The role of massage in the treatment of chronic pain

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Abstract

The global burden of chronic pain has been increasing for decades, costing billions to healthcare systems around the world. The understanding of chronic pain has evolved over the last few decades but has not yet led to a decrease in the number of people suffering. A lack of robust evidence is often cited as the reason for the lagging application of this new understanding to treatment modalities offered.

This paper first examines the changes in definitions of pain and the emergence of the biopsychosocial model. It then discusses the most common current treatment options for chronic pain sufferers: pharmacological treatment; physiotherapy and exercise; patient education; and massage and manual therapy. The role of therapeutic alliance is highlighted as a key factor underpinning the likelihood of successful outcomes across all treatment modalities.

It is concluded that research into chronic pain treatment should be moving away from isolated techniques and approaches and focus on the efficacy of multimodal protocols.

Declaration

"I certify that this work has not been accepted in substance for any degree and is not concurrently being submitted for any degree other than that of the Diploma in Advanced Clinical Massage and Sports Massage being studied at the Jing Institute of Massage and Complementary Medicine. I also declare that this work is the result of my own investigations except where otherwise identified by references and that I have not plagiarised the work of others".

Signed: **Claire Desroches** _____

Date:

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Contents

Introduction

Chronic pain is undeniably a global burden, affecting more than 30% of the world's population (Cohen, Vase and Hooten, 2021; Lumley and Schubiner, 2019) - up to 41% according to some studies (Edwards et al., 2016), and up to 51% in Latin American, African and Asian countries (Meijer et al., 2022). In addition to the impact on the individual sufferers of chronic pain, these conditions cost billions to healthcare systems around the world; Cohen et al. (2021) point out that of the four leading causes of disability-related loss of workdays, three are chronic pain conditions; back pain, musculoskeletal conditions, and neck pain. In 2010, the financial cost of chronic pain in the United States was estimated at US$560-635 billion without taking into account institutionalised individuals (e.g., prisoners and care home residents), military personnel, or children (Cohen et al., 2021). A 2019 study estimated the cost of chronic pain in Australia at AU$73.2 billion, not counting the estimated cost of reduced quality of life, and forecast this to rise from AU$139.3 billion in 2018 to AU$215.6 billion in 2050 (Deloitte Access Economics, 2019). The combined burden of the pain experienced by sufferers themselves, the demand on healthcare systems and practitioners, the toll on non-professional caregivers and the economic impact of lost workdays and disability benefits, mean that even these figures are undoubtedly underestimates of the true burden of chronic pain.

With an estimated recovery rate as low as 5.4% (Elliott et al., 2002) it is clear that existing frameworks for managing chronic pain are not working. In fact, Catley, Moseley and Jones (2019) point out that "pain is rarely the focus of medical and allied health graduate programs" (Jones and Rivett, 2019, p.32). The current opioid crisis in the United States of America has encouraged many to consider alternatives to pharmacological management of pain. However, many of these alternative approaches are poorly researched and regulated. Even within

one modality, such as massage, there exists a wide range of qualifications allowing practitioners to use the same professional title, whether they have studied for one or two days, or several years (Vickers & Zollman, 1999). For the chronic pain sufferer, this means spending untold hours and money trying different therapies and therapists, at the risk of encountering one that makes the pain condition worse.

The purpose of this paper, therefore, is to examine what role, if any, massage therapy can play in treatment of chronic pain. In order to do so, it will be helpful to discuss the current treatment options available for chronic pain sufferers, and to evaluate their merits particularly with respect to new developments in our understanding of chronic pain. Google Scholar was used to search for relevant literature. The focus is on epidemiology of chronic pain and meta-analyses of treatment modalities; for a more detailed understanding of the biology of pain and the effects of massage therapies on biological markers of pain, readers are referred to the review by Makepeace (2023).

Section 1: Key definitions

Chronic pain: a discrete pathology

The traditional understanding of pain is as a signal of potential, impending, or actual tissue damage. Pain was defined in 1979 by the International Association for the Study of Pain (IASP) as "an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage" (Raja et al., 2020) The chair of an IASP subcommittee went further in separating the experience of pain from the existence of tissue damage, recognising pain as "a psychological concept and not a physical measure" (Merskey, 1994). Despite these early definitions explicitly recognising pain as an emotional experience that may occur independently of actual tissue damage, it has been argued that they do not go far enough in recognising psychosocial factors or the extent to which the pain experience can be debilitating (Raja et al., 2020). After considerable deliberation, which included the input of philosophers and linguists, a revised definition was put forward for consideration by members of the public, and revised again to the most current definition at the time of writing: "An unpleasant sensory and emotional experience associated with, or resembling that associated with, actual or potential tissue damage" (Raja et al., 2020). During the consultation process, an equal number of respondents were "satisfied or very satisfied" as "dissatisfied or very dissatisfied" with this definition; but of those who expressed dissatisfaction, 32.4% were clinicians, researchers, administrators, educators, and students/trainees, while 49.7% were patients or their caregivers (Raja et al., 2020). This highlights a gap in understanding between professionals aiming to improve outcomes for sufferers of chronic pain, and the sufferers themselves. It would seem likely that bridging this gap could improve outcomes and quality of life for patients and their

caregivers.

Indeed, in the case of chronic pain, this definition is clearly inadequate; the very definition of chronic pain as "pain persisting beyond the expected healing time", set at three months (Treede et al., 2019; Cohen et al., 2021), negates the role of tissue damage in the pain experience. In fact, arguments have been made for a classification of chronic pain as a disease in its own right (Anwar, 2016; Treede et al., 2019).

The IASP has therefore proposed a definition of chronic primary pain as having persisted for more than three months, being associated with "significant emotional distress and/or functional disability", and "not better accounted for by another condition" (Nicholas et al., 2019). Primary pain is also known as nociplastic pain, centralised pain, central sensitisation or central augmentation, and includes conditions such as fibromyalgia (FM), irritable bowel syndrome (IBS), and what is often referred to as "non-specific" musculoskeletal pain, such as lower back pain (Lumley and Schubiner, 2019).

Chronic secondary pain is pain that arises from another disease, such as osteoarthritis or diabetic polyneuropathy, and would be considered a symptom of this other disease, at least initially (Treede et al., 2019). Although it is generally advised that peripheral nociceptive causes of the pain be identified and treated, or ruled out, before a diagnosis of chronic primary pain is made (Lumley and Schubiner, 2019), the IASP advocate for a codiagnosis and early treatment of the pain condition independently of the underlying disease (Treede et al., 2019). This would be particularly relevant in the case of osteoarthritis, for example, which is commonly associated with pain, but which can also be entirely asymptomatic (Catley, Moseley and Jones, 2019); the diagnosis and treatment of osteoarthritis alone is not sufficient to address the pain in those patients who experience it, as clearly this pain must be arising from other factors. In fact, until at

least 2019, there were no studies that reported a direct relationship between presence or intensity of pain and presence of pathology (Catley, Moseley and Jones, 2019).

The biopsychosocial model

The epidemiology of chronic pain supports the concept that tissue damage or structural change plays a relatively smaller role in the development of chronic pain than other factors; sufferers tend to be predominantly female, from lower socioeconomic backgrounds, military veterans, unhoused persons, and those living in rural areas (Cohen et al., 2021). Other risk factors include social isolation, speaking a primary language different to the country of residency, and experiencing pain or inactivity for a significant time before consultation or treatment (Catley, Moseley and Jones, 2019). Moreover, an eight-fold increase in inability to work due to lower back pain in Britain over four decades coincided with a shift to less physically demanding work due to mechanisation and a shift towards service industries, meaning the increase in pain is unlikely to be explained by biomechanical overload (Vargas-Prada and Coggon, 2015). Similarly, a sharp increase in arm pain among Australian office workers in the 1980s was not matched by other countries using the same technology (Vargas-Prada and Coggon, 2015). Clearly, pain cannot be fully explained by mechanical or physiological factors.

The biopsychosocial model was first proposed in 1977 (Jones and Rivett, 2019). It describes a "multidimensional, dynamic interaction among physiological, psychological, and social factors that reciprocally influence each other, resulting in chronic and complex pain syndromes" (Edwards et al., 2016).

While it may seem expected that chronic pain would cause low mood states such as depression, longitudinal studies actually suggest the opposite causal relationship, with

individuals suffering from depression being more likely to develop chronic musculoskeletal pain conditions (Vargas-Prada and Coggon, 2015). Neurochemical explanations have not been found to explain this link (Vargas-Prada and Coggon, 2015), highlighting the importance of evaluating and treating the emotional and psychological state as part of the assessment and treatment of the musculoskeletal pain.

Although the emergence of the biopsychosocial model is a significant step forward in the understanding of chronic pain, the application of this model to treatment modalities is lagging. Indeed, Edwards et al. (2016) point out that although the role of biopsychosocial factors in the development and maintenance of chronic pain have long been recognised, "in practice [… they] are often assigned secondary status and viewed largely as reactions to pain".

The next section, therefore, will look at some of the most common approaches to managing or treating chronic pain.

Section 2: Current treatment options

Pharmacological treatment

Often, the first treatment strategy for acute and chronic pain is medication (Oyler et al., 2015). Indeed, numerous pharmaceutical drugs are known to be effective in reducing pain. It would be beyond the scope of this review to discuss the specific indications and contraindications of these, but given that drug overdose is the leading cause of injury-related death in 30 states of the United States (Oyler et al., 2015), it seems particularly vital to consider alternatives to medication for long-term pain management.

Non-steroidal anti-inflammatory drugs (NSAIDs) are generally considered a safe alternative to opioids, but they also carry significant side-effects including various gastrointestinal complaints, a risk of cardiovascular thrombotic events, and potentially decreased fracture healing and risk of infection (Oyler et al., 2015).

Acetaminophens are used in conjunction with a lower dose of opioids. Unlike NSAIDs they lack an anti-inflammatory effect, and decrease nausea, vomiting and sedation (Oyler et al., 2015). However, their use has been correlated with liver failure and increased risk of cardiovascular events (Oyler et al., 2015). Antiepileptic drugs such as gabapentin and pregabalin have been shown to be effective in reducing neuropathic pain, but may not be appropriate for patients with renal failure, and do have potential for abuse or misuse (Oyler et al., 2015). N-methyl-D-aspartate (NMDA) receptor agonists such as ketamine are also effective in reducing neuropathic pain when administered with opioids, but it is unclear if they act independently or if their mechanism is to enhance the effects of the opioids (Oyler et al., 2015). In any case, they also present a potential for abuse, and it is therefore advised that treatment be limited to a short

timeframe (Oyler et al., 2015), thus taking it out of consideration for the treatment of chronic pain.

Skeletal muscle relaxants and benzodiazepines may be effective in certain cases, namely through anxiolytic properties, and antidepressants have been shown to reduce fibromyalgia pain, neuropathic pain, phantom limb pain and chronic lower back pain (Oyler et al., 2015; Edwards et al., 2016).

Evidence regarding the effectiveness of pharmaceutical drugs supports the recommendation that chronic pain be treated as a distinct pathology from acute pain. Not only would treating the pain sensation in chronic pain sufferers amount to treating the symptom and not the cause, but evidence suggests these treatments may actually be ineffective in reducing pain in individuals exhibiting elevated levels of negative affect (Edwards et al., 2016). This is a significant consideration in light of the association between negative affect and pain levels.

Physiotherapy and exercise

Physiotherapy, or physical therapy, is another common intervention for individuals suffering from chronic pain. There is a wide variety of approaches to physiotherapy, but it usually involves a combination of manual therapy techniques and rehabilitation exercises.

Arribas-Romano et al. (2020) evaluated the effects of some common interventions within the field of physiotherapy on two specific measurements of chronic pain, temporal summation and conditioned pain modulation, and found that both manual therapy techniques and strength training exercises (but not aerobic exercise) had beneficial effects on one or both of these markers, particularly when these interventions were combined. Spinal manipulation therapy was found to decrease pain and improve function up until 1-month follow-up, but not at 6 or 12

months, so it is recommended that this physiotherapeutic approach be used only as an adjunct to other, more active strategies such as exercise (Malfliet et al., 2019). Interestingly, contrary to popular belief, the effects of spinal manipulation therapy could not be attributed to biomechanical changes, with no difference in effect size between patients receiving region-specific manipulation techniques versus non-region-specific techniques (Malfliet et al., 2019).

As with spinal manipulation, the reduction in pain and disability following successful exercise therapy did not correlate with increases in physical function, suggesting once again that chronic pain is an experience generated predominantly by psychosocial factors (Malfliet et al., 2019). This is underscored by the lack of differences in effect size between groups following different exercise modalities (e.g. aerobic exercise, strength training, Pilates, etc.). Interestingly, aerobic exercise was found to have a potentially exacerbating effect on fibromyalgia patients, in contrast to neutral or pain-reducing effects in the general population (Arribas-Romano et al., 2020).

Pain education (PE)

As the understanding of chronic pain as originating and being perpetuated by the central nervous system has developed, interventions focussing more on psychosocial factors than physiological or mechanical factors have become more popular. Even in cases where the pain condition is not being treated according to the biopsychosocial model, such as in traditional physiotherapy as described above, it is known that a patient's beliefs about their pain will influence their recovery; for example, if a patient equates their degree of pain with the level of damage in their tissues, they will tend to avoid moving or loading those tissues, thus

exacerbating the issue (Semmons, 2016). PE has been proposed as an approach to reconceptualise pain in order to help patients understand that pain is not evidence of harm or threat, and that remaining physically active and mobile is not only safe but advisable. PE has yielded promising results without any further intervention (Lumley and Schubiner, 2019; Nijs et al., 2014), although Malfliet et al. (2019) note that the effects are limited to short-term decreases in disability and kinesiophobia, without any change to pain levels. In order to affect pain, PE had to be combined with physiotherapy, although Malfliet et al. (2019) also found these effects to be only short-term.

Marris et al. (2021) found that patients receiving PE alongside physiotherapy improved more than those receiving physiotherapy alone, or other control groups. None of the control groups included pharmacological management of chronic pain, which is a clear limitation of that particular meta-analysis; although given the risks associated with prescription drugs as outlined above, evaluating the effectiveness of all other interventions and considering medication as a last resort may be a logical approach. Interestingly, PE was not found to have an effect in the general population but did improve health status and reduce pain in fibromyalgia patients (Romano et al., 2020).

On the other hand, Louw et al. (2016) found that patients given only PE had less favourable outcomes than those given PE alongside movement and/or manual therapy. It could be argued that this is counterintuitive, as PE focusses on teaching patients that their pain is not linked to the state of the tissues, whereas hands-on techniques or specific exercises would suggest there are changes to be encouraged within the tissues. Louw et al.'s findings suggest that the use of touch-based therapies may not be at odds with the rationale underpinning PE. Given the low cost, and ease of offering widespread access to PE, this is certainly a worthwhile

intervention or addition to a course of treatment.

Massage and manual therapy

The use of massage and manual therapy has been observed for millennia (Vickers and Zollman, 1999; Hunt et al., 2019; Makepeace, 2023). Massage has been found to be effective in alleviating lower back pain during pregnancy, labour pain, migraine headaches, premenstrual syndrome, chronic fatigue, fibromyalgia, carpal tunnel syndrome, rheumatoid arthritis and osteoarthritis of the knee (Field, 2014).

Massage can be defined as "the manipulation of the soft tissue of whole body areas to bring about generalised improvements in health, such as relaxation or improved sleep, or specific physical benefits, such as relief of muscular aches and pains" (Vickers and Zollman, 1999). Manual therapy, sometimes considered distinct from massage and sometimes used as a catch-all term to include classic massage strokes such as effleurage, has been defined as "skilled hand movements and skilled passive movements of joints and soft tissue and are intended to improve tissue extensibility; increase range of motion; induce relaxation; mobilize or manipulate soft tissue and joints; modulate pain; and reduce soft tissue swelling, inflammation, or restriction" (Puentedura and Flynn, 2016). Given the broad definition of massage and manual therapy, which could include a variety of techniques applied by a range of professionals – without even considering the wide variance in pain conditions, which must, of course, be considered – it is no surprise that the research into the efficacy of massage in treating pain is equivocal (Furlan et al., 2015).

The argument that there is a lack of scientific evidence – usually referring to the lack of randomised controlled trials (RCTs) – supporting the efficacy of massage and manual therapy is

flawed. While it cannot be disputed that the lack of blinding and control could lead to biased results and placebo effects, if we recall that pain is first and foremost defined as an experience, the experience of symptom reduction must be considered valid, whatever the cause. The attempt to replace subjective ratings with imaging therefore is understandable but misguided (Robinson, Staud and Price, 2013). Moreover, a key definition of chronic neuroplastic pain and central sensitisation is that the pain sensation is diffuse and changeable; therefore, variability in outcomes cannot be used to discredit a study into chronic pain. Indeed, Robinson et al. (2013) point out that "50% of the variability in self-report of clinical pain is predictable".

A variety of specific mechanisms by which massage could modulate pain have been proposed and observed in a research setting (Makepeace, 2023). A one-month course of moderate-pressure massage (defined as "moving the skin" as opposed to "stroking the skin" for light-pressure massage) has been found to increase deep sleep in fibromyalgia sufferers, along with a decrease in salivary substance P which is known to cause pain (Field, 2014; Makepeace, 2023). There is also evidence that moderate-pressure massage increases attentiveness, mediated by vagal activity and correlated with a slower heart rate (Field, 2014). Stretch reflex has also been observed to decrease following moderate-pressure massage, which would suggest lower alpha motor neuron excitability (Field, 2014). Increased alpha motor neuron excitability has been observed in chronic pain conditions, so this mechanism could have a direct impact on chronic pain.

The correlation between negative affect and chronic pain has already been discussed. In general, massage has been seen to decrease heart rate, blood pressure, and cortisol levels (Field, 2014; Walker et al., 2017; Hunt et al., 2019). In both animal studies and a range of human studies, various forms of touch, stroking, and massage have been found to increase oxytocin

levels (Walker et al., 2017). There is also evidence that massage can shift frontal lobe EEG activity from right to left in depressed individuals; an important finding as increased right frontal lobe activity can be observed even when depressed individuals are not exhibiting behavioural symptoms (Field, 2014). Other objective markers of depression and negative affect, such as low serotonin and dopamine levels, have also been reversed following moderate-pressure massage, and blood flow to areas of the brain associated with depression and stress regulation have been increased (Field, 2014).

Whilst manipulation of the body is a core component of physiotherapy, the use of the hands in this context is often merely a tool to elicit structural changes in the soft tissues, and is often substituted for other tools such as percussive devices or instruments. However, human touch has important properties in its own right for the management of pain. In fact, manipulation under anaesthesia has been found to be ineffective for chronic lower back pain (Puentedura and Flynn, 2016). Moreover, in an experiment comparing touch with bare human skin and touch with a rubber glove, touch with bare human skin was found to elicit greater activity in the anterior cingulate cortex, the area of the brain associated with decision-making, impulse control and emotional regulation (Field, 2014).

The analgesic properties of touch have been studied for decades, starting in 1965 with the "gate control theory" suggesting that because both thin and large diameter nerve fibres (associated with nociception, and other sensations including touch, respectively) transmit sensory information from the injury site to the spinal cord, only the dominant input is registered (Fairweather & Mari, 2015; Geri et al., 2019). In other words, sensations such as touch, pressure and vibration can "replace" pain. This has been proposed as the mechanism by which "deep tissue" massage, characterised by deep pressure strokes, reduces pain (Meijer et al., 2022). It is

also thought that deep pressure increases vagus nerve activity, which reduces pain (Meijer et al., 2022).

There is also compelling evidence that pain can be decreased by delivering what is known as “affective touch”, defined as “gentle stroking of the skin which provides a pleasant sensation”, using either a hand or a soft brush (Meijer et al., 2022). However, the optimal temperature for affective touch, also referred to as “CT-optimal touch” as it is this form of touch that best activates C-tactile nerve fibres, which modulate pain, is 34°C, which is skin temperature (Meijer et al., 2022), so there may be an advantage to using the hands to deliver affective touch. Indeed, although in one study the moderate-pressure massage group had the greatest decreases in anxiety levels, both other experimental groups - receiving either light-pressure massage or vibration applied by hand-held massage wand - experienced decreases in anxiety levels (Field, 2014). This highlights the potential benefits of all forms of touch and the importance of the skin in modulating pain, and offers treatment alternatives for patients who may not be able to tolerate deeper pressure for any reason, for example in cases of complex regional pain syndrome (Semmons, 2016), or who may be unable to access touch-based therapies. It is important to note, however, that the light-pressure and vibration stimulation groups experienced an increase in arousal levels, which may not always be appropriate for a given patient (Field, 2014). These considerations should be taken into account by the therapist, by including questions about psychosocial factors such as mood state and energy levels in the intake form or initial assessment, in order to determine the most appropriate techniques for the patient.

Indeed, as discussed, pain is not a purely physiological or biomechanical phenomenon. Similarly, touch is not simply a mechanical input; indeed, touch can have an analgesic effect even when applied to areas of the body distinct from the site of pain (Goldstein et al., 2016).

Moreover, the magnitude of these analgesic effects is modulated by the identity of the person administering the touch – i.e., whether they are known to the receiver of the touch, or not – and their level of empathy (Goldstein et al., 2016). Walker et al. (2017) found that physiological responses to an acute stressor were better modulated by touch from a partner than verbal support. Goldstein et al. (2016) also noted an inverse correlation between a partner's empathy levels and their perception of their partner's pain when touch was absent. This could have important ramifications for therapists in understanding their patients' pain levels; even a highly empathetic therapist who does not use touch in their treatments may perceive their patients' pain as less intense than a less empathetic therapist who does use touch.

However, to reduce our discussion of the benefits of massage and manual therapy to the effects of touch and empathy would be a disservice to the care of those 30% of individuals suffering from chronic pain worldwide. It is easy, in our call for greater consideration of psychosocial factors in chronic pain conditions, to forget the biological and physiological factors altogether.

In addition to the ability of the therapist's hands to elicit structural and chemical changes in soft tissues, and to communicate empathy and elicit feelings of safety, physical touch can improve the patient's awareness of their body (Walker et al., 2017). This body awareness is usually referred to as "body schema" in the context of chronic pain management and movement, and has important links with pain experience, as chronic pain is known to negatively impact this internal body map in a phenomenon known as "smudging" (Fairweather and Mari, 2015; Puentedura and Flynn, 2016). Indeed, simply touching the lower back and asking patients to identify the segment of their back where they were touched, decreased pain and increased spinal flexion in patients with chronic lower back pain (Louw et al., 2016). This is highly significant

particularly for clients with high levels of fear avoidance, as it can reintroduce movement in a non-threatening way (Hunt et al., 2019).

As mentioned above, given that pain education teaches patients that their pain is generated by the central nervous system and not by the painful tissues, there is concern that applying touch to the area of pain may undermine this teaching; however, research has shown that both affective touch and manipulation techniques have global effects, so it is possible to deliver touch to areas other than the site of pain. Again, patient expectation and therapeutic alliance will have significant bearings on treatment outcome, so it is important to identify a patient's beliefs and expectations in the initial consultation.

A single common thread: the role of therapeutic alliance

It is common, when discussing research into a therapeutic intervention, to describe its effects in comparison to placebo or control. It is easy to understand how this may pose a particular challenge in researching massage therapy; study participants know whether they are receiving treatment or not (as opposed to being given two identical pills, for example, one of which lacks the active ingredient) and if, as discussed above, any form of touch may elicit neurochemical and psychological changes, sham treatment (as is often used in acupuncture studies) becomes impossible. Thus, the fact that massage or manual therapy is often said not to perform superiorly to placebo should not be viewed as an argument against using these therapies but as a clue to the mechanisms of action and possible direction for further study.

There are well-established links between patient expectation and health outcomes; patients who expect that a treatment will be beneficial experience greater relief from their symptoms than those with more pessimistic beliefs (Fairweather and Mari, 2015; Puendetura and

Flynn, 2016; Catley, Moseley, and Jones, 2019). While this may not sound like a factor that a therapist can influence, research has shown that patients who have good relationships with their doctors experience better health outcomes (Fairweather and Mari, 2015). This has been known since at least the 4th century BC when Hippocrates described the ideal appearance and demeanour of the physician (Silverman, 2012) and there is ample evidence that physicians with skills and certain personal characteristics, ranging from clear communication to humour, experience fewer cases of litigation (Levinson et al., 1997; Fairweather and Mari, 2015). Even in a study of oncology lawsuits – where one may expect interpersonal relationships to be outweighed by the objective physiological and chemical considerations – 71% of lawsuits were filed due to a sense of desertion by the physician, poor communication or lack of bedside manner (Lindsey, 2007). Lindsey (2007) also highlights the importance of health literacy in preventing litigation, which supports the role of patient education in health outcomes as discussed above.

Discussion

Research strongly supports encouraging chronic pain sufferers to take an active role in their recovery process, and following a multimodal treatment approach that incorporates movement and/or exercise. Whilst there is debate as to the efficacy of passive treatment techniques such as manipulation and massage, there is an argument that patients often expect these techniques, and that therefore their use may contribute to building a strong therapeutic alliance, which is necessary for patient buy-in to the active aspects of their treatment protocol.

Moreover, there is evidence that physical touch can contribute to a more positive mood state, which is known to correlate with more positive treatment outcomes. Touch can communicate the therapist's empathy and promote feelings of safety for the patient, both of which will strengthen the therapeutic alliance. A strong therapeutic alliance helps to educate a patient that some of their beliefs about their pain, which may still be held by many people they will continue to interact with throughout their recovery process, are unfounded and unhelpful. Moreover, touch may also help reverse the "smudging" associated with chronic pain, restoring sensation and movement in affected areas, perhaps allowing patients with a high level of fear and avoidance to return to movements and activities before full buy-in is achieved through pain education. Moderate pressure may be required for massage to have a beneficial impact on sleep and vagal tone, both of which will modulate pain levels. Therefore, a treatment that incorporates both light-pressure (i.e. affective touch) and moderate-pressure massage, in proportions appropriate to the patient's condition, tolerance, and expectations, may be more effective than using only one form of touch-based therapy. In any case, it must always be delivered in a context of strong therapeutic alliance, and accompanied by education and guidance towards active strategies such as exercise or movement.

A clear and significant limitation of this paper is the inability to directly compare treatment modalities, given the wide range of chronic pain pathologies, severity, combination of biopsychosocial factors, and techniques used within even a single treatment approach such as physiotherapy. However, it could be argued that attempting to isolate individual factors in order to study their effectiveness would be misguided even if it were possible, as the complexity of the interactions of all factors contributing to pain and disability is inherent in the etiology of chronic pain. Moreover, the therapist's personality and their relationship with each client directly contribute to treatment outcomes, by way of therapeutic alliance; two therapists delivering the exact same set of techniques to the same client are unlikely to achieve the same result. Fairweather and Mari (2015) make this exact point and build this concept into their massage-based protocol known as The Jing Method; a hands-on approach incorporating light-pressure techniques such as myofascial release with moderate-pressure techniques such as trigger point therapy, the proportions of which are governed by a thorough biopsychosocial assessment, and always accompanied by patient education and the suggestion of active modalities such as exercise or self-treatment techniques.

Semmons (2016) argues that therapists working with chronic pain patients should evaluate which of the biopsychosocial factors predominate in a patient's pain condition, and thus prioritise this one facet, for example through referral to a psychotherapist if psychological factors are seen to be the main cause. However, this again fails to recognise the interconnectedness of the components of the biopsychosocial model. For instance, although a chronic pain condition may perhaps not arise from a traumatic injury or structural changes, the pain itself often leads to behaviour modification including compensatory movement patterns, which themselves can end up causing tissue tension and eventually atrophy, leading to pain with a structural element, thus

compounding the cycle (Hunt et al., 2019). It may then no longer be possible for the individual to sense the imbalance caused by their compensatory patterns, as by their very definition they arise out of the body's attempt to rebalance itself. This makes performing rehabilitation exercises correctly challenging. Touch-based therapies can be used in this instance to improve the body schema, thus improving the efficacy of any prescribed rehabilitation exercises, as well as to deliver manual therapy techniques that may redress some of the structural changes. Where fear-avoidance is also a part of the cycle, the same touch delivering manual therapy and improving body schema could be upregulating parasympathetic nervous system activity thus reducing the sense of threat around movement.

Similarly to Semmons, Lumley and Schubiner (2019) call for an assessment that specifically addresses adverse childhood experiences (ACEs) and "internal conflicts that create anxiety", as well as recording changes or onset of pain associated with stressful experiences including the recall of ACEs or discussion of internal conflicts during said interview. This assessment would also include physical examination and review of scans, but the authors note that this would be primarily to exclude nociceptive or neuropathic pain (Lumley and Schubiner, 2019). This binary division once again fails to recognise and treat the cyclical nature of chronic pain, in which both nociceptive and/or neuropathic pain and centralised pain can be present and influencing each other.

Steinmetz (2022) calls for more specific classification of lower back pain into numerous subgroups, and introduces a number of tools presented to establish the causes and severity of these various types of lower back pain. However, these diagnostic approaches continue to reduce an individual and their pain experience to a single cause or mechanism, rather than recognising that multiple factors are likely to be contributing to a patient's pain experience by the time it

becomes chronic and disabling enough to seek a prolonged course of treatment. Moreover, it is important to note that the presence of any one of these factors may fluctuate throughout the course of an individual's pain experience, so funnelling them into a single treatment modality based on their presentation at initial consultation reduces the ability of the practitioner to be responsive to changes.

In the case of emotional and psychological trauma, unidirectional causality is assumed. Whilst this may be predominantly the case, and it cannot be argued that the emotional trauma precedes and indeed causes the onset of a chronic pain condition or heightened pain experience, the possibility that ongoing pain or other physiological symptoms may contribute to a person's traumatisation must be considered. Indeed, although the associations between biopsychosocial variables are strong, research has not yet been able to confirm the temporal relationship between them (Edwards et al., 2016). For example, for an individual who was involved in a road traffic accident and became traumatised, the experience of pain at the time of the incident forms a part of that trauma; experiencing similar pain in a manual therapy or physiotherapy exercise session, however therapeutic, may well reinvigorate the traumatic memory and thus feed the vicious cycle. Again, this is an area where any form of touch could improve outcomes, through delivering a sense of empathy and safety, and downregulating sympathetic nervous system activity; perhaps even allowing effective techniques or exercises to be performed which otherwise would have been too painful.

Conclusion

It is clear that there is no single approach in the treatment of chronic pain, but that touch-based therapies such as massage can and should play a role in a flexible and multimodal treatment plan. Rather than leading to a conclusion that there is no solution for this global burden, this realisation should be a call to action for therapists and physicians of all backgrounds to come together to share their expertise. The field of pain medicine should consider shifting the emphasis from increasingly detailed diagnostics and theories about the mechanism of pain, and towards the creation of a system for greater and more seamless collaboration between therapists. The elaboration of such an integrated system would allow therapists and physicians to focus on their area of expertise, without the pressure of being solely responsible for a patient's outcome, thus allowing them to project a higher degree of confidence and experience, which we know will increase a patient's confidence and thereby chance of successful outcomes. Although the fields of pain management and therapy appear to be moving away from all passive treatment modalities, research strongly supports the benefits of touch, which positively impacts a number of elements of the biopsychosocial model.

Further research should focus on evaluating multimodal protocols such as The Jing Method that emphasise this therapeutic alliance and patient education whilst incorporating touch-based therapies and active movement.

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