Evaluation of Clinical Reasoning in Physical Therapy using the Script Concordance Test- Are we Measuring the Impossible to Improve the Inevitable…

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1. Clinical reasoning in PT:

Clinical expertise derived from experience forms the foundation of personal knowledge and skills which is a comprehensive part of healthcare professional's clinical decision making in practice.\textsuperscript{1} Physical therapy (PT) had evolved through an ongoing paradigm shift towards evidence-informed practice (EIP) in all aspects of clinical practice, academic education, scientific research and professional administration.\textsuperscript{2} EIP warrants the fundamental role of clinical expertise in clinical decision making through clinical reasoning of pain for individualizing therapy for patient evaluation and intervention.\textsuperscript{3} Over the years, practice autonomy necessitated elaborate clinical reasoning process and it was Mark Jones who described the hypothetico-deductive model,\textsuperscript{4} and progressively, determinants and strategies of clinical reasoning was explored and implicated for PT.\textsuperscript{5}

The objective of this editorial was to provide the evidence base for clinical reasoning in PT and application of script concordance test for evaluating clinical reasoning among PTs.

ABSTRACT

Physical therapy (PT) had evolved through an ongoing paradigm shift towards evidence-informed practice in all aspects of clinical practice, academic education, scientific research and professional administration, which warranted the fundamental role of clinical expertise in clinical decision making through clinical reasoning for individualizing therapy for patient evaluation and intervention. The objective of this editorial was to provide the evidence base for clinical reasoning in PT and application of script concordance test for evaluating clinical reasoning among PTs.

Key words: clinical reasoning, clinical decision making, script concordance test, reflective evaluation.

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Clinicians' decision making choices in screening for precautionary situation such as vertebrobasilar insufficiency (VBI) was based more upon subjective examination findings rather than objective testing which was shown by Sweeney and Doody\textsuperscript{7} that the therapists reported a lack of confidence in functional positional testing (FPT) and based decisions for the use of high velocity thrust techniques using SCT.

Although originally implicated for manual therapy, clinical reasoning was used through van Trijffel et al\textsuperscript{8} found
1.1.2. Specific disorders:
1.1.2.1. Shoulder:

May et al\(^7\) found seven main themes used by novice PTs in assessment and treatment of shoulder disorders: history, physical exam, investigations, diagnostic reasoning, clinical reasoning process (diagnostic pathway), clinical reasoning process (management pathway) and treatment options. The PTs used information gathering more often than hypothetico-deductive clinical reasoning and pattern recognition.

1.1.2.2. Lumbar spine:

Josephson et al\(^10\) identified three themes of case complexity in non-specific LBP: "easy case, characterised by impairment in body function with close relation to specific body structures; complex case, characterised by impairments in body function, particular mental functions, activity limitations and participation restrictions, particular management of activity level and very complex case, characterised by impairments in body function, activity limitations and participation restrictions, and contextual factors, with help-seeking behaviour as a particular feature."

1.2. Education:
1.2.1. Students' perspective:

Higgs\(^11\) studied effectiveness of an academic program and found that the course has succeeded in stimulating students' interest and enjoyment in clinical reasoning and promoting students' understanding of and competence in this complex ability.

Cruz et al\(^12\) found four themes about clinical reasoning from undergraduate PT students as: 1) an instrumental process; 2) a clinician centered process; 3) a knowledge dependent process; 4) a context dependent process.

Atkinson and Nixon-Cave\(^13\) reported a case example where they illustrated the use of International classification of functioning, disability and health (ICFDH) framework as a tool for self-reflection and critical thinking.

Babyar et al\(^14\) found that students used pedagogical tools lesser than the preferred levels of use. Students' perceptions about clinical reasoning learning tools varied with course content and Course content corresponded to the type of pedagogical tool that students deemed essential for learning clinical reasoning.

Moore and Noonan\(^15\) found most DPT students enjoyed and felt that the animal labs helped them prepare for course works, examinations and clinical internships.

Babyar et al\(^16\) showed physical therapy students' (PTS) perspectives about clinical reasoning learning tools development as follows: "(1) PTS opinion about how they would teach clinical reasoning varied with their preferred learning mode, (2) prior life experiences were associated with clinical reasoning for some individuals, (3) academic and clinical instructors contribute to development of clinical reasoning, (4) the best pedagogic tools involved case study presentations/assignments using actual patients or videotapes, and (5) PTS gained confidence in their clinical reasoning ability while progressing through clinical education experiences."

Chapman et al\(^17\) developed the structured oral self-directed learning evaluation which was an oral examination which evaluates a student's problem-solving ability, self-directed learning skills, knowledge level and self-assessment ability.

1.3. Administration:
1.3.1. Communication:

Ajjawi and Higgs\(^18\) found five core components of communicating clinical reasoning: active listening, framing and presenting the message, matching the co-communicator, metacognitive aspects of communication and clinical reasoning abilities.

1.3.2. Strategies:

Application of clinical reasoning into individualized assessment and treatment of patients along a problem-based approach was done through a combination of strategies termed as dialectical reasoning.

1.3.3. Inter-professional comparison:

This clinical problem-solving sequence used by PTs was comparable to a method used by physicians.\(^20\)
"Current written tools of assessment are mostly measuring the capacity to solve well-defined problems by the application of rules and principles, while the essence of expertise in the professions lies in the capacity to solve ill-defined problems, that is, reasoning in contexts of uncertainty." - Charlin et al.\(^{21}\)

2. Script concordance test:

2.1. Definition:

"Script" denoted a form of organized clinical knowledge and examinees were placed into uncertain but authentic clinical situations in which they must interpret data to make decisions.\(^{22}\) The script concordance (SC) test was interpreted by measuring the degree of 'concordance' that existed between examinees' scripts and scripts of a panel of experts.\(^{23}\)

The SC questions were based upon a brief clinical vignette or a scenario followed by hypothesis generation and evaluation, where the answers would be compared to a panel of experts, in order to reflect a learner's clinical reasoning.\(^{24,25}\) The Script Concordance Test (SCT) uses a panel-based, aggregate scoring method that aims to capture the variability of responses of practitioners to particular clinical situations.\(^{26}\)

2.2. Principles:

"The approach is based on three principles: (a) examinees are faced with a challenging authentic situation in which several options are relevant; (b) the response format is a Likert-type scale that reflects the way information is processed in problem-solving situations, according to the script theory; and (c) scoring is based on the aggregate scoring method to take into account the variability of reasoning processes among experts."\(^{21}\)

2.3. Instrumentation:

2.3.1. Construction:

Fournier et al.\(^{27}\) explained the guidelines for SCT construction focusing on clinical data interpretation so that a high degree of concordance corresponded to optimal use of information in the context of these specific tasks and therefore provided an indication of clinical reasoning quality.

2.3.2. Expert panel:

Specialty-specific experts must be used to develop the scoring key.\(^{28}\) Dory et al.\(^{29}\) in their systematic review found: "around 100 items (25-30 cases) should provide reliable scores; panels with 10-20 members are needed to reach adequate precision in terms of estimated reliability; panellists' responses can be analysed by checking for moderate variability among responses; traditional scoring method was satisfactory."

Any number over 10 is associated with acceptable reliability and good correlation between the samples versus the full panel of 38. For high stake examinations, using a panel of 20 members is recommended. Recruiting more than 20 panel members shows only a marginal benefit in terms of psychometric properties.\(^{30}\)

2.3.3. Scoring:

The SCT may be a useful method to assess clinical reasoning in medical students in multidisciplinary summative assessments.\(^{31}\) Raw scores were to be presented as means and standard deviations to facilitate meaningful interpretation of scores.\(^{32}\) Five scoring methods were possible and amongst them, the single-best-answer scoring with three answer choices produced results similar to aggregate scoring on a Likert-type scale.\(^{33}\)

The feasibility of the web-based SC test was successful as two-thirds of the expected number of participants was included within the first six months.\(^{34}\)

2.4. Validity:

Aldekhayel et al.\(^{35}\) proposed an objective methodology for validation of SCT-question bank where the analysis of validation survey was done from all angles, i.e., reviewers, validation questions, and test items. The SC examination was feasible and was more valid than the MCQ examination because of better correlation with clinical performance.\(^{36}\)

SCT was reported for its high convergent validity,\(^{36}\) and Lubarsky et al.\(^{37}\) in their recent systematic review found, "content evidence for SCT was derived from clear guidelines for the creation of authentic, ill-defined scenarios. High internal consistency reliability supports the internal structure of SCT scores. As might be expected, SCT scores correlate poorly with assessments of pure factual knowledge, in which
correlations for more advanced learners are lower. The validity of SCT scores is weakly supported by evidence pertaining to examinee response processes and educational consequences. Typical information was processed faster than atypical and incompatible information. Incompatible information was processed faster than atypical information. Candidates obtained higher scores when correction was done using the answer key provided by the experts from the same country. These data support the stability of the construct validity of the tool across different learning environments.

2.5. Reliability:
Addition of standard instructions like 'confusion indication' did not improve the internal consistency of the test. Standard setting SCT using the criterion-referenced method of an adapted Nedelsky approach (using answer key normalization) was found to be both logically justifiable and logistically simple, and produced failure rates comparable to other currently utilized and less objective approaches.

2.6. Validity and reliability:
The SCT maintained its reliability and validity as a measure of intraoperative clinical reasoning among general surgical residents when administered across multiple centers.

2.7. Population-specific use of SCT:
Piovezan et al demonstrated robust evidence of reliability and validity of an SCT developed for use in geriatric medicine for assessing clinical reasoning skills under conditions of uncertainty in undergraduate medical students.

2.8. Disease-specific use of SCT:
Disease-specific application of SCT was reported for thrombophilia, urinary incontinence and diabetic care.

2.9. Specialty-specific use of SCT:
Specialty-specific application of SCT was reported for Dermatology, veterinary medicine, neurology, nursing, otorhinolaryngology, pediatric emergency medicine, pharmacy, radiation oncology, radiology and urology.

2.10. Implications for professional training:
Online continuing professional development (CPD) based on self-testing and feedback using the Practicum Script Concordance Test® (PSCT) was developed with international panelists as a composite panel of large size and it showed good psychometric properties. SCT had the ability to differentiate pre-clinical medical students from fourth-year medical students and both cohorts of medical students from expert clinicians across different institutions and geographic areas. SCT was also used for 'during procedure' assessments such as for intraoperative decision making. Hence, online SCTs and intra-procedure SCT would provide valuable inputs that enable development and design of professional training programs.

2.11. Implications for research:
Future SCT research might explore the impact of the script concordance method on teaching and learning, and examine how SCTs integrate with other assessment methods within comprehensive assessment programmes. Adding SCT to structured oral interview (SOI) was useful for assessment of cognitive reasoning in physicians who performed poorly on clinical data interpretation (CDI) and hence comparison between such methods is essential to evaluate the best approach for use.

2.12. Adaptations or modifications of SCT:
SCT was adapted for Seating and Mobility scoring systems and was validated for its use by Cohen et al. Hence SCT was able to allow adaptations and modifications depending upon context and therapist.

2.13. Limitations of SCT:
There is no standardized specification for number of cases of number of questions. In the SCT, this makes it not only a flexible tool but also gives scope for multidimensional assessment of clinical reasoning.

For the future:
There is a dearth need for developing SCT for clinical reasoning among PTs, and Journal of Physical Therapy
(JPT) owes its contribution towards establishing evidence for validity and reliability studies and efficacy of SCT-based interventions on physical therapists and students’ clinical reasoning process.65

Conflicts of interest:
None identified and/or declared.

References:


