**Author's Accepted Manuscript**

**SUBMITTED TO:** The International Journal of Osteopathic Medicine

**TITLE:** Communication strategies in psychologically informed osteopathic practice: A case report

**AUTHOR:** Hilary Abbey

**KEY WORDS:** Osteopathy, psychology, case report, communication, pain

**ABSTRACT**

Introduction: This paper presents qualitative data from communication between an osteopath and patient participating in a research study to develop a new psychologically informed pain management course.

Presentation: 'Adam', aged 49, presented with persistent pain and multiple health problems including HIV and depression. His aim in joining the study was to find ways to stay independent.

Evaluation: Existing osteopathic evaluations of musculoskeletal dysfunction were supported by psychological assessments of health beliefs and coping strategies.

Intervention: Psychological and mindfulness exercises were integrated into six osteopathic treatment sessions to support symptom relief, patient learning and self-management.

Data analysis: Audio-recordings were analysed qualitatively using Linguistic Ethnography.

Outcomes: Communication moved from 'mechanistic' pain discourses about diagnosis and structural damage towards 'facilitative' narratives involving shared sense-making about broader embodied experiences. Physical outcomes were similar to previous osteopathic treatment but with longer lasting effects due to more effective self-management, decreased fear-avoidance and increased physical activity.

Conclusion: This patient reported that a psychological and mindfulness informed pain management course increased his body awareness and ability to live well despite pain. Individual case findings are not generalisable, but the data appear to support an ecological-enactive model of osteopathic practice and suggest promising directions for future research.

**IMPLICATIONS FOR PRACTICE**

- Open questions, facilitative communication and mindfulness can be used to explore patients' present moment body experiences during osteopathic consultations

- This process of ‘mentalising interoception’ may bring preconscious sensorimotor inputs into the cognitive domain, enabling reappraisal of beliefs and behaviour
- Osteopaths can reframe patients’ own sensory descriptions and pain imagery to identify health beliefs and update narratives about the body and the self
- Osteopaths’ personal mindfulness practices and body-awareness can help to identify when and how to encourage patient learning and self-management
- Further research is needed to explore a range of cognitive and embodied-enactive learning processes that may enhance outcomes in osteopathic practice

## INTRODUCTION

This case report presents data from the second of three research studies designed to develop a psychologically informed pain management course [1, 2, 3]. The aim to integrate physical and psychological interventions was aligned with calls to expand the scope of osteopathic care [4] and optimise the effects of touch-based treatment [5, 6]. Persistent pain is associated with psychological, cognitive and behavioural symptoms, so multidisciplinary pain management programmes typically include Cognitive Behaviour Therapy (CBT), physical therapy and exercises, but often with different interventions delivered separately to patient groups [7]. This qualitative study was developed to assess if it was feasible for an osteopath to integrate psychological interventions from Acceptance and Commitment Therapy (ACT), a form of '3rd wave' CBT which incorporates mindfulness [8] with physical treatment for individual patients [9]. Data from one patient in this study is presented here to explore how different communication strategies influenced pain beliefs, behaviour and self-management.

Concerns have been raised about the scope and effectiveness of biopsychosocial models of care as biomedical evidence is often prioritised, and psychosocial factors considered only when standard treatment fails [10, 11]. It has been suggested that pain should be viewed phenomenologically as 'a relational and emergent process of sense-making through a lived body' [12:1]. From this perspective, patients' psychosocial context and beliefs become essential aspects in assessment and management [13]. To strengthen the theoretical base which underpins clinical work, Esteves et al (2021) [14] published an 'Ecological-Enactive Framework' for osteopathic practice which combines biomedicine, psychology, and cognitive science [15], based on assumptions that lived experiences arise from engaging with the world as 'a set of possibilities not yet actualised' [16:106].

One theory in cognitive science describes how individuals maintain allostasis in constantly changing internal and external environments using predictive processing, a function of the Bayesian brain [17]. The brain makes inferences about the individual's current homeostatic state and potential need for action, based on existing body-world models. The aim is to maintain effective function and minimise predictive errors i.e., differences between actual and optimal state [18]. Predictive processing is a key concept in the theory of active inference [16] and Ramstead et al's broader model of enactive inference [19] provides a framework for evaluating health experiences in individual ecological context. In enactivism, allostasis also involves metabolic, affective and existential sense-making processes [17] using somatic and visceral inputs [20].

Allostatic adjustments to internal and external environmental changes primarily occur automatically, but responses can also be influenced by an individual's conscious interoceptive capacity including *sensibility*, ability to notice internal sensations; *accuracy*, ability to interpret sensations; and *awareness* of how to use sensations to aid allostasis [21]. These mechanisms influence neural plasticity in the boundaries between an individual's internal and external environment and broaden patients' awareness of possibilities for meaningful activity [22, 23].

Research into psychologically informed physiotherapy [24, 25, 26] and osteopathy [2, 3] demonstrated promising outcomes, but there is little research into *how* changes occur in interventions with dual treatment and self-management aims [27]. In manual therapy, embodied therapeutic relationships involve participatory sense-making that occurs 'in the moment-to-moment interaction of two subjects' [28:466], and involves social connections [29] and ecological relationships with the environment [30]. This highlights the need for research to explore practice from both patients' *and* practitioners' perspectives as they interact in a therapeutic dyad. Although this case study was completed before the models above were published, the findings aim to illustrate the influence of different modes of communication in a psychologically informed osteopathic pain management course.

## METHOD

This paper follows the CARE guidelines for case reports [31] and describes the methodology of the qualitative study from which the individual patient data was extracted.

**Design:** A research study was conducted in 2013 to explore the feasibility of combining manual treatment with psychologically informed interventions to expand osteopaths' scope of care for patients with persistent pain. It followed a mixed methods pilot study of a group course in 2010-11 [1]. The researcher was an experienced osteopath (>30 years) who had also worked as a counsellor and undertaken training in Acceptance and Commitment Therapy (ACT). The auto-ethnographic research design utilised 'insider knowledge' of osteopathy, and of delivering the intervention, to explore process and outcomes in the development of the new course.

**Ethics:** The study was approved by the University of Bedfordshire Ethics Committee and the British School of Osteopathy Research Ethics Committee. Participants provided informed consent for anonymised data to be used in research reports and professional presentations.

**Intervention:** The study aimed to integrate psychological and physical interventions in each of the six, weekly, one-hour sessions. Psychological content was piloted in a previous group

course [1], but methods for integrating interventions in individual patient care evolved with experience during the study. Osteopathic assessments and treatments were based on patients' existing case histories in the [name of institution] clinic. Psychological assessments were based on ACT, a transdiagnostic approach that does not focus on causes or severity of health problems but aims to transform patients' relationships to distress by developing psychological flexibility [8] and were integrated with data from osteopathic evaluations.

Psychological flexibility is based on six core principles: *acceptance* of inner experiences that cannot be controlled; *defusion* from fixed thoughts; *awareness* of what is happening in the present moment; ability to hold multiple perspectives of the *self in context* (i.e., not limited to a fixed identity as a 'chronic pain patient' for example); awareness of personal *values* and goals; and *committed action* to achieve these goals [32]. The course was guided by a Practitioner Manual and Patient Workbook, adapted for individual needs, not a set protocol [33, 34]. Session 1 focused on present moment awareness, avoidance and fusion, moving to acceptance and defusion in Session 2. Session 3 focused on body awareness and physical function. Sessions 4 and 5 explored personal values and obstacles to change, and Session 6 aimed to develop a sustainable, patient-led self-management plan.

Mindfulness exercises included breathing exercises and body scans, which can improve perception and decision-making [35] and may contribute to interoception [20]. Practices were adapted for individuals and varied between two and twenty minutes, increasing in duration over the course. The Patient Workbook introduced mindful exercises each week, but frequency and duration of practice were optional. In some exercises during the sessions, touch was introduced to focus the patient's attention with debriefing and dialogue afterwards to support shared sense-making.

**Recruitment:** A purposive sample of four patients was recruited using posters in the [name of institution] clinic. One-hour screening interviews explored their goals and willingness to take part in research. Inclusion criteria were adults with pain for more than six months who were not waiting for further medical investigations. ACT focuses on relationship to symptoms [8], so there were no standard assessments of pain type, severity or other conditions. Exclusion criteria were uncontrolled substance abuse or psychosis, which may be contraindications for mindfulness [36]. The risks of becoming more aware of pain through mindfulness and challenges in 'accepting' pain were discussed and, if there were concerns about safety or suitability, the GP was contacted for advice.

The first four eligible patients who provided informed consent were enrolled and included two men and two women, aged 45 to 60, presenting with non-specific neck pain, back pain that had not been relieved by hip and back surgery, Fibromyalgia, Multiple Sclerosis and HIV.

**Outcomes:** The study explored the flexibility of patients' pain responses, so evaluation focused on psychological assessment, rather than diagnostic tests or medical variables. Behavioural outcomes included the ability to engage with valued activities, rather than symptom changes, and were assessed qualitatively from changes in communication about activities in day-to-day life. The researcher's insider knowledge was used to assess whether interactions were successful in achieving intended outcomes and identifying contextual factors that had enabled or limited changes.

**Data analysis:** Data were collected in audio-recordings of pre-course interviews, six treatment sessions and post-course interviews at six months. Audio-recordings were transcribed verbatim and analysed using Linguistic Ethnography (LE), a complex interdisciplinary approach which involves linked stages of Conversation Analysis (CA) and Discourse Analysis (DA) [37]. On their own, CA findings cannot be generalised beyond a specific context, whereas DA generalises findings from grouped data but loses nuanced individual meanings. LE includes a mid-level interactional stage of analysis which enables CA findings to be situated in the context of social relationships and cultural norms [38].

Table 1 illustrates three stages of frequency analysis which were conducted on all the data to identify communication types [39], patterns of interaction and 'sites of engagement' for deeper analysis [40]. Micro-level Conversation Analysis (CA) [41] was used on selected extracts to explore linguistic content and themes in interactions coded as 'familiar' or 'unfamiliar' in the context of the osteopath's experience. Interactional Socio-Linguistic Analysis (ISL) of social norms in speech patterns [42, 43] was conducted to explore relational dynamics, and macro-level Discourse Analysis (DA) situated pain discourses in the broader cultural context of biomedical and biopsychosocial healthcare perspectives [38].

Table 1: Stages of Linguistic Ethnography analysis

| Method of analysis | Used to identify |
|---|---|
| Frequency analysis: ACT content | Colour coding of 'avoidance', 'awareness' and 'approach' as relevant 'sensitising concepts' (Rampton et al 2014) |
| Frequency analysis: linguistic structure | Sentence coding by type and purpose using the Roter Interactional Analysis System (Roter and Larson 2002) |
| Frequency analysis: ethnographic factors | Coding of interactions as 'familiar' or 'strange' in osteopathic practice using the researcher's insider knowledge |
| Frequency coding of communication types | 'Familiar' osteopathic care vs 'exploratory' learning interactions |
| Micro-level Conversation Analysis | Analysis of linguistic content in 'familiar' and 'unfamiliar' interactions to identify different types of discourse about pain |

| | |
|---|---|
| Mid-level Interactional Sociolinguistics | Analysis of conversational norms to explore social roles and therapeutic relationships |
| Macro-level Discourse Analysis | Analysis of discourse processes and outcomes from biomedical and biopsychosocial perspectives |

Frequency analyses of the whole data set showed that osteopath-led communication predominated, with fewer examples of patient-centred interactions. A decision was made to focus on data from one patient which illustrated the most diverse communication examples. Data from the other three patients were also analysed, but in less depth, to provide context and confirming or divergent examples of communication in the full study thesis [9].

## PATIENT PRESENTATION

'Adam', aged 49, presented with persistent neck and back pain of >10 years' duration. Other conditions included HIV, neuropathy, asthma and medication-related gastrointestinal symptoms. He lived alone and had been unemployed due to disability for several years. Different symptoms limited his ability to walk, sit or drive, leading to inactivity and isolation. Adam had previously been diagnosed with degenerative changes in the lumbar and cervical spine, with congenital bony fusion and stenosis at C5/6. He was under the care of a GP, HIV consultant and neurologist and had received CBT for depression. Adam's pain had previously been relieved, temporarily, by osteopathic treatment but he felt this was gradually becoming less effective and he was in danger of losing his independence.

Adam's psychological flexibility was assessed using data from the pre-course interview.

Avoidance and fusion: Adam's motivation to join the study was to find '*new weapons*' and '*tools to fight pain*', which suggested lack of acceptance that symptoms might persist. He seemed fused with thoughts that his pain was caused by *'damage that could not be cured'*. Adam coped with pain by avoidance or endurance e.g., ignoring symptoms until he '*fell over'*, then using medication to *'zonk him out for three days'*, in typical 'boom and bust' behaviour [44].

*Yesterday, I could quite easily have taken a gun to my head. The pain was just so bad... I'm like a prisoner of painkillers... If I dose myself up, I can do things, but then if I dose myself up, it gets me to the stage where I just don't really want to do anything. I feel like I'm wasting my life… (P4.0, pre-course interview)*

Awareness and self-as-context: Adam's narratives focused on past experiences and future fears, rather than current sensations that were difficult to cope with. He felt that his sense of self had become '*fragmented*' into dysfunctional body parts.

Values and committed action: Adam had previously been employed in helping roles and was depressed by increasing disability but reluctant to ask for help. He was '*willing to try anything*' and joined the study to learn new ways to '*fight pain*'.

Findings presented below illustrate how different modes of communication were used to explore changes in Adam's embodied experiences and responses to pain, links between different discourses and the patient-practitioner relationship and course outcomes.

## FINDINGS

Extracts below illustrate changes in Adam's body awareness and approach to managing pain. Conversation Analysis transcription details have been deleted for ease of reading [45]. O represents osteopath and P is the patient. Numbers in brackets refer to course sessions and extracts in the original study thesis [9]. Interpretations of meaning were guided by the researcher's insider knowledge, so personal pronouns have been used where appropriate.

Although the timeline of changes was not linear, there were distinct differences in the ways that pain was conceptualised over the six sessions. Linguistic descriptions and imagery illustrated different approaches to understanding pain (Table 2), based on underlying assumptions about its nature, meaning and appropriate responses. These were categorised as 'mechanistic' discourses which framed pain biomedically and 'facilitative' discourses which encouraged learning about the broader psychosocial impacts of pain (Table 3).

Table 2: Examples of differences in mechanistic and facilitative discourses

| Mechanistic | Facilitative |
|---|---|
| Single anatomical cause of pain: *I can pinpoint it and put my finger on the bit that causes all the problems* | Varied sensation: *I can feel something happening… that's been quite painful, but it feels as though there's something releasing* |
| Violent aversive images: *It feels like it's biting my neck, but it feels jagged. Teeth tearing away…* | Images to be explored: *Like the same door but completely different, not closed. Felt more like something being sucked out of there…* |
| Autonomous body parts: *The shoulder wants to rush forwards* | Owned experience: *I can feel how I'm holding on to it* |
| Passive experience: *There's a drawing of energy from the neck to the point where your hand is touching* | Active engagement: *I've sort of focused then on when I was breathing out, and just relaxing my top half of my body* |

Table 3: Linguistic themes which illustrated changes in Adam's response pain

| | Pre-course and Weeks 1 - 3 | Weeks 4 - 6 and post-course |
|---|---|---|
| Type of discourse | 'Mechanistic' imagery | 'Facilitative' imagery |
| The nature of the body | The war zone | The foreign land |
| The meaning of pain | Resistance: a call to arms | Acceptance: it is what it is |
| Patient role and identity | Putting on a brave face | The curious explorer |
| Osteopath role and identity | Mechanic with magic hands | The guide and interpreter |

### Mentalising interoception

Focusing attention on present moment bodily sensations enables the process of 'mentalising interoception' [18]. Using mindfulness exercises during osteopathic assessment and treatment, Adam described sensations and explored previously unnoticed experiences, sometimes guided by changes in muscle tension or breathing that I noticed. I did not attempt to interpret the meaning of his experiences from my external observations but used these cues to ask open questions about what he might be noticing. His pain descriptions focused initially on structural damage and a need to avoid movement.

*It feels like it's going to explode. I can feel the scraping of the bone on the bone (P1.1)*

*If the spasm is set off in my neck, then I'm in bed for three days (P1.2)*

I encouraged Adam to describe sensations in more depth, which were often hesitant but rich in imagery about present moment awareness that did not always make (mechanical) sense.

*The neck is… I can feel it's… quite locked but it's quite loose…, locked and loose. (P1.5)*

*It's less tight than it was, if that makes sense. It's almost like it's dropped an octave. (P1.6)*

Neck pain descriptions gradually changed from *'chomping, black*' sensations to *'dark red, strangling*' feelings to '*pulsations*' of arterial blood flow, which he noticed more if stressed.

*The pain in my neck, it feels quite black, and it feels like it's biting my neck. (P4.1)*

*The pain… its' desperation was almost like clawing at me…teeth tearing away... (P4.3)*

*It certainly wasn't as black as it was last week, the pain, and the chomping that I was feeling, it's blood flow, the pumping, it's pulsating… (P4.4)*

Adam gradually started to link thoughts and sensations with their impact on his daily life.

*I think the learned pattern of behaviour of the physical learning is that the moment my neck goes, then I just tense up, which I do in order to protect the neck… (P4.6)*

*I can feel this setting off now and the sense of dread… Dread of being in excruciating pain, having to dose myself up with painkillers, stop what I'm doing and lie down, not knowing how long it will go on for but expecting it could be days. It's unbearable and it's a waste of time… (P4.7)*

**Interoceptive awareness and behaviour change**

Over time, Adam seemed to shift from automatic avoidant reactions to more flexible, conscious responses to pain. 'Interoceptive surprise' can be created when prior expectations are compared to, and differ from, actual sensations [51]. With guidance during treatment,

Adam noticed what '*holding on*' felt like, and explored his own ability to release tension and enjoy the sense of ease in his body.

*How's this? [hand pressure] (O3.1)*

*I can feel at the front of my chest, in the middle, my breastbone, is kind of um… I can feel how I'm holding on to it from the inside. It's quite interesting because it doesn't seem to relate to any particular muscles, but I can feel myself widening. I can feel my shoulders going and it doesn't feel like there's any… I'm not doing anything, if that makes any sense? (P3.2)*

*I think you are doing something. I think you are <u>not</u> holding on… Do you have awareness anywhere else lower down in your body? (O3.3)*

*Right now, where your left hand... there's a twinge that I can feel... And that seems to be doing the same sort of spreading thing that my shoulders are doing... It feels almost like when you pour a pancake into a pan, it feels like I'm doing that. Strange... (P3.4)*

Adam learned that instead of having to '*knock himself out with pills'*, he could use mindful breathing to *'make space'* for pain and carry on with activities for longer. Using new self-care strategies, he also found that treatment effects were sustained.

*If I'm lucky it [treatment] lasts a week and because I'm being more careful about what I'm doing. I'm more self-respectful, then things are lasting longer and being more self-respecting hasn't just happened because of … to be honest, [I didn't think] the mindfulness thing would have been my cup of tea. There's definitely something that has worked about it, because it's not just affected my body, its affected other parts of my life as well… (P4.17)*

**Changes in role**

Over several sessions, linguistic analysis illustrated a shift from avoidance to awareness, acceptance and active self-care. At first, 'mechanistic' discourses framed Adam's body as a battlefield, littered with broken parts, with pain caused by external attacks that he had to fight. Gradually, 'facilitative' discourses emerged with richer descriptions of embodied experiences and a stronger sense of personal ownership of 'my' body. Adam noticed how thoughts about pain influenced his reactions and sense of self. He started to focus on finding ways to cope but remain active, which changed his role from being a 'stoic fighter' to a 'curious explorer' (Table 3).

*When you put your hand there, the shoulder feels scared of... the shoulder is feeling really scared and skittish... I can feel there's uh, the front of my chest in the middle or breastbone is kind of um… I can feel how I'm holding on to it. (P4.10)*

*Do you have any sense what your body would like to happen in this area? (O4.11)*

*Um, the instinctive, er it's the instinctive is still the 'Die Hard' [pain endurance illustrated in an action film]. My shoulder wants to rush forwards um… push (P4.12)*

*What was the urge to push forwards? (O4.13)*

*Umm… it was protection... (P4.14)*

*You've let your shoulder drop into my hand as it's come back a little bit. And you've not got that protection. Does that open up any other sensations? (P4.15)*

*Well, there's a vulnerability there but I feel quite safe, so I don't feel [scared]. Does that make sense? I think there's a couple of times that I've been tearful lying here talking, just thinking. I think I must have quite a well of sadness, which is all to do with where I am... (P4.16)*

## DISCUSSION

This case report illustrates changes in communication interactions in one patient-practitioner dyad in a qualitative research study. The way that Adam talked about pain and its' impact in his life gradually appeared to shift from 'mechanistic' pain discourses about damage and the need for treatment and control to 'facilitative' discourses about self-directed ways to live a more active, meaningful life despite pain (Table 3). Changes in imagery were accompanied by congruent descriptions of behaviour changes. This discussion outlines a range of psychological and neurophysiological theories to explore how changes may have occurred through mindfulness and interoception and their implications for further research.

### Mentalising interoception

Pain has been described as a function of the whole person, which is made visible when normal activities become problematic and a person's familiar sense of their body becomes 'unhomelike' [12, 46]. Patients may become anxious about losing agency, which can limit their capacity to reappraise situations when new sensory information is received [18]. The theory of predictive processing explains how the Bayesian brain makes probabilistic inferences which monitor a person's allostatic state by comparing interoceptive and exteroceptive inputs against prior expectations [18]. Strong beliefs based on previous experience can over-ride present moment sensory inputs and the physiological effects of pain on neural plasticity can lead to interoceptive deficits [47, 48]. Interpretations of sensory information may therefore be influenced by a person's beliefs and expectations or be altered to minimise prediction errors i.e. patients feel pain because they expect to [51]. If patients interpret normal sensations as signs of dysfunction, their risk of developing persistent pain increases [49]. Practitioners therefore have an important role in helping patients notice

differences between their expectations and actual physical capabilities. Enactive inference suggests that body awareness can be increased by making pre-reflective experience and beliefs accessible for reappraisal, and this process of 'mentalising interoception' is aided by precise language and imagery to create links between sensations, thoughts and emotions [18].

Adam initially made immediate negative judgements about sensations he labelled as 'pain'. With encouragement, he gave richer, more precise but often hesitant descriptions of broader embodied experiences which often did not initially 'make sense'. At first, Adam referred to himself as a collection of fragmented dysfunctional body parts and he ignored areas that were not painful. This suggested a combination of avoidance, hypervigilance and dissociation, which could influence neural plasticity and contribute to interoceptive deficits [48]. My role was to provide a safe space to explore avoided sensations; encourage precise descriptions of present moment experiences; avoid interpreting meaning or reducing discomfort prematurely, especially for confusing or distressing experiences. This required open communication and conscious shifts between a familiar role and a more collaborative patient-led approach [50].

Manual treatments may affect somatic awareness and neural plasticity unconsciously as pain relief can occur through pre-reflective autonomic reactions to physical or emotional changes [16, 51]. Symptom perception can also be mediated by beliefs, including the anticipated effects of medication or treatment [51]. It could be argued that osteopaths normally support the process of mentalising interoception, although standard practices may not be sufficiently 'patient-centred' [50], and nocebic and structural diagnostic language has been shown to reinforce dysfunctional pain beliefs and behaviour [52]. During active examinations, I encouraged Adam to describe what he noticed because repeated exposure in a safe environment can gradually extend range of movement [53] and decrease the fear of anticipated pain [54, 55]. Combining communication, touch and mindfulness facilitated the process of mentalising interoception [19, 28] and contributed to Adam's apparent shift towards a sense of body ownership.

Guided mindfulness was combined with touch to help Adam contain sensations he might normally avoid as being too painful [56]. When there were signs of autonomic arousal, open questions were used to encourage exploration and I used exteroceptive touch to focus his attention and encourage graded exposure [54, 55]. Body scans were introduced to link physical sensations with thoughts and emotions and improve perceptual skills [35] and create whole person experiences [20]. Exploring whether Adam's prior expectations fitted

with what he felt [21] sometimes created surprise and enabled reappraisal to generate more accurate future predictions [51]. Reappraising habitual reactions to pain can increase a patient's 'field of affordance' and possibilities for action [12, 28] and be supported in collaborative alliances and shared sense-making [32]. Mindfulness appeared to help Adam recognise how his automatic reactions to pain often limited activity choices [17], but further research would be needed to assess the influence of other mechanisms of effect and potentially confounding factors.

**From awareness to behaviour change.**

Behavioural interventions aim to translate learning into action. The 'Capability, Opportunity, Motivation – Behaviour' theory (COM-B) proposes that change occurs when goals align with internal motivation [57], emphasising the need to understand and value patients' goals in clinical decision-making. 'Ecological niches' in healthcare dyads enable participants' awareness and function to become synchronously intertwined [19, 58]. In manual therapy, shared states of embodiment and sense-making are influenced by both verbal and non-verbal behaviour [58, 59]. Patients influence practitioners' states in parallel intertwined processes, so practitioner body and self-awareness, developed through mindfulness or psychological training, is a valuable and arguably essential skill [23].

Interoceptive capacity can be increased by both 'bottom-up' sensorimotor processes such as graded exposure and 'top-down' approaches like mindfulness. Repeated perception of normal sensations as 'threats' reduces interoceptive accuracy if they remain avoided and unexplored [56]. Manual therapy which includes mindfulness exercises may encourage patients to focus on 'pain' long enough to develop precision in interoceptive sensibility and sensitivity and influence 'top down' beliefs [49]. In this study, some mindfulness exercises included touch as an exteroceptive focus to help Adam explore intense or distressing experiences. He had previously tried mindfulness in a group setting, with limited effects on his depression. In this study, he described positive outcomes from body mindfulness, including lowering his blood pressure using a breathing exercise during a GP appointment.

Overlapping neurological pathways for interoception, mindfulness and touch suggest that combined approaches may be more effective than separate interventions [60], but it is not yet clear what duration, frequency or intensity of interaction is needed to create sustained changes. The intervention in this study may not have been sufficient to result in meaningful changes in interoception, and changes may have been due to other cognitive or neurophysiological factors. Alternative mechanisms could involve pre-reflective neurophysiological processes [49] or conscious reappraisal; for example, after pain education, reassurance, or psychological interventions [61, 62].

In Session 4, Adam recognised a childhood sense of ‘dread’ with tension in his shoulder and chest muscles that worsened his neck pain. Becoming aware of automatic defence patterns enabled him to explore other ways of coping as an adult. He chose activities to strengthen what felt ‘right’ in his body and ways to achieve goals that minimised the risk of exacerbating pain. This included meeting friends for coffee in a local park café, which simultaneously enabled him to socialise, walk at his own pace, enjoy nature, and choose when to leave, which avoided the pain endurance and social awkwardness that happened when friends visited his flat but stayed too long. At follow-up, Adam reported that he had continued to increase his activities despite fluctuating symptoms. He also described having regained a ‘whole’ sense of himself which had decreased his depression.

**Changing the therapeutic relationship**

Linguistic analysis suggested that Adam’s increasing self-awareness and active coping strategies were associated with changes in the patient-practitioner relationship (Table 3). Persistent pain can lead to rigid thinking and disordered sense-making if the world seems threatening or becomes meaningless [17]. The osteopathic aim of the course was to explore ways to understand the impact of pain on patients’ lives and provide appropriate treatment. The psychological aim was to help patients make sense of their own narratives [13] and create new body stories in the context of current physical capabilities [63]. This involved exploring the consequences of avoidance and developing flexible coping behaviour [33, 57]. These dual aims align with an ecological-enactive model of care, in which combined actions are not mutually exclusive [30]. They are also congruent with salutogenic osteopathic principles to assess health needs *and* strengths [64].

In this study, the osteopath’s challenges included developing the skills to shift consciously between actions to manage symptoms and actions to help patients understand their lived experiences [65]. Collaborative alliances and shared clinical decision making are, arguably, not currently common in osteopathic practice [66]. In this study, they were illustrated by a reduction in closed, osteopath-led questions and an increase in open, patient-guided conversations. Adam’s role changed from being a passive recipient of treatment to an active collaborator. In parallel, the osteopath had to balance a familiar treatment-provider role with facilitative communication to guide explorations of his embodied experiences (Table 3). Data analysis demonstrated, however, a predominance of mechanistic discourses and communication about touch-based treatment, which suggest that role changes were difficult.

Managing role changes can be challenging for both participants in a healthcare dyad [24, 65] and has implications for practitioner awareness and training [23]. In the follow-up interview, Adam reported that his pain levels were similar, and sometimes worse as he continued to struggle with multiple health problems, but he had continued to be more active and felt '*completely different*' about his life. Adam summarised his transformational shift as**:**

*[Pain]… it's no longer who I am, it's just something I have.*

## 11 Strengths and limitations

This study was innovative but the limitations of qualitative data from one patient-practitioner pair presented in this paper mean the results should be interpreted cautiously. The clinical processes and research outcomes may have been influenced by a range of mechanisms and potentially confounding factors. ACT is a transdiagnostic approach relevant for a range of physical and mental health conditions [65] which focuses on people's relationships to their symptoms, not on named conditions [8]. Patients were not recruited using standardised pain diagnoses or measures of severity or general health. Inclusion criteria were broad as the study was exploratory and developmental, but this created a heterogenous sample.

Outcomes: Adam's data was not representative of the group but was selected to illustrate diverse communication. Other patients' outcomes were probably influenced by heterogenous conditions, differences in willingness to collaborate, mindfulness practice, and relationship with the osteopath. There is conflicting information about whether formal and formal mindfulness practice outcomes are influenced by duration and/or frequency [68]. In this study, there was no formal mindfulness training, skill assessment or recording of practice, so effects and variations could not be assessed.

Intervention adherence and tolerability was good as Adam engaged actively in all sessions, even when in severe pain. He described complying with mindfulness exercises and shared insights from self-created practices. A minor adverse event occurred after Session 1 when he enthusiastically increased physical activities, causing a pain flare-up. After this, care was taken to explain pacing [44] and mindful self-care for pain flare-ups. The Practitioner Manual and Patient Workbook were amended to make this clear for others.

Changes were not necessarily due to mindfulness, acceptance or interoceptive learning and could have been influenced by other neurophysiological mechanisms or inter-personal therapeutic processes, including physical treatment effects on somatic and visceral functions or psychological changes due to reassurance, sense of control and self-efficacy. Changes in

role may also have been influenced by the Hawthorne effect [69] and social desirability responses [70], as both participants were aware of being in a research study.

Data analysis followed a systematic process, but interpretations were based on insider knowledge. However, the findings were later validated for proof of concept and feasibility in the OsteoMAP cohort study [3], as the content, structure, patient resources and practitioner training material evolved during this intervention. This suggests there would be value in further research into psychologically informed osteopathic practice.

In summary, the integrated treatment and self-management course described in this case report appeared to influence one patient's body awareness, coping style and agency. The results have limited transferability to other patient-practitioner dyads but are congruent with theories which underpin an ecological-enactive framework for osteopathic practice [14]. Innovative data analysis provided insights into two distinctive pain discourses (Table 4). The findings offer the potential to expand osteopaths' scope of psychologically informed care but have implications for practitioner training in developing collaborative therapeutic alliances, facilitative communication skills and self-awareness [23].

Table 4: Pain discourse characteristics

| Theme | Mechanistic | Facilitative |
|---|---|---|
| Treatment aims | Increase physical function<br>Decrease pain and other symptoms | Increase psychological flexibility<br>Increase personally valued activities |
| Body | Body as object, separate body parts | Body as lived experience, whole self |
| Pain | Structural damage, cause and effect, pain site and severity | Functional adaptation, relationships between factors, consequences in daily life |
| Patient role | Pace, reduce goals to live within limits, comply with expert advice | Act meaningfully with self-compassion, use values to adapt to challenges |
| Osteopath role | Expert, teacher, treater, carer<br>Be helpful, effective and in control | Facilitator, co-learner, interpreter<br>Be curious and compassionate |
| Language | Agency - Passive voice<br>Inanimate - It, the neck<br>Certainty - It is, I know<br>Expectations - Ought, have to | Agency - Active voice<br>Human - I, my, you<br>Uncertainty - I wonder, maybe<br>Possibilities - Could, might, choose |



## Conclusions

In 2020, the IASP taxonomy of pain [71] was expanded to define pain as a subjective experience influenced by personal biological, psychological and social factors. This emphasises the need to understand each individual's life experiences and pain beliefs, and the value of developing new interdisciplinary, psychologically informed approaches to persistent pain management in osteopathic practice. The take-away messages from this case report are that a patients' unique descriptions of present moment pain experiences can be reframed as open questions to prompt curiosity, self-learning and strengthen self-care. Combining mindfulness, verbal communication and touch-based interactions can generate

‘interoceptive surprise’, and the process of ‘mentalising interoception’ may bring preconscious experiences into the cognitive domain, creating opportunities to reappraise beliefs and outdated ways of coping. Managing interventions with dual treatment and self-care aims requires osteopaths to be self-aware and psychologically minded, and to use facilitative communication and mindfulness skills. In combination, this case report and results from other studies in the series of developmental research studies [1, 3, 9] indicate promising directions for research into interoceptive, cognitive and embodied learning processes which can support patient self-management and may optimise outcomes from touch-based treatment in osteopathic practice.

**Informed Consent**: This study was approved by the University of Bedfordshire Ethics Committee and British School of Osteopathy Research Ethics Committee in 2013. All participants provided written informed consent for anonymised data to be used in research reports and professional presentations.

**Acknowledgements:** With thanks to all the patients who participated in this study; Dr Lorraine Nanke for her supervision and support for the three research projects; the University College of Osteopathy for sponsoring my Professional Doctorate; and my colleagues the Ecological-Enactive Framework project group at COME.

**References**

1 Nanke L and Abbey H (2017). Developing a new approach to persistent pain management in osteopathic practice. Stage 1: A feasibility study for a group course. *International Journal of Osteopathic Medicine*, 26: 10-17.

2 Carnes D, Mars T, Plunkett A, Nanke L and Abbey H. (2017). A mixed methods evaluation of a third wave cognitive behavioural therapy and osteopathic treatment programme for chronic pain in primary care (OsteoMAP). *International Journal of Osteopathic Medicine* 24: 12-17.

3 Abbey H, Nanke L and Brownhill K (2020). Developing a psychologically informed pain management course for use in osteopathic practice: The OsteoMAP cohort study *International Journal of Osteopathic Medicine*, online. doi.org/10.1016/j.ijosm.2020.09.002.

4 Smith D (2019). Reflecting on new models for osteopathy – it's time for change. *International Journal of Osteopathic Medicine*, 31:15-20.

5 Esteves JEE, Zegarra-Parodi R and Vaucher P (2020). Models and theoretical frameworks for osteopathic care – A critical view and call for updates and research. *International Journal of Osteopathic Medicine*, 35:1–4.

6 Steel A, Foley H and Redmond R (2020). Person-centred care and traditional philosophies in the evolution of osteopathic models and theoretical frameworks: Response to Esteves et al. *International Journal of Osteopathic Medicine*, 36: 60-61.

7 Kamper SJ, Apeldoorn AT, Chiarotto A, Smeets RJEM, Ostelo RWJG, Guzman J and van Tulder MW (2015). Multidisciplinary biopsychosocial rehabilitation for chronic low back pain: Cochrane systematic review and meta-analysis. *BMJ*, 350:h444

8 Hayes SC, Strosahl KD and Wilson KG (2012). *Acceptance and Commitment Therapy: The Process and Practice of Mindful Change*. 2nd edition. New York: Guildford Press.

9 Abbey H (2017). *Developing an integrated osteopathy and acceptance-informed pain management course for patients with persistent pain*. Professional Doctorate thesis, unpublished. University of Bedfordshire. https://uobrep.openrepository.com/handle/10547/622497

10 Butler C, Evans M, Greaves D and Simpson S. (2004). Medically unexplained symptoms: the biopsychosocial model found wanting. *J R Soc Med*, 97: 219-222.

11 Draper-Rodi J, Vogel S and Bishop A (2018). Identification of prognostic factors and assessment methods on the evaluation of non-specific low back pain in a biopsychosocial environment: A scoping review. *International Journal of Osteopathic Medicine*, 30: 25-34.

12 Stilwell P and Harman K (2019). An enactive approach to pain: beyond the biopsychosocial model. *Phenomenology and the Cognitive Sciences* https://doi.org/10.1007/s11097-019-09624-7

13 Tyreman S (2018). Evidence, alternative facts and narrative: A personal reflection on person centred care and the role of stories in healthcare. *International Journal of Osteopathic Medicine,* 28: 1–3.

14 Esteves JEE, Cerritelli F, Kim J and Friston KJ (2022). Osteopathic Care as (En)active Inference: A Theoretical Framework for Developing an Integrative Hypothesis in Osteopathy. Frontiers in Psychology. https://doi.org/10.3389/fpsyg.2022.812926

15 Toro J, Kiversten J and Riteveld E (2020). The Ecological-Enactive Model of Disability: Why Disability Does Not Entail Pathological Embodiment. *Frontiers in Psychology*. doi.org/10.3389/fpsyg.2020.01162

16 Kirchhoff MD and Kiverstein J (2019). *Extended consciousness and predictive processing*. London: Routledge.

17 De Haan S (2020). An enactive approach to psychiatry. *Philosophy, Psychiatry and Psychology*, 27(1): 3-25.

18 Duquette P and Ainley V (2019). Working With the Predictable Life of Patients: The Importance of "Mentalizing Interoception" to Meaningful Change in Psychotherapy. *Frontiers in Psychology*. https://doi.org/10.3389/fpsyg.2019.02173

19 Ramstead MJD, Kirchhoff MD and Friston KJ (2020). A tale of two densities: active inference is enactive inference. *Adaptive Behavior*, 28(4);225–239.

20 Farb N, Daubenmier J, Price CJ, Gard T, Kerr C, Dunn BD, Klein KA, Paulus MP and Mehling W (2015). Interoception, contemplative practice, and health. and health. *Frontiers in Psychology*, 6:763. doi: 10.3389/fpsyg.2015.00763

21 Van den Bergh O, Zacharioudakis N and Petersen S. (2019). *Interoception, categorization, and symptom perception*. In M. Tsakiris & H. De Preester (Eds.), *The interoceptive mind: From homeostasis to awareness*. Oxford University Press. Chapter 11: 212–226.

22 D'Alessandro G, Cerritelli F and Cortelli P (2016) Sensitization and Interoception as Key Neurological Concepts in Osteopathy and Other Manual Medicines. *Frontiers in Neurosc*ience 10:100. doi: 10.3389/fnins.2016.00100

23 Shaw R, Abbey H, Casals-Gutierrez S and Maretic S (2022). Reconceptualizing the therapeutic alliance in osteopathic practice: integrating insights from phenomenology, psychology and enactive inference. *International Journal of Osteopathic Medicine*. Corrected proof in press. Available online at https://doi.org/10.1016/j.ijosm.2022.06.003

24 Foster NE and Delitto A (2011). Embedding psychosocial perspectives within the clinical management of low back pain: integration of psychosocially informed management principles into physical therapy practice - challenges and opportunities. *Physical Therapy* 91(5):790-803.

25 Critchley DJ, McCracken LM, Talewar R, Walker N, Sanders D & Godfrey E. (2015). Physiotherapy informed by acceptance and commitment therapy for persistent low back pain: The PACT study. *Physiotherapy (United Kingdom), 101*, S277. doi:10.1016/j.physio.2015.03.466

26 Godfrey E, Wileman V, Galea Holmes M et al. (2019). Physical Therapy Informed by Acceptance and Commitment Therapy (PACT) Versus Usual Care Physical Therapy for Adults With Chronic Low Back Pain: A Randomized Controlled Trial. *J Pain* S1526-5900(19)30065-3. doi: 10.1016/j.jpain.2019.05.012

27 McCracken LM and Vowles KE (2014). Acceptance and Commitment Therapy and Mindfulness for chronic pain; model, process and progress. *Am Psychol* 69(2): 178-87.

28 Fuchs T and De Jaegher H (2009). Enactive intersubjectivity: Participatory sense-making and mutual incorporation. *Phenomenology and the Cognitive Sciences*, 8:465–486. DOI 10.1007/s11097-009-9136-4

29 Dahlberg J, Ranheim A and Dahlberg K (2016). Ecological caring: Revisiting the original ideas of caring science. *International Journal of Qualitative Studies on Health and Well-being*. 11; 33344.

30 McLaren L and Hawe P (2005). Ecological perspectives in health research. *Journal of Epidemiology and Community Health*, 59:6–14. doi: 10.1136/jech.2003.018044

31 Riley DS, Barber MS, Kienle GS, Aronson JK, von Schoenanger T, Tugwell P, Kiene H et al. (2017). CARE guidelines for case reports: explanation and elaboration document. Journal of Clinical Epidemiology, 89: 218-235.

32 Hayes, SC, Villatte M, Levin M and Hildebrandt M (2011). Open, Aware and Active: Contextual Approaches as an Emerging Trend in the Behavioural and Cognitive Therapies. *Annual Review of Clinical Psychology* 7:141-168.

33 Harris R (2009). *ACT Made Simple*. US: New Harbinger Publications. http://www.actmindfully.com.au/

34 Russell TA and Arcuri SM (2015). A Neurophysiological and Neuropsychological Consideration of Mindful Movement: Clinical and Research Implications. *Frontiers in Human Neuroscience*, 9, 282. doi: 10.3389/fnhum.2015.00282

35 Mirams L, Poliakoff E, Brown RJ and Lloyd DM (2013). Brief body-scan meditation practice improves somatosensory perceptual decision making. *Consciousness and Cognition* 22; 348-359.

36 Shapiro S and Carlson L (2009). The art and science of mindfulness: Integrating mindfulness into psychology and the helping professions. *J Clin Psychol*, 65, pp.555–560.

37 Snell J, Shaw S and Copland F (2015). *Linguistic Ethnography: Interdisciplinary Explorations.* Basingstoke: Palgrave Macmillan.

38 Rampton B, Maybin J and Roberts C. (2014). Methodological foundations in linguistic ethnography. *Working Papers in Urban Language and Literacies*, Paper 125. London: King's College London.

39 Roter D and Larson S (2002). The Roter Interaction Analysis System (RIAS): utility and flexibility for analysis of medical interactions. Patient Education and Counselling, 46, pp.243-257.

40 Scollon R (2001). *Mediated Discourse: the nexus of practice*. London: Routledge.

41 ten Have, P. (2007). *Doing Conversation Analysis: A Practical Guide*. London: Sage Publications.

42 Goffman, E. (1967). On face-work: On the analysis of ritual elements in social interaction. In *Interactional Ritual*. Harmondsworth: Penguin, pp.5-45.

43 Goffman, E. (1981). Footing. In *Forms of Talk*. Oxford: Blackwell Publishing. pp.124-159.

44 Antcliff D, Keenan AM, Keeley P, Woby S and McGowan L (2022). "Pacing does help you get your life back": The acceptability of a newly developed activity pacing framework for chronic pain/fatigue. Musculoskeletal Care, 20: 99–110. doi: 10.1002/msc.1557

45 Jefferson G (1984). *Transcription Notation*, in J. Atkinson and J. Heritage (eds), Structures of Social Interaction, New York: Cambridge University Press.

46 Tyreman S (2011). Homelikeness and health: an introduction to the theme. *Medicine, Health Care and Philosophy*, 14:287–289.

47 Tsakiris M and Critchley H. (2016). Interoception beyond homeostasis: affect, cognition and mental health. *Philos Trans R Soc Lond B Biol Sci*, 371:1708.

48 Pelletier R, Bourbonnais D and Higgins J (2018). Nociception, pain, neuroplasticity and the practice of Osteopathic Manipulative Medicine. *International Journal of Osteopathic Medicine* 27; 34-44.

49 Kube T, Rozenkrantz L, Rief W et al. (2020). Understanding persistent physical symptoms: Conceptual integration of psychological expectation models and predictive processing accounts, *Clinical Psychology Review*. https://doi.org/10.1016/j.cpr.2020.101829

50 Thomson OP, Petty NJ and Moore AP (2012). Reconsidering the patient-centeredness of osteopathy. *International Journal of Osteopathic Medicine*, 16(1), 25-32. doi.10.1016/j.ijosm2012.03.001

51 Ongaro G and Kaptchuk TJ (2018). Symptom perception, placebo effects, and the Bayesian brain. *Pain*. doi: 10.1097/j.pain.0000000000001367.

52 Darlow B, Dowell A, Baxter GD, Mathieson F, Perry M and Dean S (2013). The enduring impact of what clinicians say to people with low back pain. *Annals of Family Medicine* 11(6): 527-534.

53 Burch V and Penman D (2013). *Mindfulness for health: a practical guide to relieving pain, reducing stress and restoring wellbeing*. Piatkus Books.

54 Vlaeyen JWS, de Jong J, Geilen M, Heuts PHTG, and van Breukelen G (2001). Graded exposure in vivo in the treatment of pain-related fear: a replicated single-case experimental design in four patients with chronic low back pain. *Behaviour Research and Therapy* 39 (2001) 151–166.

55 Vlaeyen JWS, de Jong J, Geilen M, Heuts PHTG, and van Breukelen G (2002). The Treatment of Fear of Movement/(Re)injury in Chronic Low Back Pain: Further Evidence on the Effectiveness of Exposure In Vivo. *The Clinical Journal of Pain* 18:251–261.

56 Zacharioudakis N, Vlemincx E and Van den Bergh O (2020). Categorical interoception and the role of threat. *International Journal of Psychophysiology*, 148: 25-34.

57 Michie S, van Stralen MM and West R (2011). The behaviour change wheel: A new method for characterising and designing behaviour change interventions. *Implementation Science* 6: 42. Online. doi: 10.1186/1748-5908-6-42.

58 Oberg GK, Normann B & Gallagher S. (2015). Embodied-enactive clinical reasoning in physical therapy. *Physiotherapy Theory and Practice*, 31(4): 244-252.

59 McParlin Z, Cerritelli F, Friston K and Esteves JE (2022). Therapeutic alliance as active inference: the role of therapeutic touch and synchrony. *Frontiers in Psychology* DOI:10.3389/fpsyg.2022.783694

60 Casals-Gutierrez S and Abbey H (2020). Interoception, mindfulness and touch: A meta-review of functional MRI studies. *International Journal of Osteopathic Medicine*, 35: 22-33.

61 Butler DS and Moseley GL (2003). *Explain Pain*. Noigroup Publications.

62 Pincus T, Holt N, Vogel S, Underwood M, Savage R, Walsh DA and Taylor SJC (2013). Cognitive and affective reassurance and patient outcomes in primary care: A systematic review. *Pain* 154(11): 2407-2416

63 Gale NK (2011). From body-talk to body-stories: body work in complementary and alternative medicine. *Sociology of Health & Illness*, 33(2): 237–251.

64 Tyreman S (2013). Re-evaluating 'osteopathic principles.' *International Journal of Osteopathic Medicine*, 16(1): 38-45

65 Lau MA and McMain SF (2005). Integrating Mindfulness Meditation with Cognitive and Behavioural Therapies: the challenge of combining acceptance- and change-based strategies. *Canadian Journal of Psychiatry*; 50 (13), 863-869.

66 Thomson OP, Petty NJ and Moore AP (2014). Clinical decision-making and therapeutic approaches in osteopathy: A qualitative grounded theory study. *Manual Therapy*, 19, pp.44-51

67 ACBS (2015). Association of Contextual Behavioural Science. https://contextualscience.org/acbs

68 Birtwell K, Williams K, van Marwijk H, Armitage CJ and Sheffield D (2018). An Exploration of Formal and Informal Mindfulness Practice and Associations with Wellbeing. Mindfulness, 10:89–99. https://doi.org/10.1007/s12671-018-0951-y

69 Oswald D, Sherratt F and Smith S (2014). Handling the Hawthorne effect: The challenges surrounding a participant observer. *Review of Social Studies*, 1(1): 53-73.

70 Bergen N and Labonte R (2020). "Everything Is Perfect, and We Have No Problems": Detecting and Limiting Social Desirability Bias in Qualitative Research. Qualitative Health Research, 30(5) 783–792. doi: 10.1177/1049732319889354

71 Raja SN, Carr DB, Cohen M, Finnerup NB, Flor H et al (2020). The Revised IASP definition of pain: concepts, challenges, and compromises. Pain, 161(9):1976–1982. doi:10.1097/j.pain.0000000000001939.