The development and exploratory analysis of the Osteopaths' Therapeutic Approaches Questionnaire (Osteo-TAQ)

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A B S T R A C T

Background: Clinical practice encompasses the complex interaction of different skills, knowledge and values in the context of a therapeutic relationship. Research has demonstrated a positive association between well-developed therapeutic relationships, patient satisfaction and clinical outcomes in musculoskeletal conditions. There has been little research into osteopaths' decision making regarding choice of therapeutic approaches.

Aim: The aim of this study was to develop a new questionnaire to assess differences in osteopaths' therapeutic approaches, and to subsequently investigate the internal consistency of the factors identifying different underlying practice concepts and the validity and generalisability of a qualitative grounded theory on osteopaths' therapeutic approaches and clinical decision-making.

Method: A 30-Item Osteopaths' Therapeutic Approaches Questionnaire (Osteo-TAQ) was developed using modified verbatim phrases from a published qualitative grounded theory. UK osteopaths were invited to complete the Osteo-TAQ questionnaire. An exploratory factor analysis, using both the principal axis factoring method and principal components method, was performed on the responses.

Results: 132 responses were received. Osteo-TAQ displayed acceptable level of modelling adequacy ($\chi^2(435) = 1466.1$, $p < 0.001$; KMO = 0.754) and internal consistency ($\alpha = 0.778$). Exploratory analysis identified eight factors with eigenvalues >1, accounting for 63.5% of the variance.

Conclusion: The Osteo-TAQ identified factors that are congruent with a qualitative grounded theory on osteopaths' therapeutic approaches. The Osteo-TAQ appeared to have good construct validity with four robust components identified and easily characterised. Further testing for construct validity should be carried out amongst a larger population of osteopaths and outside the UK to test and develop the questionnaire further.

Introduction

During the latter part of the 20th century the practice of healthcare has been said to have moved from a biomedical (BM) to a biopsychosocial (BPS) model [1], to address the dualistic, reductionist and de-humanising stance of the BM model whereby symptoms (phenomena) were viewed as purely 'medical' or 'biological' in nature [2]. The biopsychosocial model is both a philosophy of healthcare and a practical guide [1], and recently there have been attempts to advance the model in relation to musculoskeletal pain, by arguing for a revised BPS framework that places enactivism (i.e. the phenomenological concept relating to the lived experience of pain) at the core [2].

In the UK, the General Osteopathic Council (GOsC) has incorporated characteristics of the BPS model as competencies in its standards [3], giving some formal codification of the BPS model for osteopaths. Recent cross-sectional data suggests that biomedical beliefs are still apparent within osteopaths' clinical decision-making [4,5], and qualitative data suggests a lack of undergraduate training in the BPS model might be a factor in the perpetuation of the BM model amongst osteopaths [6]. It is worth noting that systematic investigation of barriers to osteopaths adopting the BPS model is underway, and should provide greater insight into how the BPS is operationalised in osteopath [7]. Alongside the emergence of the BPS model, the patient-centred care model has developed as the practical application of this BPS model, and has (in conjunction with the BPS model) been considered by some to be congruent with parts of osteopathic theory and principles of practice [8, 9]. Patient-centred care focuses on the individual's needs and seeks to empower patients to become active participants in the decision-making surrounding their care [10]. Qualitative research offers an insight in osteopaths' conceptualisation of patient-centred care, and research

suggests the role that they (and the patient) have in clinical decision-making varies from patient-led to practitioner-led [6,11]). However, it is unclear how findings from a small number of qualitative studies may be generalisable to a larger population of osteopaths.

Research into the management of musculoskeletal conditions has demonstrated a positive association between good therapeutic relationships and patient satisfaction [12] and clinical outcomes [13,14]. For this reason, research into how healthcare is delivered (and experienced by patients) and the different therapeutic approaches taken with patients is now considered an important part of the evidence-based practice research agenda [15].

In the UK, osteopaths work primarily in the private sector, [16] which as a result means that practitioners are unconstrained by some of the challenges which other healthcare professionals face when working within the large and complex National Health Service, such as high patient case loads and the resulting time pressure during consultations [17]. Therefore, osteopaths have the opportunity to spend time with their patients, share clinical decisions, understand their patients' illness experience and develop a therapeutic relationship all of which are clinical endeavours consistent with the operationalising of the BPS and patient-centred care models [18].

The literature supports the notion that a well-developed therapeutic relationship between patient and therapist is established through collaboration, compassionate non-judgemental behaviour, good communication, therapist empathy and mutual respect [14,19,20]; the presence of which is reflected in studies of what patients value in healthcare [21–23], and are now emerging as important determinants for clinical outcome of musculoskeletal pain [24]. How osteopaths conceptualise their practice and their professional identity will influence the nature of the relationships they develop with patients and the form that their decision-making process takes (for example, practitioner-lead, patient-lead or shared) [11,25].

Studies have found that patients value osteopaths whose therapeutic approach aligns with the BPS model. For example, Strutt et al.'s [12] survey of patients (n = 181) treated at an osteopathic training clinic found patients' valued being listened to and not rushed, having the treatment plan clearly explained to them and being given reassurance about the likely outcome. Similarly, in Australia a mixed methods study of 161 of osteopathy patients identified the therapeutic relationship to be a key aspect of them having a positive experience [26]. A larger (n = 1649) UK survey of patients' expectations of osteopathic care found patients ranked expectations relating to an open exchange of information highest [27]. However, qualitative research suggests that the level of involvement in clinical decision-making expected by osteopathy patients varies [28], requiring osteopaths to be flexible in tailoring their therapeutic approach to the individual values and preferences of the patient.

From the practitioner perspective a growing body of qualitative research has provided an insight into how osteopaths interact and manage their patients, including their use of the BPS model [6,29], their conception of osteopathic principles, practice and decision-making [11, 25,30] and also use of evidence-based clinical guidelines [31,32]. Thomson et al. [11,25] offered the first explanatory theory of the clinical decision-making and therapeutic approaches of osteopaths. By interviewing and observing twelve UK osteopaths, they identified participants' view of osteopathy, interaction with patients and interpretation of cues, level of patient involvement, their conception of practice as being elements that together characterised their therapeutic approach adopted with patients (see [33] for the full grounded theory). From these findings a theoretical model of three therapeutic approaches (termed *The Treater*, *The Communicator*, *and The Educator*) was constructed, which described the different emphases that osteopaths have on different areas of their clinical practice (such as hands-on treatment, patient management and clinical reasoning) [11]. Thomson et al.'s theory [11,25] propose 'conception of practice' as the core category (variable) which influenced osteopaths' therapeutic approaches, with conception of practice encompassing individual practitioners' views the nature of their practice and the different aspects of their clinical work such as knowledge, skills, activities, and decision-making [11].

Qualitative investigations of factors associated with therapeutic approach from a practitioner perspective have produced some interesting findings but have lacked the participant numbers to make their findings generalisable [6,11,25,29,30]. Therefore, the development of a survey tool that tests Thomson et al.'s [11,25,33] theory is valuable as it could be used to study the impact that the different therapeutic approaches have on clinical outcomes, patient outcome measures or to explore the generalisability of Thomson et al.'s findings to osteopath populations wider than the UK.

Therefore, the aim of this study was to develop a new questionnaire to assess differences in osteopaths' therapeutic approaches. A second aim was to subsequently investigate the internal consistency of the factors identifying different underlying practice concepts. A final aim was to investigate the validity and generalisability of a qualitative grounded theory of osteopaths' therapeutic approaches and clinical decision-making [11].

Methods

A cross-sectional survey was developed then tested with UK osteopaths using the online SurveyMonkey tool for six weeks from the 5th of December 2018. This survey used the method established by Pincus et al [34] in their development of the Attitudes to Back Pain Scale in Musculoskeletal Practitioners (ABS-mp) questionnaire. The ABS-mp was developed from a qualitative study, employing grounded theory methods, collecting data through interviews with musculoskeletal practitioners in the UK (osteopaths, physiotherapists and chiropractors) [35], shows good face and content validity [34] and therefore it was considered appropriate exemplar to on which to base this present study's methods.

Ethics

Ethics approval was granted by the University College of Osteopathy (UCO) Research Ethics Committee.

Survey development

Item generation

The items for this study were developed based on the themes developed by by Thomson et al. [11,25] (Table 1). It was not possible to access the full interview transcripts from the original grounded theory study, therefore data in the form of participants' quotations which appear in the full doctoral thesis [33] were used to aid the development of the items.

Verbatim phrases from the quotations from the participants of Thomson's qualitative study [11,33] were used to develop individual survey items. However, in some cases it was necessary to shorten or paraphrase the original wording. All categories and sub-categories were developed by the lead author and primary investigator in the source qualitative study from which the Osteo-TAQ is based [33]. See Supplementary information 1 for original statements and statements used in the Osteo-TAQ.

Item selection

Item selection for the Osteo-TAQ was discussed and agreed with the author of the qualitative source study in accordance with the approach of Pincus et al [34]. Items were suggested and reviewed by the two authors, one (OT) an osteopath with a background in qualitative research and was the lead investigator of the source qualitative grounded [11,25]; the other (VA) a final year Master's student in osteopathy.

Table 1
Themes and descriptors identified by Thomson et al. [11]].

Theme	Description of theme
Conception of practice	Conception of practice was considered to be how participants viewed the nature of their practice. This is closely associated with their views on the nature of knowledge associated with their practice.
View of osteopathy	Participants held differing perceptions of the purpose and practice of osteopathy based on their professional identity, clinical experiences, views of health and disease and education experiences, which together helped inform and shape their view of osteopathy.
Therapeutic approach	Experienced osteopaths' therapeutic approaches were characterised by their view of osteopathy, focus of interaction, approach to clinical decision-making, level of patient involvement and their therapeutic goal.
Interacting with patient and interpreting cues	There were differences in the focus of participants' interaction with patients. This resulted in diversity regarding what clinical information participants found relevant and where, and how, they focused their interaction with patients to generate clinical cues.
Approach to clinical decision making	Clinical decision-making in osteopathy occurs with varying levels of patient involvement and is related to practitioners' conception of practice and therapeutic approach.

Both authors provided feedback on item suitability and wording.

Validity testing

Face validity was assessed with a sample of 5 volunteers who were members of the UCO research team all of which were also practicing osteopaths. They were asked to review a descriptor of each characteristic then rate the proposed items as to how well they represented the characteristic using a 5-point Likert scale (1 = Strongly disagree, 5 = Strongly agree). (Supplementary information 2).

In response to the face validity process and continued review from the authors, the number of items was reduced from the original 32 to 30 (7 removed, 5 added) and some items were further modified, based on feedback, to better match the item description, avoid repetition and provide a more even spread of statements for each sub-category (Table 2). See Supplementary information 10 for the final set of statements used in the Osteo-TAQ.

Study design

The Osteo-TAQ is a cross sectional survey made using the online SurveyMonkey tool. The items were presented in a pseudo-random order (i.e. not true randomisation as randomisation was constrained so that items from categories were evenly spread across the questionnaire) with a single sequence of items being used for all participants. Participants were asked to select a response that best reflected their opinion using a Likert scale 1 (Strongly agree) to 5 (Strongly disagree).

Table 2
Table showing the split of statements per the three categories of therapeutic approach and their subcategories [11]].

	Therapeutic Approach		
Characteristic	Treater	Communicator	Educator
	A14	A15	A16, A22
Conception of Practice	Technical rationality	Professional artistry	Professional artistry
	A30, A32	A34, A38	A34, A38
View of osteopathy	Practitioner-centred	Collaboration	Empowerment
	A17, A23	A08, A35	A09, A10
Interacting with patient and interpreting cues	Body	Person	Patient
	A11, A19, A26	A27, A36	A20, A21, A29
Approach to clinical decision-making and level of patient involvement	Practitioner-led	Shared	Patient-led
	A03, A04, A05	A02, A13, A37	A06, A07

Sampling procedure

Participants were included on the basis that they were GOsC registered osteopaths that had agreed to be contacted for research processes (via a list made available by the GOsC and held by the authors' institution). There were no other exclusion criteria. A convenience sample of UK registered osteopaths was used from 1500 out of the 5200 practitioners registered with the GOsC, who had agreed to be contacted for research purposes. A sample size calculation showed 95 completed questionnaires would be needed, based on a population of 5,200, with prevalence = 0.5 (used for unknown prevalence) and margin of error = 10% with confidence level = 95% [36].

Procedure for distributing the questionnaire

Using the GOsC email list, a mass email invitation was sent to 1500 osteopaths. A link to the Osteo-TAQ was embedded within the email and the Participant Information Sheet (PIS) was attached.

Osteo-TAQ was available for a period of six weeks from the 5th December 2018. After this time the survey was closed, and data was downloaded. IP data was deleted, and the data re-saved in a new file to ensure the data set could not be used at any point to trace participants' identity.

Analysis

Osteo-TAQ data was imported into SPSS Version 25 [37] and analysed using exploratory factor analysis with principal axis factoring (PAF) to explore latent factor structure. To simplify the interpretation of the factors, initial analyses used orthogonal rotation [38].

Participant factor scores were saved, and scatterplots created for each of the 6 possible combinations of the 4 factors. However, no statistical analysis was conducted to investigate possible clustering.

Modelling adequacy was assessed using Bartlett's tests of sphericity and Kaiser-Meyer-Olkin (KMO) tests. The number of factors to be extracted were assessed using scree plots and eigenvalues. Cronbach's alpha was used to assess whether model adequacy could be improved by removal of individual items, and factors were based on the loadings for each item [38].

A cut off value of .45 was used based on the classification of Tabachnick et al [38] (0.32–0.45 = poor, 0.45–0.55 = fair, 0.55–0.63 = good, 0.63–0.71 = very good, above 0.71= excellent) (Supplementary information 4).

Cronbach's α = 0.778 for the PAF indicates an acceptable internal consistency between the items [38]. The corrected item total correlations and alpha values suggested that the model would not be improved by the deletion of any items. For all models KMO statistics were >0.7, showing that the correlation matrix was suitable for analysis.

Results

Responses

132 surveys were completed (2.5% of registered UK osteopaths), 3/3960 questions were not answered.

Modelling adequacy

Bartlett's test of sphericity gave a result of approximate $\chi^2(435)$ =

1466.1, $p < 0.001$, indicating that there was a meaningful structure in the data. The KMO measure of sampling adequacy returned an acceptable result of 0.754 [49].

Exploratory analysis of principle components

PAF identified eight factors with eigenvalues >1 PAF from the ordinal data (Fig. 1). Variables with loadings closer to −1 or 1 indicate that the variable strongly influences the factor.

Together eight factors explained 63.5% of the variation in the data (Supplementary information 5) which is considered to be an adequate amount [38]. The last four of these eight factors had one or no statements with a "'good'' or better loading and were not further examined. The remaining four of these factors accounted for 46.6% of the data variance. Visual inspection of the scatterplots suggested there was no meaningful clustering of participants with respect to the 4 factors. The scatterplots looked random, with participants scattered across all 4 quadrants of the plots. Table 3 shows the loading on the four factors.

Descriptive statistics by factor

Factor 1

Factor 1 accounted for 19.4% of the variance in the data. Eight 'fair' or better statements account for 6 of the 12 statements aligned with the 'Educator' characteristics (items A22, A38, A10, A20, A21, A29) and 3 of the 9 statements (items A35, A02, A37) aligned with the 'Communicator' therapeutic approach (Table 3 and Supplementary information 6).

Factor 2

Factor 2 accounted for 15.5% of the overall variance. Statements with a loading of .45 or greater account for 5 of the 11 statements (items A30, A32, A17, A11, A26) within the therapeutic approach labelled 'Treater' and this factor was negatively correlated with one statement (Item A34) from the professional artistry category (Table 3 & Supplementary information 7).

Factor 3

Factor 3 accounted for 6.3% of the overall variance and contained five "fair' or better statements. Four of the statements (items A02, A06, A07, A37) aligned with the characteristic 'approach to clinical decision making and level of patient involvement' for 'Educator' and 'Communicator' (Table 3 and Supplementary information 8).

Factor 4

Factor 4 accounted for 5.5% of the overall variance. All of the four statements (items A04, A05, A14, A10) with a loading of .45 or greater fell within the 'Treater' set of statements (Table 3 and Supplementary information 9).

Overlap between the factors

84 (63.6%) respondents either agreed (A) or strongly agreed (SA) with the statements in Factor 1 with 'good' or better loading values ≥ .55. Of these 84 respondents, 32 also answered A or SA to statements in Factor 2 with 'good' or better loading values, 21 also answered A or SA to Factor 3 with 'good' or better loading values, while 5 of the 84 answered A or SA to the questions in Factor 4 with 'good' or better loading values (Table 4). The overlap between the remaining Factors can be seen in Table 4. This shows that some osteopaths may use elements of some or all of these factors in their personal therapeutic approach.

For a collated table of all the responses, refer to Supplementary information 10.

Discussion

The Osteo-TAQ was designed to assess differences in osteopaths' therapeutic approaches and subsequent analysis was undertaken to assess the internal consistency of the factors identifying different underlying practice concepts and the validity and generalisability of a qualitative grounded theory describing and explaining osteopaths' therapeutic approaches and clinical decision-making [11,33].

The key findings of this present study were that Osteo-TAQ displayed an acceptable level of modelling adequacy and internal consistency, and an exploratory analysis identified eight factors with eigenvalues >1, accounting for 63.5% of the variance.

Four of the eight factors had three or more statements deemed to have a good or better influence on the strength of the factor and were further explored. These four factors aligned to Thomson et al.'s [11] theory and from the categorisation of the items the factors were termed '*The Educator*', '*The Treater*', '*A shared approach to clinical decision making*' and '*A practitioner-led approach to clinical decision making*'. Although each factor identified is unique it does appear some individuals may incorporate a mixture of approaches in their clinical practice.

Exploratory factor analysis

Factor 1 – The Educator

Nearly two thirds (84) of this study's respondents identified with this factor, as they could relate the following statement to their own

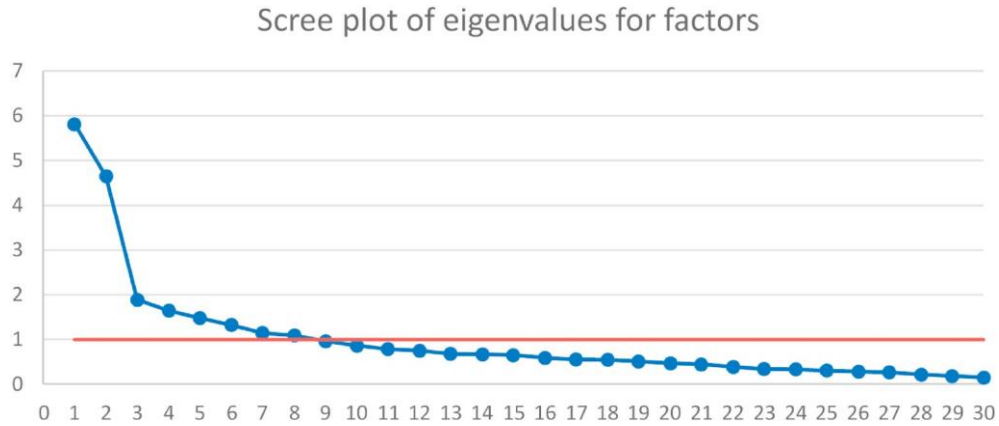

Fig. 1. Scree plot of eigenvalues of the 30 factors.

Table 3
Factor loading table (values ≥ .45. in bold).

Item		Factor loading			
		Factor 1	Factor 2	Factor 3	Factor 4
Factor 1: The Educator					
A29	I delve quite heavily into the history of the patient's complaint and what they do day-to-day which increases their pain to get a clear picture of all the things that bother them.	**0.62**	0.05	0.10	0.25
A20	I want to get an overall picture of how the patient is coping with the pain.	**0.62**	−0.01	0.03	0.02
A08	I spend a lot of time explaining to patients the options saying "this is what I can do to treat this, and this is what you can do".	**0.62**	−0.03	0.30	0.05
A22	Enhancing the patient's knowledge enables them to change their behaviours and learn how to self-manage their problem.	**0.59**	0.03	0.08	0.07
A10	I explain what I think I can do to help patients and provide them with options and they can make a choice what they would like to do.	**0.59**	−0.06	0.26	0.02
A38	I combine the information from different sources such as the clinical examination, the patient's expectations and the relationship that I have with the patient to guide my clinical decisions.	**0.55**	0.09	0.26	−0.14
A21	It is very important to communicate with the patient so you get an understanding of them.	**0.50**	0.07	0.12	−0.13
A36	I perform the hands-on treatment in the background which allows me to talk to the patient, ask them how they are, what they've done this week, because I'm concentrating on developing a relationship with the person.	**0.49**	−0.06	0.11	−0.01
Factor 2: The Treater					
A26	The information that my hands and eyes collect from the patient's body and their tissues directs my treatment.	0.09	**0.80**	−0.08	0.05
A17	As an osteopath my palpation skills are the most important tools I have.	−0.06	**0.72**	−0.10	0.26
A11	My fingers give me the information I need; they tell me what the tissues are doing.	0.05	**0.71**	−0.09	0.28
A30	I keep to the osteopathic idea that we remove obstacles in a patient's body using joint assessment and palpation as guidance.	0.11	**0.64**	0.01	0.31
A32	I think the most important osteopathic principle is that you could treat any symptom by adjusting the body's framework.	0.08	**0.45**	0.04	0.31
A34	I think osteopathy has evolved beyond the works of A.T. Still and the original principles of osteopathy.	0.23	**0.47**	0.19	0.11
Factor 3: A shared approach to clinical decision making					
A35	I ask patients what treatments they would prefer and what they think would help them most of all.	0.17	−0.12	**0.70**	−0.24
A37	Together with the patient we try different approaches and talk through options.	0.30	−0.30	**0.69**	0.13
A02	I am guided by the patient as to what they want, and I'll often say "what I can offer you is a choice of treatment options".	0.16	0.03	**0.67**	−0.24
A06	When a patient says they would like a certain treatment as it's worked before I would be inclined to follow that approach.	0.21	0.03	**0.50**	0.16
A07	I always explain "I don't think it's this, I think it could be this, but I could be wrong so we need to check this out and this is the way we could proceed. I ask them what would you like to do?"	0.17	−0.28	**0.48**	0.14
Factor 4: Practitioner-led approach to clinical decision making					
A19	My focus first of all is to find the tissues causing symptoms so I can decide what area of the body is involved.	0.03	0.12	0.07	**0.62**
A14	My primary aim is to treat, rather than sit and discuss what we can do about it.	0.00	0.20	−0.12	**0.61**
A04	The patient's role is to try and relax as much as possible and follow instructions.	0.02	0.30	0.02	**0.60**
A05	My training means I am the one to decide what treatment is best for the patient's condition - they don't have the knowledge and understanding to decide for themselves.	0.02	0.24	−0.32	**0.45**

Table 4

A matrix of the overlapping total number of Agree or Strongly Agree responses to each Factor with loadings ≥.55.

	F1	F2	F3	F4
F1	84			
F2	32	46		
F3	21	11	24	
F4	5	6	4	8

approach to practice: *"Educators considered their practice of osteopathy as facilitating empowerment, and they focused on informing patients, eliciting their personal preferences and their needs and providing choice."* [33]; p229). These qualities align with the development of a positive therapeutic relationship [19,20]. Research from osteopathic studies suggest that such characteristics which align with models of patient-centred care [18] also contribute to the positive experiences of patients receiving osteopathy care [12,26,27], and are congruent with the finding in this present study that the majority of osteopaths adopt this approach in practice.

The two statements from the 'Communicator' category could also be considered to be collaborating with and empowering the patient (A08 and A38) and suggest that the differences between 'Educator' and 'Communicator' are too similar to differentiate osteopaths' therapeutic approaches.

Factor 2 – The Treater

"Treaters viewed the practise of osteopathy as practitioner-centred, whereby they considered themselves as the central, authoritative figure that possessed the knowledge and technical skills to discover and treat the patient's problem." [33]; p228).

Almost one third of this study's respondents (46) agreed with elements of the 'Treater' approach - specifically, an approach which emphasised technical hands-on skills, a practitioner-centred view of osteopathy and a focus on interacting with the body. The four statements that had the strongest influence on this factor were those that stated the importance of palpation in their therapeutic approach (Supplementary information 7). Palpation has historically been described as the cornerstone of osteopathic diagnosis and treatment [39] and this is congruent with the relatively large proportion of osteopaths in the present study who agree with these statements. This is despite evidence showing poor reliability, validity and specificity of palpation [40,41].

Factor 3 – A shared approach to clinical decision making

The statements in Factor 3 with a 'good' or better loading sit within the 'Communicator' group. The presence of the two statements representing the 'Educator' patient-led approach with a 'fair' loading in this factor again raise the possibility that the subtlety between The Educator's shared approach to clinical decision-making and The Communicator's patient-led approach may be too similar to be distinguish with the Osteo-TAQ.

Only 24 participants agreed to all of the statements with a 'good' of better loading for factor 3. Some statements within this factor did receive a strong response: 92 participants responded 'strongly agree' or 'agree' to "*Together with the patient we try different approaches and talk through options*" (A37, Supplementary information 8). The literature supports that there is a positive association between good therapeutic relationships which empower the patient and enhances patient satisfaction [12] and clinical outcomes [13,14].

Factor 4 – Practitioner-led approach to clinical decision making

"This approach was associated with minimal patient involvement, and it is consistent with 'paternalistic' models of decision-making" and *"placed little priority on exchanging or sharing information with the patient"* [33]; pp213).

Factor 4 ties together four statements that lie wholly within the 'Treater' approach – specifically, within body-focused interaction and practitioner-led clinical decision making. Only 6% of respondents identified with these statements; this is a positive finding as these characteristics do not align to the identified attributes of forming a positive therapeutic relationship [19,20].

The continuum

"While the three therapeutic approaches have been presented as distinct, they may be considered along a continuum. The Treater model is substantially different from Communicator and Educator models, in that it is based on a conception of practice which can be considered as technical rationality" [33]; pp215).

There was a large overlap between Factors 1 and 3, and 2 and 4, when 'Treater' against 'Educator'/'Communicator' were grouped (Table 4). In addition, a large sub population of Factor 1 respondents (32/84) also agreed with Factor 2 statements (with a loading of good or better). There was, therefore, no clear delineation between the approaches some osteopaths use.

This blending of therapeutic approaches could reflect osteopaths' adapting their therapeutic approach in response to the needs and values of the individual patient. This would be consistent with research that suggests some osteopathy patients do not desire a significant level of involvement in clinical decision-making [28].

Implications and further research

The findings from this study highlight variation in the therapeutic approaches used by osteopaths and necessitate further research to investigate what practitioner characteristics or context of the interaction influences which approach is used. Assessing such characteristics amongst osteopaths would be important given the predictive capacity of contextual factors [42] and the therapeutic relationship [13] in clinical outcomes from musculoskeletal pain. The Osteo-TAQ appears to have good construct validity with four robust factors identified and easily characterised. Further testing for construct validity should be carried out amongst a larger population of osteopaths and outside the UK.

Osteo-TAQ is specifically tailored to osteopaths, and if future studies wanted to compare approaches between different groups of healthcare professionals the tool would need to be adapted. Although Osteo-TAQ was developed from data of practicing osteopaths, the tool could be tested in a student population, and employed in educational research to investigate how changes in undergraduate curricular may influence student practitioners' therapeutic approaches. Other future educational research may compare results from the Osteo-TAQ tool with osteopathy students' perceptions of their clinical tutor [43]. Considering many clinical tutors in osteopathy also work in clinical practice, it would be educationally valuable to see how the different therapeutic approaches may relate to the experiences and perceptions of students during their clinical education.

The Osteo-TAQ also poses some interesting clinical implications. Recent longitudinal research has shown that common musculoskeletal disorders can be reliably classified into clinically meaningful phenotypes, based on characteristics across the different biopsychosocial domains [44]. Further clinical research could explore whether matching different phenotypical groups of patients to osteopaths identified by the Osteo-TAQ tool as having a particular therapeutic approach would result in better clinical outcomes.

Strengths and limitations

A key strength of Osteo-TAQ is that items were generated to reflect themes identified during in-depth interviews with osteopaths and are indicative of views held by this population. This present study utilised a sample of convenience and it is possible social desirability may have impacted participants' responses. Although we met the pre-calculated sample size, we did not perform a non-respondent analysis, thus are unable to be certain that those that did respond were typical of the osteopathic profession in the UK. In addition, the sample size margin of error was set at 10%; a margin of error set at 3 or 5% may have given a more precise estimate to the factor structure [45].

This study's methods were based upon that of Pincus et al [34]; however, there is some divergence of methods used in this study which are important to highlight. Firstly, we were not able to conduct validity interviews with participants to explore their thoughts and views on the final developed questionnaire. This may limit the face validity of our questionnaire, and further work using interviews and focus groups could be employed to address this limitation.

Additionally, Pincus et al [34] conducted the qualitative stage of their questionnaire development within a year [35] of developing and testing the ABS-mp tool. In contrast, the development of the Osteo-TAQ as described in this present study occurred five years after Thomson et al [11,25] conducted and published their qualitative grounded theory study. It cannot be excluded that significant policy events in the UK such as the revision of the NICE low back pain guidance [46] and the introduction of revised GOsC practice standards [3] which took place between in this time, might have impacted the currency of osteopaths' clinical approaches constructed and described by Thomson et al [11,25].

The exploratory nature of this study meant that demographic data of

participants were not obtained (such as age, post-graduate education, years in clinical practice). Given that the development of clinical and expertise is influenced by a range of educational, environmental and temporal factors [47], further research is needed to investigate the relationship between practitioner demographics and Osteo-TAQ scores. Finally, the Osteo-TAQ was developed from a single doctoral qualitative study of twelve osteopaths [33], which developed a theoretical model of osteopaths' clinical decision-making approaches using Grounded Theory Methods [50], meaning that the items generated in the questionnaire were drawn from an empirically-based model, and can be tracked back to specific grounded theory categories (Supplementary material 3,6,8,9). Single grounded theories have resulted in the development of reliable quantitative tools previously (for example [48]) however as mentioned, the exploratory nature of the original qualitative study and that the resulting theoretical model was developed from one sample of experienced osteopaths in the UK may limit the generalisability of the questionnaire. Our hope is that Osteo-TAQ is developed further and tested, verified and validated amongst other osteopaths in other countries and contexts.

Conclusions

A 30-item instrument (Osteo-TAQ) for assessing osteopaths' therapeutic approaches was developed and displayed good modelling adequacy and an acceptable level of internal consistency. The factors identified provide some support to published qualitative grounded theory research, however not all characteristics of each approach were identified as a single factor, nor did there appear to be a differentiation between The Educator and The Communicator characteristics. Several osteopaths appear to embrace a variety of therapeutic approaches in their practice; the variation could be attributed to osteopaths' flexibly; adapting their approaches in response to their individual patients' values and expectations. Further research is needed to develop and further test the validity and generalisability of the Osteo-TAQ tool in different clinical and educational contexts.

Ethics approval and consent to participate

This study was approved by the University College of Osteopathy Research and Ethics Committee. Participants provided consent by completing the survey, as this was clearly outlined in the participant information sheet.

Declaration of competing interest

OT is an Associate Editor for IJOM but was not involved in any of the peer-review or editorial decisions regarding this paper.

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Supplementary information 1: Table of original quotes and modified statements used in Osteo-TAQ

Item No.	Quote	Modified statement
A02	I would be guided by them as to what they want, and I'll often say to patients 'what I can offer you is…' and I'll sort of pull out the menu…we can do some soft tissue work, we can do some [joint] mobilisations, we can do some spinal manipulation, we can do a bit of acupuncture and we can do some relaxation exercises.	I am guided by the patient as to what they want, and I'll often say "what I can offer you is a choice of treatment options".
A03	My approach is strictly hands-on, as my nature is more towards a purist idea of osteopathy...and while there are other practitioners that are happy to have their treatment directed by the patient...I go through my process.	I go through my process and that determines the direction of the treatment I give.
A04	The patient's role is to try and relax as much as possible...and follow instructions. So during treatment I would hold them and I would instruct them then to move their arm in a particular way.	The patient's role is to try and relax as much as possible and follow instructions.
A05	I don't need patients to dictate how I should do what I do. I didn't spend all this time training [in osteopathy] for a patient, who doesn't understand osteopathy, to tell me how they want me to treat and manipulate their joints.	My training means I am the one to decide what treatment is best for the condition - patients don't have the knowledge and understanding to decide for themselves.
A06	When patients come in and they say they'd like a certain treatment and it's worked before, I would be more inclined to follow that treatment approach- because you know it works and they've asked for it.	When a patient says they would like a certain treatment as it's worked before I would be inclined to follow that approach.
A07	...I explain to patients what their problem is – "I don't think it's this, I think it could be this, but I could be wrong so we need to check this out and this is the way we could proceed... What would you like to do?" So it's all done with the patient's decision, really.)	I always explain " "I don't think it's this, I think it could be this, but I could be wrong so we need to check this out and this is the way we could proceed... What would you like to do?"
A08	I'll spend a lot of time discussing and explaining what the options are with the patient so I'll say, you know "this is what I can do to treat this with osteopathy and this is what you can do".	I spend a lot of time explaining the options saying "this is what I can do to treat this, and this is what you can do".

A09	I want my patients to be autonomous...and they can contact me if they need to but they don't need to come in for treatments on an ongoing basis, so there is a clear end point, which is very, very important.	I want my patients to be autonomous; they can contact me if they need me but they shouldn't be coming to me for treatment on an ongoing basis.
A10	I have explained what I feel I could do to help. And given him those options and it has allowed him to make a choice as to what he wants to do.	I explain what I think I can do to help patients and provide them with options and they can make a choice what they would like to do.
A11	I think it's about my fingers giving me the information that I need, telling me about those tissues, about the quality of them, what are they doing?, are they doing what they're supposed to be doing? Are they not doing what they're supposed to be doing? What do they feel like?	My fingers give me the information I need, they tell me what those tissues are doing.
A13	If a patient feels it's more efficacious to run on a beach barefoot in the sand rather than I manipulate their spine, then I'll recommend that, and that's treatment as far as I'm concerned.	If a patient feels like exercise they are performing is a better option than me manipulating their spine I'll recommend they do that exercise as their treatment.
A14	My primary aim is to treat, rather than 'let's sit down and discuss your problem and see what we can do about it'	My primary aim is to treat, rather than sit and discuss what we can do about it.
A15	I think you can help get a lot of people better by having a good chat and a cup of tea!	I think you can help a lot of people by having a good chat.
A16	I see the patient as an individual who owns their own body and can make decisions about it.	I see the patient as the owner of their body and they can make decisions about it.
A17	For me palpation skills are extremely important…I think, more than any other profession.	As an osteopath my palpation skills are the most important thing.
A19	My focus first of all [is to] try and find the tissues causing symptoms, that's what I want to get out of the examination, first and foremost, so that I can satisfy myself that this is a facet lock, facet strain, a disc prolapse, or whatever.	My focus first of all is to find the tissues causing symptoms so I can decide what area of the body is involved.
A20	My examination is a very patient specific functional assessment [to get] an overall picture of their pain and coping with their ability to cope with the pain, and how it goes up and down in order to get a real picture of what we're dealing with and also how the person is dealing with it.	I want to get an overall picture of how the patient is coping with the pain.

A21	You need to communicate with the patient, so that you have an understanding of them, and it gives you a much rounder picture of the person you're treating. So, it is very person-centred and for me that's extremely important.	It is very important to communicate with the patient so you get an understanding of them.
A22	An awful lot of what we see I brought upon by the patients' bad habits or lack of knowledge and so with education it's all potentially preventable or self-manageable.	Enhancing patient knowledge enables them to change their behaviours and learn how to self manage their problem.
A23	I need to know what I am treating….[and] I have got to know what the diagnosis is, so that I can get behind the reason for it and I can treat it.	I need to know the specific bio-mechanical problem so I can provide the right treatment.
A26	I'm being told what to do by what the tissue tells me. So I'm not deciding what to do, I'm trying not to do that, I'm trying to assess and let the body tell me what it wants me to do to it, or what it will permit me to do.	Information my hands and eyes collect from the body and the tissues directs my treatment.
A27	….there is a lot of talk between you and the person and a lot of communication. You are talking to them the whole time, 'how does the treatment feel'?...[and] you are trying to get a gauge on how it really feels to them.	I think it's important to seek feedback from the patient during the treatment.
A29	I go quite heavily into the history of their complaint, their occupation and what they do on a day-to-day basis and then how that feeds into their aggravating and relieving factors. So try to get quite a clear picture of all the things that bothers them.	I delve quite heavily into the history of their complaint and what they do day-to-day which increases their pain to get a clear picture of all the things that bother them.
A30	As long as you keep pure to the osteopathic philosophical idea…and I suppose I still operate from a more old school point of view, where I will use palpation, and joint assessment to tell me what to do…because the principle of removing an obstacle in the patient's body, from an osteopathic point of view, is very important to me.	I keep to the osteopathic idea that we remove obstacles in a patient's body using joint assessment and palpation as guidance.
A32	I think there's only one osteopathic principle, which is what A.T. Still discovered, which is that you could treat any symptom by working on the body…If you adjust the body's framework, then you can treat anything.	I think the most important osteopathic principle is that you could treat any symptom by adjusting the body's framework.
A34	I think A.T. Still may have had a good idea at the time, but I think for us to still remain by the book, like he's some form of deity, is absurd…and I don't believe that we should be obsessed with the principles of osteopathy, like movement dysfunction, or positional lesions, I've thrown them out the window.	I think osteopathy has evolved beyond the works of A.T. Still and the original principles of osteopathy.
A35	“Okay, this is what I can do, do you have any preference, what would you like, what do you think would help you most of all	I ask patients what treatments they would prefer and what they think would help them most of all.

A36	I can perform the hands-on stuff in the background which leaves me the capacity to talk to the patient, ask them how they are, what they've done this week...because I'm concentrating on developing a relationship with the person.	I perform the hands-on treatment in the background which allows to talk to the patient, ask them how they are, what they've done this week, because I'm concentrating on developing a relationship with the person.
A37	We have tried many different approaches, and we have seen through MRI scans a certain amount of dysfunction, and prolapsed discs and nerve impingements, and loss of disc height and all the rest of it. So we know what is going on and we have talked things through together.	Together with the patient we try different approaches and talk through options together.
A38	I put all of the information that I've got from the examination coupled with a whole load of other things such as patient expectation the relationship that I have got with the patient and I put every influential factor in the melting pot and then I draw on all of it to point us in the right direction.	I combine the information from different sources such as the examination, patient expectation the relationship that I have with the patient to guide my decisions.

Supplementary information 2: Table of validity testing results (A-E are five reviewers)

	How strongly do you disagree or agree the following statements represent this view?	**Strongly disagree**	**Disagree**	**Neither disagree or agree**	**Agree**	**Strongly agree**
A30	I keep to the osteopathic idea that we remove obstacles in a patient's body using joint assessment and palpation as guidance.		C		A	BD,E
A32	I think the most important osteopathic principle is that you could treat any symptom by adjusting the body's framework.		C		A	B, D, E
A33	I think osteopathic students should be free to challenge and question what they are taught during their osteopathic training.		E	B, A,D		C
A34	I don't think we should be obsessed with A.T. Still and the principles of osteopathy.		D	A, C	B, E	
A17	As an osteopath my palpation skills are the most important thing.			D	A, B, E	C
A23	I need to know the specific bio-mechanical problem so I can provide the right treatment.			D	A, B, C, E	
A08	I spend a lot of time explaining the options saying "this is what I can do to treat this, and this is what you can do".			A, B	D, E	C
A09	I want my patients to be autonomous; they can contact me if they need me but they shouldn't be coming to me for treatment on an ongoing basis.				D	A, B, C, E
A10	I explain what I think I can do to help patients and provide them with options and they can make a choice what they would like to do.				A	B, C, D, E

A24	If a patient can understand what's going on and what they can do about it gives them back control.			B	C	A, D, E
A25	It's important for a patient to be able to decide if the treatment is right for them.			B	A, C	D, E
A14	My primary aim is to treat, rather than sit and discuss what we can do about it.	C			A, D	B, E
A15	I think you can help a lot of people by having a good chat and a cup of tea.		A, D		B, C, E	
A16	I see the patient as the owner of their body and they can make decisions about it.			D	A, B, C, E	
A22	Enhancing patient knowledge and changing their behaviours enables them to self manage their problem.			A	C	B, D, E
A11	My fingers give me the information I need, they tell me what those tissues are doing.			C	A, B, E	D
A12	If the body is not moving freely as it should do then it's not healthy, and I need to ensure the body is able to move as it should.		C	A	B, D, E	
A18	If you don't know what is underneath your fingers then don't touch the body, It's as simple as that.	C	D		A	B
A19	My focus first of all is to find the tissues causing symptoms so I can decide what area of the body is involved.		C		E	A, B, D
A26	Information my hands and eyes collect from the body and the tissues directs my treatment.		B	C	A, E	D
A27	I think it's important to seek feedback from the patient throughout the treatment.		B	A, D	E	C
A20	I want to get an overall picture of how the patient is coping with the pain.			E	A, B, C, D	
A21	It is very important to communicate with the patient so you get an understanding of them.				E	A, B, C, D
A29	I delve quite heavily into the history of their complaint and what they do day-to-day which increases their pain to get a clear picture of all the things that bother them.			A, B	D	C, E
A01	I view the treatment time as a time to treat rather than filling it with an unnecessary conversation	C		D	A	B, E
A03	I go through my process and that determines the direction of the treatment I give.	C			A, B	D, E
A04	The patient's role is to try and relax as much as possible and follow instructions.	C			B, D	A, E
A05	My training means I am the one to decide what treatment is best for the condition - patients don't have the knowledge and understanding to decide for themselves.	C				A, B, D, E
A13	If a patient feels like exercise they are performing is a better option than me manipulating their spine I'll recommend they do that exercise as their treatment.			C, D	A	B, E
A02	I am guided by the patient as to what they want, and I'll often say "what I can offer you is a choice of treatment options"		C		A, E	B, D
A06	When a patient says they would like a certain treatment as it's worked before I would be inclined to follow that approach.	C			A, B, E	D

A07	I always explain “I don’t think it’s this, I think it could be this, but I could be wrong so we need to check this out and this is the way we could proceed... What would you like to do?”		B		A, E	C, D

Supplementary information 3: Table of Statements used in SurveyMonkey questionnaire with approach, category and subcategory.

Item No.	Approach	Category	Sub Category	Modified statement
A08	Communicator	View of osteopathy	Collaborative	I spend a lot of time explaining to patients the options saying "this is what I can do to treat this, and this is what you can do".
A06	Educator	Approach to clinical decision making and level of patient involvement	Patient led decision	When a patient says they would like a certain treatment as it's worked before I would be inclined to follow that approach.
A23	Treater	View of osteopathy	Practitioner-centred	I need to know the specific biomechanical problem so I can provide the right treatment.
A11	Treater	Interacting with patient and interpreting cues	Body	My fingers give me the information I need; they tell me what the tissues are doing.
A02	Communicator	Approach to clinical decision making and level of patient involvement	Patient led decision	I am guided by the patient as to what they want, and I'll often say "what I can offer you is a choice of treatment options"
A29	Educator	Interacting with patient and interpreting cues	Patient	I delve quite heavily into the history of the patient's complaint and what they do day-to-day which increases their pain to get a clear picture of all the things that bother them.
A30	Treater	Conception of Practice	Technical rationality	I keep to the osteopathic idea that we remove obstacles in a patient's body using joint assessment and palpation as guidance.
A09	Educator	View of osteopathy	Empowerment	I want my patients to be autonomous; they can contact me if they need me but they shouldn't be coming to me for treatment on an ongoing basis.

A20	Educator	Interacting with patient and interpreting cues	Patient	I want to get an overall picture of how the patient is coping with the pain.
A17	Treater	View of osteopathy	Practitioner-centred	As an osteopath my palpation skills are the most important tools I have.
A26	Treater	Interacting with patient and interpreting cues	Body	The information my hands and eyes collect from the patient's body and their tissues directs my treatment.
A38	Communicator	Conception of Practice	Professional artistry	I combine the information from different sources such as the clinical examination, patient's expectations and the relationship that I have with the patient to guide my clinical decisions.
A03	Treater	Approach to clinical decision making and level of patient involvement	Practitioner led decision	I go through my process and that determines the direction of the treatment I give.
A36	Communicator	Interacting with patient and interpreting cues	Person	I perform the hands-on treatment in the background which allows me to talk to the patient, ask them how they are, what they've done this week, because I'm concentrating on developing a relationship with the person.
A10	Educator	View of osteopathy	Empowerment	I explain what I think I can do to help patients and provide them with options and they can make a choice what they would like to do.
A22	Educator	Therapeutic approach	Educator	Enhancing the patient's knowledge enables them to change their behaviours and learn how to self-manage their problem.
A04	Treater	Approach to clinical decision making and level of patient involvement	Practitioner led decision	The patient's role is to try and relax as much as possible and follow instructions.

A34	Communicator	Conception of Practice	Professional artistry	I think osteopathy has evolved beyond the works of A.T. Still and the original principles of osteopathy.
A16	Educator	Therapeutic approach	Educator	I see the patient as the owner of their body and they can make decisions about it.
A19	Treater	Interacting with patient and interpreting cues	Body	My focus first of all is to find the tissues causing symptoms so I can decide what area of the body is involved.
A27	Communicator	Interacting with patient and interpreting cues	Person	I think it's important to seek feedback from the patient during the treatment.
A07	Educator	Approach to clinical decision making and level of patient involvement	Patient led decision	I always explain “I don’t think it’s this, I think it could be this, but I could be wrong so we need to check this out and this is the way we could proceed. I ask what would you like to do?”
A37	Communicator	Approach to clinical decision making and level of patient involvement	Shared clinical decision making	Together with the patient we try different approaches and talk through options together.
A14	Treater	Therapeutic approach	Treater	My primary aim is to treat, rather than sit and discuss what we can do about it.
A21	Educator	Interacting with patient and interpreting cues	Patient	It is very important to communicate with the patient so you get an understanding of them.
A32	Treater	Conception of Practice	Technical rationality	I think the most important osteopathic principle is that you could treat any symptom by adjusting the body's framework.

A15	Communicator	Therapeutic approach	Communicator	I think you can help a lot of people by having a good chat.
A35	Communicator	View of osteopathy	Collaborative	I ask patients what treatments they would prefer and what they think would help them most of all.
A05	Treater	Approach to clinical decision making and level of patient involvement	Practitioner led decision	My training means I am the one to decide what treatment is best for the patient's condition - they don't have the knowledge and understanding to decide for themselves.
A13	Communicator	Approach to clinical decision making and level of patient involvement	Shared clinical decision making	If a patient feels like the exercise they are performing is a better option than me manipulating their spine I'll recommend they do that exercise as their treatment.

Supplementary information 4: Matrix of rotated factor analysis results for the eight factors with an eigenvalue >1 with values of .45 to .54 in italics and values of .55 or greater in bold.

	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
A02	0.16	0.03	**0.67**	-0.24	0.09	0.15	-0.05	0.17
A03	0.19	0.18	0.01	0.32	0.03	0.13	0.52	0.03
A04	0.02	0.30	0.02	**0.60**	0.19	0.02	0.20	0.00
A05	0.02	0.24	-0.32	*0.45*	-0.22	0.08	0.13	-0.01
A06	0.21	0.03	*0.50*	0.16	0.01	0.01	-0.29	-0.04
A07	0.17	-0.28	*0.48*	0.14	0.17	-0.07	0.16	0.01
A08	**0.62**	-0.03	0.30	0.05	0.06	0.29	-0.08	0.00
A09	0.18	-0.06	0.13	-0.01	0.16	-0.14	0.07	0.43
A10	**0.59**	-0.06	0.26	0.02	0.14	-0.04	-0.10	0.33
A11	0.05	**0.71**	-0.09	0.28	-0.01	0.24	0.02	-0.10
A13	0.10	-0.16	0.14	-0.10	0.47	-0.10	-0.17	0.14
A14	0.00	0.20	-0.12	**0.61**	-0.19	-0.02	-0.16	0.17
A15	0.38	-0.12	0.19	0.01	0.18	-0.36	0.05	-0.02
A16	0.30	0.11	0.09	-0.04	**0.70**	-0.07	0.20	0.01
A17	-0.06	**0.72**	-0.10	0.26	0.04	0.06	0.01	0.06
A19	0.03	0.12	0.07	**0.62**	-0.06	0.24	0.09	-0.11
A20	**0.62**	-0.01	0.03	0.02	0.00	0.08	0.33	0.09
A21	*0.50*	0.07	0.12	-0.13	0.23	-0.12	0.00	-0.34
A22	**0.59**	0.03	0.08	0.07	0.34	0.01	0.15	0.03
A23	0.06	0.15	0.03	0.31	-0.10	**0.65**	0.14	-0.13
A26	0.09	**0.80**	-0.08	0.05	-0.07	-0.01	0.10	-0.04
A27	0.27	-0.05	0.43	-0.03	0.23	0.01	0.21	-0.34
A29	**0.62**	0.05	0.10	0.25	0.01	0.09	0.08	-0.08
A30	0.11	**0.64**	0.01	0.31	0.08	0.14	0.02	-0.03
A32	0.08	*0.45*	0.04	0.31	-0.32	-0.15	0.14	0.08
A34	0.23	*-0.47*	0.19	0.11	0.06	0.03	0.05	0.06
A35	0.17	-0.12	**0.70**	-0.24	-0.03	-0.09	0.12	0.20
A36	*0.49*	-0.06	0.11	-0.01	-0.02	-0.31	-0.03	0.06
A37	0.30	-0.30	**0.69**	0.13	0.11	-0.16	0.00	-0.16
A38	**0.55**	0.09	0.26	-0.14	0.06	-0.11	-0.07	0.08

Supplementary information 5: Table of Variance of the eight Eigenvalues greater than 1.

Total Variance Explained									
Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.811	19.368	19.368	5.331	17.769	17.769	3.350	11.168	11.168
2	4.650	15.499	34.867	4.194	13.978	31.747	3.028	10.092	21.260
3	1.887	6.289	41.156	1.412	4.708	36.455	2.604	8.678	29.939
4	1.647	5.490	46.646	1.185	3.951	40.406	2.177	7.256	37.195
5	1.478	4.926	51.572	0.962	3.207	43.612	1.321	4.402	41.597
6	1.325	4.416	55.988	0.816	2.719	46.331	1.050	3.501	45.097
7	1.145	3.818	59.806	0.615	2.049	48.380	0.816	2.719	47.817
8	1.094	3.646	63.452	0.575	1.917	50.297	0.744	2.480	50.297

Supplementary information 6: Factor 1 statements, loading value and the classification used for this questionnaire.

No.	Loading value	Approach	Category	Subcategory	Statement
A08	0.62	Communicator	View of osteopathy	Collaborative	I spend a lot of time explaining to patients the options saying "this is what I can do to treat this, and this is what you can do".
A10	0.59	Educator	View of osteopathy	Empowerment	I explain what I think I can do to help patients and provide them with options and they can make a choice what they would like to do.
A20	0.62	Educator	Interacting with patient and interpreting cues	Patient	I want to get an overall picture of how the patient is coping with the pain.
A21	0.50	Educator	Interacting with patient and interpreting cues	Patient	It is very important to communicate with the patient so you get an understanding of them.
A22	0.59	Educator	Therapeutic approach	Educator	Enhancing the patient's knowledge enables them to change their behaviours and learn how to self-manage their problem.
A29	0.62	Educator	Interacting with patient and interpreting cues	Patient	I delve quite heavily into the history of the patient's complaint and what they do day-to-day which increases their pain to get a clear picture of all the things that bother them.
A36	0.49	Communicator	Interacting with patient and interpreting cues	Person	I perform the hands-on treatment in the background which allows me to talk to the patient, ask them how they are, what they've done this week, because I'm concentrating on developing a relationship with the person.

A38	0.55	Communicator	Conception of Practice	Professional artistry	I combine the information from different sources such as the clinical examination, the patient's expectations and the relationship that I have with the patient to guide my clinical decisions.

Supplementary information 7: Table of Factor 2 loading values and classifications used for this questionnaire.

No.	Loading value	Approach	Category	Subcategory	Statement
A34	-0.47	Communicator	Conception of Practice	Professional artistry	I think osteopathy has evolved beyond the works of A.T. Still and the original principles of osteopathy.
A30	0.64	Treater	Conception of Practice	Technical rationality	I keep to the osteopathic idea that we remove obstacles in a patient's body using joint assessment and palpation as guidance.
A32	0.45	Treater	Conception of Practice	Technical rationality	I think the most important osteopathic principle is that you could treat any symptom by adjusting the body's framework.
A11	0.71	Treater	Interacting with patient and interpreting cues	Body	My fingers give me the information I need; they tell me what the tissues are doing.
A26	0.80	Treater	Interacting with patient and interpreting cues	Body	The information that my hands and eyes collect from the patient's body and their tissues directs my treatment.
A17	0.72	Treater	View of osteopathy	Practitioner-centred	As an osteopath my palpation skills are the most important tools I have.

Supplementary information 8: Table of Factor 3 loading values and classification used for this questionnaire.

No.	Loading value	Approach	Category	Subcategory	Statement
A06	0.50	Educator	Approach to clinical decision making and level of patient involvement	Patient led decision	When a patient says they would like a certain treatment as it's worked before I would be inclined to follow that approach.
A07	0.48	Educator	Approach to clinical decision making and level of patient involvement	Patient led decision	I always explain “I don’t think it’s this, I think it could be this, but I could be wrong so we need to check this out and this is the way we could proceed. I ask them what would you like to do?”
A02	0.67	Communicator	Approach to clinical decision making and level of patient involvement	Patient led decision	I am guided by the patient as to what they want, and I’ll often say "what I can offer you is a choice of treatment options".
A37	0.69	Communicator	Approach to clinical decision making and level of patient involvement	Shared clinical decision making	Together with the patient we try different approaches and talk through options.
A35	0.70	Communicator	View of osteopathy	Collaborative	I ask patients what treatments they would prefer and what they think would help them most of all.

Supplementary information 9: Table of Factor 4 loading values and classifications used for this questionnaire.

No.	Loading Value	Approach	Category	Subcategory	Statement
A05	0.45	Treater	Approach to clinical decision making and level of patient involvement	Practitioner led decision	My training means I am the one to decide what treatment is best for the patient's condition - they don't have the knowledge and understanding to decide for themselves.
A04	0.60	Treater	Approach to clinical decision making and level of patient involvement	Practitioner led decision	The patient's role is to try and relax as much as possible and follow instructions.
A19	0.62	Treater	Interacting with patient and interpreting cues	Body	My focus first of all is to find the tissues causing symptoms so I can decide what area of the body is involved.
A14	0.61	Treater	Therapeutic approach	Treater	My primary aim is to treat, rather than sit and discuss what we can do about it.

Supplementary information 10: Table of collated results of questionnaire

Question number	Statement	Strongly Agree	Agree	Neither	Disagree	Strongly Disagree	Total
A08	I spend a lot of time explaining to patients the options saying "this is what I can do to treat this, and this is what you can do".	49	57	19	7	0	132
A06	When a patient says they would like a certain treatment as it's worked before I would be inclined to follow that approach.	5	39	67	16	5	132
A23	I need to know the specific biomechanical so I can provide the right treatment.	28	46	25	27	6	132
A11	My fingers give me the information I need; they tell me what the tissues are doing.	26	65	28	12	1	132
A02	I am guided by the patient as to what they want, and I'll often say "what I can offer you is a choice of treatment options".	13	38	35	40	6	132
A29	I delve quite heavily into the history of the patient's complaint and what they do day-to-day which increases their pain to get a clear picture of all the things that bother them.	75	51	4	2	0	132
A30	I keep to the osteopathic idea that we remove obstacles in a patient's body using joint assessment and palpation as guidance.	30	56	33	10	3	132
A09	I want my patients to be autonomous; they can contact me if they need me but they shouldn't be coming to me for treatment on an ongoing basis.	17	36	52	19	7	131
A20	I want to get an overall picture of how the patient is coping with the pain.	52	74	5	0	0	131
A17	As an osteopath my palpation skills are the most important tools I have.	25	38	43	22	4	132
A26	The information that my hands and eyes collect from the patient's body and their tissues directs my treatment.	32	69	25	5	1	132
A38	I combine the information from different sources such as the clinical examination, the patient's expectations and the relationship that I have with the patient to guide my clinical decisions.	59	62	7	3	1	132
A03	I go through my process and that determines the direction of the treatment I give.	29	57	31	14	1	132

Question number	Statement	Strongly Agree	Agree	Neither	Disagree	Strongly Disagree	Total

A36	I perform the hands-on treatment in the background which allows me to talk to the patient, ask them how they are, what they've done this week, because I'm concentrating on developing a relationship with the person.	13	45	51	21	2	132
A10	I explain what I think I can do to help patients and provide them with options and they can make a choice what they would like to do.	33	77	16	5	1	132
A22	Enhancing the patient's knowledge enables them to change their behaviours and learn how to self-manage their problem.	82	47	3	0	0	132
A04	The patient's role is to try and relax as much as possible and follow instructions.	5	20	59	38	10	132
A34	I think osteopathy has evolved beyond the works of A.T. Still and the original principles of osteopathy.	30	49	34	12	7	132
A16	I see the patient as the owner of their body and they can make decisions about it.	65	55	12	0	0	132
A19	My focus first of all is to find the tissues causing symptoms so I can decide what area of the body is involved.	17	47	35	22	11	132
A27	I think it's important to seek feedback from the patient during the treatment.	70	48	10	3	0	131
A07	I always explain "I don't think it's this, I think it could be this, but I could be wrong so we need to check this out and this is the way we could proceed. I ask them what would you like to do?"	13	48	44	21	6	132
A37	Together with the patient we try different approaches and talk through options.	22	70	28	11	1	132

Question number	Statement	Strongly Agree	Agree	Neither	Disagree	Strongly Disagree	Total
A14	My primary aim is to treat, rather than sit and discuss what we can do about it.	14	35	51	25	7	132
A21	It is very important to communicate with the patient so you get an understanding of them.	94	38	0	0	0	132
A32	I think the most important osteopathic principle is that you could treat any symptom by adjusting the body's framework.	5	14	44	48	21	132
A15	I think you can help a lot of people by having a good chat.	12	64	41	12	3	132
A35	I ask patients what treatments they would prefer and what they think would help them most of all.	3	34	49	39	7	132
A05	My training means I am the one to decide what treatment is best for the patient's condition - they don't have the knowledge and understanding to decide for themselves.	3	29	42	47	11	132
A13	If a patient feels like the exercise they are performing is a better option than me manipulating their spine I'll recommend they do that exercise as their treatment.	17	36	61	18	0	132