



Masterclass

Integrating osteopathic approaches based on biopsychosocial therapeutic mechanisms. Part 2: Clinical approach

Gary Fryer, B.Sc(Osteopathy), PhD. ^{a, b, *}^a College of Health and Biomedicine, Victoria University, Melbourne, Australia^b A.T. Still Research Institute, A.T. Still University, Kirksville, MO, USA

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ABSTRACT

The biopsychosocial mechanisms for therapeutic effect in an osteopathic treatment encounter for people with somatic pain were reviewed and discussed in Part 1 of this article. The author argued that both biological and psychosocial therapeutic mechanisms are potentially important in clinical practice, although the relative importance of these mechanisms differs depending on the person's presentation and the nature and chronicity of the involved pain. In Part 2, clinical implications of the differing processes of pain and therapeutic mechanisms of osteopathic techniques are discussed. A rationale is presented for osteopathic management based on an understanding of the likely biological and psychological factors present and for the complementary actions of manual therapy with a cognitive behavioural approach to pain and disability. Appropriate communication, reassurance, education, and empowerment can result in positive attitudes and behaviours to pain and complement the specific biological effects of osteopathic manipulative treatment. This article will aid the clinical reasoning process and provide guidance to osteopaths for treatment selection based on patient presentation and the likely biological and psychological factors involved in pain and disability.

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Introduction

Osteopathic manipulative treatment consists of a wide and eclectic range of manual techniques that are used to optimise function and reduce pain [1,2]. The osteopathic approach is claimed to be holistic, which is sometimes described as consideration and treatment of the physical body as an interconnected whole [1,2], but should also encompass consideration of broader psychosocial factors [3]. Biopsychosocial therapeutic mechanisms for the effectiveness of manual therapy were reviewed in Part 1 of this article. The aim of Part 2 is to explore and describe clinical approaches that match the important therapeutic mechanisms to the pain processes and movement impairment encountered in persons with somatic pain. Osteopathic texts have described a wide range of techniques [1,2], but few texts offer guidance for using particular techniques or approaches for different patient presentations, the likely processes involved in pain and disability, or the likely therapeutic mechanisms of the techniques.

Osteopathy has a biomedical heritage, and osteopathic manipulative technique developed within a biomechanical paradigm. However, lack of clinical evidence supporting the longevity and clinical relevance of tissue changes following manual therapy, in contrast to the growing evidence of the influence of psychosocial factors and central nervous system (CNS) changes in response to pain, suggests that the biomechanical framework was over-emphasised in the past. This second article will explore and discuss how an understanding of the likely mechanisms for therapeutic effect can guide clinical reasoning and emphasise the most appropriate treatment approach.

Therapeutic mechanisms of manual therapy

Part 1 of this article presented evidence from experimental studies and explored the mechanisms that might be responsible for therapeutic action in the manual therapy consultation for persons with musculoskeletal pain. Osteopathy is considered a complex intervention, which means that treatment may have therapeutic effect because of a combination of biological (encompassing biomechanical, tissue changes, and neurologically mediated mechanisms) and psychosocial mechanisms; the relative influence

* College of Health and Biomedicine, Victoria University, PO Box 14428 MCMC, Melbourne, 8001, Australia.

E-mail address: gary.fryer@vu.edu.au.

of these different mechanisms varies between people. There is strong evidence of the adverse effect of psychosocial factors on pain and disability [4], and substantial clinical evidence that education [5] and psychosocial approaches in clinical practice improve attitudes and reduce disability [6,7]. Multidisciplinary treatments that target psychological and social aspects as well as physical aspects of low back pain (LBP) have resulted in larger improvements in pain and daily function than treatments aimed only at physical aspects [6].

Of the biological mechanisms, experimental and clinical evidence suggest that manual therapy produces short-term modulation of pain, probably mediated by activation of the descending inhibitory pathways of the CNS [8–11]. While there is limited clinical evidence supporting immediate increases in spinal range of motion [12–17] and influence on posture [16,18–20], additional research is required to determine whether these changes are clinically relevant. It is important to realise that, while basic or primary experimental research may support the plausibility of a variety of mechanisms that produce changes to the tissues or nervous system, there remains a lack of clinical evidence that establishes these changes as relevant and meaningful to clinical outcomes in patients. Some of these plausible, but speculative, therapeutic mechanisms affecting the tissues include drainage of tissue fluids and pro-inflammatory metabolites from injured joints and tissues [21–23], short-term changes in joint pressure and motion due to joint tribonucleation and cavitation [24,25], manipulation of extrapped zygapophyseal meniscoid folds [24,26], promotion of tissue healing and collagen remodelling following injury [27–29], reduced thickness (densification) and improved viscosity of the loose connective tissue layer in deep fascia [30,31], mechano-transduction and anti-inflammatory cellular responses of fibroblasts [32–36], improvement in sensory motor integration [37–39] and proprioception [40–43], parasympathetic responses following gentle techniques to the neck and head [44–46], and increased lymph flux, circulating lymphocytes, and immunity from abdominal lymphatic pump techniques [47–50].

Clinical approach

In a clinical setting, the techniques and osteopathic treatment approach to the person with pain and movement impairment will depend on the diagnosis of the individual's presentation. This diagnosis will be detailed enough to be able to inform the practitioner whether the underlying pain is predominately from nociceptive pain, typical in acute pain, or from central sensitisation, which may predominate in chronic pain. The diagnosis is based on the clinician's judgement of the patient presentation, history, and clinical findings; but specific tools may be helpful in determining the presence of central sensitisation and important psychosocial factors. Given that many osteopaths currently assess and diagnose using a biomechanical framework, these tools may be very helpful in identifying non-biomechanical factors. Symptoms or clinical findings that are judged to be related to tissue, neurological, or psychosocial processes will require treatment approaches that address the specific processes. Hence, a person with largely tissue-based nociceptive pain symptoms might be treated with techniques that most likely influence tissue-based mechanisms, such as progressive mobilisation of healing and repairing tissue. For most people, a blend of biological and psychological factors will contribute to pain and dysfunction, and these factors should be addressed concurrently. In some people, some factors will predominate, and the emphasis of treatment will shift to address the relevant factors.

If a person presents with predominately nociceptive pain, the emphasis of the treatment will be on techniques that address the

tissues, such as approaches that assist healing and adaptation of injured tissues; enhance fluid flow and drainage around a joint, muscle, or region; or improve passive and active mobility and posture. If abnormal or impaired neurological processing is judged to be involved, such as central sensitisation or poor motor control, the osteopath may wish to use techniques and approaches that are likely to modulate pain, improve sensorimotor integration and proprioception, and improve motor control. When important psychosocial factors have been identified, the osteopath will need to carefully listen and empathise, reassure, educate, and empower the person to be active and involved in their own management.

What is the type of pain and physiological process involved?

Knowledge of the likely processes responsible for a person's pain will better inform the osteopath regarding appropriate management. Information from the patient history, clinical findings, and specific questionnaires can help determine the predominating type of pain process involved. Nijs et al. [51,52] outlined a process for classifying predominately neuropathic, nociceptive, and central sensitisation pain in persons with chronic pain. Initially, the presence of neuropathic pain should be identified or excluded. If neuropathic pain can be excluded, the next step is to identify whether the pain is of nociceptive (originating from the tissue nociceptors) or central sensitisation origin [51,52]. The clinician should also be aware that chronic pain may involve a dynamic mix of nociceptive and central sensitisation input in many people [53,54].

Neuropathic pain arises as a direct consequence of a lesion or disease affecting the somatosensory system; the lesion can be central or peripheral, such as radicular pain from a compressed nerve. Therefore, neuropathic pain should be identified or excluded based on factors such as whether the pain is described as burning, shooting, or pricking or whether the pain is neuroanatomically logical, although a dermatomal or peripheral nerve distribution may not be a consistent feature [55]. Further, neuropathic pain may be identified by identification of the underlying neurological lesion, particularly if radiculopathy with sensory impairment is present [51,52]. If neuropathic pain is indicated, then referral to a medical specialist should be considered as appropriate to the underlying condition and patient symptoms.

With neuropathic pain excluded, the clinician must differentiate between pain of nociceptive and central sensitisation origin. Nociceptive pain is from input of nociceptors in the tissues and is typical of acute pain. The clinician must determine whether the pain experience is disproportionate to the nature and extent of injury or pathology, taking into account the anxiety of a patient in an acute situation, and whether it is widespread. In the case of LBP, clinical judgement and some speculation about the likely extent of the injury are required since the nociceptive causes of non-specific LBP cannot usually be determined clinically [56]. If the pain experience appears to be proportionate to the extent of injury and is localised, then nociceptive pain from tissue injury is most likely [51,52].

Central sensitisation pain is more predominate in chronic pain [57]. If the pain experience is disproportionate to the nature and extent of injury, the clinician should determine whether the pain is widely distributed beyond the putative area of injury. If the pain is widespread and if clinical signs of hyperalgesia (to pressure, pin prick, or heat and cold) and allodynia (to light touch) are detected outside the area of the injured tissue, central sensitisation pain is implicated [51,52]. If the pain is disproportionate but not widespread, further questioning is recommended for other signs of sensitisation, such as sensitivity to bright lights, noise, temperature, and stress, because these signs are often involved in central

sensitisation. Additionally, screening tools, such as the Central Sensitisation Inventory [58], may aid the diagnosis of central sensitisation pain [51,52].

Discussion of the case history and careful communication with the patient may reveal the presence of psychosocial yellow flags, which are psychosocial risk factors for chronicity of pain. Yellow flags include the belief that back pain is harmful or severely disabling, fear-avoidance behaviours and reduced activity levels, low mood, or an expectation that passive treatments rather than active participation will help [59]. Useful questions can include 'Have you had time off work in the past with back pain?', 'What do you understand is the cause of your back pain?', 'What are you expecting will help you?', 'How is your employer/co-workers/family responding to your back pain?', 'What are you doing to cope with back pain?', and 'Do you think that you will return to work? When?' [59].

Where yellow flags are suggested or where the pain is chronic or persistent, the use of validated tools will confirm the presence of risk factors. The short-form Orebro Musculoskeletal Pain Screening questionnaire [60], Start Back Screening Tool [61], Fear Avoidance Beliefs questionnaire [62], and Tampa Scale of Kinesiophobia [63] are all useful to determine and quantify these risk factors in a clinical environment. If anxiety and depression are suspected, using a screening tool like the Hospital Anxiety and Depression Scale [64] is advisable. Additionally, these tools can be later used as an objective outcome measure of the patient's clinical progress. Depending on the severity of the scoring for these tools and the clinical presentation, referral to an appropriate practitioner, such as a psychologist, is advised.

What approaches and techniques should I use?

Most osteopathic and manual therapy texts provide little guidance on the selection of techniques for patient presentations, particularly chronic pain. The author will outline a broad approach to technique and treatment selection based on the likely physiological processes underlying the symptoms. This is a broad guide only, and clinicians will need to use their judgement based on the clinical presentation, their skill level, and the patient's preferences. The following examples are based on spinal pain presentations, but the principles apply to pain or injury in any region.

Acute pain and movement impairment

In persons with acute spinal pain and movement impairment and where pain is proportional to the injury and not widespread, nociceptive pain from tissue sources is implicated. The tissue source of spinal pain may arise from any of the innervated structures and is not possible to determine with clinical assessment [65]. Movement impairment in acute pain is likely related to voluntary guarding to limit load on pain sensitive structures and fear avoidance behaviour in response to the pain. In addition to techniques aimed at addressing tissues, patients should receive reassurance that there is no serious injury or pathology and encouragement to be active to mitigate the likelihood of developing inappropriate beliefs and behaviours about their pain.

Treatment approaches should be selected that address the tissue source and likely nature of tissue dysfunction. Although the nature of injury and tissues involved in acute nociceptive pain is usually speculative, tissue damage and inflammation are likely, and there is a rationale to apply techniques that promote optimal tissue healing (remodelling of collagen in response to mechanical stress), fluid drainage (from around the inflamed and congested region), and mobility. An eclectic range of manual techniques may assist the clinician in meeting these goals. When tissue injury is suspected, motion and progressive loading (articulation, stretching, active

movement as appropriate) to match the degree of healing and connective tissue remodelling [27] should follow the initial management of acute inflammation. For example, very gentle extensibility and stretching forces are advisable for a strained muscle in the first few days of injury, which can be progressively increased as the sensitivity of the tissue decreases and healing occurs. Passive manual techniques may promote movement [12–17] and reduce pain [8–11] and, combined with reassurance and pain education, encourage the person to perform normal movement patterns and activity (Fig. 1).

Active and passive movements create pressure fluctuations within synovial joints [66], which promote trans-synovial flow of fluids across the synovial membrane and stimulate blood flow around the joint [67–69]. When active motion is limited by acute pain or apprehension, passive joint articulation may promote drainage from and around the joint to relieve inflamed and congested tissues. In osteopathy, joint articulation is traditionally performed at the end-range of joint motion to increase range of motion, but the author proposes that mid-range articulation may be advisable when joints are acutely painful. For example, end-range techniques may further injure and inflame joint capsules and associated tissues, whereas mid-range articulation, progressed towards the barrier as pain recedes, may promote pain inhibition and fluid drainage without irritating the injured capsule or provoking fear and anxiety in the patient.

Muscle energy technique (MET) may also enhance drainage of inflamed and congested regions. Rhythmic muscle contraction from exercise increases muscle blood and lymph flow rates [23]. Similarly, MET application may facilitate lymph and venous drainage and reduce pro-inflammatory cytokines in tissues, which could be of particular use when the person is not active because of fear of pain and guarding behaviour. MET is traditionally applied at the end-range of a restrictive joint barrier [1], but variations have been proposed for the apprehensive person with an acutely painful joint and are theorized to promote fluid drainage [70]. In acute conditions, gentle isometric muscle contraction can be performed with the joint in the mid-range of available motion, alternating the direction of contraction. Thus, the joint is not positioned at the painful barrier, so the person should be relaxed and not fearful of experiencing pain. The repetitive contraction and relaxation phases may aid drainage of tissue fluid from around the joint and stimulate muscle and joint mechanoreceptors to promote descending inhibition of pain, as previously discussed. As the person becomes less fearful, the joint can be progressively positioned towards the restrictive barrier, and decreases in pain may then allow a traditional end-range MET to be performed [70].

Where pain and inflammation are very substantial, indirect techniques may be useful. Indirect techniques typically involve placing the person in a position of comfort, and studies have reported reduction of pain [71] and anti-inflammatory effects [35,36] following these techniques. In addition to possible tissue effects, the position of comfort is reassuring for the person and may reduce fear and anxiety. There is moderate evidence that high-velocity, low-amplitude (HVLA) spinal manipulation decreases pressure pain sensitivity [9], but HVLA may not be appropriate if the individual has substantial pain and is anxious. Adequate joint positioning and relaxation are required for the successful application of HVLA, and this positioning and relaxation might not be achievable. Even though acute pain may not involve long-lasting central sensitisation or psychological involvement, reassuring the person is important to mitigate these factors becoming involved. A clear and simple reassurance that no serious damage has occurred (unless serious damage is evident) without the use of technical or discipline jargon should reduce anxiety and affirm that normal activities can be resumed and maintained where possible.

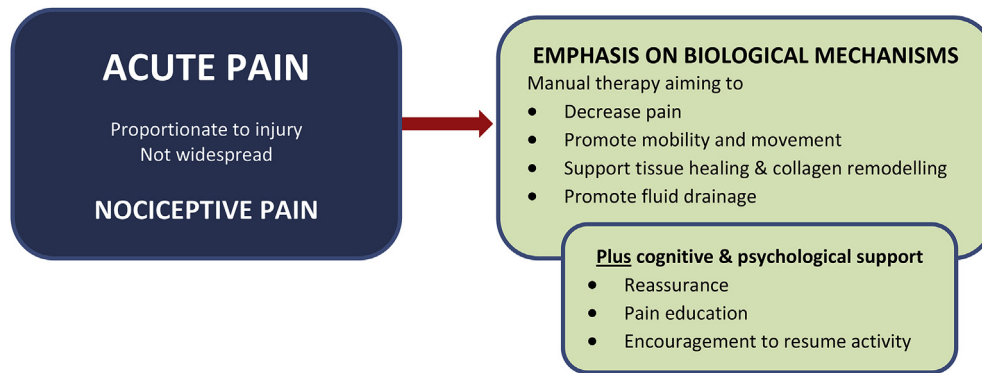


Fig. 1. Treatment emphasis for acute pain.

Chronic pain and movement impairment

Central sensitisation is likely the predominating process in chronic pain [57], and the emphasis of treatment will change to approaches that target neurological and psychosocial mechanisms. Passive manual therapy will have a lesser role in the treatment of these persons. However, a peripheral nociceptive component may sometimes be involved with chronic pain [53,54] and, given evidence that central sensitisation can diminish once the peripheral nociceptive driver is removed [72], addressing tissues in people with chronic pain, along with neurological and psychosocial factors, may still be justified. Movement impairment may initially relate to guarding and avoidance of movement in the direction that provokes pain [73] and may become habitual even when the nociceptive stimulus has resolved. The primary aims of treatment for persons with persistent pain are to reassure and reduce their fear of pain, educate them about the nature of chronic pain, identify and correct inappropriate beliefs and behaviours concerning their symptoms, and encourage activity and confidence in movement (Fig. 2). Pain education that involves an explanation of the neurobiology of pain, along with reassurance and addressing fears [74], can have a positive effect on pain and disability [75].

Manual therapy may have a small role in decreasing pain by activating descending pain mechanisms [8–11], aiding sensorimotor and proprioceptive processing [37–43], and promoting mobility and flexibility [12–17]. When a person has persistent pain, they may be fearful of movement, employ bracing and guarding strategies, and have poorer proprioceptive and fine-position motor control [76–81]. Immediately following an application of manual therapy, there may be a reduction in pain sensitivity and increase in motion and, although only short-term, these changes may help reduce fear, avoidance, and guarding and, in conjunction with cognitive reassurance, pain education, and practitioner guidance of movement, may provide the confidence to move in a normal manner without fear of pain. Passive and active movement with lessened fear and avoidance behaviour may help desensitise movement, allowing the CNS to unlearn the stimulus as a threat.

O'Sullivan and colleagues [73,82] have described subgroups of chronic LBP patients with movement impairment, where pain avoidance in the direction of pain accounts for the movement impairment of one subgroup. They also developed cognitive functional therapy which directly challenges the pain behaviours in a cognitive, specific, and graduated manner [73,82]. In one study with LBP patients, this approach produced superior outcomes compared with traditional manual therapy and exercise [83].

Manual techniques, such as passive joint articulation, may be an important first step in promoting mobility and confidence in movement in persons with chronic pain and movement impairment. Together with reassurance and pain education, the clinician

provides reassuring contact and support (for example, supporting the person's arms and back during seated thoracic rotation articulation), allowing the person to relax and permit passive movement with reduced fear and guarding strategies. It is important that the movements are not painful and that the clinician has established good communication so that the person will signal when feeling pain.

Given the evidence of its ability to produce hypoalgesia [9], HVLA potentially has a role for persons with chronic pain. However, the evidence for HVLA is largely limited to short-term benefits in pain threshold [9], and studies on chronic pain show small, significant, but not clinically relevant, short-term effect on pain relief [84]. Therefore, HVLA is hard to justify unless the person has a strong preference based on previous positive responses, but the osteopath should be careful to not reinforce erroneous beliefs of a tissue basis of pain (the spine that is 'out'), a topic which will be elaborated on later in this article.

Although lacking supporting evidence [85], the author proposes that MET may have a role for people with chronic pain and serve as a useful link between passive techniques and active rehabilitation [86]. MET has both passive and active elements (passive mobilisation, active muscle contraction) and may be useful for persons who are fearful, guarded, and avoid movement as they transition to becoming more active, less fearful, and engaged in exercise programs. Exercise programs appear to be beneficial interventions for people with LBP [87–89], as well as for preventing LBP [90] and recurrences of LBP [91]. The exercise programs may consist of short, simple exercise or fitness programs [89] or of strength, resistance, and stabilisation exercise programs [88].

In a variation of MET, graded progression of isometric and concentric contraction is used through the full range of motion while the person feels safe and not fearful of pain [70]. A plane of motion can be chosen that is easy for the clinician to control, such as rotation, and the patient should perform gentle isometric contraction efforts towards neutral through 'stages' of ranges of motion (e.g., in neutral, at 20°, at 40°, etc.). Further, gentle, controlled concentric (i.e., isotonic in MET literature [92], allowing motion and muscle shortening) contraction phases can be employed, initially in stages of ranges of motion where controlled motion is allowed towards the mid-range neutral position, and then progressed to gentle concentric contractions towards the barrier or painful range, as appropriate to the patient. This approach can be used in the non-painful joint range and be progressed using stronger contraction efforts, but it should cause no pain and provide comfortable, consistent contraction and movement, and the patient should be relaxed and not apprehensive [70].

For persons with chronic pain, the psychological risks must be explored and well managed. Psychosocial yellow flags should be

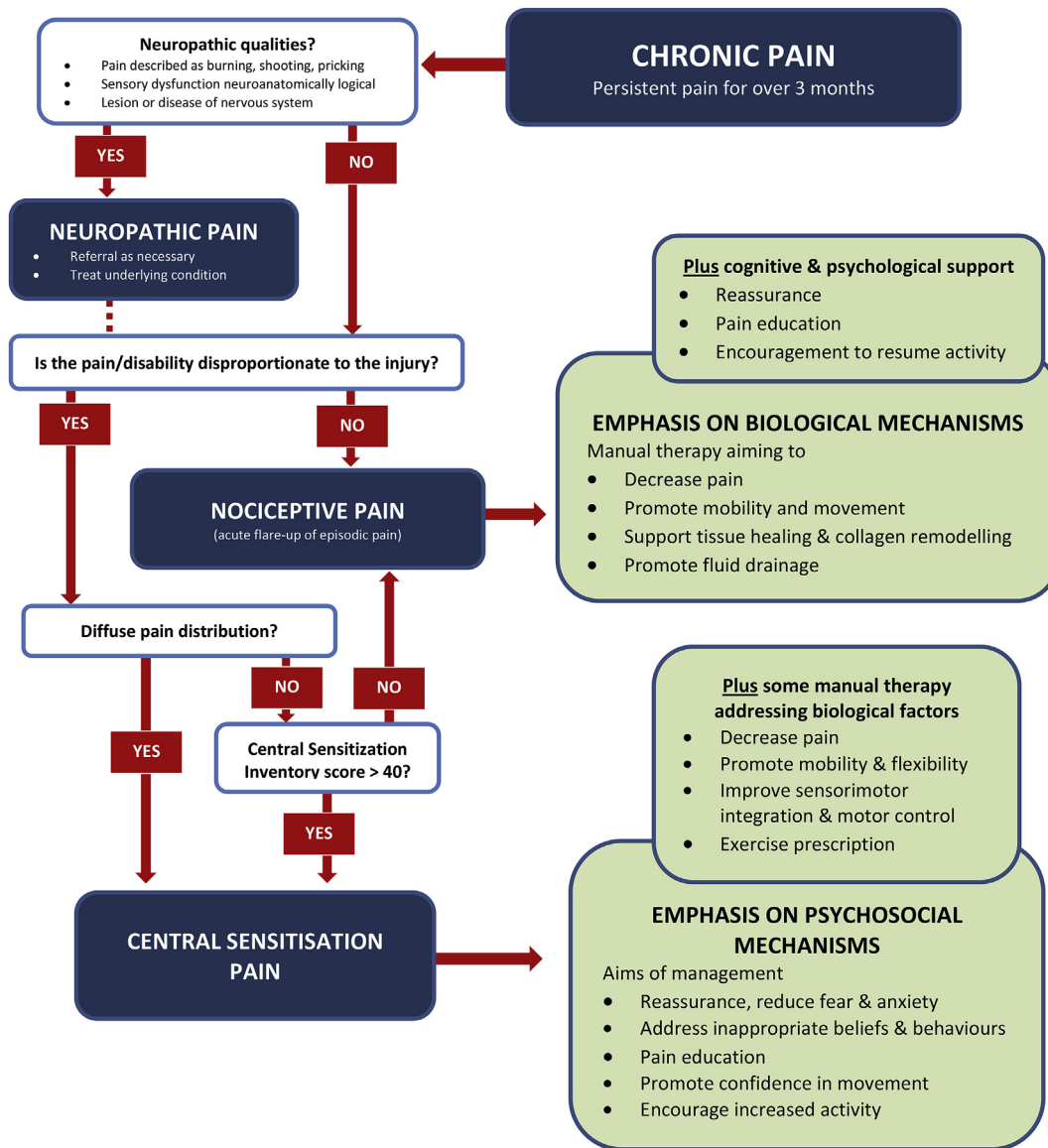


Fig. 2. Diagnostic and treatment approaches for chronic pain. Pain question flow chart modified from Nijs et al. [50,51].

identified and, where appropriate, screening questionnaires, such as the short-form Orebro questionnaire [60], Start Back Screening Tool [61], Fear Avoidance Beliefs questionnaire [62], and Tampa Scale of Kinesiophobia [63], can be employed to quantify these risk factors and monitor their progression. The clinician should provide education about the nature of the pain, reassurance, and positive messages and be aware of how their medical jargon may either encourage and empower the person or produce unintended adverse consequences. Further, osteopaths should recognise the limits of their scope of practice, and when patients have been identified with chronic pain and psychological risk factors, they should consider a referral to specialist psychologists or multidisciplinary pain clinics. Osteopaths should also consider upskilling in cognitive behavioural therapy approaches, such as Acceptance and Commitment Therapy (ACT). ACT aims to increase psychological flexibility and focuses on improving function, has been suggested for use by manual therapists [93], and has been reported to have positive effects on chronic pain, depression, anxiety, pain intensity, physical functioning, and quality of life [94].

The language of disempowerment

Anxiety about the cause or consequences of a back problem may make some people fearful of movement, cause them to be hyper-vigilant and over-attentive to their pain, and decrease their confidence in performing daily activities [95]. Fortunately, clinicians can have a strong and enduring influence on the beliefs of their patients [95,96]; therefore, clear information and positive messages should be conveyed. A person's understanding of the source of their symptoms is influenced by their interpretation of the information provided by their health practitioner, which in turn influences their symptom interpretation [96]. Patients may selectively focus their attention on statements that reinforce their beliefs about their pain and, with a poor choice of words, a clinician may inadvertently reinforce counterproductive beliefs and behaviours [97].

The medical jargon used by clinicians can have a powerful influence on a person's interpretation of their symptoms. Historically, osteopathic manipulative treatment was developed within a biomechanical conceptual framework and has given rise to a

disparate range of labels for alleged biomechanical dysfunctions [86,98]. The use of medical and osteopathic jargon can scare and disempower people because benign dysfunctions (typically minor movement impairments) may be interpreted as serious impairments with long-term consequences that require ongoing passive manual treatment for correction.

The language associated with the 1950s Fryette biomechanical model [99] is still used in many current osteopathic texts [1,2,92,100]. 'Positional' nomenclature of dysfunction is commonly associated with this largely discredited model [86] and includes labels, such as 'flexed and rotated' vertebra, 'anteriorly rotated' innominate bones, or 'superiorly subluxed' first ribs, all of which inevitably reinforce the erroneous concept of a 'bone out of place'. Using such jargon may confirm the impression of a serious structural disorder in the mind of a fearful person, leading to catastrophizing, fear avoidance behaviour, and unnecessary dependency on treatment to correct the person's back when it 'goes out'. In this author's view, positional terminology is anachronistic and potentially harmful. Motion restriction terminology is a preferable means of defining the motion characteristics of a segment because it does not reinforce the message of a fixed displacement in the mind of the patient or practitioner.

When a clinician thoughtlessly states to a patient that the 'L5 vertebra is flexed and rotated', the messages conveyed may be something like: 'My vertebra is twisted and out of place; no wonder I'm in pain; and it will probably never stay in, and I'll always have pain and need treatment'. Similarly, the notion of 'clinical instability' has been popular among some osteopaths, and a statement to the patient that 'Your muscles are not doing their job and your low back is unstable' conveys the message of 'My back is fragile, and I need to be very careful or I will injure it again'. These messages can be further reinforced by the suggestion that the person should be rebuked to keep a 'check' on the problems identified. Even inadequate attempts at pain education may be counterproductive. The statement 'Your back is fine, but the pain is all coming from the brain' may be easily misinterpreted as 'The osteopath thinks my pain is all in my head and that I'm making this pain up, so I'll find someone who believes me'.

The language of empowerment

Providing explanations to people about their conditions in a way that is meaningful and accurate without using jargon or terms that may be misinterpreted is challenging. Clinicians need to carefully consider how to frame information in a way that the information will not be misconstrued. Osteopathic educational institutions have the remit of providing their graduates with language that avoids positional and structural jargon and conveys appropriate messages to patients.

An emphasis on positive messages, education, and reassurance are important to reduce fear behaviours and will empower people to take an active role in their own management [7]. Confirming the person's understanding of what has been said can ensure information is interpreted as intended and will avoid unintentional reinforcement of unhelpful beliefs and behaviours [96].

Reassurance using positive messages, such as 'The good news is that your bones and discs are basically healthy and strong', will provide confidence and reduce fears about fragility and the harmfulness of activity. While not specific or even accurate, explaining that osteopathic treatment will help loosen and relax the muscles and help the back function better may demystify the role of treatment and be less likely to validate the person's perception of the presence of a 'back lesion'. Statements, such as 'keeping flexible, active, and strong will help keep your back healthy and reduce the pain', provide empowering and helpful messages.

Conclusion

The biological and psychological mechanisms for therapeutic effect in an osteopathic treatment encounter were explored in Part 1 of this article. The author argued that a combination of biological and psychological factors likely influence pain in many people and that treatment should aim to address these factors. Part 2 of this article explored the clinical implications and approaches for treating somatic pain in an osteopathic setting based on an understanding of different processes in acute and chronic pain and the therapeutic mechanisms and approaches that might be most useful.

The present article highlighted the need to identify the type of pain the patient may be experiencing as neuropathic, nociceptive, or central sensitisation; determine whether a tissue source of pain is likely; and assess whether psychosocial risk factors for chronicity are present. If pain is predominately nociceptive, treatment may be targeted at tissues, whereas if it is predominately central sensitisation pain, treatment should be targeted to influence neurological and psychosocial mechanisms and passive manual therapy will have a much smaller role. Manual therapy may produce temporary reductions in pain and increased movement, which complements the cognitive behavioural approach used to reduce fear avoidance and improve pain and confidence in movement. The language that the practitioner uses is important because it may convey positive or unintended counterproductive messages. Finally, a range of manual techniques have been discussed in relation to the likely processes underpinning the symptoms and mechanisms of treatment to guide clinicians in appropriate treatment selection.

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