The development of an oral assessment of clinical reasoning in osteopathy.

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PROJECT TEAM

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- Based on an AOA benchmarking grant

PRECIS OF PRESENTATION

- What is Clinical Reasoning (CR)?
- How is CR assessed in pre-entry level courses?
- Project
  - Aim
  - Methods
  - Results
  - Discussion
- Relevance to osteopathic educators

What is Clinical Reasoning?

"a context-dependent way of thinking and decision making on professional practice to guide practice actions"

Higgs J: *Clinical reasoning in the health professions.* Elsevier Health Sciences; 2008.

- a vital skill in healthcare

- a core capability in the accreditation standards of osteopathic programmes internationally.

What is Clinical Reasoning?

Thinking and decision making

not

demonstrating and doing

What is Clinical Reasoning?

- This use of both analytical and intuitive reasoning, or dual-processing, has emerged as a central aspect of clinical decision-making

  Croskerry P: **A universal model of diagnostic reasoning.** *Acad Med* 2009, **84:**1022-1028.

- There is debate about whether the integration of these diverse processes develops only with experience or can be taught and learnt during training

  Groves M, Dick M-L, McColl G, Bilszta J: **Analysing clinical reasoning characteristics using a combined methods approach.** *BMC Med Educ* 2013, **13:**144.

What is Clinical Reasoning in osteopathy?

- CR in osteopathy has only recently been discussed in the literature

- Thomson found a continuum from
  - technical rationality, encompassing a practitioner centred, biomedical and biomechanical approach,

  to

  - professional artistry that is more a patient centred holistic approach

Thomson OP, Petty NJ, Moore AP: **Clinical decision-making and therapeutic approaches in osteopathy – A qualitative grounded theory study.** *Man Ther* 2013, **19:**44-51.

Attributes of CR

- Analysis   interpretation of information
- Heuristics   informal thinking strategies
- Inference   speculation
- Logic   argument
- Cognition   perception or awareness
- Information Processing organisation of data
- Metacognition   reflective thinking

Simmons B. Clinical reasoning: concept analysis. Journal of Advanced Nursing. 2010; 66(5); 1151-1158.

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Assessing CR

- Key Features Question - key features essential for resolving a problem. Vignette-based multiple choice questions - assess the *technical rational* aspect of reasoning; Farmer EA, Page G: A practical guide to assessing clinical decision-making skills using the key features approach. *Med Educ* 2005, 39:1188-1194.

- Extended matching questions – match a single complaint with the most appropriate diagnosis or action; Wood EJ: What are extended matching sets questions? *Bioscience Education* 2003, 1.

- Problem based scenarios - a case with each step requiring recording of student reasoning and investigation of knowledge sources for solutions to queries; Anderson, K., Peterson, R., Tonkin, A., & Cleary, E. (2008). The assessment of student reasoning in the context of a clinically oriented PBL program. *Medical Teacher, 30*(8), 787-794.

- **Script Concordance Test (SCT)** - uses case based scenarios with a series of questions prompting further diagnostic thought and analysis, conducted online **or in person**. Charlin B, Roy L, Brailovsky C, Goulet F, van der Vleuten C: The Script Concordance test: a tool to assess the reflective clinician. *Teach Learn Med* 2000, 12:189-195.

Project - Aims

- To develop an oral examination and grading rubric for the assessment of CR in osteopathy

    – A grading rubric is an assessment tool that describes the expectations and performance criteria of an exam explicitly, thereby enhancing examiner marking reliability.
    – The use of a grading rubric that is developed collaboratively and is authentic to clinical examiners language and understanding establishes its validity for the assessment task.
        - Jonsson A, Svingby G: The use of scoring rubrics: Reliability, validity and educational consequences. *Educational Research Review* 2007, 2:130-144.

- trial it in senior students in three accredited university programs in Australia and New Zealand, and

- to evaluate its content and face validity.

Project - Methods

- A research team of experienced osteopathic academics developed 20 cases and a grading rubric.

- Thirty senior students were recruited, 10 from each university. There were 12 fourth year and 18 fifth year level students.

Project - methods

- Three trained examiners.

- Two cases to each student participant

- Data entered into statistical software
  - differences in examiner marking
  - relationships between cases, institutions, and different year levels.

- The rubric was tested for internal consistency.

- an observer at each location recorded comments reflecting the consistency of the process.

Project - methods

- Descriptive statistics were generated for each case and each question on the assessment rubric.

- An ANOVA was used to assess for statistically significant differences between the total scores for each case along with differences between the total scores and question scores awarded by each examiner. Alpha was set at $p < 0.05$.

- Cronbach's alpha was used to assess the internal consistency of the assessment rubric

- Pearson's *r* was used to correlate each question on the assessment rubric.

- The total and question scores from the students' first and second cases were compared to examine whether their performance on the first case predicted their performance on the second case.

- Pearson's r was interpreted as per Hopkins: <0.10 (trivial); 0.10-0.30 (small); 0.30-0.50 (moderate); 0.50-0.70 (large); 0.70-0.90 (very large); 0.90-1.0 (perfect).

A new view of statistics. [http://www.sportsci.org/resource/stats/effectmag.html]

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Attributes of CR in osteopathic context

Analysis

- Demonstrates interpretation of case information

Heuristics

- Makes connections between cues in the case, including the patients context in the additional information

Inference

- Uses knowledge to generate ideas about differentials, examination and treatment.

- Discriminates and distinguishes relevant from irrelevant information, recognises inconsistencies, filters information appropriately and identifies gaps in cues collected. Includes consideration of red flags and most likely diagnoses

Attributes of CR in osteopathic context (cont)

Information processing

- Differentials, examination and treatment strategy are organised in a cohesive manner

Logic

- Provides sound reasoning for differentials, examination and treatment strategy. Including strategies to rule DDs in and out.

Cognition

- Thinks 'aloud' about choices in relation to differentials, examination and treatment strategy.

- Ability to adapt to emerging information

Meta- cognition

- Demonstrates the ability to reflect on their reasoning process, including with regards to osteopathic principles

Viva examination process

Vignette presented (Presenting Complaint and some cues)

Q1:   How have you interpreted the information given to you so far?

Q2:   Can you integrate this information to give it more meaning?

Further information given that deepens and complicates the case (Previous Medical History, Psychosocial cues)

Q3:   What are the primary cues in the additional case information?

Q4:   Are there any connections between them?

Q5:   Please outline the most important elements of this case and provide some differential diagnoses.

Q6:   Please summarise the case so far; including your thoughts on primary diagnosis, examination and treatment strategies

Q7:   Give your reasoning for the choice of differentials

Q8:   What examination and investigation strategies will you use to rule in/out your DDs

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Viva examination process (cont)

Physical examination findings presented

Q9:   What would be your treatment strategy and explain the rationale for it.

Q10:   Can you tell me about alternative diagnostic or treatment choices if what you have planned doesn't work?

Q11:   What would you do if the case was male/female, older /younger, more acute/chronic?

Q12:   What are your thoughts about how your handling of this case could have been improved?

Q13:   How did the osteopathic principles influence your reasoning in this case?

Criteria

Marking criteria

5 = Outstanding level of performance

4 = Thorough - Above expected level of performance

3 = Expected level of performance

2 = Limited - Minimal level of performance

1 = Poor - Unsatisfactory level of performance

0 = did not attempt

Rubric design (example of first 2 steps)

1. Analysis

– Demonstrates interpretation of case information

- Q1 How have you interpreted the information given to you so far?
  - 0-1   Poor or no attempt to interpret information from case
  - 2   Limited interpretation of case information
  - 3   Interprets case information to reveal important patterns, differences & similarities
  - 4   Thorough interpretation of case information
  - 5   Comprehensively interprets information

- Q2 Can you integrate this information to give it more meaning?

  – 0-1　　Poor or no attempt to synthesise relevant information from case
  – 2　　　Limited synthesis in use of case information Not able to reveal important patterns, differences and similarities
  – 3　　　Synthesises case information to reveal important patterns, differences and similarities
  – 4　　　Thorough synthesis of case information to reveal important patterns, differences and similarities
  – 5　　　Comprehensively synthesises information. Is able to reveal subtle patterns, differences and similarities
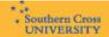
Rubric design

Attribute/descriptor	Question(s)	1	2	3	4	5
Analysis Demonstrates interpretation of case information	Q1 How have you interpreted the information given to you so far?	Poor or no attempt to interpret information from case	Limited interpretation of case information	Interprets case information to reveal important patterns, differences & similarities	Thorough interpretation of case information	Comprehensively interprets information
	Q2 Can you integrate this information to give it more meaning?	Poor or no attempt to synthesise relevant information from case	Limited synthesis in use of case information Not able to reveal important patterns, differences and similarities	Synthesises case information to reveal important patterns, differences and similarities	Thorough synthesis of case information to reveal important patterns, differences and similarities	Comprehensively synthesises information. Is able to reveal subtle patterns, differences and similarities
Heuristics Makes connections between cues in the case, including the patients context in the additional information	Q1 What are the primary cues in the additional case information?	Unable to identify major cues	Identifies a limited number of cues	Identifies main cues relevant to the case	Identifies majority of cues relevant to the case	Identifies all cues relevant to the case
	Q2 Are there any connections between them?	Unable to make connections	Is able to make limited connection between cues	Connects main cues relevant to the case	Connects the majority of cues relevant to the case	Connects all cues relevant to the case
Inference Uses knowledge to generate ideas about differentials, examination and treatment. Discriminates and distinguishes relevant from irrelevant information, recognises inconsistencies, filters information appropriately and identifies gaps in cues collected. Includes consideration of red flags and most likely diagnoses	Q1 Please outline the most important elements of this case and provide some differential diagnoses (DD's)	FAIL Includes irrelevant DD's, omits 'red flags'	FAIL Includes a limited range of relevant DD's Omits major 'red flags'	Discriminates and distinguishes relevant from irrelevant information. Includes major 'red flags' and most likely diagnoses	Includes a range of relevant DD's and 'red flags' using appropriate information	Offers an extensive range of relevant DD's and 'red flags' Recognises and addresses gaps in information
	Q2 Upon what knowledge are you basing your ideas about differentials, examination and treatment?	Poor application of knowledge, with use of irrelevant literature	Limited application of knowledge, with limited use of relevant literature	Appropriate application of knowledge and use of literature	Thorough application of knowledge and appropriate literature	Comprehensive application of knowledge and appropriate literature
Information processing Differentials, examination and treatment strategy are organised in a cohesive manner	Q1 Please summarise the case so far; including your thoughts on differentials, examination and treatment strategies	Poor or no attempt at organising and processing information for case diagnosis and management strategies	Limited processing and organisation of information for case diagnosis and management strategies	Information about all aspects of the case are organised in a cohesive manner	Thorough organisation and processing of all aspects of case information	Comprehensively organises and processes information on all aspects of the case. Case information is summarised in a cohesive manner

Rubric design

Attribute/descriptor	Question(s)	1	2	3	4	5
Logic Provides sound reasoning for differentials, examination and treatment strategy. Including strategies to rule DDs in and out.	Q1 Give your reasoning for choice of differentials?	Unable to provide sound reasoning for choice of DD's	Limited use of reasoning for choice of DD's	The student provides sound reasoning for choices of DD's	Provides thorough reasoning for choice of DD's	Comprehensive use of advanced reasoning skills for determining DD's
	Q2 What examination and investigation strategies will you use to rule in/out DD's?	No clear strategy for ruling in/out DD's	Limited use of strategy for ruling in/out DD's	Strategies used to rule in/out DD's	Clear logical strategy used to rule in/out DD's	Comprehensive and clearly logical use of strategies
	Q3 Can you now tell me your working diagnosis and the rationale for your treatment strategy?	Illogical working diagnosis and unsound rationale	Limited use of logic in working diagnosis and rationale	Sensible working diagnosis and sound rationale	Thorough and logical working diagnosis and rationale	Comprehensive logic used and rationale given
Cognition Thinks 'aloud' about choices in relation to differentials, examination and treatment strategy. Ability to adapt to emerging information after feedback	Q1 Can you tell me about alternative diagnostic or treatment choices if what you have planned doesn't work?	Poor or no attempt to reason alternative options in relation to case	Limited ability to reason aloud alternative options and problem solving strategies in relation to case	Reasons aloud through problem solving strategies in relation to DD's, examination and treatment	Reasons aloud problem solving strategies in relation to all aspects of case	Comprehensively talks through alternatives and problem solving approaches
	Q2 What would you do if the case was male/female, older /younger, more acute/chronic?	Is not able to articulate alternative options	Limited skills in articulating alternative options	Illustrates ability to articulate reasonable alternative options	Thoroughly demonstrates ability to articulate their reasoning and decision(s) in accordance with new information	Comprehensively demonstrates flexibility in reasoning, with ability to adjust DD's and treatment plans according to new information
Meta- cognition Demonstrates the ability to reflect on their reasoning process, including with regards to osteopathic principles (body as a unit, structure and function inter-related, self healing capacity)	Q1 What are your thoughts about how your handling of this case could have been improved?	Poor or no attempt at reflection of the strengths and weaknesses in their reasoning process	Limited ability for reflection of the strengths and weaknesses in their reasoning process	Student is able to reflect of the strengths and weaknesses in their reasoning process	Demonstrates thorough reflection of the strengths and weaknesses in their reasoning process	Comprehensively reflects on the strengths and weaknesses in their reasoning process
	Q2 How did the osteopathic principles influence your reasoning in this case?	Poor or no attempt at reflection on how osteopathic principles have influenced their reasoning process	Limited ability for reflection on how osteopathic principles have influenced their reasoning process	Student is able to reflect on how osteopathic principles have influenced their reasoning process	Demonstrates thorough reflection on how osteopathic principles have influenced their reasoning process	Comprehensively reflects on how osteopathic principles have influenced their reasoning process

Overall performance

Please comment on issues in the students performance, especially if they have failed a section or the whole case

Case examples (short)

Presenting complaint

- 35-yr old female presents with acute low back pain referring into left buttock following a yoga class

Examiner gives extra information

- Doing yoga teacher training, had first child 9 months ago, is a vegetarian, was a lawyer in the city for 10 years and is now "burnt out", reports spotting (blood) between periods lately.

Physical examination/Investigation findings

- Kemps positive for left familiar buttock pain
- Slump negative
- Negative Straight Leg Raise
- Plain lumbosacral x ray NAD

Case example (long)

Presenting complaint
- 33 year old male who works in a law firm and spends the majority of his work in front of a computer.
- has headaches with associated neck and shoulder pain
- Headaches underneath his skull, radiate to just above his eyes with the right side worse than the left
- intensify towards the end of the day and he usually has to take a couple of paracetamol to help get him through the rest of his work day.
- present most days, but they improve a little on the weekend.
- suffered from headaches since he was a teenager, but thinks that working long hours has made them much worse in the last 6 months.

Examiner gives extra information
- Past history of neck pain since age of 18.
- Onset after MVA - rear ended at a moderate speed and suffered from what was diagnosed as 'whiplash' in the base of his neck right side worse than the left.
- He rides to and from work each day on his mountain bike, which is about a 30-minute commute. He is now finding that his neck pain appears aggravated by this riding. By the time he gets home, his headache is much worse and he has to jump straight into the shower to ease off the muscles in his neck before having dinner. He has no time for other exercise.
- Father died of heart attack and had hypertension. Patients GP had noted a high blood pressure.

Physical examination/Investigation findings
- BP 145/95
- +ve Cervical soine quadrant test (pain over the C5/6 region)
- -ve Spurlings

Project - results

- No statistical difference was found between:
  - total and single question scores
  - total scores between examiners.

- Significant difference was found between 4th and 5th year students on total score and a number of single questions.

- The rubric was found to be internally consistent.

Results

- The internal consistency of the assessment rubric was α = 0.944.

- The alpha score did not improve if any of the questions were removed.

- Large correlations (*r* >0.70) were observed for a number of question combinations
  - 1 and 2
  - 3 and 4
  - 7 and 8
  - 8 and 9
  - 11 and 12

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Discussion

- Assessing Clinical Reasoning requires a specific approach to elucidate the students' higher order thought processes

- Oral exams are suitable for this aim

- Scenarios should be designed by clinical educators (validity)

- Rubrics should be explicit (fairness and reliability)

- Examiners require training in using the process (reliability)

Results from this study:

- The oral exam can achieve validity and reliability

- The oral exam may differentiate between 4th and 5th year students' capabilities in CR.

- Further work is required to establish the reliability of assessment

- The oral exam could be as efficient with less questions/time

Thanks - all welcome to visit SCU