], but no more accurate [-0.73% (-2.58, 0.50) N=2]. for *left hand images*, right-handers were faster [69.38ms (95%CI: 2.92, 135.84) N=4] and more accurate than left-handers [3.21% (95%CI 1.42, 4.99) N=2].

(2) Right-handers were faster [42.14ms (95%CI 21.51, 62.77) N=50] but no more accurate [-0.10% (95%CI -0.62, 0.42) N=34] at identifying right hand images over left.

(3) Left-handers were no faster at identifying left versus right hand images [3.13ms (95%CI -44.62, 50.87) N=3], nor more accurate [1.63% (95%CI -0.45, 3.71) N=2].

Conclusions

Limited evidence showed that right-handers are faster than left-handers at recognising hand laterality, regardless of whether the image is of a right or left hand. Such findings suggest that cerebral dominance may play an overarching role in MIP. However, *within* right-handers the effects of hand dominance on MIP were somatotopically-specific: they were quicker at recognising images of right hands than images of left hands. This did not occur *within* left-handers: they were no quicker at recognising images of left versus right hands. Such findings may reflect the comparatively reduced hand dominance of left- versus right-handers (i.e., left-handers are typically more ambidextrous). There is a relative paucity of information for left-handers and evidence for accuracy differences was conflicting. Collectively, handedness appears important to consider/control for in MIP.

PAIN AND NEUROIMMUNE RESPONSE FOLLOWING TREATMENT WITH CHEMOTHERAPY AND IMMUNE CHECKPOINT INHIBITORS IN MICE

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Background and Aims

Peripheral neuropathy is a common adverse effect of cancer treatments, such as chemotherapy. Recently immunotherapy, and particularly treatment with immune checkpoint inhibitors (ICIs) that initiate anti-tumour response, has become a mainstream method of cancer therapy alone and in combination with chemotherapy. Immune checkpoints, such as the programmed cell death protein / ligand (PD-1/PD-L1) pathway, are also expressed in the nervous system. However, little is known about the effects of ICIs on the nervous system. In this study, we investigated the effects of treatment with chemotherapy and/or immunotherapy on axonal damage, pain hypersensitivity and neuroimmune responses in mice.

Methods

C57BL/6 mice were injected intraperitoneally with 6 cycles of chemotherapy (Paclitaxel, cumulative dose of 30mg/kg), immunotherapy (anti PD-1, cumulative dose of 75mg/kg) or both combined. Mechanical allodynia was quantitated by measuring the hindpaw withdrawal response to von Frey filament stimulation at baseline, day 21 and day 27. At day 30 following treatment, the dorsal root ganglia (DRG) and spinal cords were dissected. DRG explants were cultured ex vivo for 72h and neurite outgrowth was assessed. ELISA and immunohistochemistry were performed to confirm the expression of PD-1 and PD-L1 in the DRG and spinal cord and to determine immune and glial cell activation.

Results

Both PD-1 and PD-L1 were shown to be expressed in the DRG and spinal cord. Mice that were treated with paclitaxel and/or anti-PD-1 exhibited a significantly increased mechanical pain hypersensitivity compared to the vehicle treated control group (N=6 per group, P←0.0015). DRG derived from paclitaxel or anti PD-1 treated mice demonstrated reduced neurite outgrowth ex vivo (by 24% and 38% respectively, N→20 explants per group). IBA1 (a marker of macrophages/microglia) immunoreactivity was significantly increased in the DRG (P←0.03) and in the dorsal horn of the spinal cord (P←0.01) and P2YR12 (a marker of homeostatic microglia) immunoreactivity was significantly decreased (P←0.05) in the spinal cord of treated mice.

Conclusions

These results demonstrate that both paclitaxel and anti-PD-1 independently can cause mechanical allodynia and reduced outgrowth of peripheral sensory neurons, supporting the existence of neuropathic pain in mice that were treated with ICIs and/or chemotherapy. Furthermore, the changes in the immune signature of regions that are highly associated with sensory inputs suggest that neuroimmune crosstalk may be a key factor in the development of this neuropathy. Our findings have important consequences when considering ICIs therapy in patients with established peripheral neuropathy, or when designing a combinatory paclitaxel and anti-PD-1 therapy.

CHRONIC PELVIC PAIN AND CROSS-ORGAN SENSITISATION INDUCED COMORBIDITIES IN A MOUSE MODEL OF ENDOMETRIOSIS

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Background and Aims

Endometriosis is a debilitating condition, characterised by chronic pelvic pain (CPP) and infertility, that affects approximately 1 in 10 women worldwide. Up to 80% of patients with endometriosis exhibit significant comorbidity with chronic abdominal and pelvic pain disorders such as interstitial cystitis/painful bladder syndrome and irritable bowel syndrome. The aim of this study was to develop mouse models of endometriosis to study the mechanisms underlying endometriosis-induced CPP and cross-organ sensitisation.

Methods

Endometriosis was generated via 1) intraperitoneal inoculation of donor uterine horn or 2) auto-transplantation of uterine horn fragments alongside the mesentery (three fragments) and uterus (two fragments) in ovariectomised and estradiol treated C57BL/6 mice. Sham surgery was performed as a control. In a subset of mice, endometriotic lesions were collected, weighed and measured, with H&E staining confirming structure. Vaginal and colonic sensitivity to pain in vivo was quantified on week 8 post-endometriosis induction. Pain was measured by recording the visceromotor response (VMR). for this, electrodes were implanted into the abdominal muscle and electromyographic activity was recorded, as the total area under the curve (AUC), during balloon inflation (0-80mmHg) within the vaginal or colonic cavity.

Results

Both inoculation and auto-transplantation models of endometriosis induction resulted in endometriotic lesion development at 8 weeks post induction. Inoculation of uterine horn resulted in the development of lesions throughout the peritoneal cavity, including around the uterus, colon and kidneys, averaging 7.8 ± 1.01 lesions per mouse, with a total weight of 5.44 ± 1.1mg (N=3). Transplantation of 5x2mm uterine horn segments resulted in lesions 2.97 ± .15mm wide and weighing 4.2± 0.19mg (N=3). In both models Lesions were endometrial in nature, developing endometrial glands and stroma. Sham surgeries resulted in no endometrial lesions, in either model. Both models of endometriosis induction resulted in enhanced pain responses to both vaginal (VD) and colorectal distensions (CRD) in vivo compared to sham mice. The auto-transplantation method induced enhanced response to VD ($P \leftarrow 0.05$. Sham: AUC = 1114 ± 183.5, N=5 vs. Endo: AUC 1825 ± 238.2 N=5) and CRD ($P \leftarrow 0.001$. Sham: AUC = 842.9 ± 81.65, N=9) vs. Endo: AUC 1630 ± 143, N=8). Inoculation of uterine horn also increased the AUC in endometriosis mice to both VD ($P \leftarrow 0.01$, Sham: 989.8 ± 170.1, N=10 vs. Endo: 2326 ± 318.0, N=8) and CRD ($P \leftarrow .0001$, Sham: 536.8 ± 44.42, N=8 vs. Endo: 1353 ± 146.6 N=10).

Conclusion

Auto-transplantation and inoculation of uterine horn fragments induced endometriosis in mice. Endometriosis mice experienced vaginal and colonic hypersensitivity; indicative of CPP and endometriosis induced cross-organ sensitisation of co-morbid colonic pain. These pre-clinical models will facilitate greatly needed research into peripheral and central mechanisms of CPP in endometriosis.

"AGEING WITH PAIN" PERCEPTIONS OF OLDER PEOPLE ABOUT BARRIERS AND FACILITATORS OF PHYSICAL ACTIVITY

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Background and Aims

Populations around the world are rapidly ageing, and almost 50% of those aged over 65years experience pain and disability. Older adults might experience a variety of facilitators (*what works*) and barriers (*what doesn't work*) for their pain management, activity limitation, and community participation from their day to day life. This qualitative focus group study explored perspectives on barriers and facilitators to physical activity (PA) and community participation by New Zealand older adults' living with chronic musculoskeletal pain. Understanding these views would inform the development of better management approaches for the ageing population.

Methods

Sixteen participants (14women), majority categorized as of New Zealand European origin (N=15, 94%; remaining n=1 MĐori decent) with an age range of 65-85 years, with chronic musculoskeletal pain (↗3 months in duration), from rural and urban communities participated in five face-to-face semi-structured focus group interviews. Demographics, pain location, severity, and interference were collected. Interviews (range 60-75 minutes) were recorded and transcribed verbatim. Interpretative Phenomenological Analysis was used to guide data analysis, and demographics were analysed descriptively.

Results

Neck pain and/or low back pain (N=5, 31%) were the most commonly represented sources of pain; half of the total participants (N=8, 50%) recognized this pain to be interfering with their life substantially. Two overarching themes emerged from interviews. In terms of impact upon the level of PA and community participation: *'Strive to maintain PA levels', and 'Individual barriers to PA' themes were identified. Constant pain, depression, and ageing stigma* were reported to negatively impact on PA and community participation. *Positive attitude, and self-administered pain management strategies* were associated with promoting community participation. for perceived barriers and facilitators to PA: *'Unsupportive environment',* and *'Recognizing the purpose of life' themes were identified. Poor physician communication, lack of support from family and friends, financial problems*, and *unsupportive infrastructure* were reported as the barriers to PA and community participation. Among facilitators, the identified categories were: *Inspiration for social engagement, role of support person* and *access to affordable, convenient, and stimulating options.*

Conclusion

These findings reflect the importance participants placed on existing support personnel and health-care professionals. Results suggested that older adults may be healthy and active regardless of their pain/health condition, if they receive meaningful multidimensional support which can address a variety of physical, functional, social, psychological, motivational, environmental, lifestyle, and other perceived barriers. Therefore, interventions/programs that address the holistic needs of this population, integrating psychological and social components, could promote successful ageing with chronic pain.

ALTERED REGIONAL BRAIN ACTIVITY AND HYPOTHALAMIC CONNECTIVITY PRECEDING A MIGRAINE

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Aims

The mechanisms underlying migraine pathogenesis remain hotly debated. A large body of evidence suggests that the development of migraine-pain is dependent on the activation of the trigeminal sensory afferents that innervate meninges and their large blood vessels. More recently it has been hypothesised that increased sensitivity of the central nervous system is also needed for migraine initiation, although few studies have explored the brain immediately prior to a migraine attack. During the 24-hour period preceding a migraine headache, symptoms such as altered sleep, appetite and thirst often present, which likely result from altered hypothalamic function. It is possible that an altered hypothalamic network is involved in the initiation/expression of a migraine attack. Indeed, we have recently shown increases in resting infra-slow oscillations in regions of the hypothalamus, periaqueductal gray, dorsal pons and spinal trigeminal nucleus in this period. In this study, we aimed to investigate whether individuals in the 24-hour period preceding a migraine attack would exhibit alterations in cerebral blood flow and hypothalamic connectivity, reflecting both neural and vascular changes. Given this, we hypothesise that the same areas displaying changes in resting activity patterns immediately prior to a migraine attack, will show significant blood flow and hypothalamic connectivity alterations.

Methods

In 7 migraineurs preceding (within 24 hours) a migraine (5 female, mean age 32yrs), 13 migraineurs following (within 72 hours) a migraine (9 female, mean age 32yrs), 22 interictal migraineurs (15 female, mean age 31yrs) and 26 controls (22 females, mean age 32yrs) we measured arterial spin labelling (ASL) (108 volumes, TR=5.3 seconds) and resting blood oxygen level dependent functional magnetic resonance imaging (fMRI) (180 volumes, TR=2 seconds) over the entire brain. Using SPM12, ASL images were realigned, cerebral blood flow maps calculated and spatially normalized to the Montreal Neurological Institute template. fMRI images were realigned, intensity normalized and spatially normalized to the Montreal Neurological Institute template. Significant differences in resting blood flow, as well as in hypothalamic connectivity were determined using a two-sample random effects procedure ($p \leftarrow 0.05$ false discovery rate corrected and $p \leftarrow 0.002$ respectively).

Results

There were significant decreases in cerebral blood flow in the period immediately preceding a migraine attack in the regions encompassing the lateral hypothalamus, visual cortex and retrosplenial cortex. Using a cluster of reduced blood flow as a seed, hypothalamic connectivity was assessed and decreases occurred only during the period preceding a migraine. Reductions in hypothalamic connectivity occurred in the rostral ventral medulla, midbrain periaqueductal gray, dorsal pons, spinal trigeminal nucleus and anterior cingulate cortex.

Conclusion

These findings provide evidence that in the 24-hour lead up to a migraine, the activity of the hypothalamus and descending pain modulatory system is disturbed. As the descending control of the trigeminal nociceptive pathway is altered, hyperexcitability develops along the trigeminovascular pathway. Further investigations exploring the role of the hypothalamus and its complex network preceding a migraine is needed.

THE TREATMENT OF VULVODYNIA IN AUSTRALIA

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Background and Aims

Vulvodynia is a condition characterised by pain or discomfort of the vulva lasting more than three months and for which no obvious aetiology can be found. Much of the recent international research has investigated healthcare management pathways and treatment efficacy for vulvodynia. However, there is currently no research on these management pathways or which treatments are being prescribed or utilised in an Australian context. This study therefore aimed to explore the type and number of healthcare professionals that Australian women with vulvodynia seek care from, and which treatments are provided or prescribed from these healthcare professionals.

Methods

Women with vulvodynia were invited to take part in an anonymous online survey. The survey was quantitative but had additional free-text response sections to allow respondents to add any missing healthcare professionals or treatments. Women were eligible to participate if they had been diagnosed with vulvodynia by a healthcare professional, were currently living in Australia, and were over 18 years old. Data were analysed using descriptive statistics and categorisation of open-ended qualitative data.

Results

There were 71 respondents to the survey, with 50 respondents meeting the inclusion criteria (mean age 30.5±8.8 years). The average diagnostic delay (between symptom onset and diagnosis) was 5.8±6.5 years. Respondent's average impact score, as rated on the Pelvic Pain Impact Questionnaire was 2.0±1.0 (out of 4). On average, respondents reported seeing four different types of healthcare professionals in the management of their vulvodynia, with general practitioners (GPs) (98%), medical specialists (96%), and physiotherapists (80%) being the three most commonly consulted healthcare professionals. The majority of respondents reported seeing multiple GPs (→87%), multiple medical specialists (→77%), and multiple physiotherapists (50%) to seek help. Respondents reported receiving 74 different treatments from healthcare professionals. The most commonly prescribed treatments were pelvic floor down-training exercises (76%), topical (70%) and oral (70%) medication, information (56%), pain education (54%), vaginal dilators (54%), and internal pelvic floor release (46%).

Conclusion

Australian women with vulvodynia seek help from a number of healthcare professionals and receive a variety of treatments for their pain. Their diagnostic delay is long, and women remain in pain post-diagnosis. Despite receiving a number of different treatments, the majority of evidence supporting their use is of low methodological quality. There appears to be a disconnect between treatments supported by research and treatments offered clinically. for example, over half of respondents reported being prescribed vaginal dilators and just under half had pelvic floor release, despite neither intervention being supported by high-quality research trials. Further high-quality research regarding vulvodynia treatments is required, as well as investigation into the clinical decision making of healthcare professionals treating Australian women with vulvodynia. Finally, further education for these healthcare professionals may help to improve their management of women presenting with vulvodynia.

A DYADIC PERSPECTIVE ON COPING WITH CHRONIC PAIN AND ITS EFFECTS ON RELATIONSHIP QUALITY AND PSYCHOLOGICAL DISTRESS

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Background and Aims

Dyadic coping is the process of coping that transpires between couples when challenged with a common stressor such as one partners' illness. Dyadic coping is intended not only to support the patient but also to maintain equilibrium in the relationship. There has been considerable conjecture on the role dyadic coping plays in couples' coping with chronic pain. Given that partners are often the primary caregivers and emotional support for patients; and make adjustments to their daily living and long-term life plans it is important to understand the process of dyadic coping from both patient and partners' perspective. This study applies the dyadic conceptualization of coping which recognizes the interdependence between intimate relationships. Aim. To examine the effect of dyadic coping on relationship quality and psychological distress, over time, from patient and their partner's perspective.

Methods

Recruitment: Members of Pain groups (e.g. Flemish Pain League) in Belgium were invited via a letter to participate. To be eligible patients had to be experiencing pain for at least 3 months and living together with a partner for more than a year. Three measurements over six months were collected from each couple. Measures: (i) Dyadic coping was measured using pain-specific Dyadic Coping Scale, (ii) Relationship quality was measured using Dyadic Adjustment Scale and (iii) Psychological distress was measured using the Depression, Anxiety, Stress Scale. All couples' demographic information and patients' pain rating (using Graded Chronic Pain Scale) was also collected. Analysis. The effects of dyadic coping were examined together by treating data from both members of the dyads as a unit, using an innovative statistical model, the Actor–Partner Interdependence Model.

Results

139 couples participated, 82% of patients were female and 81% of partners were male. All couples identified as Caucasian, with 82% cohabitating, with mean length of relationship 25.2 years. The mean pain intensity for patients was 6.90 (SD= 1.41). Both patient and partner's relationship quality, was strongly associated with the patients' own perception of received dyadic coping. Similarly, both patient and partners' psychological outcomes, should strong association with patients' perception of received dyadic coping. Partner reported dyadic coping did not show statistically significant association with their own and patients' relationship quality, and patients' psychological distress.

Conclusions

As compared to partner report, patient perception of dyadic coping seemed to be a better predictor of patient and partners' relationship quality, and psychological outcomes, over time. These findings may have clinical implications, appropriate appraisal of patients' expectation from dyadic coping may be central to the couple's overall wellbeing. Incorporating interventions to teach adaptive and open communication skills to the couples may directly improve their individual psychological outcomes and indirectly their relationship quality.

ASIC3 ACTIVATES AND SENSITIZES SENSORY NERVES IN THE BONE MARROW CAVITY OF RATS

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Background and Aims

The Acid Sensing Ion Channel 3 (ASIC3) is a non-selective cation channel that is activated by protons (pH below 7) and inflammatory mediators. It has been suggested to have a pro-algesic role in a range of conditions that present with bone pain, including bone cancer and osteoporosis. In this study we aimed to determine if ASIC3 is expressed in sensory neurons that innervate bone marrow (bone afferent neurons), and if it contributes to inflammation-induced activation and/or sensitization of bone afferent neurons in vivo.

Methods

A combination of retrograde tracing and immunohistochemistry was used to determine expression of ASIC3 in the soma of bone afferent neurons that innervate the rat tibial marrow cavity. A novel, in vivo, electrophysiological bone-nerve preparation, developed in our laboratory, was used to make recordings inn anaesthetised animals, of the activity and sensitivity of bone afferent neurons in a fine nerve that innervates the rat tibial marrow cavity. Recordings were made before and after injection of the inflammatory agent carrageenan, with or without the ASIC3 selective inhibitor (APETx2), into the marrow cavity.

Results

A substantial proportion of bone afferent neurons express ASIC3 (29.4 ± 5.9 SEM; n=4). These include both small diameter myelinated (neurofilament rich) and unmyelinated (neurofilament poor) neurons that are likely to be A-delta and C fiber neurons respectively. Electrophysiology recordings revealed that inhibition of ASIC3 reduced carrageenan-induced increases in spontaneous activity of bone afferent neurons. Carrageenan-induced sensitisation of bone afferent neurons to mechanical stimulation was also reduced by inhibition with APETx2.

Conclusions

We have shown that ASIC3 is expressed in sensory neurons that innervate the bone, and that the ASIC3 antagonist APETx2 can inhibit acute inflammation-induced activation and sensitisation of bone afferent neurons in an in *vivo* anesthetised bone-nerve preparation, and pain behaviour in conscious animals. The findings support a role for ASIC3 in the pathogenesis of pain associated with bone pathology or disease.

MICROSTRUCTURAL CHANGES IN THE TRIGEMINAL NERVE OF INTERICTAL MIGRAINEURS

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Background and Aims

Migraine is a common debilitating neurological disorder affecting approximately 15% of the global population. While neuroimaging studies have revealed altered trigeminal nerve volumes and diffusivity in chronic pain conditions such as trigeminal neuralgia, the structure of the trigeminal nerve has not been explored in migraine sufferers. Evidence from one histological investigation, however, found that the altered structure of the zygomaticotemporal nerve in migraineurs may be indicative of disrupted axon alignment. This study aimed to determine whether structural alterations of the trigeminal nerve contribute to migraine pathophysiology. We hypothesised that the trigeminal nerve volume may be similar between the left and right trigeminal nerves of migraineurs and controls, but that indicators of altered fibre alignment such as free water diffusion will be reduced.

Methods

Thirty-nine subjects with migraine (mean age: 29.97 years, 29 females) and 39 healthy controls (mean age: 30.70 years, 23 females) were recruited for the study. In all subjects, T1-weighted anatomical images and diffusion tensor images (DTI) of fractional anisotropy (FA), mean diffusion (MD), axial diffusion (AX) and radial diffusion (RD) were collected. Using SPM12, these images were resampled and the left and right trigeminal nerves within the root entry zone were isolated. Using the T1 image, a volume of interest encompassing the trigeminal root entry zone was created and the nerve volume (mm3) from each voxel inside this isolated region was extracted and averaged. Additionally, maximum coronal cross-sectional area value (mm2) was calculated from the cross-sectional volume of the nerve in each coronal slice. Further, DTI parameters were calculated from trigeminal nerve volumes. The nerve was divided into caudal, middle and rostral thirds based on voxel location in the coronal plane and the FA, MD, AX and RD values for the caudal, middle and rostral thirds of the trigeminal root entry zone were calculated.

Results

The left and right trigeminal nerve volumes revealed that the left nerve showed a significantly greater volume than the right nerve in both the control and migraine group. Additionally, MD, AX and RD were significantly greater in the left nerve compared to the right nerve of migraineurs. However, regional analysis of the trigeminal nerve revealed that FA differences between the left and right nerves of controls were significantly greater than that of the left versus right nerve in migraineurs in the middle and rostral segments of the nerve.

Conclusions

This data revealed that migraine pathophysiology may be associated with microstructural abnormalities in the trigeminal nerve. Migraineurs exhibit differences between the left and right nerve, however this change is not significantly different to the controls. Furthermore, migraineurs display microstructural alterations in FA which may be indicative of demyelination and/or axonal loss within the middle and rostral, more myelinated portion of the trigeminal nerve.

WOMEN REFERRED WITH PELVIC PAIN: CHARACTERISTICS AND FEATURES THAT PREDICT WHO GETS SURGERY AND WHO HAS ENDOMETRIOSIS

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Background and Aims

Pelvic pain is a major health issue with referrals comprising a substantial proportion of the gynaecology workload. The aim of this study was to prospectively follow a cohort of women referred to specialist gynaecology outpatients for chronic pelvic pain (CPP) management and to identify features that influenced management decisions, factors that predicted whether surgery was undertaken and the operative findings.

Methods

A prospective, observational clinical trial (ACTRN12616000150448) recruiting women aged 18-50 years at the time of their primary referral. Women were randomised to two gynaecology clinics (one general unit, the other with a specific interest in gynaecology-endoscopy) at the Mercy Hospital for Women (MHW), Melbourne, Australia. Inclusion criteria were referral for dysmenorrhoea, dyspareunia, dysuria, dyschezia, non-cyclic pelvic pain or lower abdominal pain. Women were excluded if they presented with subfertility, were post-hysterectomy, were planning a pregnancy, showed ultrasound evidence of an ovarian cyst →6cm diameter, or had been recently diagnosed with severe endometriosis. Participants completed baseline questionnaires assessing their symptoms, medical history, quality of life (QoL), pain scores and levels of pain catastrophisation. Examination and ultrasound findings, management decisions, and surgical and histopathology results were acquired from patient records. Data analysis was conducted using Cox proportional hazards regression and logistic regression.

Results

Baseline characteristics of participants(n=426) in each group were similar. Of these, 123(28.9%) underwent laparoscopic or open abdominal surgery with CPP as the primary indication. Within this cohort, 47 (38.2%) women had histologically confirmed endometriosis. Women were at increased risk of surgery if they had irregular menses (HR=2.10, p=0.022) or if they were allocated to the gynaecology-endoscopy unit (HR=3.60, p=0.001). of women undergoing surgery, 89 (72.4%) were under the care of the gynaecology-endoscopy unit whilst 34 (27.6%) were managed by the general gynaecology unit. Surgical and non-surgical patients did not differ in their symptoms, past history of endometriosis, QoL, pain scores, pain catastrophisation scale, examination findings or ultrasound results. Univariate logistic regression did not reveal any significant predictors for endometriosis. Multivariate analysis identified increasing parity was associated with a decreased risk of endometriosis (OR=0.53, p=0.023), while a previous history of endometriosis was associated with an increased risk of endometriosis at surgery (OR=3.28, p=0.035).

Outcomes

CPP patients managed medically versus surgically and those with or without endometriosis do not significantly differ in their clinical presentation. Despite this, there is a greater than two-fold difference between the surgical rates in women managed by the gynaecology-endoscopy unit and the general gynaecology unit at MHW. This suggests that the decision to operate is largely clinician-dependent. This study found that a previous operative diagnosis of endometriosis increases the likelihood of endometriosis being identified at subsequent surgery whereas multiparity reduces this likelihood. However, neither of these factors were predictive of surgical management for CPP.

AN EXPLORATION OF THE MEANING OF PAIN AMONGST BHUTANESE REFUGEES

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Background and Aims

Bhutanese refugees have been subject to one of the largest resettlement operations in the world, with over 5000 refugees resettled in Australia. Previous research has shown that Bhutanese refugees experience higher rates of chronic pain when compared to the general population (Van Ommeren et al., 2001). Other research into migrant groups in Australia also found that they conceptualise pain in different ways than compared to Western cultures, with emphasis on religion, family and community, which suggests that Western medical services may not always meet their needs (Brady, Veljanova, Chipchase, 2017). The purpose of this study was to explore conceptualisations and beliefs of chronic pain among the Bhutanese refugee community in Australia.

Methods

Participants included 23 Bhutanese refugees (7 male, 15 female) who were diagnosed with chronic pain. Participants were recruited from a specialised pain clinic and agreed to participate in one of three semi-structured focus groups exploring their experiences of pain. Focus groups were audio recorded and were conducted in Nepali by a bilingual facilitator. Data were analysed using a thematic analysis to identify salient themes and commonalities within the data.

Results

Results of the thematic analysis revealed five main themes which were (1) pain is persistent and creates suffering, (2) pain is subjective and poorly understood, (3) pain is a biomedical problem that needs to be solved, (4) pain is complex and more than a biomedical problem and (5) coping with pain is multi-faceted.

Conclusions

Findings suggest that while refugees had differing conceptualisations of pain however common experiences for all participants were that pain was persistent, viewed in a negative light, increased suffering and made life in Australia harder. While many participants endorsed biomedical views of pain, some participants held views more in line with a biopsychosocial framework which is positive for future treatment. This study adds to the growing literature studying refugee health and provides an in depth perspective of how Bhutanese refugees in Australia view their chronic pain, with the hope that this can inform future research into culture and pain management and be used to create a pain management program specific for this population.

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PROPERTIES OF A NOVEL DEVICE TO TEST TACTILE ACUITY

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Background
Tactile acuity appears to be reduced in patients with chronic pain. However, psychometric properties of clinical tools assessing tactile acuity appear limited. A novel semi-automated tool, the Imprint Tactile Acuity Device (iTAD), was recently developed to overcome some of their challenges

Aims
To describe the iTAD prototype and briefly present a series of studies investigating the psychometric properties of its assessments: the localisation test, orientation test and overall score (average of both tests).

Methods
In study one, a test-retest design was used to asses reliability. Forty healthy participants performed several iTAD and two-point discrimination threshold (TPDT) assessments at the neck on two consecutive days. Intra-rater, test-retest and inter-rater reliability (ICC(2.1)) were assessed as well as the coefficient of variation (CoV). In study two, a known-group comparison design was used to assess construct validity. The iTAD scores (0-100% each) in thirty individuals with persistent neck pain were compared to thirty age and gender matched healthy controls. In study three, a cross sectional design was used to establish normative scores for the neck. Healthy participants were recruited in six age brackets and performed both tests once. Additionally, anthropomorphic measures (neck height, neck circumference and body mass index) were taken to assess their influence on iTAD scores.

Results
Study 1: The mean ICC(2,1) values ranged from 0.54 to 0.66 for the localisation test, 0.59 to 0.76 for the orientation test, 0.68 to 0.75 for the overall score and 0.65 to 0.70 for the TPDT. The CoV ranged from 12.2% to 15.6% for the localisation test, 12.7% to 15.2% for the orientation test, 9.9% to 11.4% for the overall score and 25.3% to 25.8% for the TPDT. Study 2: No significant between group differences were found in the iTAD scores. In the male subgroup, however, the overall score was significantly lower (mean (SD); 7.6% (2.5)) for individuals with neck pain compared to healthy controls. Study 3: Preliminary results of 71 participants (36 females) indicated significantly lower scores for women, compared to men. Additionally, individuals →50 years old scored significantly lower than individuals of 18-50 years old. for each of these four groups, the lowest 5%, 10% and 15% cut off values were calculated for each of the three outcome measures. No significant correlation was found between any iTAD score with any of the anthropomorphic measures.

Conclusion
Tests of the iTAD demonstrate moderate to good reliability, comparable to the TPDT. However, CoV appears lower for the iTAD, indicating less measurement error. Clear construct validity was not established, but results may be biased by initial design issues. Normative data is presented to improve interpretability of scores. Additionally, scores do not appear to be affected by anthropomorphic measures. Taken together, the iTAD shows promise but further fine-tuning is needed.

MUSCLE FUNCTION AND POWER BUT NOT MASS PROTECT AGAINST MORE SEVERE KNEE PAIN TRAJECTORIES

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Background and Aims

Evidence suggests that periarticular muscles have a role in the pathogenesis of pain, but results have not been consistent. We recently reported that pain population is heterogenous and consists of different subgroups of which the causes and mechanisms differ. Study has not been performed yet to investigate whether muscle function, power and mass are risk factors for worse pain trajectories. The aim of this study was to examine the association of leg strength, knee extensor strength, low-limb muscle quality (power), total and local muscle mass with knee pain trajectories over 10.7 years.

Methods

This study utilised the data from a population-based older adult cohort study. 1,099, 875, 768 and 563 participants attended baseline, follow-ups at Year–2.6, 5.1 and 10.7, respectively. Leg strength in both legs and dominant knee extensor strength were measured at baseline. Dual-energy X-ray absorptiometry was used to assess total muscle/fat and lower-limb muscle/fat mass. Low-limb muscle quality (power) was calculated (i.e. leg strength divided by lower-limb muscle mass). The Western Ontario and McMaster Universities Osteoarthritis Index pain questionnaire was used to measure knee pain at each time-point. Radiographic knee osteoarthritis (ROA) was assessed by X-ray. Group-based trajectory modelling was applied to identify pain trajectories. Multi-nominal logistic regression was used for the analyses.

Results

A total of 975 participants [Mean±SD: age 62.2±7.4 years, body mass index 27.8±4.6 kg/m2 and 51% females] were included in the analysis. Three distinct pain trajectories were identified: 'Minimal pain' (53%), 'Mild pain' (34%) and 'Moderate pain' (13%). In multivariable analyses, both greater total and low-limb muscle mass were associated with an increased risk of 'Mild pain' [total muscle mass: relative risk (RR): 1.45 per SD increase, 95%CI: 1.11–1.90; low-limb muscle mass RR: 1.30 per SD increase, 95%CI: 1.05–1.61] and 'Moderate pain' [total muscle mass: RR: 2.09 per SD increase, 95%CI: 1.42–3.08); low-limb muscle mass: RR: 1.65 per SD increase, 95%CI: 1.22–2.23] compared to the 'Minimal pain' trajectory group. After adjustment for fat mass, these associations disappeared. In relative to the 'Minimal pain' trajectory, leg strength, knee extensor strength and power were associated with a reduced risk of being in more severe pain trajectories after adjustment for covariates (RR=0.59 to 0.73 per SD increase, all P←0.05). Similar results were observed in those with ROA.

Conclusions

Muscle strength and power, but not mass are associated with a reduced risk of more severe pain trajectories, suggesting that loss of muscle function and power are of more clinically relevance to preventing the development and maintenance of worse pain trajectories. Disappeared association between muscle mass and pain trajectories after adjustment for fat mass indicates that detrimental effects of muscle mass on pain are caused by fat mass. These results underscore that training/exercise specifically for strength should be recommended to improve pain symptom in general practice.

THE PREDICTIVE VALUE OF THE PAIN CATASTROPHISING SCALE FOR PAIN AND QUALITY OF LIFE OUTCOMES IN WOMEN WITH PERSISTENT PELVIC PAIN

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Background and Aims

Persistent pelvic pain (PPP) is a common condition that can impact significantly on the quality of life (QoL) of affected women. Women with PPP frequently exhibit high levels of mal-adaptive coping styles such as pain catastrophising. This study sought to investigate the predictive value of the pain catastrophising scale (PCS) in women with PPP. It was hypothesised that high baseline PCS would be associated with lower QoL and higher pain scores at follow-up. It was further hypothesised that these associations would be greater for younger women, than for older women.

Methods

This study formed part of the larger PPP Study, a prospective observational study registered with the Australian New Zealand Clinical Trials Registry. Women aged 18-50 referred to a single tertiary referral centre with pelvic pain were identified and recruited (n=471). Women were excluded if their referral contained information regarding infertility and pregnancy planning, they had a past history of hysterectomy or recent sonographic evidence of a complex ovarian cyst →4cm. Baseline questionnaires were completed and repeated at 6-monthly intervals for 30-months. These included measurements of QoL, PCS and pain scores. Medical records were also reviewed retrospectively. Backward stepwise multiple linear regression analysis was performed using STATA.

Results

471 women completed baseline questionnaires, with a median age of 30 (interquartile range: 14). of those who completed the PCS component of the baseline questionnaire (n=450), 50.2% (n=226) had a clinically relevant PCS total score (30). Baseline score on the PCS helplessness subscale was negatively correlated with 30-month physical QoL (p=0.021). Baseline score on the PCS magnification subscale was positively correlated with total pain score (p=0.036), dyspareunia pain score (p=0.030) and dyschezia pain score (p=0.001) at follow-up. The impact of age on measured associations between PCS and outcome variables was insignificant.

Conclusions

Women with PPP demonstrate high levels of clinically relevant pain catastrophising. Baseline score on the PCS magnification subscale may be predictive of increased long-term pain severity in women with PPP. There has been limited application of PCS to PPP. This finding represents one of the first to identify the relevant PCS subscales in PPP. Baseline score on the PCS helplessness subscale may be predictive of decreased long-term physical QoL in women with PPP. Identifying and stratifying women with high PCS subscale scores at presentation may allow for targeted treatment and improvement in long-term pain outcomes.

IDENTIFICATION OF EFFECTIVE ANALGESICS FOR DYSTROPHIC EPIDERMOLYSIS BULLOSA (DEB)

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Background and Aims

Epidermolysis Bullosa (EB) is a group of genetic blistering skin disorders caused by mutations in genes encoding structural adhesion proteins within the skin. Pain is a major clinical problem that contributes substantially to the disease burden in EB, reducing quality of life of these patients. Due to the heterogeneous manifestation of pain and the ad hoc nature of analgesic prescribing, knowledge of the most effective analgesics in the treatment of EB-related pain remains limited. Using Col7a1Δ mutant mice from a novel model for dominant dystrophic EB (DEB) (a major subtype of EB) that we recently developed and validated, we aimed to objectively compare the effectiveness of existing analgesics commonly used to treat EB-associated pain.

Methods

DEB mice were treated with different classes of analgesics currently used in EB patients including: buprenorphine, an opioid; meloxicam, a non-steroidal anti-inflammatory drug; and bupivacaine, a local anaesthetic, and paw withdrawal thresholds (PWTs, reported as mean ± SEM) assessed in DEB and wildtype control mice using a standard von Frey assay.

Results

After 1 hour of systemic administration of 0.1 mg/kg buprenorphine (s.c.), PWTs of DEB mice (n=5) significantly (pÐ0.0001) increased from a baseline value of 0.24 ± 0.03 g to a post-treatment value of 0.67 ± 0.06 g, with 41.2 % reversal of pain-like behaviour compared to wild-type controls. After 1 hour of systemic administration of 2 mg/kg meloxicam (s.c.), PWTs of DEB mice (n=5) significantly (pÐ 0.0001) increased from a baseline value of 0.22 ± 0.03 g to a post-treatment value of 0.7 ± 0.07 g, with 47.1 % reversal of pain-like behaviour. After 20 min of local administration of 0.1 % bupivacaine (i.pl.), PWTs of DEB mice (n=5) significantly (pÐ 0.0001) increased from a baseline value of 0.21 ± 0.03 g to post-treatment value of 1.24 ± 0.1 g, with 99 % reversal of pain-like behaviour. At the given doses, none of the drugs significantly affected the PWTs of wildtype control mice, suggesting absence of any impaired motor reflexes.

Conclusions

Analgesics currently used to treat EB-associated pain differ in their efficacy and potency. These data (and ongoing experiments in this area) are likely to inform and assist with more rational prescribing of analgesic drugs for the relief of EB-related pain, and also provide important mechanistic insights into the processes that are driving pain in this condition.

DEVELOPMENT OF A MOUSE MODEL OF DYSTROPHIC EPIDERMOLYSIS BULLOSA (DEB)

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Background and Aims

Mutations within the collagen VII (COL7A1) gene lead to a rare skin disorder, known as Dystrophic Epidermolysis Bullosa (DEB), which is characterized by widespread blistering and often severe acute on chronic pain that can occur both in the presence and absence of blistering. The pathogenesis and optimal treatment of this pain remains poorly understood. To better understand and treat DEB-related pain, we therefore sought to establish a novel mouse model for DEB and to characterize its baseline responses in different pain-related behavioural assays.

Methods

Using an online DEB mutation database, we identified the most common human COL7A1 mutation responsible for dominantly inherited DEB (ÐG2043R), and then used CRISPR technology to introduce the corresponding mutation in mouse Col7a1 (ÐG2037R) into the genomes of early stage mouse embryos. The resultant mice were characterised based on their gross anatomy, histology and biochemical features, as well as in both von Frey and Hargreaves behavioural assays to assess for their response to mechanical and heat stimuli respectively.

Results

Our Col7a1ÐG2037R mice closely phenocopy dominant DEB in humans. Specifically, mice show recurrent, dominantly-inherited blistering, which is first observed transiently around the mouth and paws in the early neonatal period and then again around the digits from 8-10 weeks of age. Histologically, the mice show evidence of micro-blistering via light microscopy, reduced COL7A1 protein via immunostaining, and abnormal COL7A1 anchoring fibrils via electron microscopy. Biochemically, COL7A1 protein from the mice showed reduced thermal stability, consistent with what is observed in patients. Mice tested via both the Von Frey and Hargreaves assays prior to the onset of visible blistering in early adulthood showed significantly increased sensitivity to both mechanical and heat stimuli, which also mirrors what has been observed in DEB patients previously.

Conclusions

We have developed a novel mouse model of DEB, which recapitulates the clinical features of dominantly inherited DEB in humans, including an increased sensitivity to mechanical and thermal stimuli similar to that seen in DEB patients. Moving forward, we plan to use this model to better understand and treat DEB-related pain.

EMBEDDING LOW INTENSITY COGNITIVE BEHAVIOURAL THERAPY IN A TERTIARY CHRONIC PAIN SERVICE: A PILOT STUDY

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Background and Aims

Chronic pain affects 1 in 5 Australians in their lifetime, and costs billions of dollars annually in lost productivity and care. While providing adequate pain management remains difficult, with long waiting lists for specialist pain units, CBT-based pain management can improve pain, disability, and quality of life. Low-intensity CBT (LICBT) more accessible as it is administered via phone by various tertiary-trained professionals, and has reduced mental illness and improved functioning in chronic illness patients, but has not been trialled for chronic pain. The aim of our pilot study was to assess the effectiveness and feasibility of embedding LICBT within a chronic pain outpatients unit.

Methods

Clinical Masters students administer LICBT in-person or over-the-phone. Six manualised sessions address goal setting, psycho-education, brain retraining, weakening the pain cycle, activity scheduling, pacing, and thought disputation. We are trialling two LICBT modalities (using convenience samples): (1) following a mandatory pain education program and prior to further pain unit contact, to improve self-management (as a pilot 2-group parallel RCT); and (2) alongside pain unit appointments, to enhance standard care. Depression (using the PHQ9), anxiety (using the GAD7), pain catastrophising (using the PCS), and pain intensity/severity (using the BPI) are assessed at the start and end of therapy. Preliminary data are available for these 2 modalities: (1) 9 treatment-as-usual (66% female) and 3 LICBT (66% female) participants, and (2) 42 pain unit patients (64% female). Descriptive statistics, along with repeated measures t-tests for pain unit patients, have been calculated.

Results

Ror pain unit patients (n = 42), depression (M=14.21, SD=7.11, vs. M=11.36, SD=7.74), anxiety (M=11.83, SD=6.67, vs. M=9.31, SD=7.03) and pain catastrophising scores (M=29.59, SD=12.67, vs. M =21.82, SD=16.05) significantly (i.e., p ← .05) decreased from pre- to post-LICBT, being small to moderate in effect size (d = .37 to .54). Pain severity and intensity showed very small, non-significant decreases. Results were similar when limiting analyses to those undertaking the recommended 6+ sessions (n = 22). RCT descriptive statistics appear to support these changes among LICBT participants, while treatment-as-usual scores remained the same/increased. Following education, uptake was low, and dropout high (80%), with LICBT more readily accepted alongside pain unit appointments. Patient and clinician feedback suggested many post-education patients were focussed on medical intervention and/or not in an active stage of change. Qualitative feedback patient highlighted several beneficial components of LICBT.

Conclusions

LiCBT is a feasible and promising option for chronic pain sufferers, with results supporting improvements seen for other chronic illness sufferers. Psychological rather than functional benefits may reflect mechanisms of engagement/validation. Our ongoing RCT will provide more rigorous effectiveness results, including longer-term 'maintenance' outcomes.

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THE DEVELOPMENT OF THE MY BACK MY PLAN PROGRAM: AN INDIVIDUALISED PRIMARY CARE INTERVENTION FOR ACUTE LOW BACK PAIN

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Background and Aims

Low back pain (LBP) is the largest cause of years lived with disability in Australia and globally1. There is an urgent need to address gaps between evidence and practice, develop innovative interventions and redesign how clinical services are delivered for LBP in primary care. The aim of this study was to develop a prototype of an individualised primary care program for acute LBP.

Methods

The primary care program for acute LBP, My Back My Plan (MBMP), was designed using the scholarly intervention development methods Complex Intervention development2 and intervention mapping.3 An integral component of this process was the input and guidance from key stakeholders, including health care practitioners and patients using co-design methodology. To develop an initial version of the MBMP, evidence scoping was conducted of the best available research evidence for treatment for acute LBP in primary care and recommendations provided in current clinical practice guidelines for the management of acute LBP. Additionally, two nationwide surveys were conducted to identify experiences and expectations of primary care treatment from 426 LBP patients4 and experiences of providing treatment from 200 primary care clinicians5. These surveys revealed a need for a more person-centred and integrated approach in the primary care management of acute LBP. The final version of the MBMP was developed by conducting focus groups of 13 clinicians and 14 patients, and an online survey of a panel of 17 experts in the field of LBP for final feedback and incorporate key amendments into the final prototype.

Results

The MBMP program for LBP is designed to be a low-cost and high-value personalised treatment for delivery in primary care. The MBMP program involves interprofessional care that is individualised for each patient based on their clinical presentation including psychosocial evaluation using a biopsychosocial framework, that is, matched care. An essential component of the program is the focus on self-management. Key elements of the program include education using an interactive patient booklet and individualised advice about returning to daily activities and work, exercise, analgesic medication and imaging.

Conclusions

The MBMP is the first program prototype for acute LBP that has used a scholarly approach to intervention development, including co-design with consumers and clinicians.

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THE DEVELOPMENT AND PSYCHOMETRIC EVALUATION OF A MULTIFACETED SELF-REPORT OVERACTIVITY ASSESSMENT IN CHRONIC PAIN

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Background and Aims

Overactivity in the context of chronic pain (i.e. activity engagement that significantly exacerbates pain) is an important clinical issue that has gained empirical attention in the last decade. Current assessment concepts of overactivity tend to focus on merely frequency to quantify the severity of the pain behaviour. The aim of this study was to develop a more comprehensive self-report overactivity assessment tool, the Overactivity in Persistent Pain Assessment (OPPA), and examine its psychometric properties.

Methods

The overactivity concept was first deconstructed using theories, qualitative data and clinical observations. Five quantifiable and progressive severity features were identified: Severity of the Pain Exacerbation, Maladaptive Coping Strategies Used, Impact on Occupational Performance, Recovery Time and Frequency. A single-item format was adopted to quantify each of these five features in OPPA. After initial clinician and consumer feedback was gathered, a sample of 333 individuals with chronic pain completed the OPPA. A subset of 202 individuals also completed a set of existing measures of pain-related outcomes and activity patterns. The remaining 131 participants were provided with a second copy of the OPPA to fill in one week following their initial assessment. A principal component analysis (PCA) using direct oblimin rotation was first conducted. Next, the construct validity of the OPPA was evaluated by correlating the OPPA scores to the scores of pain-related measures. A series of hierarchical linear regression models were also performed to evaluate whether the OPPA had superior ability to predict pain severity, pain-related disability and psychological functioning, when compared with the other existing overactivity scales after controlling for age, gender and activity avoidance. To examine the test-retest reliability of the OPPA, interclass correlation coefficients (ICC) with 95% confident intervals were calculated based on the 2-way mixed-effects model with absolute agreement. The internal consistency was calculated using Cronbach's alpha coefficient.

Results

The principal component analysis confirmed that the OPPA items were best represented by a single construct (labelled overactivity severity). The OPPA was found to correlate with pain-related measures in an expected way that is supported by both theory and qualitative data. When compared to existing overactivity measures, the OPPA was the only measure to contribute significantly to the regression models predicting higher levels of pain severity, more pain interference and lower levels of activity participation. In addition, the OPPA scale exhibited acceptable internal consistency and good test-retest reliability.

Conclusions

The results of this study reinforce the important role of overactivity in the maintenance of pain-related suffering and supports a corresponding assessment tool with preliminary psychometric evidence for clinical and research applications.

PLACEBO NEURAL MECHANISMS: THE DIFFERING NEURAL NETWORK OF PLACEBO RESPONDERS AND NON-RESPONDERS

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Background and Aims

The neural mechanisms underlying placebo analgesia have begun to be elucidated. For the most part, human brain imaging studies have shown altered activation during placebo analgesia in a network involving primarily frontal and cingulate regions. However, a gap exists in the literature such that direct examination of brainstem activity is sparse. Since descending modulatory circuits in the brainstem hold dynamic control over ascending nociceptive information in the primary synapse of the spinal cord's dorsal horn, we aim to utilise ultra-high field strength (7 Tesla) MRI to accurately resolve and measure activity within cortical and brainstem regions we believe responsible for placebo analgesia. We hypothesize that placebo responsiveness will be associated with altered activation in the brainstem periaqueductal gray (PAG) and rostral ventromedial medulla (RVM).

Methods

We applied two Vaseline creams to the right volar forearm of 27 healthy controls (13 males; mean age 22.74±0.67 years [±SEM]); one described as purely Vaseline, and the other as containing Lidocaine. However, both creams were Vaseline and only differed in appearance. Conditioning and reinforcement paradigms were conducted on two successive days using low and moderately painful thermal stimuli. On day two we collected a T1-weighted anatomical scan, as well as two fMRI series (134 volumes, TR = 2.5 seconds). During the first series, 8 moderately painful thermal stimuli were applied to the control cream with each subject rating their pain on-line. During the second series the same moderate stimuli were applied to the Lidocaine cream although each subject expected pain reduction due to conditioning and reinforcement. Using SPM12, fMRI images were pre-processed and normalised to MNI space. We isolated the brainstem using the SUIT extension in Matlab. Subjects were grouped into responders and non-responders using a two standard deviation band method, and significant BOLD signal changes were determined through a second-level paired random effects analysis of both groups ($p<0.001$). Additionally, a one-sample covariate analysis was performed with each subject's pain change across the two series to identify cortical and brainstem regions which correlated with placebo response intensity ($p<0.001$).

Results

Significant differences in cortical and brainstem activity were observed between responders and non-responders. Specifically, placebo responsiveness was associated with altered signal intensity within the ventrolateral PAG and the RVM. Additionally, prefrontal and cingulate regions were associated with placebo responsiveness and connectivity between the dorsolateral prefrontal cortex (dlPFC) and anterior cingulate cortex (ACC) was significantly greater with increased placebo responsiveness.

Discussion

Our findings demonstrate activity within the ventrolateral PAG and RVM facilitate a placebo response. Further, we define a top-down cortico-cortical signalling pathway responsible for the activity of these brainstem regions during placebo analgesia, revolving around the dlPFC and ACC. This network likely contacts the brainstem, ultimately altering ascending noxious information within the spinal cords dorsal horn.

THE USE OF DIETS AND NUTRITIONAL INTERVENTIONS FOR CHRONIC PAIN – A SYSTEMATIC REVIEW

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Background

The standard western diet is nutrient poor and high in processed sugary food that displaces nutrient dense whole foods required for metabolic wellness, leading to metaflammation and oxidative stress. There is limited research on how these adverse metabolic drivers may be associated with maladaptive neuroplasticity seen in persistent pain, and whether this could be attenuated by a targeted nutritional approach. The aim of this systematic review was to identify the evidence for whole food dietary interventions in chronic pain management.

Method

A systematic search of eight databases was performed up to December 2018. Studies were included if: i) participants were adults with chronic pain involving the musculoskeletal or nervous system, ii) had whole food dietary interventions greater than 2 weeks that changed common foods or drinks, iii) reported a clinical outcome for pain (primary measure), secondary measures (inflammatory biomarkers, quality of life or psychological health) were also recorded. Capsule or extracted powder supplements, medical food and processed commercial meal replacement studies were excluded.

Results

After removal of duplicates there were 6657 studies screened resulting in 341 full text reviews of which 37 met the eligibility criteria containing 40 groups receiving a dietary intervention (25 RCTs, 9 pre-post, 2 controlled interventions and 1 case study). There were a range of chronic pain presentations including general rheumatoid arthritis (13), fibromyalgia (9), osteoarthritis (8), musculoskeletal (5) and neuropathic (2). The types of dietary interventions included either altered the dietary pattern or the micronutrient intake. Interventions were categorised as either vegetarian/vegan; Mediterranean; single food changes; standard calorie and fat restriction; elimination protocols; or focus on Omega 3. A visual analogue scale (10 point or 100mm) was the most commonly reported pain outcome measure followed by pain score subsets from the WOMAC and SF36 questionnaires. Common secondary outcome measures included inflammatory blood biomarkers, weight change, and various questionnaires for overall function, quality of life, disease activity and mental health. When considering primary pain measures expressed as a percentage change from baseline, only 1 case-study showed a large effect of diet on pain, 16 groups showed a medium sized effect (11 reported as significant), and 23 showed a small effect (5 significant). For studies with a control, 12 reported significant findings in favour of the dietary intervention and 3 were in favour of the control (with 2 of these excluded as they included a drug intervention and the third being the intervention for the study but our comparator). Twenty-seven studies reported significant improvement on secondary related measures.

Conclusions

There is limited consistency in the application of nutritional interventions as a part of chronic pain management with variable reported effectiveness. Further research is required to elucidate which pain populations may benefit and the most effective dietary intervention.

LOCALISATION OF CD163-POSITIVE CELLS IN HUMAN DORSAL ROOT GANGLIA

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Background and Aims

The cell bodies of pain-associated neurons, nociceptors, are localised in trigeminal and dorsal root ganglia (DRG). The vast majority of research on DRG has been conducted using laboratory animals, but the cellular composition of human DRG is less clear. Dorsal root ganglia contain immune competent cells such as macrophages, and T- and B-lymphocytes in addition to nerve cell bodies associated satellite glia cells and intraganglionic blood vessels.

Methods and Results

Human dorsal root ganglia (n = 4) were obtained from cadavers that were part of the Medical Dissection Course, Flinders University, or from autopsy (Flinders Medical Centre, n = 1). Pre-tests showed that staining intensity of a control antiserum (NF200) was not different between paraffin sections with and without post fixation. Comparison of paraffin-, polyethylenglycol (PEG)- and cryo-embedded sections using NF200 showed best preservation of tissue and antigenicity in PEG-sections, followed by paraffin-sections. Using antisera against CD163 (presumably macrophages), CD4 (T-lymphocytes) and CD20 (B-lymphocytes), we were able to detect cells that expressed each of these markers in human DRG. In contrast to rat or mouse DRG, human DRG contain larger areas that do not contain nerve cell bodies but nerve fibre bundles. Multiple labelling immunohistochemistry with simultaneous labelling of CD163, S-100 (satellite cells) and DAPI (nuclear stain) showed high numbers of CD163+ve cells with morphological features of macrophages, predominantly in areas containing nerve cell bodies. Many of the CD163+ve cells were adjacent to S-100+ve satellite cells but we could not find immune cells or cell processes that were in contact with cell bodies of sensory neurons.

Conclusions

In summary, our experiments showed the presence of B- and T-cells as well as relative abundant macrophage-like CD163+ve cells in human DRG. The macrophage-like cells are closely related to areas containing neurons, in particular satellite cells.

CLASSIFICATION AND TREATMENT FOR NECK PAIN; A SCOPING REVIEW

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Background and Aims

Neck pain is the fourth leading cause of disability globally and third in Australia, as measured by years lived with disability. The lack of clarity surrounding the pathophysiology and the subsequent symptom-based classification systems has contributed to a diversity of interventions for people with neck pain. We conducted a scoping review to 1) provide an overview of how neck pain is classified in the literature, 2) define and group interventions for people with neck pain.

Methods

We conducted a scoping review of the currently available literature on treatments of neck pain.

We selected the clinical practice guidelines (CPGs) published in 2014-2018 concerns the references on systematic reviews (SRs) and randomized clinical trials (RCTs) that were used to underpin the recommendations of the interventions. Standardised data extraction forms were developed to extract information. The data extracted from SRs concerns the classifications of the interventions evaluated and the number of RCTs included.

Finally, the RCTs studying conservative interventions for adults suffering neck pain concerns the classification of neck pain and the interventions evaluated. We excluded studies that evaluate medications or invasive techniques such as Acupuncture, injections and surgery for neck pain management.

Results

We Included 7 clinical practice guidelines, 92 systematic reviews and RCTs. Descriptive analysis was performed to categorize patients with neck pain across CPGs, SRs and RCTs. The results obtained from 7 CPGs showed that the Neck Pain Task Force classification is used by three out of seven clinical practice guidelines to categorize neck pain.

We found 92 interventions that are recommended by these CPGs for management of chronic neck pain only.

Conclusions

This scoping review demonstrated that there are several ways of classifying neck pain, but the most frequently used classification system is Neck Pain Task Force classification.

IS THERE A CAUSAL RELATIONSHIP BETWEEN ACUTE STAGE SENSORIMOTOR CORTEX ACTIVITY AND THE DEVELOPMENT OF CHRONIC LOW BACK PAIN? A PROTOCOL AND STATISTICAL ANALYSIS PLAN

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Background

Why some people develop chronic pain following an acute episode of low back pain is unknown. Recent cross-sectional studies have suggested a relationship between aberrant sensorimotor cortex activity and pain persistence. The UPWaRD cohort study is the first prospective, longitudinal investigation of sensorimotor cortex activity in low back pain. This paper describes the development of a causal model and statistical analysis plan for investigating the causal effect of sensorimotor cortex activity on the development of chronic low back pain.

Methods

Sensorimotor cortex activity was assessed within 6 weeks of low back pain onset using somatosensory evoked potentials and transcranial magnetic stimulation mapping techniques. Chronic low back pain is defined as ongoing pain (Numerical rating score ↗ 1) or disability (Roland Morris Disability Questionnaire score ↗ 3) at six months follow up. Variables that could confound the relationship between sensorimotor cortex activity and chronic low back pain were identified using a directed acyclic graph and content expertise was used to specify known causal paths. The statistical model was developed 'a priori' to control for confounding variables identified in the DAG, allowing an unbiased estimate of the causal effect of sensorimotor activity in acute low back pain on the development of chronic pain. The statistical analysis plan was finalized prior to follow-up of all participants and initiation of analysis.

Discussion

This paper describes a pre-determined protocol and statistical analysis plan for investigating the causal effect of sensorimotor cortex activity in the acute stage of low back pain and the development of chronic low back pain.

Trial registration

ACTRN12619000002189 [retrospectively registered]

A MODEL OF CRPS PATIENT EXPERIENCE TO GUIDE PATIENT – CLINICIAN INTERACTION

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Background and Aims

Pain is a subjective experience but Complex Regional Pain Syndrome (CRPS), which is reported to be the most intense pain 'known to man', has never been examined from the patients' lived experience perspective. The consequences of living with CRPS can be debilitating and people with CRPS generally have a poorer quality of life and higher risk of suicide than people with other types of chronic pain. This research sought to examine the experience of living with CRPS. It is expected that with greater awareness and deeper understanding of the lives of people living with CRPS, the knowledge base of health practitioners, patients, carers, and the general population will be extended. This knowledge in turn is anticipated to assist with early diagnosis, inform current treatment, and inform policy. It is also anticipated that empathy for the experience of living with CRPS will be increased as people gain an appreciation of their daily struggles.

Methods

This research utilised a phenomenological approach to investigate the phenomenon of living with CRPS. Purposive sampling was used to recruit seventeen patients and four health professionals from 6 different countries. Interviews were conducted face-to-face, by Skype or telephone and lasted between 34 and 94 minutes. Experiential material from internet blogs and a book containing patient stories were also included as data sources.

Results

The overarching essence of the phenomenon was that patients face a daily battle to live with this condition. Within the battle, there were five major themes: dealing with an unknown enemy, building an armoury against a moving target, battles within the war, developing battle plans with allies, and warrior or prisoner of war. The findings suggest that some patients require further education about CRPS. Further, health practitioners have limited understanding of the big and smaller battles faced by patients such as fingernail problems, fear of being touched without warning, mobility and the fear of spread indicated by pain in other parts of the body. It was identified that patients' goals are not necessarily the same as those of the health professional. A model of the lifeworld of CRPS was developed from the themes.

Conclusions

This research suggests that people living with CRPS are facing a daily battle to live their lives. They face all the difficulties of living with a chronic pain condition alongside additional problems unique to CRPS. Support is not always forthcoming from the general community and some healthcare professionals are uninformed about the condition. Improving the health literacy of patients, especially their pain literacy, will help the CRPS affected cohort to understand their condition and begin to accept their new normal. If the lifeworld is understood by others, especially health care professionals, people with CRPS can be given appropriate and focussed patient centred care. Use of the model is expected to assist in this process.

EFFICACY PROFILING OF SINGLE ORAL BOLUS DOSES OF DULOXETINE RELATIVE TO PREGABALIN IN THE CHRONIC CONSTRICTION INJURY (CCI) AND CISPLATIN-INDUCED RAT MODEL OF PERIPHERAL NEUROPATHY

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Background

Cisplatin, a platinum-based cancer chemotherapeutic agent has been in widespread use for the treatment of various tumour types and so there is a large population with cisplatin-induced peripheral neuropathy (CIPN) who are otherwise healthy cancer survivors. Additionally, peripheral neuropathic pain may also develop in humans in response to mechanical injury. Hence, the aim of this study was to assess the analgesic efficacy of duloxetine relative to pregabalin and vehicle (0.5% Natrosol with 0.01% tween 80) in rat models of these two peripheral neuropathic pain conditions.

Methods

Animal Ethics approval was obtained from The University of Queensland's Animal Ethics Committee. Male Sprague-Dawley rats were housed in groups of 2-3 per cage in a temperature-controlled room equipped with a 12h/12h light-dark cycle. A chronic constriction injury of the sciatic nerve was induced in one group of rats (Bennett and Xie, 1988) and cisplatin-induced neuropathy was induced in a second group of rats (Han et al., 2014). Temporal development of mechanical allodynia (paw withdrawal thresholds, PWTs) and mechanical hyperalgesia (paw pressure thresholds, PPTs) in the ipsilateral hindpaw (CCI-rats) and the bilateral hindpaws (CIPN-rats) were assessed. Drug dosing commenced once mechanical allodynia was fully developed (PWTs ↖6g; day 14 for CCI-rats and day 28 for CIPN-rats). A 'washout' protocol was used with at least two days washout between successive doses.

Rats were randomly assigned to receive single oral bolus doses of duloxetine (3-100 mg/kg), pregabalin (10-100 mg/kg) or vehicle. PWTs and PPTs were assessed immediately pre-dose and at regular intervals over a 3-h post-dosing period by a tester who was blinded to test item administration.

Results

In CIPN-rats, single oral bolus doses of duloxetine evoked dose-dependent anti-hyperalgesia but it did not alleviate mechanical allodynia. In CCI-rats, duloxetine at 10 mg/kg evoked marginally significant relief of mechanical hyperalgesia in the ipsilateral hindpaw but not at higher or lower doses and it did not alleviate mechanical allodynia in the ipsilateral hindpaws. Pregabalin evoked dose dependent anti-allodynic and anti-hyperalgesic effects in both pain-models. As expected, the vehicle was inactive.

Conclusions

In summary, single oral bolus doses of duloxetine evoked dose-dependent relief of mechanical hyperalgesia in the bilateral hindpaws of CIPN-rats but it was ineffective for relief of mechanical allodynia. In CCI-rats, duloxetine lack efficacy for relief of both mechanical allodynia and mechanical hyperalgesia.

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TALKING TO TEENS ABOUT PAIN: A MODIFIED DELPHI STUDY OF ADOLESCENT PAIN SCIENCE EDUCATION LEARNING OBJECTIVES

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Background and Aims

Persistent pain is a prevalent condition that negatively influences physical, emotional, social and family functioning in adolescents. Pain science education is a promising therapy for adults, yet to be thoroughly investigated for persistent pain in adolescents. Pain science education involves explaining what pain is, what function it serves, and what processes are thought to underpin it. It provides a means for patients and their families to understand their pain condition, and the principles that guide biopsychosocial interventions. There is a need to develop suitable curricula for adolescent pain science education. This study aims to explore the clinical need and evidence base of adolescent pain science education and reach consensus on learning objectives.

Methods

An interdisciplinary meeting of 12 clinicians and researchers was held during March 2018 in Adelaide, South Australia. The a *priori* objective of the meeting was to identify and gain consensus on key learning objectives for adolescent pain science education using a 3-round modified-Delphi process.

Results

Twelve panellists were recruited from varying locations (i.e. Australia, USA, Canada) and health disciplines (i.e. anaesthesiology, physiotherapy, psychology) working clinically, in research, or a combination. Consensus was reached on seven learning objectives for adolescent pain science education that included: (1) pain is a protector, (2) pain can become overprotective/sensitised, (3) pain is a brain output, (4) pain is not an accurate marker of tissue state, (5) there are many potential contributors to anyone's pain, (6) we are all bioplastic, (7) pain education is treatment.

Conclusion

Further exploration of the effect of pain science education using the proposed learning objectives for adolescents with persistent pain is warranted. Recommendations are made for promising areas for future research in adolescent pain science education.

EVALUATING REAL-WORLD ADHERENCE AND EFFECTIVENESS OF THE 'REBOOT ONLINE' PROGRAM FOR THE MANAGEMENT OF CHRONIC PAIN IN ROUTINE CARE

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Background

Chronic pain is a debilitating condition traditionally managed using multidisciplinary, non-pharmacological therapies. Common modalities include patient education, physical activity and psychological therapies. However, availability of such services can be limited, particularly in rural areas. Reboot Online was developed as an accessible, multidisciplinary online treatment program for chronic pain. It has been shown to be effective in clinical trials, but the effectiveness of this program in routine care settings remains unknown. This study aimed to examine program adherence and effectiveness in a real-world sample of participants completing Reboot Online in the community. We hypothesised that adherence and program effectiveness would be lower in routine care than in previous clinical trials.

Methods

A retrospective cohort study was conducted using real-world data from participants who were referred to the Reboot Online program by clinicians as part of their routine care, from April 2017-April 2019. Routinely collected data on program adherence, participant demography and clinical outcomes were included in the analyses. Reboot Online includes eight narrated lessons incorporating cognitive behavioural therapy, physiotherapy, psychoeducation and guided meditation. All course components are accessed via the internet. Participants also completed online assessments at pre-, mid- and post-treatment. Measures included the Pain Self Efficacy Questionnaire, Brief Pain Inventory, Tampa Scale of Kinesiophobia, Pain-Disability Index and Patient Health Questionnaire 9-item. Logistic regression was used to investigate whether certain factors predict program adherence (completion versus non-completion), and linear mixed models were used to examine program effectiveness.

Results

867 participants registered for the Reboot Online program, and 583 engaged with at least one Reboot Online lesson. Of these, 42% (n=247) completed the course in its entirety, with rurality and lower baseline Tampa scores being significant predictors of adherence ($p \leftarrow 0.05$). Completers demonstrated significant improvements across all outcome measures, with effect sizes ranging from 0.22-0.51. The largest post-treatment effect was observed on the Tampa scale (mean difference of 4.4 points post-treatment; Hedge's g effect size 0.48).

Conclusions

Reboot Online is an effective treatment for chronic pain in the routine care setting. Adherence was lower than in previous controlled trials (42% versus 60%) but was comparable to other self-directed programs of similar intensity. Reboot Online may be appropriate for those living in rural areas, which is incidentally where access to traditional therapies may be most limited. Strategies to address kinesiophobia may be useful for improving real-world adherence to the program in future.

AGEING WELL WITH CHRONIC MUSCULOSKELETAL PAIN: A SYSTEMATIC REVIEW OF NON-PHARMACOLOGICAL INTERVENTIONS AIMED AT REDUCING PAIN IN AN AGEING POPULATION

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Background and Aims

Chronic musculoskeletal pain is highly prevalent in older people, with osteoarthritis, low back pain, neck pain and other musculoskeletal disorders as the leading contributors to pain chronicity and disability. Previous reviews reporting effective non-pharmacological interventions for treating chronic pain either include few studies or included studies examine the outcome over a limited time span. Further, because of the complex and variable nature of the interventions included in the studies, it is difficult to interpret the effectiveness of particular interventions. Therefore, the aim of this systematic review was to investigate the effectiveness and the critical components of interventions associated with management of chronic musculoskeletal pain in older adults (→65 years).

Methods

We conducted this systematic review following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines and according to a protocol registered in PROSPERO (CRD42017074173). Randomised controlled trials (RCTs) of non-pharmacological interventions aimed at reducing pain in older adults with chronic musculoskeletal pain were included. Keywords and MeSH headings in four broad areas (Ageing; Pain; Musculoskeletal conditions; and RCT) were used in the development of a search strategy. Articles were identified through a comprehensive search of the following databases: Ovid MEDLINE, Embase, CINAHL, AMED, Scopus, Web of Science, and PEDro (from database inception to 31st August 2018). Two reviewers independently screened articles retrieved from the search for eligibility, completed data extraction, and extracted relevant data on methodological issues. The Cochrane Collaboration's tool for assessing the risk of bias was used to critically appraise included trials. Because of the clinical heterogeneity of the trials, we refrained from pooling, and performed a 'best evidence synthesis' within the subgroups and according to the interventions.

Results

The search resulted in 1,639 articles, and 265 articles were identified as potentially eligible for the review. While checking the full text eligibility, ten articles were included in this review including people with chronic pain due to various musculoskeletal problems. Ten interventions were evaluated; four main subgroups of interventions were determined: Self-management programmes, Physical therapy, Alternate therapies, and Cognitive behaviour therapy (CBT). The main methodological flaws in the included trials were: unblinded participants, and personnel (caregivers, observers, and assessors), only two studies were found to be of high quality.

Conclusion

There is moderate evidence for the effectiveness of CBT in reducing pain and improving physical functions for chronic musculoskeletal pain. There is limited evidence for the effectiveness of guided imagery, walking, aquatic physiotherapy, and auricular-point acupressure. There is conflicting evidence concerning the evidence of self-management programmes compared to Short-wave diathermy, or standard care control group.

PSYCHOLOGICAL FACTORS INFLUENCE SOMATOSENSORY FUNCTION IN PEOPLE WITH SHOULDER PAIN: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Background

A range of modifiable factors can influence the somatosensory abnormalities observed in people with persistent shoulder pain. This systematic review aimed to investigate the level of evidence for the associations between somatosensory function and psychosocial factors, sleep, and physical activity measures among individuals with shoulder pain.

Methods

A comprehensive literature search was conducted in six electronic databases from their inception to July 2019. After studies were selected two reviewers independently assessed the methodological quality using a modified Quality In Prognosis Studies Tool and supplemented with recommendations from Checklist for Critical Appraisal and Data Extraction for Systematic Review of Prediction Modelling Studies and the Quality Assessment of Diagnostic Accuracy Studies-2 tool. The level of evidence was assessed using the Grading of Recommendations, Assessment, Development, and Evaluations (GRADE) system. Meta-analyses using the combined data from four papers were conducted to evaluate the strength of the relationships.

Results

Five studies related to shoulder pain were included in the review. Four studies provided sufficient data were included in the meta-analysis. A 'very low' to 'low' quality of evidence was found for all the investigated factors. Pain catastrophizing and depression have significant (small to fair) associations with pressure pain thresholds and heat temporal summation. The pooled estimate (n= 2) showed that a higher catastrophizing score associated with a lower pressure pain threshold (r = -0.42; 95% CI: -0.62 to -0.23). Whereas, the pooled estimate from two studies showed that a small association is existing between depression and heat temporal summation (r = 0.21; 95% CI: 0.03 to 0.40).

Conclusion

A 'very low' to 'low' quality of evidence was found between psychological factors and somatosensory function. The phase of the investigation, study limitations, indirectness, and imprecision were the common issues found, which led to downgrading the evidence of the investigated factors. Prospective longitudinal studies are required to increase the level of evidence between psychosocial, sleep, and physical levels and somatosensory function among individuals with shoulder pain.

ADJUNCTIVE HYPNOSIS TO AID PAIN EDUCATION: A PILOT FEASIBILITY RANDOMISED CONTROLLED TRIAL

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Background and Aims

Chronic low back pain (CLBP) is common and burdensome. Recent recommendations have called for the investigation of new treatment strategies, including those that might adjunctively enhance clinical effects. This pilot feasibility study had two aims: (1) to test the feasibility of a novel intervention that delivers pain science education (PSE) hypnotically in adults with CLBP and (2) to evaluate the acceptability of this new treatment.

Methods

Adults with CLBP (pain →3 months) were recruited from the Central Adelaide Local Health Network Pain Management Unit wait-list. Participants (n=20) were randomised to one of two groups, both of which received PSE followed either by hypnotic suggestions for PSE concepts or by progressive muscle relaxation (to control for additional treatment time). Participants received 2 in-person treatments (1/week) and 4 at-home telephone calls (1/week). Criteria for feasibility (recruitment, enrolment, blinding, retention, and treatment completion), and treatment acceptability and burden were set a priori. Acceptability and burden were assessed using both open and closed format questions. Secondary clinical outcomes for pain intensity/interference (0-10 NRS, PROMIS subscales, Pain Catastrophising Scale, Tampa Scale of Kinesiophobia), disability (Roland Morris Disability Questionnaire), quality of life, mental health (PROMIS subscales), and knowledge about pain (revised Neurophysiology of Pain Questionnaire) were evaluated at baseline, post-treatment (2 week), 6 weeks, and at 3 and 6-months.

Results

Using a priori criteria, it was not feasible to recruit solely from the hospital wait-list. Feasibility targets were met once recruitment strategies were adapted to include community-based adults with CLBP. Un-blinding of the assessor occurred in 30% of participants. There were 90% and 60% follow-up rates at post-treatment and at 6 months, respectively. Due to assessor error, nine follow up assessments were not administered. Two participants did not complete the in-person treatment, one was busy and could not reschedule and the other was lost to follow-up. Participants reported both test and control treatments to be acceptable (94%) and helpful (72%). However, 41% reported that the self-report questionnaires were burdensome. There were no within group differences for any secondary clinical outcome at post treatment follow up.

Conclusions

Protocol modifications to enhance recruitment and assessor blinding, and to mitigate burden from questionnaires are required before progressing to a large scale randomised controlled trial for hypnosis enhanced PSE. That participants found PSE delivered hypnotically or with progressive muscle relaxation to be acceptable and helpful for management of CLBP, supports progression to a larger trial.

EDUCATION FOR KNEE OSTEOARTHRITIS - WHAT ARE ACCREDITED EXERCISE PHYSIOLOGISTS SAYING?

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Background and Aims

Guidelines for the non-surgical management of knee osteoarthritis (OA) recommend education as standard care. Improving patient understanding of OA and promoting positive self-management are key concepts addressed in education programs. This includes pain management strategies but no specific recommendation for pain neuroscience education (PNE). Contemporary pain rehabilitation practices include PNE, which has been shown to benefit a range of chronic musculoskeletal conditions. PNE can evoke clinically meaningful decreases in catastrophizing and kinesiophobia, which are major roadblocks to patients pacing up/engaging in exercise treatment [1]. Accredited Exercise Physiologists (AEPs) frequently treat patients with knee OA, although it is unknown whether the education they provide is consistent with the guidelines. AEPs knowledge and use of PNE is also unclear. Therefore, the aim of this study was to investigate if the education delivered by AEPs during exercise prescription for knee OA aligns with guideline recommendations. A secondary aim was to better understand the PNE delivered by AEPs and to assess their knowledge of pain neuroscience.

Methods

An online survey investigating AEP approaches to the management of knee OA was distributed via professional networks and social media platforms across Australia. Thematic analysis was used to evaluate the nature of education being delivered by AEPs. The revised neurophysiology of pain questionnaire (r-NPQ) was included to assess AEPs knowledge of pain neuroscience.

Results

A total of 161 AEPs (63 males, 98 females; mean experience 5.8 ± 4.7 years; 73% primarily treated patients with musculoskeletal conditions) completed the survey, with complete data available from 140 and 155 respondents for the education and r-NPQ components, respectively. Four education themes were identified: exercise (86% of respondents), self-management (61%), weight loss (56%) and pain management (51%). These themes are broadly consistent with OA management guidelines. Of those who provided pain management education, only 43% (n=30) provided PNE specifically. AEPs' knowledge of PNE was moderate, with a mean r-NPQ score of 8.97/13 ± 2.2 (69%). Questions that required a deeper understanding of pain biology were the most poorly answered. The questions "it is possible to have pain and not know about it" and "special pain receptors convey the message to your brain" were incorrectly answered by 50% and 70% of AEPs, respectively.

Conclusion

The primary education being delivered by AEPs for OA concerns exercise whereas education about OA, appropriate treatments and self-management is underutilised. While AEP pain neuroscience knowledge is similar to other health professions [2], only 21% of AEPs considered delivering PNE. Greater understanding of pain neuroscience could assist AEPs to deliver PNE that is more meaningful to patients to help them make better sense of their pain and improve adherence in exercise rehabilitation.

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ANALGESIC PH-RESPONSIVE NANOPARTICLES SELECTIVELY INHIBIT NK1R SIGNALLING FROM ENDOSOMES

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Introduction

The Neurokinin 1 Receptor (NK1R) is a GPCR activated by the neuropeptide Substance P (SP), and when stimulated it mediates neurogenic inflammation and central pain transmission. Like many dynamic, signalling receptors, NK1R is redistributed from the plasma membrane to endosomes within minutes of activation. Once internalised, the NK1R continues to signal from intracellular membranes in a spatially and temporally distinct manner that is proposed to be associated with pain transmission. Hence, the endosomal pool of NK1R is hypothesised to be physiologically important for pain and offers a unique therapeutic target.

Aims

To design and characterise polymeric nanoparticles that selectively deliver the NK1R antagonist Aprepitant into endosomes, as a strategy to alter intracellular drug distribution and improve the analgesic potential of NK1R inhibitors.

Methods

2-[N,N-(diisopropylamino)ethyl] methacrylate (DIPMA) diblock copolymer were synthesised through RAFT polymerization and cargo were loaded into nanoparticles by self-assembly. In vitro experiments include examination of uptake and distribution of nanoparticles by confocal imaging and FRET signalling assays to determine the ability of pH-responsive nanoparticles to decrease NK1R-mediated endosomal signalling. To explore the potential antinociceptive effect, nanoparticles were tested in acute (capsaicin), inflammatory (Complete Freund Adjuvant) and neuropathic (Sural nerve spare) models of pain.

Results

pH-responsive nanoparticles with a diameter of 30 nm rapidly release cargo at pH 6.2 when imaged in vitro by confocal microscopy. In vivo, they are disassembled within the first hour of injection. pH-responsive nanoparticles decreased nuclear ERK-evoked endosomal signalling in vitro and induced antinociception in vivo. When compared with the gold standard analgesic morphine, pH-responsive nanoparticles showed lower efficacy, but prolonged the antinociceptive effect in the 3 models tested.

Discussion

Using pH-responsive DIPMA-based polymers that promote nanoparticle disassembly and cargo release, the altered Aprepitant distribution successfully decreased NK1R-mediated signalling associated with pain transmission. This proof of concept study may be more broadly applicable for modifying drug disposition and therefore have the potential to repurpose old drugs for new indications.

Conclusion

pH-responsive nanoparticles loaded with an NK1R antagonists were able to decrease NK1R endosomal signaling in vitro while producing antinociception in 3 pain models. Together, we demonstrate that the use of pH-responsive nanoparticles may serve as a strategy for modifying the distribution of drugs, to offer an alternative to analgesics, that are known to have limited use due to their unacceptable safety profiles.

EVALUATION OF A THEORY-DRIVEN PHYSICAL ACTIVITY INTERVENTION FOR INDIVIDUALS WITH WHIPLASH ASSOCIATED DISORDERS USING A SINGLE CASE EXPERIMENTAL DESIGN

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Background and Aims

Neck pain is the most common symptom of whiplash associated disorder (WAD). However, there are considerable variations in physical impairment, psychological distress and social dysfunction. In addition, individuals with WAD are frequently insufficiently active for good health, increasing their risk of morbidity, and compounding the effects of the whiplash injury. To date, interventions have focussed on impairment or remediation in a rehabilitation setting with the aim of improving pain and disability. Trial results are equivocal and optimal treatment continues to be a challenge. The aim of the present study was to evaluate whether a community-located intervention using evidence-based behaviour change strategies increased participation in physical activity (PA), and subsequently, reduced perceived interference of neck pain on daily activities.

Methods

A single-case, multiple-baseline design across participants with replication enabled individual level analysis and ensured that a heterogeneous response was not masked by average effects typically generated with group level designs. Six individuals with chronic WAD (time since injury=1-18 years) were randomised to one of three baseline periods (e.g. tiers: 5, 8 or 11 week), and participated in a 16-week intervention period with 12 sessions conducted by an accredited exercise physiologist. Each session included evidence-based strategies with individualized exercise and lifestyle physical activity prescription tailored to the participant's knowledge, beliefs, values, perceived ability, and motivational readiness for regular PA. A wrist-worn accelerometer measured habitual PA as activity counts per minute. The PROMIS-pain interference scale assessed perceived pain interference relating to participation in daily tasks, home and social activities.

Results

At baseline, all participants had moderate/severe neck disability (neck disability index: range=30-68/100) and self-reported low levels of daily physical activity. A structured visual analysis supplemented with Tau U statistical analyses showed that following the intervention: PA significantly increased in two participants with moderate effect sizes (ES) ($\rightarrow$0.5) and the weighted Tau U across tiers was not significant (weighted Tau U: z=1.90 (0.24), p$\leftarrow$0.057); and perceived pain interference was significantly reduced for two participants with very large ES ($\rightarrow$0.7) and the Tau-U weighted average across tiers was significant (weighted Tau U: z=-1.98 (0.23), p$\leftarrow$0.048).

Conclusions

To our knowledge, this is the first study to evaluate the effects of an intervention specifically focused on increasing habitual PA in individuals with chronic WAD using a single-case experimental design. The intervention increased accelerometer-measured PA activity for two participants, and significantly reduced the perception that day-to-day activities may be hindered by pain in two other participants. Due to the heterogeneous nature of the WAD population, the use of a single-case experimental design was advantageous because it enabled individual-level analysis not possible with typical group level designs.

nPOWER™- A PROSPECTIVE, MULTI-CENTER TRIAL WITH A BATTERY-FREE MICROSTIMULATOR DELIVERING A NOVEL, PULSED-STIMULATION-PATTERN TO THE SPINAL CORD TO TREAT PAIN

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Introduction

A new, battery-free, micro-sized spinal cord stimulation (SCS) system has been created for the treatment of chronic pain. The system utilizes an external power source that bi-directionally communicates with a small, implantable pulse generator (←1.5 cc volume) connected to multiple leads. Preliminary testing on usability, patient comfort and the use of a proprietary Pulsed-Stimulation Pattern (PSP) has led to this first-in-human clinical study.

Methods

A prospective, multi-center, open-label clinical trial was recently initiated to demonstrate the safety and performance of a new microstimulator in the treatment of trunk and limb pain. Specifically, subjects diagnosed with failed back surgery syndrome (FBSS) who were unresponsive to conservative treatment options, displayed adequate psychological stability and reported leg and/or back pain greater than 6/10 were recruited. Subjects meeting all of the other inclusion and exclusion criteria were consented for study inclusion. Subjects underwent an SCS trial with the new system with the Nalu PSP stimulation paradigm. If subjects qualified they continued onto the long-term implant phase with follow-ups at multiple, pre-defined time points for up to 1 year following implantation. Clinical and usability outcomes will be obtained at baseline, out to the end of study.

Results

Nineteen (19) chronic back and/or leg pain subjects completed a 2-week trial with no trial failures and proceeded to the long-term follow up phase of the study and were included in a per-protocol interim analysis. At the most recent follow-up visit for the 19 subjects, at which time more than half the cohort were more than 6 months post implant, the overall average NRS pain reduction in the low back was 5.7 (83%), and the overall average NRS pain reduction in the leg was 5.5 (81%). In addition, all subjects are wearing the external power source nearly continuously and rating its average comfort ←1 on a 10-point scale (0 is Very Comfortable and 10 is Very Uncomfortable). The usability and efficacy data clearly illustrate robust connectivity.

Discussion and Conclusions

These early results demonstrate the favorable efficacy and usability of a battery-free, externally powered IPG utilizing dynamic feedback and a novel stimulation pattern. Study subjects are finding the external power source to be comfortable when worn continuously, and the system, as a whole, to deliver significant pain relief. These preliminary findings need confirmation in large population of chronic pain patients.

CHRONIC PAIN AFTER TRAUMATIC BRAIN INJURY: A NEW SERVICE MODEL AND FRAMEWORK

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Abstract

The chronic pain and brain injury project was established to develop appropriate resources and design a service model to improve pain management for people with a moderate to severe traumatic brain injury (TBI). An estimated prevalence rate of 50% is often cited in the literature, however, the specific data is much more inconsistent, with reported rates varying from 12.7% to 52%. In addition, there is limited information within the existing literature to provide guidance on the most appropriate assessment tools and specific pain management resources and strategies for this population. Specialist brain injury, and pain management clinicians were consulted on their experiences with pain management; they articulated their perceived lack of confidence and described feeling under resourced to manage this issue. The PROMIS-29 has been identified as a potential screening tool for chronic pain, this will be described and how it can be used to provide a framework for the classification of pain complexity and provide direction for clinical pathways for chronic pain management. A new service model option which provides improved access to specialist pain management services for this population will be explained. Promising preliminary results of a small pilot trial to test the model will be discussed. In addition, the framework of a suite of new clinical resources for pain management for consumers with a TBI will be previewed.

PREVALENCE AND INCIDENCE OF PHANTOM LIMB PAIN, PHANTOM LIMB SENSATIONS AND TELESCOPING IN AMPUTEES: A SYSTEMATIC REVIEW

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Abstract

This systematic review aimed to critically appraise and synthesise the recent literature (2014-2019) evaluating the incidence and prevalence of post-amputation phantom limb pain (PLP) and sensation (PLS). Five databases (Medline, Embase, Emcare, PsychInfo, Web of Science) and Google Scholar were searched, with two independent reviewers completing eligibility screening, risk of bias assessment, and data extraction. The search identified 1350 studies with 12 cross-sectional and 3 prospective studies meeting inclusion. Studies evaluated traumatic (n=5), atraumatic (n=4), and combined traumatic and atraumatic (n=6) amputee populations, ranging from one month to 33 years post-amputation, and using various measures of incidence/prevalence. Study heterogeneity prevented data pooling. The majority of studies had a high risk of bias, primarily due to limited generalisability. Three studies evaluated PLP incidence, ranging from 2.2% (atraumatic; one month) to 41% (combined; three months) and 82% (combined; 12 months). Only one study evaluated PLS/telescoping incidence. Across contrasting populations, PLP point prevalence was between 6.7%-88.1%, one to three-month period prevalence was between 49%-93.5%, and lifetime prevalence was high at 76%-87%. Point prevalence of PLS was 32.4%-90%, period prevalence was 65% (one month) and 56.9% (three month), and lifetime prevalence was 87% (atraumatic). Telescoping was less prevalent, highest amongst traumatic amputees (24.6%) within a one-month prevalence period. The wide variation amongst incident and prevalence estimates of PLP, PLS, and telescoping requires health professionals to carefully consider the most relevant rate for each patient. Study heterogeneity, variations in population type (e.g., amputation characteristics), and prevalence/incidence measures likely influence the large variability, preventing reliable estimates. For contemporary and representative incidence and prevalence estimates, rigorous prospective studies collecting data at established time-points post-amputation are required. Without standardised assessment guidelines post-amputation, it will remain difficult to provide individually discrete estimates and understand the evolution, incidence, and prevalence of PLS, PLP, and telescoping.

FEAR OF MOVEMENT IS ASSOCIATED WITH CORTICOMOTOR INHIBITION IN RESPONSE TO ACUTE EXPERIMENTAL MUSCLE PAIN

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Background and Aims

Acute musculoskeletal pain is associated with reductions in corticomotor output, known as 'corticomotor inhibition' that persists even after pain resolves. Factors that contribute to corticomotor inhibition following acute pain are largely unknown. This study aimed to establish whether psychological factors, including pain catastrophising, kinesiophobia, and implicit theories of pain, were associated with corticomotor inhibition following acute experimental muscle pain.

Methods

Forty-two healthy individuals completed three questionnaires: The Pain Catastrophising Scale, the Tampa Scale of Kinesiophobia, and the Implicit Theories of Pain Scale. Acute pain was then induced into the right extensor carpi radialis brevis (ECRB) muscle by injection of hypertonic saline. Corticomotor inhibition was assessed as a reduction in motor evoked potentials measured from the ECRB muscle in response to transcranial magnetic stimulation before, immediately after, and at 10, 20, and 30 minutes following pain resolution.

Results

Corticomotor inhibition was present at each time point relative to baseline. Individuals with higher kinesiophobia displayed less corticomotor inhibition than those with lower kinesiophobia. No relationship was observed with any other psychological variable.

Conclusions

These data provide new insight into the relationship between psychological factors and adaptation in corticomotor output following acute pain. The findings suggest that pain-related fear of movement/(re)injury is associated with corticomotor inhibition following acute pain. That sustained corticomotor inhibition may be implicated in the development of persistent pain suggests that understanding the implications of this relationship following a clinical episode of acute pain is warranted.

Not published data.

DIAGNOSTIC CODES FOR LOW BACK PAIN: NOMENCLATURE OR NOISE?

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Background

While current clinical practice guidelines endorse a very limited number of diagnostic categories for low back pain (LBP), electronic medical classification systems offer a plethora of possible diagnostic codes. What is striking is that the various systems do not seem to agree with each other or with current clinical practice guidelines. To date no study has systematically investigated the mismatch between electronic medical classification systems for LBP and diagnostic categories advocated by contemporary clinical practice guidelines.

Aim

To examine if diagnostic codes for LBP listed in electronic medical classification systems align with guideline-endorsed categories for LBP.

Methods/Study Design

We are conducting a descriptive study. We are examining six electronic medical classification systems: SNOMED Clinical Terms (CT)1, SNOMED CT-AU (Australian Version)2, International Classification of Diseases, 10th Revision (ICD-10)3, International Classification of Diseases, 10th Revision, Clinical Modification (ICD-10-CM)4 READ5-7 and The International Classification for Primary Care (ICPC)8. Two independent reviewers extract LBP diagnostic codes from each system and all four authors categorise the extracted codes under four guideline-endorsed categories for LBP: specific/serious spinal pathology, stenosis, sciatica, and non-specific LBP. We document redundancy (the presence of multiple codes to represent the same diagnosis) for each system. Where necessary, we consult with clinical experts to reach a consensus on the categorisation of codes.

Results

So far, we have categorised the codes for one system, SNOMED CT-AU. This system has 91 codes. We found redundancy in this system: multiple codes for each of the four categories endorsed in LBP guidelines. For example, 29 codes would fit under the category 'non-specific low back pain' and 18 would fit under the category 'sciatica'. Part of the redundancy is because some of the codes look like synonyms (e.g. low back strain, lower back injury, lumbar sprain) or presume a level of diagnostic specificity that is not currently possible (e.g. strain of back muscle vs strain of tendon of back). In contrast, there is only one code (arthritis of spine) to describe a number of recognised serious inflammatory conditions associated with LBP. Our preliminary results suggest that electronic medical classification systems are out of touch with guideline-endorsed categories in the field of LBP.

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MALES WITH UNILATERAL INSERTIONAL ACHILLES TENDINOPATHY EXHIBIT ALTERED MODULATION OF PAIN AND WIDESPREAD HYPERALGESIA: A CROSS-SECTIONAL STUDY

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Objective

The primary aim was to assess whether people with insertional Achilles tendinopathy (IAT) have altered endogenous modulation of painful stimuli, and the secondary aim was to investigate if there was widespread pressure hyperalgesia.

Methods

Using a cross-sectional design, we recruited men with unilateral IAT and asymptomatic men as controls matched for age, body mass index (BMI) and activity history (participation in running, lower limb loading sport or sedentary). We collected pressure pain threshold (PPT) at the asymptomatic side Achilles insertion for cases, and dominant side Achilles insertion for controls. We compared PPT between groups before and after inducing pain in the hand by immersing it in a custom cold-water apparatus.

Results

Twenty men with unilateral IAT (45.4 years [SD 10.02], BMI 29.09 [SD 4.61], 60% sedentary) and 34 men without symptoms (43.2 years [SD 8.78], BMI 27.59 [SD 3.18], 50% sedentary) participated. Change in PPT after cold water immersion was 1.20 (CI 0.25 to 2.15, p=0.014) Kg greater in the asymptomatic control group (1.44 Kg [SD 1.79]) than at the IAT group unaffected side (0.24 Kg [SD 1.47]). Before cold water immersion, PPT was 4.77 (CI 3.22 to 6.31, p←0.001) Kg greater in the control group (10.83 Kg [SD 2.90] compared to IAT unaffected side (6.06 Kg [SD 2.44].

Conclusion

This study provides evidence that men with IAT have altered endogenous modulation of painful stimulus and display widespread hyperalgesia to pressure compared to men without symptoms. These findings may indicate alterations in central nervous system processing of nociceptive stimuli.

PAIN-ON-CHIP: TOWARDS A CELL-BASED MICROFLUIDIC SENSOR FOR PAIN MODULATION

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Introduction

Chronic and persistent pain represents a common but imperceptible health problem worldwide. Although decades of research have provided significant insights into molecular mechanisms involved in the development of chronic and neuropathic pain, no quantitative measures of sensory modalities have been implemented in the diagnosis and treatment of these conditions. To develop a prototype microfluidic device, we wanted to test whether pain sera collected from chronic pain animal models can functionally activate nociceptive responses in artificial peripheral sensory neurons. We have developed protocols that directly differentiate an immortalised DRG cell line 50B11 into nerve growth factor (NGF)-dependent "peptidergic-like" and glial derived growth factor "non-peptidergic-like" neuronal properties within a microfluidic platform. In this study, we tested whether these cells have the ability to generate physiological responses that are capable of discriminating between serum samples collected from different rat chronic pain models.

Methods

The microfluidic chip is fabricated using the photolithography method where Polydimethylsiloxane (PDMS) is poured on to a silicon mould to form PDMS microchannel chips. Immortalised 50B11 DRG cells were directly differentiated within the microfluidic channels using either NGF or GDNF to form peptidergic and non-peptidergic sensory neurons subtypes respectively [2]. Functional neuronal response towards commonly used nociceptive stimulants (ATP and capsaicin for mechanical and heat pain, respectively) and ex vivo rat pain serum (partial sciatic nerve ligation model) were measured using intracellular calcium flux.

Results

Immortalised 50B11 DRG cells were able to differentiate within the microfluidic chip into two distinctive sensory neuron subtypes (peptidergic and non-peptidergic) responsible for heat and mechanical pain detection, with a 84% differentiation rate. The expression of TRPV1 and P2X3 receptors (sensitivity to thermal and mechanical stimuli, respectively) were confirmed by immunostaining. The functionality of the neuronal response was validated via capsaicin and ATP calcium assays. We show that NGF differentiated 50B11 cells expressing TRPV1 were responsive to capsaicin while GDNF differentiated cells were responsive to ATP. Furthermore, ex vivo rat plasma serum derived from a neuropathic pain model or control animals were tested by perfusion into the 50B11-on-chip system and revealed differences in calcium responses.

PAIN-ON-CHIP: TOWARDS A CELL-BASED MICROFLUIDIC SENSOR FOR PAIN MODULATION

CONTINUED

Discussion & Conclusions

Our data provide proof-of concept for the development of a 50B11-pain-on-chip system that uses versatile, artificial nociceptors with potential to discriminate between different chronic pain conditions. While this system requires further development, it is a first step towards a semi-quantitative, objective estimation of chronic pain conditions.

Acknowledgements

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RED FLAGS FOR MALIGNANCY IN LOW BACK PAIN GUIDELINES LACK EMPIRICAL SUPPORT

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Objective
To identify the red flags endorsed in guidelines for the detection of malignancy in patients with low back pain in primary care and to evaluate its origin and diagnostic accuracy.

Method
We performed 2 systematic reviews, one evaluating red flags endorsed in multidisciplinary clinical guidelines in low back pain in primary care, and one evaluating the origin and diagnostic accuracy of these red flags.

Results
We found 21 discrete guidelines in which 46 discrete red flags related were endorsed to the four main categories of serious pathology: malignancy, fracture, cauda equina syndrome and infection. We identified 13 red flags for malignancy endorsed in a total of 16 guidelines and 2 extra red flags not endorsed in any guideline. The origin of many red flags was unclear. The incidence of malignancy in patients presenting with LBP in primary care varied between 0% and 0.7%. We found 5 red flags with accuracy data from 2 or more studies, with 2 ("history of malignancy" and "strong clinical suspicion") considered informative.

Conclusion
A wide variety of red flags was presented in guidelines for low back pain, with a lack of consensus between guidelines. The origin and diagnostic accuracy of many red flags endorsed in guidelines are unclear. A "history of malignancy" and "strong clinical suspicion" are the only red flags for malignancy with empirical evidence of acceptably high diagnostic accuracy.

Take home message
red flags for malignancy lack empirical support to be used in clinical practice.

TRAINING PRIMARY CARE PROVIDERS IN OPIOID DEPRESCRIBING AND CHRONIC PAIN MANAGEMENT BASED ON LOCAL GUIDANCE: A PRE–POST STUDY OF ATTITUDE CHANGE

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Background

Local chronic non-cancer pain guidance recommends that general practitioners should consider opioid deprescribing and referral to multidisciplinary healthcare providers for behaviourally based treatments. We designed a training package called AIMM (Assess, Inform, Manage and Monitor) to reinforce this stewardship.

Aim

To identify whether participation in AIMM training effectively aligned clinicians' attitudes with local guidance for treating chronic non-cancer pain.

Design and setting

In 2014–15, the AIMM training was tested using a pre–post-test non-randomised design at two sites in NSW, Australia. The primary outcome measure was an 11-item, study-specific, pain attitude questionnaire (PAQ).

Method

Step one of AIMM training involved online completion of the PAQ and review of a specialist pain website. Step two involved attendance at two face-to-face, two-hour interactive workshops led by pain experts who addressed opioid deprescribing and switching to broader care. A repeat PAQ survey was completed at the conclusion of the second workshop.

Results

Nineteen participants attended the workshops, including general practitioners (n = 7), nurses (n = 5), exercise physiologists (n = 2), a dietitian (n = 1), community pharmacists (n = 2) and psychologists (n = 2). Significant shifts in six attitudes occurred, including prescribing less pain medication, greater emphasis on social reconnection, increasing planned activity and adopting anti-inflammatory nutrition ($p \leftarrow .05$). Responses to the item regarding expectations of a positive recovery was not aligned with local guidance and no significant attitudinal change was found. Four other attitudes were aligned with local guidance at baseline and did not change during the study.

Conclusions

Online information and face-to-face training can achieve a change in healthcare provider attitudes towards non-pharmacological treatment of chronic non-cancer pain. Further work is needed to assess whether attitudinal changes are maintained and translate into behavioural change.

THERAPEUTIC ALTERNATIVES FOR SUPPORTING GPS TO DEPRESCRIBE OPIOIDS: A CROSSSECTIONAL SURVEY

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Background
GPs are central to opioid strategy in chronic non-cancer pain (CNCP). Lack of treatment alternatives and providers are common reasons cited for not deprescribing opioids. There are limited data about availability of multidisciplinary healthcare providers (MHCPs), such as psychologists, physiotherapists, or dietitians, who can provide broader treatments.

Aim
To explore availability of MHCPs, and the association with GP opioid deprescribing and transition to therapeutic alternatives for CNCP.

Design & setting
Cross-sectional survey of all practising GPs (N = 1480) in one mixed urban and regional Australian primary health network.

Method
A self-report mailed questionnaire assessed the availability of MHCPs and management of their most recent patient on long-term opioids for CNCP.

Results
Six hundred and eighty-one (46%) valid responses were received. Most GPs (71%) had access to a pain specialist and MHCPs within 50 km. GPs' previous referral for specialist support was significantly associated with access to a greater number of MHCPs (P = 0.001). Employment of a nurse increased the rate ratio of available MHCPs by 12.5% (incidence rate ratio [IRR] 1.125, 95% confidence interval [CI] = 1.001 to 1.264). Only one-third (32%) of GPs reported willingness to deprescribe and shift to broader CNCP treatments. Availability of MHCPs was not significantly associated with deprescribing decisions.

Conclusion
Lack of geographical access to known MHCPs does not appear to be a major barrier to opioid deprescribing and shifting toward non-pharmacological treatments for CNCP. Considerable opportunity remains to encourage GPs' decision to deprescribe, with employment of a practice nurse appearing to play a role.

VISUO-PROPRIOCEPTIVE INCONGRUENCE AND SELF-LOCALISATION IN COMPLEX REGIONAL PAIN SYNDROME

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Background and Aims

Understanding the 'complex' nature of Complex Regional Pain Syndrome (CRPS) remains challenging. CRPS patients typically have disrupted representations of their affected limb and specific impairment in self-localisation (i.e. ability to locate their affected limb in space; Brun et al., 2019a; Brun et al., 2019b; Reid et al., 2017), indicating an impaired representation of the limb. However, recent evidence of preserved spatial mapping of fingers in the primary somatosensory (s1) cortex (Mancini et al., 2019) and an enlarged s1 representation of the healthy hand in CRPS patients (Di Pietro et al., 2015) contest these long held beliefs. Accordingly, this study aimed to test the self-localisation of the affected upper limb in CRPS using a novel method in which a mismatch between the visually and proprioceptively encoded position of the limb is induced. It was predicted that the CRPS group would be less accurate in localising their limb than a non-CRPS hand pain group; and in turn, the non-CRPS hand pain group would be less accurate than pain-free controls. Both pain groups were predicted to be less accurate at localising their affected limb than unaffected.

Methods

Sixteen participants with upper limb CRPS [13 females; mean = 39±12 years], 16 participants with non-CRPS persistent hand pain [14 females; mean age = 60±14 years], and 23 pain-free controls [14 females, mean age = 29±12 years] were included in the sample. Participants completed a self-localisation task using MIRAGE (Newport et al., 2010) during three conditions (seven localisations, repeated twice for each hand): an incongruent condition (IC) involving a visuo-proprioceptive mismatch of the hands and two control conditions involving no mismatch. Following each condition, participants localised their hand. A linear mixed model was conducted with localisation error as the dependent variable and fixed effects of condition, group, and time as well as their interactions between each factor. Participant ID was a random effect.

Results

In the IC, the CRPS group were the least accurate ($p \leftarrow .001$), followed by the pain-free controls and the non-CRPS pain group were the most accurate ($p \leftarrow .001$). Both hand pain groups were more accurate in locating their affected than their unaffected hand ($p \leftarrow .001$).

Conclusions

That accuracy was poor for the affected hand of the CRPS group, seems to support the findings of Di Pietro et al. (2015). That those with non-CRPS hand pain were better than controls and the CRPS group aligns with some previous data suggesting CRPS participants more closely resemble healthy controls than they resemble people with non-CRPS pain (Mancini et al., 2019). These results advocate for a review of the mechanisms underpinning the maladaptive neuroplasticity of CRPS.

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BARRIERS TO PAIN CLINIC APPOINTMENT ATTENDANCE

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Background

At Hunter Integrated Pain Service (HIPS), 2018 ePPOC (Electronic Persistent Pain Outcome Collaboration) annual report showed an 86% reduction in patient outcome numbers between initial intake and treatment end. Similar reduction in patient outcome numbers were also noted for All Services (1). Reasons for this are unclear. At HIPS the most notable attrition occurs following the initial patient education group (Understanding Pain). There is a subgroup of patients who request to progress to assessment and subsequently fail to attend. Little is known about this subgroup.

Aim

To explore patient expectations and barriers related to pain clinic attendance.

Methods

60 patients attending 'Understanding Pain' will be recruited and complete a short survey exploring expectations and barriers to attending the pain service and will be invited to consent to a potential phone interview. Demographic information will be collected from their ePPOC questionnaires. Following Understanding Pain, attendance will be monitored. Those who request an assessment and subsequently do not attend will be eligible for a short semi-structured phone interview exploring issues around their non-attendance. We anticipate conducting approximately 30 interviews. Interview and survey results will be analysed to identify salient themes regarding participant expectations, key influencers on their decision to request more appointments at the service and possible reasons for subsequent decision not to attend. Questionnaires will be analysed to identify demographic features associated with attending and not attending assessment appointments.

Preliminary results

To date, n= 48 participants have consented to the study and n=29 ePPOC questionnaires have been analyzed. (A further n=12 to be recruited in November 2019). Of the n=48: 81% attended the pain service 'to get help to have a life with pain' while 56% came to 'be told how to get rid of pain' and 52% to 'get help with more or better medications'. 25% reported no barriers to attending appointments. 25% identified the barrier of 'being unsure how it could help', and 21% identified having a 'long way to travel' as a barrier. Of the n=29: 34% are male, with a mean age of 55 (range=27-76). They live an average of 33km away from HIPS (range from 0-126km). A mean of 3 pain related medications groups are used with a mean oMEDD of 56mg. Participants have a median pain severity of moderate with 7.12/10 interference (BPI). Median psychometric scores show severe depression, anxiety, stress, pain catastrophizing and pain self-efficacy (DASS21, PCS and PSEQ, respectively).

To date. 14 participants have been invited to assessment appointments at the time of submission which are scheduled for after the submission date. Therefore, non-attendance rates are currently unknown, and no interviews have been conducted.

Conclusion

Results of this project may be useful for guiding service provision improvements. Potentially, implementing strategies to align clinician and patient expectations and minimising modifiable barriers to attendance may minimise attrition rates.

References

1. ePPOC Annual Report 2018.

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1. *Joondalup Health Campus*

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MULTIDIMENSIONAL SELF-REPORT ASSESSMENT OF PAEDIATRIC ACUTE PAIN

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Background and Aims

Despite widespread acceptance of the multidimensional nature of pain, unidimensional assessments prevail in the paediatric acute pain context. This study examined the feasibility of administering a multidimensional, self-report assessment protocol in the paediatric acute pain context. The study aimed to investigate the relationships between self-reported sensory, affective and cognitive-evaluative constructs, and to consider how the various dimensions of pain relate to meaningful clinical outcomes, such as an individual's belief about whether they can cope with the pain, and the clinician's analgesic prescribing behaviour.

Methods

A total of 182 children, aged 4-18 years old (M = 10.7; SD = 3.5), were recruited from the acute pain round or short-stay surgical unit at the Sydney Children's Hospital, Randwick, including 132 children who experienced current pain. Self-report measures of pain intensity, affect, bother, perceived coping, perceived unfairness and pain expectations were administered. Duration and ease of assessment was recorded.

Results

On average the multidimensional self-report assessment took about 2.5 minutes to complete, and a minute longer (on average) for the 4-7 year olds. Even young children demonstrated an ability to discriminate between pain intensity and affect. Children who perceived they couldn't cope with the pain were significantly younger (M=8.71; SD=3.79; U=1244; p←.05), reported more intense pain (M=5.23; SD=1.74; U=391; p←.01), and reported greater perceived unfairness (M=4.19; SD=2.98; U=477; p←.05) than children who believed they could cope with the pain. When considering the ability of self-report responses to predict pain-related bother, it was found that self-reported pain intensity (Đ=.547, p←.05) and perceived unfairness (Đ=.201, p←.05) were both significant, unique predictors. None of the self-report pain responses were significant predictors of clinician analgesia prescribing behaviour, which was only predicted by duration of pain (Đ=.-.32, p←.05).

Discussion

The current study provided evidence to support the distinct nature of the sensory, affective and evaluative dimensions of pain, and the ability of children to discriminate between them. Self-report measures assessing affective and cognitive-evaluative aspects of the acute pain experience provided important, unique information, in addition to pain intensity, and thus contribute to a more comprehensive assessment of a child's acute pain experience. It should be acknowledged that the sample included more participants with low-moderate levels of pain intensity, negative affect and bother, due to children (especially young children) with high pain intensity, negative affect, or bother more likely to decline to participate. Further validation research is warranted into the brief measure of perceived unfairness used in the current study. Moreover, further research is needed to investigate whether some dimensions of the acute pain experience, as assessed by self-report, are predictors of pain chronicity and whether they can help guide acute clinical response.

DOES MODE OF DELIVERY OF CHRONIC PAIN EDUCATION INFLUENCE PATIENT ENGAGEMENT WITH PAIN SERVICE IN REGIONAL NSW

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Background and Aims

The burden of chronic pain in Australia is steadily increasing. More than 3.24 million Australians are affected by chronic pain with an estimated increase to 5.23 million by 2050 (1). Pre-assessment group education sessions are now commonplace in most pain services around Australia. Tamworth Integrated Pain Service (TIPS) runs regular pain education group seminars, 'Understanding Pain' to expose patients to current pain neuroscience and transition from passively received treatments to active self-management. This is the first step towards engaging with the service. The content of this group is made available in a digital version: a DVD or an online link, for those who are unable to attend this education session in person (2). This research compared patient take-up of further services at TIPS based on whether the seminar was attended in person or accessed digitally.

Methods

Data was obtained from a feedback form provided to both in-person seminar attendees and those who accessed the digital version. Patients were requested to indicate whether they would like a further appointment at TIPS or discharge from TIPS by ticking a box on the form. In total, 7 Understanding Pain seminars were presented from January 2019 to date, with total number of in-person attendees in this period being 47. Ten patients were provided with DVD and online link to access the seminar during the same period. This collection and analysis is currently ongoing.

Results

Preliminary results indicate an overall high election rate (77%) to continue with TIPS, with 85% of in-person seminar attendees choosing to continue engagement with TIPS. Of the 10 patients who were provided with the digital version, 4 elected to continue with the service, 1 elected discharge and responses from the remaining 5 patients is awaited.

Conclusions

The study suggests that digital format of providing pain education seminars does not limit take-up rates for engaging with pain management clinics. This has significant implications for improving access to evidence-based pain management education to patients living in rural and remote areas of Australia. Further research is being undertaken to look at other variables influencing patient engagement.

Reference

1. National Strategy Action Plan for Pain Management 2019
2. http://www.hnehealth.nsw.gov.au/Pain/Pages/Understanding -Pain.aspx

ELECTRONIC PATIENT SATISFACTION SURVEY

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Background and Context

Patient satisfaction has become a quality indicator in patient centred healthcare systems. In some systems it has become mandatory and linked to renumeration. Patient experience surveys are recognised by FPMANZCA as Patient Evaluation CPD. Improving patient satisfaction can lead to improved outcomes such as continuity of care and compliance to treatment. Paper surveys can be cumbersome to return and to collate. Electronic Surveys may improve return.

Process

In this pilot study, the Practice Experience Survey for Pain Medicine from ANZCA was modified to use on the HosPortal Connect patient survey platform. Over a 4-month period March to June, 2019, consecutive patients attending a medical consultation at the Royal Prince Alfred Pain Management Centre were contacted by SMS and invited to complete a linked patient satisfaction survey on their smart phones. Patients could open and complete the surveys at their convenience. One automated reminder was sent at 24 hours.

Analysis

Data was de-identified and collated on the HosPortal System in compliance with Australian Privacy Principles. The pain specialist's data was reported to them individually together with the department summary for comparison by monthly reports.

Outcomes

Over the 4month period 649 patients were sent SMS messages, 316 were opened, 267 surveys were started, and 231 surveys were completed giving a completion rate of 36%. The average time taken was 2 minutes 14 seconds.

Quantitative data:
The average score for the department on a 1 (poor) to 5 (excellent) Likert scale is given:
Introducing themselves to you 4.6, being polite 4.7, making you feel at ease 4.6, assessing your pain 4.3, explaining the treatment to you 4.4, involving you in decisions about your treatment 4.4, answering all your questions 4.5, the pain medicine specialist was approachable 4.6, I had confidence in the pain medicine specialist 4.4, I would be happy to see the pain medicine specialist again 4.5.

Qualitative data: Respondents were able to make free script comments in relation to the pain medicine specialist. Making you feel at ease: None 133, positive comment 100, negative comment 17. Assessing your pain: None 162, positive 57, negative 27. Explaining the treatment: None 189, positive 46, negative 22. Involving you in decisions: None 180, positive 50, negative 18. Answering your questions: None 190, positive 45, negative 16. Confidence in the pain medicine specialist: None 191, positive 45, negative 13. Common positive and negative themes were collated.

Respondents were invited to comment if they had a positive or a negative experience, to please tell us about it. Respondents were invited for suggestions about how we could improve our service. Responses included: reduce waiting time, provide appointments outside working hours, provide written material, improve the comfort of waiting chairs. Pain Specialists were interviewed about their experience with the survey. They agreed to repeat the survey annually. Further surveys will assess allied health and administration.

http://www.anzca.edu.au/documents/appendix_1pm_patient_experience_survey.pdf

THE RISING TIDE OF OBESITY IN CHRONIC PAIN SETTINGS

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This project was funded by the Australian and New Zealand College of Anaesthetists

Background and Aims

The rapid and dramatic rise in obesity in Australia over the last 40 years is alarming, with 27% of adolescents between the ages of 12-17 now identified as being overweight or obese1. Rates of obesity are expected to increase with health costs running into the tens of billions2. These disturbing trends have significant implications for the already 'difficult to treat' chronic pain patient cohort. Particularly those treated in public health settings governed by outcome-based funding frameworks. A large-scale study in the United States demonstrated that chronic pain incidence increases incrementally as Body Mass Index (BMI) increases3. Obese patients have been shown to have poorer treatment response, higher health care use, and up to 82% treatment drop-out rate compared to their non-obese counterparts4,5. This pilot study sought to determine the prevalence of obesity among new patients referred to the Pain Medicine Centre at Royal Perth Hospital, and also identify whether obese patients differed from non-obese patients on potentially modifiable factors.

Methods

Over a six-month period, 75 (51% Female, M Age = 59 years) newly referred patients provided informed consent and completed weight (BMI, waist-hip ratio, physical activity), pain (symptom and treatment history, pain catastrophizing, pain self-efficacy, pain-related disability), and psychosocial (depression, anxiety, and trauma symptoms, quality of life) assessments during clinical interviews and via standardized self-report measures.

Results

A striking 81% of newly referred patients were found to be overweight or obese. Preliminary findings suggest that obese chronic pain patients reported significantly lower levels of pain-related self-efficacy ($p \leftarrow .05$), significantly lower perceived physical and psychological quality of life ($p \leftarrow .05$), and significantly higher levels of pain catastrophizing ($p \leftarrow .05$), compared with non-obese chronic pain patients.

Conclusions

These findings are the impetus to establish an intervention trial targeting obesity specifically as part of the multidisciplinary approach to chronic pain management.

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SLEEP WELL, LIVE WELL: A COGNITIVE BEHAVIOURAL THERAPY (CBT) FOR INSOMNIA GROUP CO-DEVELOPED BY CONSUMERS WITH CHRONIC PAIN

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Background and Context

Cognitive Behavioural Therapy for Insomnia (CBT-I) is an evidence based psychological treatment that changes thoughts and habits to improve sleep. The Pain Management Unit conducted this 6-week pilot group because of innovative research demonstrating that CBT-I not only improves sleep and quality of life but also improves ability to manage pain in the long term. Research indicates psychological treatments that don't utilise consumer feedback experience 20% early dropout rates and up to 40% non-improvement rates. Using consumer feedback to refine treatment has been shown to keep clients in treatment longer and improve outcomes.

Process

The pilot group used benchmarks of trying to achieve 1) ←20% drop out rate, and 2) ←40% non-improvement rates in insomnia severity. Across the 6-week course of treatment feedback was sought from consumers on how to improve the group, using the following strategies: Verbal feedback about problems, consumer-led solution-development, anonymous written feedback forms, evaluation of group facilitator performance every session and a 45 minute focus group in the last session. This information was used to co-develop all subsequent CBT-I groups. Primary outcomes (sleep quality and insomnia severity) was assessed via daily sleep diaries and the Insomnia Severity Index (ISI). Secondary outcomes (wellbeing, pain intensity, pain interference, distress, self-efficacy, and catastrophising) were measured via the Group Session Rating Scale (GSRS), the Outcome Rating Scale (ORS) and the Electronic Persistent Pain Outcomes Collaboration (EPPOC) measures.

Analysis

The pilot commenced with a sample of sixteen clients. Client demographics included 82% females/18% males, mean age = 61.8 years with comorbidities including Post-Traumatic Stress Disorder, Major Depressive Disorder, Attention Deficit Disorder and Generalised Anxiety Disorder. Five clients dropped out during the course of the treatment (Retention = 68.7%) citing external family stressors or acute medical events. Average group sleep efficiency improved by 23% (Pre-mean = 53%, Post-mean = 76%). Average group insomnia severity decreased from the Clinical Range with Moderate severity to the Subthreshold Insomnia Range (Pre-mean = 20.3, Post-mean = 11.9). A small effect was seen for self-efficacy (PSEQ d = 0.36), catastrophizing (PCS d = 0.47) and pain interference (BPI d = 0.33). A moderate effect was seen for pain intensity (BPI d = 0.55). A large effect was seen for reduction in distress (DASS-21 d = 0.94) and increase in wellbeing (ORS d = 1.25). Accounting for ceiling effects, 100% of clients reported an improvement in the experience of CBT-I sessions over time.

Outcomes

Results indicate a significant clinical effect of CBT-I on sleep quality, insomnia severity, distress and wellbeing. The co-development model did not meet the benchmark of getting under 20% drop out rate but did demonstrate improvement of sleep quality in 93% clients which exceeds the benchmark of under 40% of non-improvement. This pilot provides an innovative model for consumer co-development which shows promising outcomes, albeit with a small sample size.

AN AUDIT IN DURATION AND QUANTITY OF OPIATES ON DISCHARGE FROM AN EMERGENCY DEPARTMENT

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Background and Aims

Opiates are a widely prescribed, and frequently abused, medication for patients suffering from moderate to severe pain. Over-prescription of opiates on discharge can lead to dependency, toxicity, and diversion (opiates transferred to someone other than the initial prescription holder). Recent studies have shown that 71% of opiate abusers receive their opiates through legitimate prescriptions intended for someone else, 51% of the time they use a prescription obtained from a family member or friend1. As doctors, we have a responsibility in attempting to limit and reverse this worrying trend. In response to this, several American centres have produced guidelines for discharging patients on opiate analgesia2. These guidelines can be summarised by the following three points, prescribing opiates for no longer than 3 days, prescribing no more than 30 opiate tablets, and only prescribing opiates of short acting duration. This audit aimed to examine adherence to such guidelines.

Process

Data was systematically sampled through the hospital's patient administration system i.Patient Manager. I reviewed the presenting complaint of every patient who presented to the Emergency Department within a 72-hour period between the 27th and 29th of January 2020. Inclusion criteria consisted of having 'pain' in their presenting complaint at triage, age →18 years and was discharged from the Emergency Department by an emergency physician. Exclusion criteria consisted of chronic pain (→2 weeks in duration), cancer patients, patients who had sustained an injury, and pregnancy. Data was entered into a Microsoft Excel sheet and anonymised. The discharge summary on the hospital's clinical record system of any patient who fulfilled the inclusion and exclusion criteria was analysed to assess if opiate medication was prescribed on discharge.

Analysis

Results showed a total of 867 patients presented to ED within the 72 hours. Of these, 35 patients fulfilled the inclusion and exclusion criteria. Of these 35 patients, 13(37%) were given prescriptions of opiates on discharge. The average duration of the prescription was 7.8days [mode=5, median=5, range of 5 to 14 days]. The average amount of opiate tablets prescribed on discharge was 59.3[mode=40, median=40, range of 20 to 112 tablets]. All 13 of the prescriptions were for short acting opiates. One prescription did not show a clear duration or amount of opiates prescribed on the discharge summary.

Outcomes

In this Emergency Department, opiates were prescribed on discharge for a longer duration, and with more tablets dispensed, than recommended by American guidelines. Studies suggest that much of our prescribed medication may lead to patient dependency, toxicity, with unused tablets being diverted. We should consider prescribing shorter duration, with fewer tablets of opiates in the future

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A TELEMENTORING PARTNERSHIP IN WESTERN VICTORIA USING THE PROJECT ECHO MODEL: DEVELOPMENT AND IMPLEMENTATION

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The aims of this project are:

1. To reduce healthcare disparities in the provision of pain care services between primary and tertiary health care and between metropolitan, rural and regional locations in Western Victoria.
2. To create a 'virtual community of practice' amongst primary care clinicians from different disciplines to facilitate the provision of co-ordinated, but geographically separated, multidisciplinary or interdisciplinary services.
3. To test the Project ECHO model in the Australian adult persistent pain context to determine whether the model could be expanded to other regions and other health conditions.

Key personnel from the WVPHN attended mandatory training in Brisbane in September 2019. Anne Daly attended the mandatory training at the University of New Mexico, Albuquerque. Once this training was completed, partnership documents were signed with Project ECHO and access was granted free of charge to the ZOOM video conferencing platform and to the Project ECHO Resource Library (PERL) which contains hundreds of documents and publications related to setting up, financing and running ECHO sessions. The partners then set about planning for the persistent pain ECHO.

Key components of planning included:

- The development of an evaluation framework
- Design of a curriculum
- Conducting a clinician Learning Needs Assessment within the WVPHN,
- Development of partnership agreements, terms of reference etc
- Selection of the multidisciplinary panel

The first ECHO session of the current series occurred on February 4, 2020. The first series, the planning processes and the broader ECHO approach will be expanded on in the presentation.

COMPENSABLE CLIENTS AND PAIN MANAGEMENT PROGRAMS: EXPLORING THE EPPOC DATA IN THE VICTORIAN WORKSAFE AND TRANSPORT ACCIDENT COMMISSION SCHEMES

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Since 2015, the Transport Accident Commission (TAC) and WorkSafe Victoria (WSV) have funded six pain management services to participate in the electronic Persistent Pain Outcomes Collaboration (ePPOC). ePPOC provides standard biannual reports to each of the pain services and to the TAC and WSV. A partnership between the TAC, WSV and ePPOC is now in place over a period of three years with the goal of further interrogating the ePPOC data collection to provide information beyond that reported in these standard reports. Questions are asked of the data and reported on in 6 monthly intervals, meaning that there will be 6 sets of questions and reports delivered during the partnership period.

The aims of this partnership are:

1. To gain a deeper understanding of TAC and WSV clients who are referred for multidisciplinary pain management program; who have good outcomes following a PMP; and who maintain or improve further following completion.

1. To identify barriers to achieving and maintaining a good outcome following a PMP:

2. To understand how Victorian compensated clients are similar and different to other compensated clients from Australia and New Zealand and the Australasian average.

3. To inform how WorkSafe and the TAC triage clients, develop customised service options to enhance client outcomes, and engage with pain services into the future.

This presentation will highlight the findings from the first 3 of 6 reports and include data submitted since July 2015. The information will include a comparison of Victorian compensated clients with others with respect to their demographics, severity at referral and their outcomes following a PMP. Consideration will be given to the impact of jurisdictional factors on client outcomes. Specific client characteristics of interest to WorkSafe and the TAC will be explored and finally the first steps in the development of a predictive model will be discussed. Throughout the presentation, the challenges of interpreting the data will be acknowledged, particularly the determination of how a 'good outcome' was defined. The findings to date and how these will influence the direction of the remainder of the research project will also be considered.

EDUCATING UNDERGRADUATES ABOUT THE CHALLENGES OF CHRONIC PAIN FOR SOCIETY

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Background and Context

It is widely acknowledged that pain education for health professionals is critical, particularly given the widespread prevalence of chronic pain in the community. Not surprisingly, a number of targeted educational strategies have been instigated to address this need. Much less work has been done, however, in terms of educating the community more broadly about chronic pain.

In 2017, an opportunity arose to develop a two credit point unit of study – Health Challenges: Pain and Society. This unit, which is the equivalent of 40 hours of study, aims to teach undergraduate students about the issue of chronic pain from a societal perspective. It forms part of the Open Learning Environment (OLE) initiative at the University of Sydney: a collection of units for students to build novel skills and knowledge in different fields of study. Currently, most undergraduate degrees require that students undertake the equivalent of twelve (12) credit points of OLEs. This poster reports on the design and implementation of the unit.

Process

The development of this unit was collaborative and iterative. A draft outline was proposed that initially drew upon the pain competencies endorsed by the International Association for the Study of Pain (IASP). Then, an advisory committee was established, comprised of discipline areas and a consumer representative, to provide input into the draft outline and proposed delivery of the unit. Ultimately, the unit comprised three modules, each one with an introductory video, 2 interactive workbooks, selected readings, and assessable tasks.

Analysis

The research framework for investigating the effectiveness of this unit is design-based research. The analysis of the quantitative and qualitative data collected from the first cohort is underway and will be reported in the poster presentation. Initial teacher observations and student feedback suggest good student engagement and achievement of learning outcomes. A number of modifications to the learning design are also being considered for 2020.

Outcomes

This development of this unit has provided the opportunity to develop understanding about chronic pain in a new target audience that traditionally would not have been exposed to this content area. A total of 83 students, from 22 different undergraduate degree programs, enrolled in the unit in 2019. Of this cohort, seventy-four students (89%) were enrolled in non-health related degrees and nine students (11%) were undertaking a health focused degree.

MEDICATION-RELATED BURDEN IN A PERSISTENT PAIN POPULATION

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Medication Burden can be defined in a different ways: the number of medicines being taken by a patient may also be compared the number of individual doses being taken. It may also relate to the financial burden being experienced by these individuals. First described in 2007(1); the number of medications correlates with increased risk of adverse outcomes.

Clinical notes of a cohort of 104 adult patients of all ages attending a Persistent Pain Clinic for new and review appointments from October 2017-June 2018 were evaluated. A 'Best Possible Medication History' was collected by the Clinical Pharmacist. Age at presentation to the clinic appointment was recorded including the number of medications being taken. Medications were grouped by: indication, analgesic type, calculated Oral Morphine Equivalent Daily Dose (OMEDD), CAMs and OTC medications, and medications taken for co-morbid conditions.

We were unable to categorize medication use for appropriateness or evaluate the effects of pharmaceutical review on reducing medication burden.

Data was assessed by age and by age groupings to reflect the expected increase in comorbidity with increasing age and the use of opioid analgesics in younger age groups.

Polypharmacy (more than 5 medicines) was noted in 38% and Hyperpolypharmacy(2,3,4) (more than 10 medicines) was noted in 39%. There was a trend to increasing number of medicines with increasing age. Half of all medicines being taken were for comorbid conditions; 13% for mental health issues, 37% for analgesia (10% for IR opioid, 8% for CR opioids, 6% for AED adjuvants, 3% for tricyclic antidepressants and 9% for paracetamol and NSAIDs). Analgesic medications accounted for 35% of all poly and hyper-polypharmacy.

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THE USE OF VIRTUAL PATIENTS FOR NURSING PAIN EDUCATION: A SCOPING REVIEW

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Background and Context

This poster presents the results of a scoping review that explored the types of artificial intelligence or virtual reality computer simulation education programs that have been used for the provision of pain care education for registered nurses in hospital settings and in undergraduate or postgraduate nursing programs. Globally, nurses make up the majority of the healthcare workforce and the provision of relevant and quality pain education for registered nurses and nursing students being becoming increasingly challenging. Recent research identified that pain education across all health professions (1), inclusive of nursing curriculum is a neglected area (2) and that there is a wide program variation and design in current nursing pain resources (3).

Process

This scoping review identified published and unpublished literature within the field of nursing education, undertaken in undergraduate, postgraduate and hospital settings. The literature search was undertaken from March to October 2019. A search of peer reviewed literature used 8 databases. Unpublished literature was sourced through Google scholar, Trove and websites of selected organizations namely Australian Pain Society and the International Association for the Study of Pain. The initial search retrieved a total of 283 articles. Following duplicate removal and inclusion/exclusion criteria applied 47 articles underwent full screening.

Outcome

A total of 4 articles were included in the scoping review. Preliminary findings identified that there are limited high-fidelity artificial intelligence computer simulation education programs that have been used for the provision of pain care education for nurses. The research is limited to USA and Brazil, is located within hospital settings and focuses on acute pain and post-operative pain in adults. Of the included studies: one described the simulation program; two studies explored the effectives of the simulation on improving knowledge and management of pain and one described the use of a simulation program to demonstrate disparities in pain assessments.

Conclusion

The description of the simulation programs varied in each of the studies, with all including two or more patient scenarios. This is an exciting and newly merging area of research within this field. This scoping review identified the paucity of high-fidelity artificial intelligence computer simulation nursing education programs for pain and supports the future direction of pilot testing similar technology in Australian settings with a larger cohort of participants as a pre and post-test intervention.

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BRINGING PAIN EDUCATION TO THE FUTURE: WHAT IS THE EFFECT OF UPDATING A LOW INTENSITY PAIN MANAGEMENT PROGRAM ON PARTICIPANT ENGAGEMENT AND CLINICAL OUTCOMES?

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Background and Aim

The Pain Education Program (PEP) is a low intensity group pain management program that has been delivered at the Barbara Walker Centre for Pain Management since 2013. The program is eight hours total (two hours per week over four weeks) and provides participants with psycho-education relating to pain neurophysiology, activity pacing, stress management, exercise, goal setting and sleep hygiene. PEP has traditionally been delivered in a lecture style format, with an emphasis on information delivery via didactic teaching strategies. Annual ePPOC report data in recent years shows minimal clinically meaningful change following completion of PEP. As a result, we were interested in updating the program in an attempt to improve clinical outcomes and participant engagement.

Method

Our primary focus of the updated program was on the facilitation of health behaviour change and the implementation of practical, active pain management skills, as opposed to just information delivery. We attempted to achieve this by incorporating a variety of active learning strategies into the program, such as facilitated group discussion, individual and pair work, work sheets, use of multimedia and white-boarding. We also incorporated skills practice within each session (relaxation and stretches) so that participants had the opportunity to practice these in a supervised environment. A heavy emphasis was also placed on participants trying out a variety of active pain management skills between sessions.

Participant engagement was measured using 'did not attend' (DNA) rates and program completion rates - successful completion of program considered when 3 or more sessions have been attended. Clinical outcomes were measured using electronic Persistent Pain Outcomes Collaboration (ePPOC) data (pre and post program), with comparison of outcomes between the updated version of PEP (2019) and the previous version of PEP (2018).

Results

Nine programs were delivered in 2018. 68 participants started the program and 55 participants completed the program (80.88% completion rate). A total of 264 appointments were made, with 39 DNAs (14.77%). In comparison, 6 programs have been delivered to date in 2019. 47 participants started the program and 38 participants completed the program (80.85% completions rate). There were 192 total appointments booked, with 18 DNAs (9.38%). Paired samples t-tests were conducted to examine the changes in outcome measures from pre- to post-program for each year. No significant pre-post differences were found for the 2018 program sample. The 2019 program was associated with significantly greater self-efficacy post-program, $t(26) = -5.16$, $p \leftarrow .001$, and decreased catastrophizing post-program, however this difference did not reach significance at the Bonferroni-adjusted alpha level of .004, $t(24) = 2.68$, $p = .013$.

Conclusion and Future Directions

Updating a low intensity pain management program to facilitate active group participation and practical skills training has resulted in improved clinical outcomes, most notably improved pain self-efficacy and catastrophizing.

THE PRINCESS ALEXANDRA HOSPITAL ACUTE PAIN SERVICE AND PREADMISSION CLINIC EXPERIENCE

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Background

Pain management education by specialist acute pain (APS) nurses in the preoperative setting is vital to improving patient outcomes and encouraging a more positive attitude toward pain relief (Shug, Palmer, Scott, Halliwell & Trinca , 2015, p. 26) The objective of this study was to evaluate the effectiveness of APS nurses in the preadmission clinic (PAC) at the Princess Alexandra Hospital (PAH). The purpose was to discover if APS nurses conducting a thorough pain assessment and pain history, assessing neuropathic symptoms, measuring anxiety and catastrophising, calculating current oral daily Morphine equivalents (ODME) and building rapport with high risk patients in the acute PAC assisted with the prevention or transition to persistent pain.

Case presentation

This study was conducted at the Princess Alexandra Hospital (PAH), an 800-bed multidisciplinary tertiary centre located in Brisbane, Queensland. There are approximately 6423 patients seen in PAC each year. The study itself comprised of a prospective, cohort study in which patients were selected on a daily basis from a PAC list based on level of acuity and likelihood of engagement with APS during their hospital stay due to post-operative pain modality. These patients were then seen individually by an APS nurse. During clinic reviews patients were educated about various modalities likely to be used for them including being provided with education brochures created by the APS nurses. APS nurses then screened patients for neuropathic symptoms using S-LANNS and for catastrophising/ anxiety using Pain Catastrophising Scale (PCS) and ODME was calculated.

These patients were then followed up on the ward postoperatively and asked to fill out a simple questionnaire relating to their PAC visit, this data was then collated. Data was also collected relating to patients discharged from APS with slow release (SR) analgesia.

Conclusions

APS nurses in the PAC had a positive effect in terms patient satisfaction, setting realistic expectations and overall patient compliance with analgesia and complex pain management modalities. Our observation was that early intervention provided the basis of good long-term care, however also highlighted the need for better ongoing management post discharge.

Clinical impact

The results indicate that there is a need for better follow up post-acute hospitalisation perhaps with the formation of a sub-acute clinic/ follow up clinic to manage patients commenced on neuropathic agents and slow release analgesia in the acute setting. The aim would be to follow this patient cohort and provide the means for improved opioid stewardship and ongoing care.

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COMPARISON OF OPIOID TREATMENT PROGRAM OUTPATIENT REFERRALS AT CENTRE FOR ADDICTION MEDICINE WESTERN SYDNEY LOCAL HEALTH DISTRICT, PRIOR AND AFTER "UP-SCHEDULING CODEINE" POLICY, 20TH OCTOBER 2014- 20TH FEBRUARY 2019

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Introduction and Aims

After "codeine up-scheduling" policy implementation in 1st February 2018, codeine containing analgesics are only dispensed with prescription. (1-3)There has been a general conception that drug and alcohol services demand would be increased after implementation of this policy in Australia.(4)

As there has been no study done on Western Sydney Local Health District (WSLHD) Drug Health services demand after the policy implementation, we aimed to compare the sociodemographic, clinical indicators and the number of codeine dependent patients starting Opioid Treatment Program (OTP), prior and after policy implementation.

Design and Methods

This is a cross-sectional retrospective study. Codeine dependent patients who started OTP in outpatient services between 20th October 2014 and 20th February 2019 were included. The sociodemographic, clinical indicators and the number of patients starting OTP were compared. The data was analysed using descriptive statistics.

Results

The patients were mostly Australians (72%) with mean age of 37 years. Post policy implementation, all of the patients reported to primarily used codeine for pain, were started on buprenorphine-naloxone film and retained more on OTP (86% versus 53%). Interestingly, two years after policy announcement and implementation, the number of codeine dependent patients starting OTP reduced (85.5% versus 14.5%, p ←0.05).

Discussions and Conclusions

This study demonstrated a decrease in WSLHD Drug Health service demand post policy implementation. However, the patients suffering from the pain mostly retained on the program. This study addressed one of the outcome indicators for evaluation of the new policy at district level in Australia.

Disclosure of Interest Statement

No funding or pharmaceutical grants were received in the development of this study.

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INJURY PREVENTION AND INJURY MANAGEMENT IN THE WORKPLACE - THE FUTURE OF EVIDENCED BASED AND SOCIALLY CONSCIOUS INJURY PREVENTION AND MANAGEMENT

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Back and shoulder pain represent a significant burden for workers, employers and workplace insurers. Care delivered to workers who develop back or shoulder pain in their work context is often variable may lead to poor outcomes in terms of pain and suffering for workers, poor or delayed return to work outcomes, loss of productivity for employers and expensive claims for insurers. There is potential to intervene at the level of the workplace, insurer and treating clinician to improve outcomes for all stakeholders.

In a recent systematic review of the influence of social support and integration on return-to-work outcomes for people with work-related injuries, seven social facilitators in the RTW process were identified. Five facilitators were primarily workplace-based. These included contact and good communication, genuine care and concern, organisational trust, validation and belief in injury legitimacy, and relationships in the workplace (White et al 2019).

From the systematic review, important social facilitators to return to work were -supervisor communication; genuine concern from their co-workers and from supervisors; a culture of mutual trust in the work community including the sense that the injured worker was trusted and able to trust their supervisors. It was also critical that supervisors believed in the legitimacy of injured workers' claims. The existence of socially supportive relationships between the injured worker, their co-workers and employers was also considered a facilitator of return to work.

The service delivery aimed to identify best practice treatment with & without workplace/insurer support for back & shoulder pain in injured workers. Participants included 20 workers who had made a Workers Compensation claim for back or shoulder pain.

Baseline clinical and demographic details of workers were collected, and outcomes were determined by follow-up clinical status – pain, disability, work status, Quality of living (2 week, 4 week, 3 month), claim information: time and cost.

Results showed that workplaces must recognize the unique role that leaders and managers play in defining employees' work experience, and enable managers to design experiences consistent with core values; ensure the organization's actions are conveying the values intended and nurture an environment that reinforces mutually supportive co-worker relationships; help employees understand the deeper meaning of their work and how it contributes to the wider organizational purpose and goals; treat performance as a continuous conversation, fuelled by social recognition, feedback and growth opportunities; offer employees opportunities to participate in decision making and trust them with the autonomy they need to find the best paths to achieving success.

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WHAT PROPORTION OF PATIENTS WITH CHRONIC NONCANCER PAIN ARE PRESCRIBED AN OPIOID MEDICINE? SYSTEMATIC REVIEW AND META-ANALYSIS OF OBSERVATIONAL STUDIES

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6. *Warwick Clinical Trials Unit, University of Warwick; and University Hospitals of Coventry and Warwickshire, United Kingdom.*

Background and Context

Guidelines now discourage opioid analgesics for chronic non-cancer pain because the benefits frequently do not outweigh the harms. We aimed to determine the proportion of patients with chronic non-cancer pain who were prescribed an opioid, the types prescribed, and factors associated with prescribing.

Process

Database searches were conducted from inception to 29th October 2018 without language restrictions and citation tracking conducted. We included observational studies of adults with chronic non-cancer pain that were prescribed opioids for pain management. We included population-based studies (such as databases, including dispensing data), studies from clinical settings (i.e. primary, secondary or tertiary care settings). We excluded studies of self-report opioid use, and studies not considered to be a representative sample. Two review authors independently screened, extracted data and assessed risk of bias. Opioid prescribing was determined as the proportion of patients with chronic non-cancer pain that were prescribed opioids. Opioids were categorised as weak (e.g. codeine) or strong (e.g. oxycodone).

Analysis

Study quality was assessed using a risk of bias tool designed for observational studies measuring prevalence. Individual study results were pooled using a random-effects model. Meta-regression investigated study level factors associated with prescribing. The overall evidence quality was assessed using Grading of Recommendations Assessment, Development and Evaluation criteria.

Outcomes

Of the 42 studies (5,244,313 participants) identified, the majority (n = 28) were from the United States of America. Eleven studies were judged to have low risk of bias. The pooled estimate of the proportion of patients with chronic non-cancer pain prescribed opioids was 30.9% (95%CI 28.9% to 33.0%, 42 studies, moderate-quality evidence). Strong opioids were more frequently prescribed than weak opioids (18.4% (95%CI 16.0% to 21.0%, n = 15 studies, low-quality evidence), versus 8.5% (95%CI 7.2% to 9.9%, n = 15 studies, low-quality evidence)). Meta-regression determined opioid prescribing was associated with year of sampling (more prescribing in recent years) (P = 0.015), geographic region (P = 0.048; Asia prescribing less than North America, P = 0.006) and no disclosure of funding (P = 0.45) but not by setting (P = 0.972) or the duration of the sampling period (P = 0.091). In conclusion, opioid prescribing for patients with chronic non-cancer pain is common and has increased over time.

ASSESSING THE VIABILITY OF AN ONLINE QUESTIONNAIRE IN A PAIN SERVICE

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Background and Context

In the past financial year (2018-2019) HIPS distributed 669 13-page questionnaires to those attending the orientation group Understanding Pain (UP). Optimization of resources is possible through the distribution of an electronic questionnaire. The option for an on-line version is under-utilised.

Process

A questionnaire called 'Internet Access: Benefits and Limitations' was created to gauge participant's access to internet and devices and willingness to complete on-line forms.

At UP, the questionnaire was distributed to 47 participants. The intention is to further collect and collate data from future UP sessions.

Analysis

33 questionnaires on internet access were completed. 12% report not having internet access, 38% of people have access on their phone, 34% have access on a home computer, 14% of people have access on their tablet, 12% on a work computer and 2% used a gaming console for internet access.

Given the questionnaire can be difficult to access on a smaller device, examining whether those with internet on their phone also use a larger device such as an iPad or computer is imperative. 32% of those who used the internet on their phone had no other device to use in order to fill in an online questionnaire.

74% of participants have and use email. Of those, 79% check their emails regularly. This is a total of 21% that check their irregularly, resulting in a delay to respond to services.

55% of people would prefer a paper copy of the questionnaire citing lack of internet or device, easier/more convenient and ability to add extra information as reasons.

Conversely, 45% of people would prefer an on-line questionnaire citing saving resources, not losing a physical copy, and ease/convenience as reasons.

Outcomes:

A literature search on on-line versus paper questionnaires yielded limited data. One paper by Steffen et al. (2014) compared the report of tobacco use via paper-based or online questionnaire with face to face contact and found compliance and accuracy is equal between the two.

The majority of people opted for a paper copy of the questionnaire. A better question to have asked may have been "would you fill in an on-line version of the questionnaire if it was sent to you?" looking at possibility as opposed to preference.

The outcome of this questionnaire has wider implication than internet access and may also reflect on the use of websites and internet for patient education. Given the paucity of evidence and its impact on our services, designing a more rigorous questionnaire and adapting the questions to suit current findings would allow progression to publish results.

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OUCH: AN EVALUATION OF OPIOID USE IN CURRENT HOSPITALISED SURGICAL PATIENTS IN A REGIONAL HOSPITAL

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Background and Context

The rise in the use of prescription opioids is well described in Australia, with a five-fold increase in the past decade. The burgeoning problem is worse in regional NSW, which reports 40% higher rates of unintentional deaths. Literature has described an association between a "trigger" event in opiate naive patients, commonly surgery and the risk of developing long term, persistent opioid use.

Junior doctors are usually tasked with the responsibility of discharge prescriptions in public hospitals. However, information about opioids prescribed, much less a weaning plan are often not included in discharge letters. Patients are left to wean their analgesics with little guidance. This is even more pertinent in a rural setting, where barriers to accessibility of primary healthcare, lack of chronic pain clinics compound the issue. Clear documentation is key in this context for patient education and for good clinical handover.

This quality improvement project aims to measure and better the appropriateness and accountability of opioid prescribing practices of junior medical officers in Wagga Wagga Base hospital.

Process

OUCH is a retrospective cohort analysis looking at the number of surgical patients who were discharged on opioids and the proportion who were provided a de-prescribing plan over a one-month period in 2019. Only patients who underwent a surgical intervention and had a length of stay of more than 1 day were included. From this data, we hope to evaluate the appropriateness of opioid prescription, defined as follows: firsts, a provision of opioids only if they had used prescribed pro-re-nata opioids 24-48 hours prior to discharge; second, prescription of opioids in the context of multimodal analgesia with regular paracetamol and/or NSAIDS; and last, the provision of a de-prescribing plan.

Analysis

Of the 26 patients identified, only 8% had a de-prescribing plan in the discharge documentation, 20% had been on opioids prior to admission, and 62% were prescribed concomitant simple oral analgesics. This initial data highlights a deficiency of the current system to provide accountability in the form of prescription monitoring for opioids on discharge. Many JMOs do not document either in discharge reconciliation of medications or on discharge documentation the amount of opioids prescribed. These numbers grossly underestimate the amount of opioids prescribed on discharge, considering the high turnover of the orthopaedic and surgical wards and the inherent deficiency of the eMeds system to keep track of medications dispensed on discharge.

Outcomes

This project is a pilot study for future research which aims to estimate and evaluate the magnitude of inappropriate opioid prescription to surgical patients, a problem that is compounded by the lack of opioid de-prescribing plans. Data will be evaluated over a 3-6 month period. This will form the basis of future recommendations in identifying at risk groups and need for junior doctor education to change prescribing practices to tackle the issue in the local community.

THE USE OF VIRTUAL REALITY TO INFLUENCE ENGAGEMENT AND ENJOYMENT DURING EXERCISE: A SCOPING REVIEW

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Background and Context

Nearly half of Australians do not meet recommended exercise guidelines. Physical inactivity is, in part, influenced by the presence of negative affect and low enjoyment during exercise. Virtual Reality (VR) has been proposed as a way to improve exercise enjoyment, but little is known about how VR is being used for such purposes. This scoping review aimed to summarise the existing literature that evaluated exercise affect, motivation, enjoyment, and engagement during VR use.

Methods

A Population (clinical and healthy), Concept (the extent and nature of research about VR in exercise, specifically the types of interventions and their theoretical underpinnings), and Context (any setting, demographic, social context) framework was used as per PRISMA scoping review guidelines. Search terms related to VR and exercise engagement/enjoyment were adapted for Medline, Scopus, Embase, PsychINFO, and Google Scholar databases. Two independent reviewers screened the titles and abstracts of potentially relevant studies, formally applied eligibility criteria, and extracted data.

Analysis

The search identified 962 studies; of these, 25 unique studies were included (n=994 participants). Most studies (22/25) evaluated the use of VR in healthy populations, which included healthy control groups (n=883; 89%), with seven studies evaluating clinical populations (n=111, 11%). VR set-ups included use of a head mounted display (n=12), projected/screen (n=17), and audio-based VR (n=1). The underpinning theories for VR use included: attentional focus theory (n=6); flow theory (n=2); psychological reversal theory (n=1); social comparison theory (n=1); social cognitive theory (n=1), self-determination theory (n=1); dual mode theory of affect (n=1); attention restoration theory (n=1); immersion (n=8); no theory provided (n=3). Exercise motivation was assessed in 9 studies, affect in 10, engagement in 19, and enjoyment in 17. The use of a competitive avatar showed the greatest promise in improving exercise motivation (67% of studies). Immersion and added immersive features were associated with more positive affect (83% of studies), more enjoyment (64% of studies), and engagement in healthy (75% of studies) and clinical (67% of studies) populations.

Outcomes

There is limited evidence for the use of VR to influence exercise motivation, enjoyment, engagement, and affect, particularly in clinical populations. Preliminary evidence shows that VR positively influences exercise for each outcome – conflicting findings may relate to the heterogeneity of definitions of VR. Different outcomes may be influenced by different factors that VR can provide (e.g. virtual competitors and immersion). Adverse effects (cybersickness) were reported in one study suggesting that VR may provide a low risk modality in improving exercise experiences. Given the preliminary positive findings, larger randomised clinical trials are warranted to assess the efficacy of VR as an intervention.

RECONSIDERING OPIOID MEDICATION FOR CHRONIC PAIN: CAN A NURSE LED INTERVENTION HELP REDUCTION?

Ms Kathie Nickerson[1]

1. *Hunter New England Health*

Background and Context

Prescription opioid use for chronic non cancer pain (CNCP) is a topic that polarises opinion in both the community and health profession. Ongoing therapy is associated with the dual effect of increasing harm and dwindling benefit.

Reduction is difficult due to the complex effect opioids have on the brain. Reward pathways are hijacked, reducing pleasure in experiences that would have otherwise given joy and enforcing the need to continue taking opioids to provide positive feelings.

The problem is extensive with more than half of the over 15 million opioid prescriptions written in Australia last year being for CNCP and 16% of the population taking opioids.

Hunter Integrated Pain Service treats patients with CNCP through group programs and recommends opioid cessation. Two things have changed recently for HIPS participants. Tighter messaging around opioid use has encouraged GP's to deprescribe and restriction to group treatment programs for people on opioids (to promote active rather than passive strategies), has meant that some participants are blocked from continuing to pain reduction treatment until they reduce dose. There is concern that without a robust intervention for opioid reduction these patients may be lost to therapy.

Processes

Nurse Supported-Prescription Opioid Reduction Pathway has evolved from the previous ad hoc system of phone contact to support these changes.

It consists of a 2-hr group program Medication Education and Support (MES) group using Motivational Interviewing technique and underpinned by self-management principles followed by scheduled phone support from HIPS Clinical nurse specialists. Participants are encouraged to be part of decision making by writing their own reduction plan.

For people unable to attend a group program there is a second option of phone support only.

Analysis

The aim of the pathway is to improve readiness to wean, facilitate opioid dose reduction, provide participants with a satisfactory process to support reduction, and promote participant movement to the next treatment step. A prospective cohort study has commenced to observe if the process meets these aims.

Outcomes

A three-month pilot study of MES group demonstrated that 50% of people who attended reduced opioid dose and 33% of participants moved on to the next group program.

DESIGNING FOR CHRONIC PAIN: A QUALITATIVE EXPLORATION OF THE CLIENT EXPERIENCE

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1. *Australian Catholic University, Melbourne*

Background

The current study was interested in clients' experiences of the built environment within pain management settings. The objective was to explore the client's experience of the therapeutic space within a pain management setting, by asking how the therapeutic space influenced the wellbeing of clients who have attended pain management clinics. To explore this proposed link between design and wellbeing amongst people with chronic pain, a predominantly qualitative approach was used.

Process

Interviews were conducted with six participants ranging in age from 27 to 54 years old (M = 38 years, SD = 12.22 years), with five females and one male. The average duration of pain of the participants was 13 years (SD = 8.53). A semi-structured format was chosen with an emphasis on the clients' experiences of light, sound and access to nature.

Analysis

Interviews were transcribed, coded and analysed using thematic analysis (Braun & Clarke, 2006).

Outcomes

Results indicated five main themes: attention to detail, design impacts on wellbeing, design is layered and subjective, staff owning design challenges, and "something more inviting..." (recommendations). The results align with previous research which has indicated that key aspects of the physical environment can support the wellbeing of the users of the space. Clinicians can implement knowledge from this study in their clinical practice – results showed that clients appreciated and responded well to the clinicians offering choice, modifications and using features that could not be modified therapeutically. Future research could be informed by this qualitative study and move to experimental designs for testing design modifications and the impact of these potential changes.

PROVIDING MULTI-DISCIPLINARY PAIN MANAGEMENT TO REGIONAL SOUTH AUSTRALIA: ESTABLISHING A TIMELIER AND COST-EFFECTIVE MODEL OF SERVICE DELIVERY

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Background and Context

: Consumers living in regional South Australia have traditionally needed to travel to Adelaide to access tertiary-level pain management services. SA Health recently invested in the delivery of multi-disciplinary outreach pain services as part of a state-wide model of care to address the significant inequities in access. The CALHN Pain Management Unit set up the first of three outreach sites at Whyalla on the Upper Eyre Peninsula.

Process

A two-day, monthly outreach service at Whyalla Hospital commenced in May 2018. The multi-disciplinary team comprises a pain medicine specialist, psychologist and physiotherapist visiting from Adelaide supported by a local nurse. The outreach service delivers an equivalent service to metropolitan, excluding interventional procedures, whilst coordinating care with general practitioners and local health services. Telemedicine is utilised to augment care between site visits. Pain questionnaires as part of the electronic Persistent Pain Outcome Collaboration (ePPOC) are recorded at referral and at end of episode, including Brief Pain Inventory (BPI), Depression, Anxiety and Stress Scales (DASS), Pain Catastrophizing Scale (PCS) and Pain Self-Efficacy Questionnaire (PSEQ). The BRIEF Health Literacy Scoring Tool and Patient Activation Measure (PAM) are also recorded.

Analysis

Over 18 months, 125 patients received input through the outreach service. There were 325 occasions of service, including 80 new appointments, 120 in-person reviews, 30 telemedicine reviews and 95 attendances at group/ information sessions. Pain questionnaires at referral scored as follows: BPI severity (6.0), interference (7.0); DASS depression (14.7), anxiety (10.8), stress (16.0); PCS total (24.5); and PSEQ (19.2). Pain questionnaires at end of episode have been completed by twelve patients to date and illustrated improvements in PCS total (21.9) and PSEQ (22.0) while other scores were unchanged. Health literacy scoring was marginal/ limited (53%) and PAM was low (46%). Staff travel costs to Whyalla totalled $42,000; avoided patient travel reimbursements to Adelaide totalled $54,000.

Outcomes

The CALHN Pain Management Unit improved access to pain management services in regional South Australia whilst simultaneously reduced the economic burden of providing this service. Two additional outreach sites have since been established in Port Pirie and Port Lincoln. Whilst there is an initial indication for reduced pain catastrophizing and improved pain self-efficacy, larger numbers of end of episode data are required and will be collected and formally evaluated. Service implementation has been enabled through partnerships with regional health services; focus on community-based care; expansion of telemedicine to support outreach activity; and training and support for local health care providers in pain management. The challenges encountered in this patient population include high levels of pain interference; high levels of psychosocial distress and incidence of life trauma (51%) with minimal mental health services available in community; socioeconomic disadvantage; and low levels of consumer health literacy and engagement. Providing pain management into regional areas remains an area for continued service improvement.

POST-OPERATIVE PRESCRIBING OF SLOW-RELEASE OPIOIDS: IMPLICATIONS OF ACUTE PAIN MANAGEMENT GUIDELINES ON CLINICAL PRACTICE

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3. *St. Vincent's Hospital, Sydney, NSW, Australia*

Background and Context

Dose titration with immediate-release opioids is currently recommended for acute post-operative pain. The Australian and New Zealand College of Anaesthetists and the Faculty of Pain Medicine released guidelines in March 2018 supporting its use in the treatment of acute pain in opioid-naïve patients, however the impact of these recommendations on clinical practice is currently unknown. This retrospective cohort study was conducted to compare opioid prescribing patterns before and after the release of these guidelines.

Process

Data was collected on 184 surgical patients (2017, n=78; 2018, n=106) admitted into Prince of Wales Hospital in November 2017 and 2018, which consisted of demographic data, opioid prescriptions and discharge opioid information. The main outcome is the number of prescriptions of slow-release opioids in 2017 versus 2018 after these guidelines were published. Secondary outcomes included pain scores and opioid management during patient discharge. Confounding factors were accounted for using logistic and multiple regression as appropriate.

Analysis

A seven-fold decrease in slow-release opioid prescriptions was found during hospital admission (2017: n=31, 40% vs. 2018: n=12, 11%; p←0.001) and an eight-fold decrease at discharge (2017: n=20, 26% vs. 2018: n=9, 9%; p=0.02) post-publication. Orthopaedic patients were more likely to receive slow-release opioids (2017: n=26, 61% vs. 2018: n=18, 15%, p←0.001), consistent with results from previous studies. Median pain scores at rest and during movement were not significantly different between the 2017 and 2018 study groups (at rest: 1.5 vs 1.3, p=0.56; during movement: 2.4 vs. 1.8, p=0.60). Additionally, a lower percentage of patients received an opioid cessation plan in 2018 compared to 2017 (2017: n=15, 39% vs. 2018: n=6, 12%; p=0.007).

Outcomes

The decrease in slow-release opioid prescribing may be associated with the publication of recent acute pain management guidelines. Interestingly, this was not accompanied by a significant increase in pain scores, which may indicate that slow-release opioids confer minimal benefit. As slow-release opioids have been associated with increased harm and protracted opioid use, the lack of opioid cessation plans provided during patient discharge may be a significant cause for concern.

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ANALGESIA PRESCRIPTIONS FOR MUSCULOSKELETAL PATIENTS DISCHARGED FROM EMERGENCY DEPARTMENTS A RETROSPECTIVE ANALYSIS (1999 TO 2019)

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Background

In Australia, there were more than 8 million emergency department (ED) visits in 2017-18. Studies show that opioid analgesics such as oxycodone are commonly prescribed in the ED and the concern is the potential for dependence and harm. Additionally, many clinical practice guidelines for musculoskeletal conditions discourage the use of opioid analgesics on the grounds that the potential for benefit may not outweigh the risk of harms.

There is clear evidence on the increasing use of opioid analgesia in Australia. However, the rate of opioid analgesia discharge prescriptions in Australian emergency departments is unclear. Current evidence from the US ED setting may not be generalised to Australia due to the differences in the health systems.

This protocol is for a retrospective study analysing analgesia discharge prescriptions from the Sydney Local Health District (SLHD).

To determine the proportion of patients presenting with a musculoskeletal condition to ED that are discharged with an analgesic, particularly an opioid analgesic, in SLHD and the patient and clinician factors associated with their use.

Process

All discharge prescriptions for patients presenting to three Australian emergency departments between 1999 and 2019 (~150,000 ED presentations annually) will be accessed from two sources that will be amalgamated: iPharmacy, which is the pharmacy dispensing software and Electronic Medication Management (eMEDs) system, which focuses on patient administration details as well the prescribing, reconciling and administration of drugs in a real-time setting.

The inclusion criteria will be patients presenting to ED with any musculoskeletal condition. Data extraction will include discharge analgesic medicines (e.g. class, dose and frequency), patient details (age, mode of transport, Systematized Nomenclature of Medicine - Clinical Terms [SNOMED-CT] code) and providing clinician details (e.g. consultant).

The patients will be categorised according to the discharge prescription medication (no analgesia, non-analgesia medication, simple analgesia, non-steroidal anti-inflammatory drugs, anti-epileptics, anti-depressants, anxiolytics, muscle relaxants and opioid analgesic). Those who were prescribed an opioid analgesic will then be further categorised as having received a weak, strong or combination [weak or strong]. The opioid analgesia doses will be converted to morphine milligram equivalents.

Predictors (e.g. clinician and patient factors) of (1) any analgesic and (ii) opioid analgesic prescriptions will be determined using multivariate logistic regression.

Analysis & Outcome

This will be the first analysis investigating the extent of opioid analgesics prescribed on discharge for patients presenting with a musculoskeletal condition and their associated factors in Australian EDs. We will have preliminary data results for the conference.

BUILDING CAPACITY FOR CHRONIC PAIN MANAGEMENT IN A REGIONAL CENTRE: ARE WE GETTING BANG FOR OUR BUCK?

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1. *Pain Management Unit, Flinders Medical Centre, Bedford Park, SA*

Background and Context

Chronic pain affects 1 in 5 Australians in their lifetime, and is associated with lengthy waits for specialist services. Prevalence appears higher in regional areas, yet access to care is limited, given the lack of regional specialist services and GPs with professional pain management training. The National Action Plan for Pain Management recommends improving access in regional areas, by not only bringing services to patients – through regular regional clinics or telehealth – but also by capacity-building among local professionals. Also, models of care should be adapted where possible to better support regional patients' needs. Our pain unit has trialled regional outreach in Murray Bridge, a town 75km South-East of Adelaide.

Process

Our regional model of care focused on group pain education and combined interdisciplinary assessments, where patients see multiple pain specialists (consultant, psychologist, physiotherapist) in one appointment. This resulted in greater access through less travel (distance and occasions), swifter case discussion and correspondence to GPs, and opportunity for review where indicated. A novel addition was access to 6-8 telephone-led low-intensity cognitive behavioural therapy sessions for interested patients. This model was designed to generate timely specialist recommendations to support GPs and patients in implementing a biopsychosocial pain management approach locally. We have completed 12 months of the regional trial (September 2018 to August 2019), including multidisciplinary assessments for 52 patients. We are currently critically evaluating this model by surveying GPs and patients.

Analysis

The 5 responding GPs (18% response rate) were quite satisfied with the service, providing 'average' to 'very good' ratings on all questions. All GPs spontaneously requested easy and useful phone contact with the outreach team. The 20 responding patients' (38% response rate) mean scores indicated at least 'average' satisfaction ratings, including satisfaction with the location, information provided, and usefulness of recommendations. However, individual responses often spanned the entire 1-5 scale. Only 15% said their situation had improved due to the assessment. Qualitative feedback centred on improving follow-up (e.g., automatic/more regular/quicker) and responding to their subjective pain experience (providing more self-management strategies, better understanding their experience). Seven patients spontaneously made positive comments regarding the service.

Outcomes

While we may be better supporting regional GPs in managing chronic pain, some patients may not understand or share this goal. Moreover, little changes regarding patient outcomes. This relates to the scarcity of local allied health services, resulting in few referring options. We have learnt that to invest pain services in regional centres, we must conduct greater capacity-building and engagement (e.g., community liaison, train-the-trainer); equally, buy-in from local champions (including telehealth facilitators) is required for pain self-management to be owned by the local community. Our activity targets may also hinder this engagement phase. Ultimately, a visiting team treating a limited number of patients in isolation will not produce the most desirable return on investment.

THORACIC ZYGAPOPHYSIAL JOINT THERMAL NEUROTOMY: AN ADDITIONAL PROSPECTIVE CASE SERIES IN A COMMUNITY PRACTICE

Dr Geoffrey Speldewinde[1]

1. *Capital Pain and Rehabilitation Clinic*

Summary of background data

There are techniques for diagnosing thoracic zygapophyseal joint pain, and it is feasible to undertake percutaneous thermal neurotomy of the medial branch nerves of such identified painful joints.

Objectives

To determine to what extent thermal neurotomy of thoracic zygapophysial medial branch nerves can provide useful relief.

Methods

This was a retrospective audit of consecutive prospectively gathered data at Capital Pain and Rehabilitation Clinic, Canberra, Australia of patients with thoracic joint pain 2009-2018. This is an additional 10 years of data to that published earlier by the author [1].

The primary outcome was 'good to complete' change of →50% in Numerical Rating Scale of pain for →6 months. Secondary outcomes Functional Rating Index (FRI), Depression Anxiety and Stress Scale (DASS 21) and Patient Specific Functional Scale (PSFS). Results are presented as success rates.

The thermal neurotomy was undertaken by a single practitioner using conventional monopolar lesions at 80° centigrade for 60 seconds at four target points for each medial branch nerve, after 2 positive diagnostic intra-articular blocks.

Results

Of 54 complete data sets the success rate for 50-75% relief for 3 months or more was 20% and for →75% relief was 26% for the known outcomes, total success rate of 46% (36%-60%, 95%CI). The mean NRS pain change was 6.5 to 4.1 (p←0.001). The broader usefulness of the procedure is reflected in the clinically useful improvements in PSFS, FRI and DASS with small to large effect size.

Discussion/Conclusion

This additional consecutive case series continues an earlier case series to show that large numbers of patients with thoracic zygapophysial joint pain will obtain useful and often complete pain relief for neurotomy-concordant periods of time. Moreover, reducing the nociceptive output from these painful joints will assist in improving their physical and psychological function.

References

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WHAT A PAIN IN THE BACK: AND ITS EMERGENCY DEPARTMENT MANAGEMENT

Rebecca Tynas[1] and Jazmin O'Reilly-Hawes[1]

1. *Joondalup Health Campus, Joondalup, WA*

Background

Evidence-based guidelines exist for musculoskeletal back pain (MBP) management yet are not always implemented. In an emergency department (ED) where MBP represents 2% of presentations, this study aims to determine what management practices were applied, including demographical differences.

Methods

Cross-sectional analysis of 139 randomly selected adults with presentations of MBP as coded by treating doctors, was conducted in ED from September to December 2018.

Results

Of 121 MBP presentations matching criteria, 93% were acute and 7% chronic pain. Physiotherapy saw 29%; 17% neither received simple analgesia nor had taken any prior to admission; 64% received opioids (40% received one, 18% two, 6% 3 different types of opioid); 4% received only opioids; 24% underwent spinal imaging; and 16% were admitted. Of those discharged home, 36% received opioid scripts (28% for one, 7% for two, 1% for three different opioids), of which 50% were not administered during admission. In 38% of cases, no documentation was made on script provision. Presentations comprised 75% under-65s (U65) and 25% 65-and-overs (65+). Age groups received similar imaging requests and physiotherapy referrals. U65s were more likely to receive paracetamol (76% vs 50%, p←0.01), NSAIDs (74% vs 40%, p←0.001) and benzodiazepines (26% vs 3%, p←0.01). No differences existed for opioid or gabapentinoid administration, however 65+ were more likely to receive only opioids during admission (1% vs 13%, p=0.01). Admission to wards was more common in 65+ (11% vs 30%, p=0.01).

Discussion

Adherence to recommendations of clinical practice guidelines (CPG) on MBP management is associated with improved clinical outcomes [1]. Recommendations include return to normal activity, exercise therapy and use of simple analgesia, while advocating cautious use of opioids[2]. In this ED, under a third of patients were seen by physiotherapy, almost a fifth did not receive simple analgesia and a minority received only opioids. Most patients received opioids. Of those discharged, a third received opioid scripts, of which half had not been trialled in ED. A further fifth of discharged patients had unclear documentation on script provision. These practices are contrary to international best practice and evidence based guidelines [2]. This study found U65s utilised ED for back pain more than 65+. 65+ were significantly less likely to receive simple analgesia compared to U65s, and significantly more likely to solely receive opioids. MBP guidelines should be in place and known to staff to optimise care. This should result in less inappropriate imaging, opioids administration and discharge prescriptions and increased physiotherapy input.

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PHYSIOTHERAPISTS KNOWLEDGE OF OPIOIDS IN MUSCULOSKELETAL PAIN MANAGEMENT

Natalie Walton[1] and Peter Window[1]

1. *Queensland Health, Brisbane, QLD, Australia*

Background and context

Physiotherapists managing patients with musculoskeletal conditions in outpatient settings frequently encounter patients taking various medications for pain management including opioids. Local data within a tertiary hospital physiotherapy outpatient setting demonstrated that of all patients taking medicine for pain management, 27% included opioid medications. Opioid use can have unwanted effects on the treatment outcomes of patients with musculoskeletal conditions including delayed return to work and mood impairment. Although physiotherapists receive some undergraduate education and training regarding the effects of medicines (including opioids), it may be insufficient given that physiotherapists reported frequently asking patients about their medicines and/or being asked by patients about their medicines. This study set out to evaluate i) physiotherapist knowledge regarding opioid use and side effects in musculoskeletal pain within a tertiary hospital physiotherapy department, and ii) the impact of a one-hour education session on opioids on physiotherapist knowledge.

Process

To ascertain baseline physiotherapist knowledge of opioid medicines, a senior pharmacist developed a questionnaire consisting of 7 multiple choice questions which was reviewed by two independent physiotherapists prior to being administered to physiotherapists. Certainty-based marking was utilized to include an assessment of the physiotherapist's confidence in their selected answer. A subsequent one-hour education session focusing on factors to consider with opioid use in musculoskeletal pain was then delivered face to face by a senior pharmacist as part of weekly physiotherapy professional development in-service. Two weeks following the education session the physiotherapists were asked to repeat the questionnaire. Ten physiotherapists and four physiotherapy students undertook the initial questionnaire and participated in the education session. The follow up questionnaire was completed by nine physiotherapists and one physiotherapy student.

Analysis

Survey responses were entered into an excel spreadsheet and mean scores for survey responses were generated. Changes in scores pre- and post-education were analysed using descriptive statistics.

Outcomes

Baseline testing indicated discrepancies between physiotherapists knowledge and perceived certainty in their knowledge across a number of areas including identification of adverse effects and potential impact of opioids on treatment outcomes. This is significant as confidence in an incorrect answer may contribute to missing potential medicine related problems, such as urinary retention as a potential adverse effect of opioids. In the pretest the average questions answered correctly was 50% compared to 83% answered correctly post education. Across all questions physiotherapists reported an increase in certainty for a correct answer post education. Question 4 considered the potential impact of opioids on treatment outcomes. Pre education 21% physiotherapists selected the correct answer. Interestingly of those who selected an incorrect answer 70% indicated moderate or high confidence in their answer. Post education 80% of respondents answered correctly to question 4 with 88% reporting moderate or high confidence. This study demonstrates that education is a key component to providing physiotherapists with the knowledge and confidence to assess the impact of opioids on the assessment, treatment and prognosis of musculoskeletal conditions.

CASE REPORTS – POSTERS

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Successful Back and Trunk Pain Treatment with Peripheral Nerve Field Stimulation in Patients Who Were Not Candidates for Spinal Cord Stimulation

Dr Romil Jain[1], Dr Anandhi Rangaswamy[1]

1. *Act Pain Centre, Calvary Clinic*

Electrical Injury: Case Series Highlighting Chronic Pain, Post Traumatic Stress and Movement Disorders

Dr Elizabeth Lun[1], Dr Aidan Tan[1], Professor Chris Andrews[2], Professor David Champion[3]

1. *University Of New South Wales,*
2. *Faculty of Medicine, University of Queensland,*
3. *St Vincent's Hospital*

The Effect of Knee Re-Sizing Illusions on Pain and Swelling in Symptomatic Knee Osteo-Arthritis: A Case Report

Ms Erin Macintyre[1], Ms Maja Sigerseth[2], Brian Pulling[3], Dr Roger Newport[4], Dr Tasha Stanton[3,5]

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SUCCESSFUL BACK AND TRUNK PAIN TREATMENT WITH PERIPHERAL NERVE FIELD STIMULATION IN PATIENTS WHO WERE NOT CANDIDATES FOR SPINAL CORD STIMULATION

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1. *ACT Pain Centre, Calvary Clinic, Bruce, Australian Capital Territory, Australia*

Background

Growing numbers of patients experience back and trunk pain that is resistant to conventional medical management. Their chronic pain may limit work productivity and negatively impact quality of life. Neuromodulation can successfully deliver opioid-free pain management for selected patients. Spinal cord stimulation (SCS) is most often selected for back and trunk pain, but may not be possible for patients with deformities of the spinal canal or surgical history that resulted in scarring or epidural adhesions or that limits epidural access. In cases such as these, peripheral nerve stimulation (PNS) may be another option.

Case Presentation

Nine patients (six men, three women) presented with well-defined pain in the lower back and trunk/groin. All patients had undergone multiple prior back surgeries that rendered the epidural space unsuitable for placement of epidural SCS leads. The average pain was 7 on a standard 0-10 numeric rating scale. For trial periods of up to two weeks, octad leads were placed subcutaneously and programmed to maximise paresthesia coverage of the most painful areas. At the end of the trials, pain was reduced by at least 50% for all patients, to an average of 3.3. Importantly, PNS treatment dramatically improved pain-related affective domains. On the Depression Anxiety Stress Scale (DASS), pre-implant ratings were 13.1 [D], 7.5 [A], and 15.3 [S], which were reduced to 5.3, 3.3, and 4.8, respectively, with PNS treatment. Additionally, the average score on the Pain Catastrophising Scale (PCS) improved from 22.7 to 15.8. All patients were satisfied with treatment and subsequently proceeded with permanent implant. Robust and durable pain treatment was observed after permanent implant.

Conclusions

Subcutaneous PNS has been previously reported in small samples to be an effective long-term treatment for chronic back pain. Our findings support those observations and suggest that PNS may be a good option for patients who have intractable back or trunk pain but are either not suitable or are high-risk candidates for SCS. Prospective evaluation of this intervention in a multicentre trial is warranted.

Clinical Impact

Neuromodulation is a minimally-invasive and opioid-free pain management intervention for back and limb pain. When SCS is not practical, PNS can be successfully employed. Future research should investigate the utility of this intervention.

ELECTRICAL INJURY: CASE SERIES HIGHLIGHTING CHRONIC PAIN, POST TRAUMATIC STRESS AND MOVEMENT DISORDERS

Elizabeth Lun[1], Aidan Tan[1], Chris Andrews[2] and David Champion[3]

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2. *Faculty of Medicine, University of Queensland, Herston, Queensland, Australia*
3. *St Vincent`s Clinic, 438 Victoria St Darlinghurst, NSW 2010, Australia*

Background

Following injury from an electric current (EI), victims may experience persistent, progressive pain-related disability, central and peripheral nervous system dysfunction, movement disorders, sleep disorders and psychiatric problems. Despite this, there is a paucity of medical literature regarding chronic pain post electrical injury.

Methods

We performed a retrospective case series (n=15) of patient/claimants with complex chronic pain disorders secondary to electrical injury in a medico-legal practice in Sydney, Australia. Comprehensive information relating to pre-injury and post-injury biological, psychological and social features were collected on each patient. Extensive hospital, GP, specialist medical records and investigations in the medico-legal context aided the assessments. Systematic evidenced-based cutaneous and deep pressure somatosensory examination was performed. A detailed literature review of EI consequences and chronic pain was conducted in widely used databases with multiple search terms.

Case presentations

Prior to injury, most patients were working either manual or sedentary jobs [12/15 (80.0%)] and were not on social security benefits [14/15 (93.3%)]. Most did not have any pre-injury risk markers for adverse pain or psychological reaction to injury. Almost all [14/15 (93.3%)] of the electrical injuries were classified as severe. The primary site of injury was the hand in all patients. Early presentations to Emergency Departments and/or general practitioners occurred in 10/15 (66.7%), and 5 (33.3%) were hospital inpatients. Chronic pain developed in all, and was widespread in 10/15 (66.7%). Cutaneous allodynia to dynamic light touch was elicited in 13/15 (86.7%) and features strongly inferring central sensitisation were evident in all patients. Most patients [12/15 (80.0%)] fulfilled 8/8 DSM 5 Criteria for post-traumatic stress disorder (PTSD). Movement disorders such as involuntary muscle contractions [7/15 (46.7%)], digital dyskinesia and tremor [5/15 (55.5%)] were prevalent. Fulfillment of current criteria for Restless Legs Syndrome was determined in 5 of 6 recent cases tested. Secondary musculoskeletal, particularly spinal, injury was common. Post injury outcomes were generally severe, where 14/15 (92.9%) suffered post injury depression, impaired sleep and were unable to work again. Disability was concerningly underestimated in all cases. All patients suffered severe social impacts, which included major financial and employment loss, difficulties with activities of daily living and cessation of recreational and social activities.

Conclusions

EI patients were challenging to assess and manage, and experienced poor outcomes. Imaging investigations offered limited pathological information, leading to an underestimation of EI impacts and disability, distress, inability to work, impaired sleep and other detrimental consequences to patient/claimants. Application of the biopsychosocial model and somatosensory stimulus-response testing was important to comprehend the full impact of EI and for improved management. EIs manifest as direct CNS dysfunction with a variety of sequelae, notably including movement disorders.

Clinical Impact

These cases highlight the severely painful yet often overlooked consequences of EI, especially when accompanied by PTSD.

THE EFFECT OF KNEE RE-SIZING ILLUSIONS ON PAIN AND SWELLING IN SYMPTOMATIC KNEE OSTEOATHRITIS: A CASE REPORT

MacIntyre E, Sigerseth M, Pulling B, Newport R and Stanton TR

Background

Re-sizing visual illusions that manipulate body size have been found to be analgesic in some pain conditions. Recent theoretical models, namely the cortical body matrix model, postulate that physiological regulation of the body is intertwined with body perception. This raises the possibility that illusions that alter one's perception of their body may also alter physiological features, such as swelling. This report is the first detailed description of a case in which body re-sizing illusions modulate both pain and swelling in knee osteoarthritis (OA). This has implications for both our understanding of OA as a condition, as well as offering a novel research direction which may improve clinical outcomes.

Case Presentation

A 55-year-old Caucasian male, with a long history of episodic knee pain and swelling, and who was diagnosed with severe knee OA in 2013 took part in this study (taken from a larger study evaluating the analgesic effects of re-sizing illusions in knee OA). Over three sessions, a mediated reality system (alters real-time video) was used to provide re-sizing "stretch" and 'shrink" illusions of the participant's knee. In these illusions, the visual change in knee size is augmented by congruent tactile input (see the limb elongate, and a gentle traction force to the limb). In the first session, the stretch illusion reduced the participant's pain intensity, but also induced a visually noticeable increase in knee swelling. Therefore, in sessions two/three swelling was also assessed. In these sessions, repeated (n=10) stretch illusions and sustained (3mins) stretch illusions both had cumulative analgesic effects but resulted in cumulative *increases* in swelling. In contrast, sustained (~10mins) visual minification of the entire knee and leg reduced *both* pain and swelling, despite the knee shrink illusion (only reducing knee size) increasing pain.

Conclusions

Our findings add to the growing evidence that body-relevant sensory input can have profound influences on pain and physiological regulation. That the effects on pain and swelling seen here were conflicting (pain decrease, swelling increase) during the multisensory knee stretch illusion, but consistent (pain and swelling decrease) during a unisensory illusion (vision only, altering the entire limb) suggests differential pathways of effect based on the type of sensory manipulation. Indeed, that similar visual input of reduced knee size (via shrink illusion vs whole limb minimisation) had differential effects on pain merits further exploration. Our findings provide support for the cortical body matrix theory, namely, that a multisensory representation of the body is involved in maintaining integrity and homeostatic regulation of the body (including physiological regulation), and this body matrix dynamically adapts to changes in (perceived) body structures.

Clinical Impact

That both pain and swelling may be modulated by altering body-relevant sensory input in symptomatic knee OA has important implications for our understanding and management of pain. Cumulative analgesic and swelling effects were seen for the sustained minification illusion, raising the possibility of clinical utility in people with knee OA. Given that both swelling and pain are cardinal signs of arthritis, a novel treatment option that modifies both symptoms would have clinical relevance.

DIGITAL ABSTRACTS

2020 AUSTRALIAN PAIN SOCIETY 40TH ANNUAL SCIENTIFIC MEETING

In the IASP Global Year for the Prevention of Pain

It was disappointing that the accepted free paper and poster abstracts were not able to be presented at the 2020 ASM. Therefore, the APS Board and Scientific Program Committee are pleased to provide Members and interested delegates with another prominent means for these abstracts to be viewed.

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2020 AUSTRALIAN PAIN SOCIETY 40TH ANNUAL SCIENTIFIC MEETING

In the IASP Global Year for the Prevention of Pain

We wish to congratulate the contributors to APS 2020 who were selected to present their research in the popular Rapid Communication sessions.

A few of the presenters were able to prepare a video to share – we hope you enjoy watching them!

Watch Now

2020 APS DISTINGUISHED MEMBER AWARD

A/Prof David Champion AM

A/Prof G David Champion AM
MBBS, MD, FRACP, FFPMANZCA

Associate Professor G David Champion AM has had a singular career. Well-known for his clinical evolution from rheumatologist to clinical pharmacologist to pain physician. In adult, and especially paediatric spheres, what distinguishes David is his remarkably long-term involvement in research while working full-time in private practice – a very uncommon combination in the modern era. As a private practicing physician, it was brave and costly to spend long hours on unpaid research. However, David is the first to acknowledge that his achievements and publications reflect collaboration and teamwork. Less than 10% of his personal contribution to research since 1975, almost 140 listed publications, has been funded externally; the remainder has been pro bono.

David established the modern Department of Rheumatology at St Vincent's Hospital, Sydney, in 1974. Having trained also in paediatric rheumatology in the UK and the USA, David began a Paediatric Rheumatology Clinic at Prince of Wales/Sydney Children's Hospital in 1975, collaborating with Prof John Ziegler and Dr John Feller, and continued that for about 35 years.

In 1986, David founded the Pain Research Unit at Sydney Children's Hospital. The early focus of this group was primarily children's self-report and behavioural measures of pain intensity. Its first publication, in 1990, introduced the internationally acclaimed Faces Pain Scale which became a classic citation - the third most cited publication in paediatric pain between 1975 and 2010. The derivative paper, developed in collaboration with Canadian colleagues, established the international standard of paediatric pain measurement (The Faces Pain Scale – Revised: toward a common metric in pain measurement. Pain 2001; 93:173-183). Over many years, the team used the needle pain model for examining child and parental influences on children's pain outcomes. Children's ability to draw distinction between pain-related anxiety and pain intensity was considered. The team found parental influences on pain-related distress following immunisation injections to be strongly evident as early as 4 to 6 months of age, and that brief parental guidance could improve outcomes. Under David's leadership, the now internationally recognised Unit's research interests diversified into areas such as twin studies in paediatric pain, children's attention and distraction, information provision, somatosensory testing in children, and pain and the family. He was a co-convenor of the 6th International Symposium on Paediatric Pain in Sydney in 2003.

In 1998, David was awarded a Doctorate in Medicine from the University of Sydney on the basis of his published work in the pharmacology and therapeutics of rheumatic disease – again achieved from outside hospital- or university-based academic structures. In 1999, he was inducted as a Foundation Fellow of the Faculty of Pain Medicine of the Australian and New Zealand College of Anaesthetists. Since 2003, he has held a conjoint appointment as Associate Professor in the School of Women's and Children's Health at UNSW Sydney. In 2008, David retired from adult medical private practice, maintaining a medicolegal practice in pain medicine that – characteristically – has also spawned a research component.

This long-standing clinical and research activity has been the source of David's prolific presentations at Australian Pain Society (APS) meetings over more than three decades, on

2020 APS DISTINGUISHED MEMBER AWARD

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topics varying from the measurement and assessment of pain in children, to the Repetitive Strain Injury ("RSI") phenomenon in adults, to the relationship between growing pains in children, adolescent pain, and restless legs syndrome in adults. In fact, his first publication on growing pains was in 1985. In the past five years alone he has been author or co-author of approximately 40 presentations at national and international conferences, particularly in paediatric pain medicine. Such is "retirement"!

David has been a member of the Australian Pain Society since the early 1980s – probably the first rheumatologist in Australia to do so – reflecting his recognition that rheumatology and general medical paradigms were inadequate to explain the painful conditions experienced by many of our patients. About this time he and colleagues were confronted with the "RSI" phenomenon – then a mysterious cervicobrachial pain syndrome, now recognised as an example of nociplastic pain. David's was one of the few voices at that time to challenge – successfully – the notion that the problem was primarily psychosocial in nature. In 1988, he became a member of the International Association for the Study of Pain and served as an officer of its Special Interest Group (SIG) on Pain in Childhood from 1990 to 1994. It is no surprise that David has been a member and supporter of the APS Pain in Childhood SIG since its inception in 2011.

David Champion has been one-of-a-kind during a long career characterised not only by sustained activity and enthusiasm, but also by a willingness to search for and adapt to new knowledge and thinking, when so easily he might have followed more conventional paths. Few have contributed so broadly to the field of Pain Medicine, both clinically and in research. In 2018, he was appointed a Member of the Order of Australia for significant service to medicine in the field of paediatric rheumatology and to medical research and treatment of musculoskeletal pain. He is indeed a Distinguished Member of the Australian Pain Society.

ANNUAL GENERAL MEETING (AGM)

THE AUSTRALIAN PAIN SOCIETY

will be held via Zoom video conference
from 5:30 – 6:30pm AEST
on Thursday 28 May 2020

A General Business Meeting (GBM) will immediately follow the AGM.

The AGM Information Pack was emailed to members and includes:

- Notice of AGM
- AGM Agenda and following GBM Agenda
- Proxy Form
- Minutes from previous AGM and GBM
- Office Bearer Nominee Information
- APS constitution, adopted on 10 April 2019
- By-Laws to support the APS constitution

The financial accounts for the year ended 31 December 2019 are available on the Members Only area of the APS website.

If you are unable to attend the AGM please send your apology via the RSVP link sent by separate email and proxy form to the Secretariat by email to aps@apsoc.org.au by 5:30pm AEST Tuesday 26 May 2020.

SAVE THE DATE

2021 AUSTRALIAN PAIN SOCIETY
41ST ANNUAL SCIENTIFIC MEETING

In the IASP Global Year Against Back Pain

18 - 21 April 2021 • National Convention Centre Canberra, ACT

APS 2021 will be held from 18-21 April 2021 at the National Convention Centre, Canberra.

Please visit the conference website here:
www.dcconferences.com.au/aps2021

Further information on APS 2021 will be sent out in the coming months, but we have some exciting speakers already confirmed and we can't wait to catch up with you all next year.

IMPORTANT DATES FOR YOUR DIARY

Wednesday 8 July
Topical Session Submissions Open

Wednesday 29 July 2020
Rising Star Award Applications Open
SPC Scholar Position Applications Open
Free Paper/Poster Abstract Submissions Open

Wednesday 4 November 2020
Registrations Open

If you have any questions please contact the APS Conference Secretariat: aps2021@dcconferences.com.au