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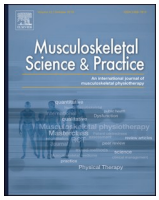

Original article

Exploring the role of therapeutic alliance and biobehavioural synchrony in musculoskeletal care: Insights from a qualitative study

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ABSTRACT

Background: Person-centred care underscores the therapeutic alliance (TA) as fundamental, fostering positive treatment outcomes through collaborative patient-clinician interactions. Biobehavioural synchrony within the TA, essential for effective care, reflects an adaptive process where organisms align responses during interactions. Enactivism and active inference provide profound insights into human perception, reshaping musculoskeletal care understanding. Touch and verbal communication, integral to the TA, foster synchrony and alignment of personal beliefs.

Aim: This study aimed to identify the tools used by manual therapists in musculoskeletal care to establish a TA with patients. Furthermore, it endeavours to evaluate the alignment of these strategies with current literature and their correlation with biobehavioural synchrony, enactivism, and the role of touch in active inference.

Methods: The methodology followed rigorous qualitative research principles, particularly Grounded Theory and interpretative-constructivist principles, conducting eleven semi-structured interviews with open-ended questions.

Results: The core category identified in the study is elucidated as follows: "*Interwoven Connection: The Fabric of Therapeutic Synchrony*." The interviews unveiled three main categories, each comprising sub-categories: (1) Creating a meaningful dialogue; (2) Promoting active patient participation; (3) Synchronisation.

Conclusion: Fostering meaningful dialogue, patient involvement, and therapeutic synchrony is crucial for a robust therapeutic alliance in musculoskeletal care. This underscores the importance of establishing a deep connection between clinicians and patients, central to effective person-centred care. Clinicians must prioritise two-way communication, empathy, and patient collaboration in defining personalised goals. Emphasizing touch and seeking patient feedback are also pivotal. Further research is needed to explore these elements and their impact.

1. Introduction

Person-centred care has emerged as the cornerstone of effective musculoskeletal healthcare, placing individuals seeking care at the heart of the evaluation, treatment, and management process (Keter et al., 2024; Hutting et al., 2022). This approach necessitates a comprehensive biopsychosocial understanding of the patient's experience, encompassing person-focused communication and supported self-management (Hutting et al., 2022). Central to this model is the therapeutic alliance (TA), which enhances treatment outcomes through synergistic

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interactions between patients and clinicians (McParlin et al., 2022; Pinto et al., 2012).

The TA hinges on biobehavioural synchrony, wherein biological and behavioural responses coordinate during interactions, crucial for effective musculoskeletal care (Atzil and Gendron, 2017; McParlin et al., 2022). This synchronisation mirrors an adaptive process where organisms develop sensorimotor models to align with environmental dynamics (McParlin et al., 2022). Clinicians have increasingly focused on understanding and implementing a person-centred care approach, which fosters patient empowerment, shared focus, and shared decision-making. This approach has particularly advanced in gaining patient appreciation and building a strong therapeutic alliance in MSK conditions, such as chronic low back pain (Keter et al., 2024; McParlin et al., 2022).

Beyond the biopsychosocial model of care which has been widely regarded as the foundation of person-centred care (Hutting et al., 2022), enactivism and active inference provide profound insights into human perception and interaction with the environment (Accardi et al., 2023; Esteves et al., 2022). Enactivism emphasizes the reciprocal influence of body and environment on perceptions and experiences, while active inference highlights the dynamic interplay between action and perception, providing valuable insights into the mechanisms that drive synchronisation and collaborations (Friston and Frith, 2015; Accardi et al., 2023). Enactivism views cognition as distributed, enacted, and embodied, emphasizing organism-environment interactions in shaping cognitive processes such as perception and attention (Esteves et al., 2022; Shaw et al., 2022). Active inference engages with the environment, integrating touch and verbal communication to facilitate synchrony and belief alignment (Kim et al., 2022; Smith, 2019). These factors are intrinsic to the TA, aligning with patient-centred practice and an enactive-biopsychosocial perspective (Cerritelli and Esteves, 2022; Shaw et al., 2022). Emotional attunement, sensitivity, and empathy are essential for developing the TA (Pinto et al., 2012).

The patient's expectations significantly influence treatment outcomes, highlighting the importance of understanding embodied predictive mind and biobehavioural synchrony (Wassinger et al., 2022; Mohamed et al., 2020; Haanstra et al., 2015; Cormier et al., 2016; McParlin et al., 2022; Rossettini et al., 2018). The theory of predictive processing suggests that the central nervous system minimises prediction error by adjusting prior beliefs to match sensory events and attend to unexpected information (Pezzulo et al., 2019).

Active inference involves active perceptual processing and goal-directed behaviour (Pezzulo et al., 2019), thereby influencing responses to patients' expectations (Ongaro and Kaptchuk, 2019). Synchronising with patients by accumulating sensory evidence helps align beliefs and minimise prediction errors, nurturing a strong TA (Shaw et al., 2022; Krupnik, 2023; Kim et al., 2022; McParlin et al., 2022; Cerritelli and Esteves, 2022). Successful interpersonal interactions develop reciprocal cycles of action and perception adapt neural pathways, enhancing predictability and reducing uncertainty through shared narratives (Friston and Frith, 2015; Vasil et al., 2020).

Clinicians (*e.g.*, manual therapists) who can manage patients' beliefs in a collaborative setting can achieve positive feedback, promoting homeostatic abilities and reducing allostatic overload (McParlin et al., 2022; Bruineberg et al., 2018). However, clinicians' beliefs regarding the TA are relatively unexplored and often overlooked in clinical practice. Investigating therapists' perspectives sheds light on their beliefs, clinical boundaries and goals, particularly in musculoskeletal care (Babatunde et al., 2017; Taccolini et al., 2018; Søndenå et al., 2020).

This study aimed to identify the tools employed by manual therapists in musculoskeletal care to establish a TA with patients and facilitate the process of person-centred care. Additionally, it sought to assess the alignment of these strategies with existing literature and their relationship to biobehavioural synchrony, enactivism, and touch as active inference.

2. Methods

2.1. Study design

This qualitative study was conducted using a Grounded Theory approach, as outlined by Farrelly (2013). This research methodology provides a framework for delving into the intricacies of participants' thoughts, actions, and beliefs, focusing on the '*how*' and '*why*' aspects (Tenny et al., 2017). Aligned with the contemporary interpretative-constructivist approach, it underscores the researcher's active engagement in shaping an understanding of reality, drawing from the meanings attributed by participants to their experiences (Lee, 2012; Kamal, 2019; Chandra and Shang, 2017).

2.2. Ethical and quality criteria

The study's quality was assessed using the COnsolidated criteria for REporting Qualitative research checklist (Tong, Sainsbury, and Craig, 2007). Additionally, the Standards for Reporting Qualitative Research were consulted, offering a structured process while allowing researchers flexibility (O'Brien et al., 2014). Approval for the study was obtained the Local Ethics Committee of COME Collaboration Foundation and the Malta ICOM Educational Ethics Committee (Date March 2023), adhering to the ethical principles of the Declaration of Helsinki (Goodyear et al., 2007). Stringent measures were taken to maintain data confidentiality, with information anonymized using numerical codes (Sanjari et al., 2014). Additionally, all data were securely stored on a password-protected server to ensure their safety.

2.3. Participants selection and involvement

Participants from several countries (Table 2) were approached via e-mail, selected based on their experience and interest in scientific research and study topics (Robinson, 2014). A non-randomised, intentional, judgmental sampling method was employed (Palinkas et al., 2013; Robinson, 2014). Additionally, the first author (A.A.) solicited references from other participants to enrich the selection, leveraging the snowball effect (Naderifar et al., 2017). Some respondents were recommended by other two authors (J.E.E.; G.R.). Consent for the use of personal data and audio recording of interviews was obtained through a document attached to each interviewee. Eleven clinicians were purposefully selected for their unique perspectives and potential to enrich the understanding of the phenomena under study, as detailed in Table 2.

2.4. Inclusion and exclusion criteria

The sampling process sought osteopaths and physiotherapists with at least five years of post-qualification clinical experience in manual therapy, ensuring substantial practical knowledge and a mature understanding of relevant scientific evidence. Participants had to be well-informed and enthusiastic about the TA, biobehavioural synchrony, touch, communication, expectations and interactions with patients. They had to have completed a pre-registration programme in osteopathy or physiotherapy, although additional qualifications were also considered to enrich the diversity and expertise of the study sample. Clinicians who did not have the necessary experience or interest in the research and those whose involvement might have compromised objectivity were excluded.

2.5. Data collection

Eleven semi-structured 30–40 min interview was conducted through exploratory, in-depth and iterative dialogues aimed at fully capturing the participants' clinical experience and personal views regarding the TA, while keeping a neutral and non-judgemental approach. All interviews were conducted by the first author (X.X.), a female osteopath

Table 1
Interview questions.

INTERVIEW QUESTIONS
Tell me something about your university education. Where and in which institute did you study?
How many years have you been working in the clinical environment?
Do you often treat pediatric and geriatric patients?
Are you up to date on the recent published studies on the importance of touch and the therapeutic alliance?
How would you define the concept of the therapeutic alliance?
And in particular, what strategies do you think can help to establish this concept?
What are your experiences regarding the involvement of the patient during the treatment? Why do you think this aspect is important for the therapeutic alliance?
How do you think a patient's expectations and experiences influence the outcome of treatment based on your experience?
How do you discuss with the patient the goals set for their treatment path?
When working with paediatric patients, do you interact with the parents during the process of treating the child? Do you actively involve the child?
What about the same situation, but with an elderly patient? Do you think you change the way you relate with an elderly person? For example, in communication
How do differences in communication and expectations of patients with chronic pain manifest in your experience?
What role do you think non-verbal communication can play during the treatment?
What importance do you recognize to the touch in order to establish the alliance?
How do you perceive the role of empathy in building and maintaining relationships with patients?
Do you want to add something to the interview?

Table 2
Participants' biographical information.

PARTICIPANT	GENDER	AGE	PROFESSION	LOCATION
I1	M	58	Physiotherapist	USA
I2	M	34	Osteopath	Italy
I3	M	32	Osteopath	Italy
I4	M	/	Osteopath	Australia
I5	F	53	Physiotherapist	Canada
I6	F	56	Osteopath	Brazil
I7	F	/	Osteopath	UK
I8	F	43	Osteopath	Italy
I9	M	45	Physiotherapist and Osteopath	New Zealand
I10	F	41	Osteopath	Italy
I11	M	48	Osteopath	Italy

Legend: I, Interview; M, Male; F, Female.

with a recent BSc credential and one year of experience in qualitative research methodologies (DeJonckheere and Vaughn, 2019).

A senior researcher (X.X.), with more than 20 years of experience in research related to manual therapies, oversaw the methodology and conduct of the study to ensure meticulous structuring and evaluated the first version of the questions (Table 1) to ensure their appropriateness. Changes were made throughout the study to enhance and customize the questions according to the contextual needs.

Informed consent was obtained from each participant, ensuring they fully understood every aspect of the study and agreed to the use of personal data and audio recordings. A one-week cooling-off period was provided, allowing participants time to reconsider their involvement before finalising consent. Interviews were conducted in English and Italian via Zoom, Google Meet, and phone calls to facilitate remote communication. Anonymity was granted, and the transcribed text was shared with participants to identify any potential misinterpretations or modifications (Adeoye-Olatunde and Olenik, 2021).

2.6. Data analysis

The data collection and validation processes were conducted concurrently with the interviews, facilitating the verification and potential inclusion of additional ideas. Throughout the use of Grounded Theory, efforts were made to generate innovative theories at each stage of data collection and analysis, which is characteristic of this type of research methodology (Chapman et al., 2015).

The analysis, characterised by a cyclical process, integrated deductive and inductive methods, comparing data across categories to identify common patterns (Chandra and Shang, 2017; Azungah, 2018; Goldkuhl and Cronholm, 2010). Insights were dynamically shaped through a reflective engagement with both theory and literature, continuously evolving as categories for data analysis were developed in line with the constructivist approach that underpins qualitative research. Concurrently, both the theory and research lines of enquiry were continuously refined and interpreted based on the researcher's discoveries, facilitating a process of constant co-construction between the data from the study and the literature.

During data collection, memo writing, and subsequent transcription were utilized to identify keywords or concepts and break them down into essential components. The initial open coding phase involved a detailed examination, line-by-line and word-by-word, to identify potential units of meaning through combinations for similarities. Subsequent axial coding focused on central themes, while selective coding involved identifying the main category (Thompson et al., 2014).

Axial coding facilitated the creation of relationships between conceptual categories through an interactive process of rereading and transcribing. Finally, selective coding allowed for the identification of the main category that determined the interpretative paradigm explaining the entire theory. The constant comparative method continued until data saturation was reached, confirmed by the eighth interview, and validated by the last four turns (Chun Tie et al., 2019; Mohajan and Mohajan, 2022).

Data saturation was determined following the method outlined by Guest et al. (2020), which is related to a 5% information threshold. While there is no absolute certainty that saturation is fully achieved at this threshold, these criteria provide a clear approach for subsequent researchers to interpret the assessments.

After this, the results were reviewed and discussed by A.A. and J.E.E., together with another author (G.R.), a physiotherapist with 16 years of research experience, in order to reach a broader consensus regarding the results collected and the drafting of the study.

3. Results

3.1. Participants

Twenty-two out of forty physiotherapists and osteopaths responded to the introduction email. However, four were unable to participate despite their strong interest. Additionally, two acknowledged that they did not meet the inclusion criteria, and contact was lost with five others despite initial interest. Ultimately, eleven clinicians, comprising five women and six men, joined the study. To ensure confidentiality and privacy, participants' biographical information is detailed in Table 2, and they are identified in the study from I1 to I11.

3.2. Findings

The core category identified in the study is elucidated and

summarised as follows: "*Interwoven Connection: The Fabric of Therapeutic Synchrony*." This metaphor portrays the TA as a complex fabric and interconnected relationship, emphasizing the blending of interactions between clinician and patient, underscoring the importance of synchronised dynamics in the therapeutic process.

The interviews revealed three primary categories, with each encompassing sub-categories that substantiate and expand upon the theory proposed in this research (Fig. 1). These categories delineate consecutive steps within a theoretical framework for the field of musculoskeletal care, emphasizing the specific significance of contextual elements that influence the TA.

1. Creating a meaningful dialogue;
2. Promoting active patient participation; and
3. Synchronisation.

Examples of patients' quotes for each category and subcategory are presented in Table 3, while the exhaustive reporting is presented in Supplementary File 1-5.

3.3. Category 1: creating a meaningful dialogue

At the heart of effective TA is the capacity to cultivate meaningful dialogue, characterised by active listening, reciprocal communication, and a clear understanding of expectations, as evidenced by participants I1, I2, I3, I4, I5, I6, I8, I9, and I11.

3.3.1. Subcategory 1: active listening

The importance of active listening is the first sub-category that relates to the issue of meaningful dialogue with patients (Table 3 and Supplementary File 1). Notably, participants acknowledged that allowing the patient to express themselves and ensuring that the message received accurately reflects the patient's intent are effective strategies [I3, I4, I5, I6, I8, I10]. Unconditional positive regard creates a welcoming atmosphere [I1, I3, I4, I6, I8, I9, I11], while maintaining eye contact and dedicating time to the patient demonstrates care [I1, I6, I9]. It is crucial to differentiate between empathy and over-emotionality, with therapists being mindful of managing emotions to facilitate treatment while maintaining professionalism [I2, I3, I4, I5, I6, I7, I8, I10]. Openness, honesty, and constant feedback, using phrases such as "I feel" and "I think," enhance mutual understanding [I3].

3.3.2. Subcategory 2: Bidirectional communication

Another key strategy is the bidirectional communication with patients (Table 3 and Supplementary File 1). In paediatrics, addressing the child directly helps to establish a bond and create a comfortable environment, encouraging the trust of both child and parents [I1, I4, I6, I8, I9, I10]. This collaboration allows open communication and mutual understanding, enabling the therapist to adapt treatment techniques to the child's specific needs. Non-verbal communication is crucial, as patients can interpret body language and respond physiologically [I5]. Rogerian humanistic psychology is cited as supportive in overcoming communication barriers [I2]. Considering aspects such as pre-reflexivity and pre-verbality suggests that cognition and alliance stem from bodily experiences and social interactions [I7].

3.3.3. Subcategory 3: Understanding patient's expectations

The third subcategory that emerged is the role of expectations in the musculoskeletal field. Therapists who genuinely and emotionally connect with patients create a more meaningful therapeutic experience [I6] (Table 3 and Supplementary File 2). Asking questions such as "What are you looking for?" highlights the importance of the patient's perspective [I6]. Managing expectations and transparent communication are crucial to promoting informed and responsible involvement [I2, I3, I4, I5, I6, I7, I9, I11]. Improving sensory and cognitive influences can enhance the TA [I2, I3, I4, I5, I6, I8, I9, I11].

3.4. Category 2: promoting active patient participation

Data from the interviews indicate that two key aspects are shared goals and person-centred care, recognising the importance of patient involvement in decision-making and individualised care [I1, I2, I3, I4,

Fig. 1. Fig 1 - Interwoven Connection: The Fabric of Therapeutic Synchrony

Table 3
Examples of participants' quotes for each category.

CATEGORY	SUBCATEGORY	EXAMPLE OF PARTECIPANTS' QUOTE
Creating a meaningful dialogue	**Active listening**	*' … I think it's the job of the osteopath or the other healthcare practitioner to explore this horizon of understanding with the patient, to try to have an understanding of that person's world and what is meaningful to that patient and to allow what is meaningful to unfold and to present itself …. I see it is a process of sharing and understanding so that patients can find what is meaningful to them … ' [I7].*
	Bidirectional communication	*' … I think the main element is communication and that it is bidirectional, from the therapist to the patient and vice versa. As I was saying before, it is important to give awareness and, therefore, to give constant feedback, e.g. 'I feel, I perceive, I think that … ' [I3].*
	Understaning expectations	*' … I think patients' expectations and to some extent their beliefs probably are a stronger predictor for the outcome than the treatment used. We've seen that in our surgical studies and we've seen that also in our conservative care studies … ' [I1].*
Promoting active patient partecipation	**Goal sharing**	*'.Just the fact that if you're in an alliance with somebody, the chances are you're looking towards the same goals. You're sitting next to each other and looking to see towards the same ends or the same goals. So, having this shared horizon on this shared plane of understanding, for me, that's quite important … ' [I7].*
	Person-centred care	*' … I really like the following definition, namely: 'a respectful and understanding attitude towards the patient's individual preferences, needs, values, making sure that it is the patient's values that guide the clinician'. So, this means recognising personal characteristics, values, beliefs and accepting the uniqueness of their person in order to validate, respect and also contribute to the connection with the patient … '[I11].*
Synchronisation	**Touch**	*' … Therapeutic touch acts as a means of reassurance, providing the patient with emotional support, shaping the patient's experience and legitimising their experience of pain. It contributes to shaping the patient's experience, influencing pain perception, trust in the therapist and emotional connection in the context of therapy … ' [I11].*
	Coordination and adaptation	*' … In my opinion, I cannot develop a therapeutic alliance if I do not involve him or if a communicative relationship is not horizontal but vertical, where I give things to you and not vice versa … If I do not provide the patient with such a climate so that he can feel at ease in giving me this feedback, I have difficulty in proceeding, I become 'the one who treat''. Instead, if I want to be what is described in some papers as an 'educator', there has to be a relationship of mutual exchange … '[I3].*

I5, I6, I8, I9, I11].

3.4.1. Subcategory 1: Goal sharing

The first subcategory emphasizes active patient involvement through shared decision-making in goal-setting, encouraging patients to contribute to realistic plans (Table 3 and Supplementary File 3). Regular goal review is crucial, particularly in chronic cases, focusing on building alliances strategically [I2]. SMART criteria are utilized for setting clear and specific goals [I1]. The Enactive-Neuroaesthetic model aids in understanding patient responses during sessions [I2].

Elderly people are often motivated to maintain their autonomy, and this desire can drive meaningful and motivating goals for them [I11].

3.4.2. Subcategory 2: Person-centred care

Person-centred care marks a shift away from a practitioner-centred model towards active patient involvement in decision-making by furnishing patients with information and support to make informed choices [I1, I3] (Table 3 and Supplementary File 4). Collaborative decision-making acknowledges patients as partners in their care (I1, I3). Participants highlighted the importance of addressing misconceptions through debunking prejudices and false beliefs of patients and pain education, which can correct misunderstandings and offer patients a clearer understanding of their condition [I2, I3, I6, I7, I8, I9, I11]. Moreover, in paediatric consultations, emphasis is placed on considering the entire family: the discussion has shifted from a therapist-patient relationship to a triadic one. A welcoming and reassuring therapeutic environment is vital in encouraging active participation from children, promoting behaviours and habits conducive to well-being from an early age. The challenges in managing this triad prompted some participants to exit the paediatric field [I1, I4, I6, I8, I9, I10].

3.5. Category 3: Synchronisation

A clinician who is attuned to the patient's needs and responsive to their signals can create a safe and supportive environment.

3.5.1. Subcategory 1: Therapeutic touch

In this regard, touch is seen as a powerful tool for building alliance and synchrony in the context of manual therapy [I1, I3, I4, I6, I8, I9, I10, I11] (Table 3 and Supplementary File 5).

Participants emphasised that touch encourages a sense of care and understanding, highlighting the importance of a patient-centred approach. They stressed the need to recognize individual preferences and sensitivities and to capture patient feedback through spontaneous expressions and movements, which indicate comfort and engagement. Particularly through C-tactile fibres neural pathways, touch enables non-verbal communication, which is especially useful in situations where verbal communication may be limited, such as with patients with disabilities, children, or the elderly [I3, I8, I10].

The consensus among participants is that touch conveys that the patient is not merely a set of symptoms, but an individual with distinct needs and experiences. One participant noted that while touch is a crucial aspect of the patient relationship, it is part of a broader spectrum of interactions and impacts that are salient to this alliance [I7].

3.5.2. Subcategory 2: Coordination and adaptation through feedback

Coordination and adaptation through feedback are crucial for

synchronisation, as discussed by all respondents (Table 3 and Supplementary File 4).

Synchrony, understood as the harmonisation between the clinician's actions and the patient's responses, was identified as a key element in ensuring an effective therapeutic outcome.

Clinicians pointed out that synchrony requires clinicians to perceive, interpret, and respond promptly to patient signals during treatment. This implies a high level of tactile sensitivity and the ability to establish an empathic connection with the patient, to be able to attune to his or her needs and respond appropriately [I1; I2; I3; I5; I7; I9; I10; I11].

The ability to establish a relationship of trust and mutual respect raises synchronisation between therapist and patient, creating an optimal therapeutic environment.

Interviewees stressed that each patient is a unique individual with different needs and responses, so it is essential to be able to adapt therapeutic techniques and strategies to maximise treatment effectiveness through a flexible mindset.

Clinicians stressed that effective coordination with patients involves addressing both physical and emotional needs. The therapeutic relationship and treatment outcomes are enhanced when patients' needs are understood and responded to.

4. Discussion

The study delved into the perspectives of clinicians, specifically manual therapists, regarding strategies to bolster the TA, emphasizing mutual connection, collaboration, and achieving harmonious therapeutic objectives. Participants underscored the importance of a holistic outlook and an educational role for a person-centred approach.

The study explores the interplay between interview themes and embodied cognition, viewing patients as integrated systems where cognitive experiences are intertwined with bodily manifestations. This perspective highlighted the importance of sensory perceptions, emotions, and physicality in shaping well-being. It advocates for a comprehensive enactive-ecological healthcare model incorporating embodied and cognitive experiences in the healing process (Bohlen et al., 2021; Banton et al., 2023; Cerritelli and Esteves, 2022; Esteves et al., 2022).

4.1. Active listening and expectations

Integrating the principles of embodied cognition with active listening enhances clinicians' awareness of communication dynamics in therapy sessions. In practice, this perspective can help clinicians understand conditions that patients may not want to or cannot express in words. By evaluating and enhancing signals concerning the perceptual and motor systems of patients, clinicians can grasp these unspoken conditions. Therefore, this approach can be used not only to help overcome cognitive disorders or emotional trauma but also to assess the consistency between what the patient expresses through gestures and what they say in words. This approach recognizes the body's significant role in emotional perception and expression, as highlighted in various studies (Øberg et al., 2015; Mundle and Smith, 2013; Ekerholt and Bergland, 2019). By synchronising reciprocal gestures and sharing bodily cues, clinicians foster positive therapeutic relationships. These interactions are supported by models such as the action-perception model and the shared circuit model (Ghane and Sweeny, 2013; Ramseyer, 2011).

This integration deepens the understanding of patients' narratives and improves clinical efficacy and empathy (Chowdhury and Bjorbækmo, 2017). Active listening allows therapists to fully grasp patients' experiences, emotions and perspectives, thus improving therapeutic relationships (Barry, 2017). Clinicians prioritise humanity, anchoring their therapeutic journey on active listening and empathy (Kohpeima Jahromi et al., 2016). Patients' narratives provide valuable insights into their inner worlds, facilitating nuanced understanding (Smythe and White, 2017; Soundy et al., 2014; Diener et al., 2016).

Establishing an authentic connection increases collaboration and adherence to treatment. This extension of empathy goes beyond physical symptoms and is supported by functional magnetic resonance imaging (fMRI) studies showing that active listening positively impacts patients' perception and evaluation of personal experiences (Kawamichi et al., 2015; Miciak et al., 2018; Rodríguez-Nogueira et al., 2022).

Balancing active listening with empathy is crucial to prevent clinicians from becoming overly emotionally invested in their patients' experiences (Hardy, 2017; Mármol-López et al., 2023; Fischer et al., 2013). Interviews emphasize synchrony and active listening as essential for patient-centred care, requiring ongoing adaptability. Additionally, patient expectations significantly influence treatment dynamics and transactional analysis (TA), with positive expectations enhancing outcomes. However, managing unrealistic expectations is critical and can be addressed through transparent communication (El-Haddad et al., 2020; Unsgaard-Tøndel and Søderstrøm, 2021).

Patients' beliefs, past experiences, and emotional states shape encounters, especially in chronic pain contexts, influencing musculoskeletal pain perception through neurological and cognitive mechanisms (Bohlen et al., 2021; Burleson and Quigley, 2019; Stroman et al., 2021). Understanding humans as dynamically interacting with their world highlights the need for self-regulation to maintain homeostasis, supported by theories such as active inference and enactivist perspectives (Seth and Friston, 2016; Esteves et al., 2022; Arnaldo et al., 2022; McParlin et al., 2022; Kim et al., 2022).

Finally, contextual factors, including verbal cues, can shape expectations and activate neurobiological changes, emphasizing the importance of aligning communication with patient expectations to maintain trust. Trust-building through attentive listening without immediate contradiction is crucial for optimizing strategies and preserving the TA (Rossettini et al., 2018, 2022).

4.2. Sharing goals and person-centred care

During the interviews, sharing treatment goals with patients in manual therapy was emphasised for establishing synchrony between therapist and patient. This collaborative approach promotes transparency, mutual trust, and active patient involvement in their healing journey (Hoffmann et al., 2022; Finset and Ørnes, 2017; Dunlay and Strand, 2016). Discussing treatment goals, encompassing symptom alleviation and setting realistic expectations, considers patient preferences and allows continual adaptation based on treatment progress, facilitating ongoing collaboration (McParlin et al., 2022; Krist et al., 2017; Dunlay and Strand, 2016).

Attention was drawn to the chronic nature of some conditions, often accompanied by emotional components such as anxiety and depression, impacting treatment engagement and goal pursuit (Penedo et al., 2020; Becker, 2020). Aligning mental states improves cooperative communication, while discussing treatment goals establishes a stable foundation for the therapeutic relationship (Gallotti et al., 2017; Accardi et al., 2023). Empathy plays a central role in understanding patient needs and promoting positive treatment outcomes through brain-brain synchrony (McParlin et al., 2022; Finset and Ørnes, 2017).

Additionally, this collaboration aligns with person-centred care, emphasizing synchronicity and clinicians' ability to connect with patients on multiple levels, addressing individual needs.

Embodied cognition recognizes that patients' experiences are grounded in their physicality and embodied history. Synchronicity encourages active patient involvement in healing, addressing both surface symptoms and deeper challenges (Riess and Kraft-Todd, 2014; Banton et al., 2023).

Participants view patients as individuals influenced by their environment, acknowledging the body's role in shaping their perceptions and the sense of self, including the embodied self and the sense of agency. This understanding evolves through ongoing interactions and

reciprocal influences, highlighting the mind's power (Bohlen et al., 2021; Cerritelli and Esteves, 2022; Esteves et al., 2022; Montirosso and McGlone, 2020).

According to an enactivist model, patients' sense-making processes are crucial for healing, helping them derive meaning from experiences and symptoms. This extends to how patients cope and engage in healing, developing resilience and adaptability through meaning-making (Esteves et al., 2022; Bohlen et al., 2021).

From an embodied, enactive, and shared relationship perspective, a multi-level consideration of realms such as pre-reflexivity and pre-verbality has emerged. This underscores the idea that cognition and therapeutic alliance are deeply rooted, not only in our bodily experiences but also our actions, and social interactions, extending beyond traditional views that focus solely on conscious, rational thought. Specifically, the pre-reflective dimension does not imply self-awareness since it is based on the "I" experiencing rather than the "I" reflecting. In this context, the self is regarded as a dynamic and experiential state that is always evolving. Additionally, the pre-verbal dimension occurs in manual therapy when information gathered through palpation leads to perception and action even before it is defined in words (Esslen et al., 2008; Comeaux, 2005; Bohlen et al., 2021).

In manual therapy, active inference enhances understanding of patient-practitioner interactions. Clinicians adjust strategies based on perceived responses and shared predictions, promoting a paradigm where perception shapes experience (Bohlen et al., 2021; Esteves et al., 2022). This collaborative approach, likened to 'rowing' together, views the patient as an active partner, embracing authentic collaboration and fruitful outcomes.

4.3. Bidirectional communication and therapeutic touch

Effective communication in therapy extends beyond mere information exchange, favouring a profound connection between practitioner and patient, where both actively contribute to understanding (Henry et al., 2012). Synchrony encompasses the alignment of verbal and non-verbal cues, facilitating mutual understanding (Ahlsen and Nilsen, 2022).

Clinicians attuned to patients' expressions capture emotional subtleties and bodily responses, reflecting synchrony in their reactions, thus creating an environment of genuine empathy and understanding. This reciprocal process necessitates active listening and reflexive response (Del Giacco et al., 2020).

Synchronicity enhances therapeutic communication and trust through co-construction of meaning and real-time adaptation (McParlin et al., 2022). Research on communicative dynamics reveals synchronised neural responses termed 'person-to-person coupling', indicative of effective communication. This connectivity diminishes without communication, with listener neural reactions mirroring those of the speaker, suggesting active prediction of speaker expressions and better comprehension (Hasson et al., 2012).

In geriatric musculoskeletal care, establishing a strong patient-caregiver connection through effective communication is crucial for person-centred treatment (Sundler et al., 2020; Vestøl et al., 2020). Hands-on therapies enhance elderly patients' quality of life by providing physical and emotional support, promoting trust, and overcoming psychosocial barriers (Kopf, 2021; Souesme and Ferrand, 2019). Direct tactile interaction helps patients perceive caregivers as attentive and caring (Kiselev et al., 2018; Harman et al., 2011). Understanding communication and synchrony mechanisms is vital, especially in contexts requiring language mediators and cultures, fueling family involvement (McParlin et al., 2022).

Touch serves as a key form of communication, alleviating physical symptoms and establishing an empathic connection between practitioner and patient (Baroni et al., 2021; Schaefer et al., 2021). When aimed at patient well-being, touch fosters trust and emotional openness, conveying empathy and support (Strigo and Craig, 2016). The practitioner attention to touch influences sensory perception and alters brain connectivity patterns, with studies suggesting convergence in the interoceptive cortex between awareness and tactile perception, offering innovative perspectives for treating mind-body disorders (Cerritelli et al., 2021; Casals-Gutiérrez and Abbey, 2020).

Congruence between emotionality, expressivity, and tactile perception is crucial, as congruent and emotionally charged social stimuli activate relevant affective networks in the brain, intensifying neural activity when facial expression aligns with tactile sensation associated with emotional valence (Ebisch et al., 2016).

The TA acts as an 'ecological niche', nurturing patient growth and transformation, with the practitioner fostering optimal conditions for emotional well-being and patient growth through biobehavioural synchrony, sensitivity, attention, and respect for individual diversity (Esteves et al., 2022; Ramstead et al., 2019).

In paediatric musculoskeletal care, communication through touch is emphasised, with clinicians co-creating meaning and promoting reciprocal interaction and synchrony while the child guides movement (Sørvoll et al., 2022; Elkiss and Jerome, 2012). Immersing oneself in the child's reality and recognising the child as an active participant strengthens the therapeutic bond, highlighting non-verbal communication and body language dynamics (Engelsrud et al., 2018; Olsen, 2023). Sharing intentions builds trust and strengthens TA (Zhang et al., 2019). Involving the child's parent/guardian in a triadic relationship further strengthens trust in the child and his/her caregivers.

TA therefore represents a multifaceted connection between therapist and patient characterised by synchronicity and sharing on various levels, with the patient actively participating in their own healing process.

5. Limitations

The study acknowledges limitations, such as the reliance on email communication, which may affect response rates and data accuracy (Danko et al., 2019). Video interviews lacked interactivity, which was mitigated by observing body language and encouraging feedback, while telephone interviews focused on tone due to the absence of visual cues (Saarijärvi and Bratt, 2021; Irani, 2019; de Villiers et al., 2022; Dejonckheere and Vaughn, 2019; Archibald et al., 2019; Saarijärvi and Bratt, 2021). The over-representation of osteopaths may prevent generalisation, but the inclusion of clinicians from different countries and comparison with larger samples of physiotherapists provided different perspectives. Strict supervision counteracted the interviewer's limited experience.

6. Conclusion

This study emphasised the fundamental importance of promoting meaningful dialogue, active patient involvement and therapeutic synchrony to strengthen the TA in musculoskeletal care. Effective person-centred care requires the establishment of deep empathic connections and mutual communication to ensure a comprehensive exploration of the patient's problems. Collaboration with patients to formulate personalised treatment goals, along with an emphasis on tactile interaction and feedback, is considered essential. Research suggests a rigorous examination of these components, calling for future quantitative studies to evaluate the effectiveness of TA. Future research should investigate factors influencing the quality of therapeutic communication, develop strategies for greater patient involvement, and evaluate practices that promote synchrony. Adoption of these principles should elevate the quality of musculoskeletal care, integrate theoretical and practical frameworks, enrich clinician-patient relationships, and stimulate innovative research and improved patient management.

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Institutional review board statement

Approval for the study was obtained by the Local Ethics Committee of COME Collaboration Foundation and the Malta ICOM Educational Ethics Committee (Date March 2023.

Informed consent statement

Informed consent was obtained from all subjects involved in the study.

Data availability statement

The data presented in this study are available on request from the corresponding author.

Ethical approval

Approval for the study was obtained from the Institutional Review Board (IRB) of the COME Collaboration Foundation and the Malta ICOM Educational Ethics Committee (IRB protocol #07/2023).

Declaration of interest statement

None.

CRediT authorship contribution statement

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Appendix A. Supplementary data

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