Adaptation of Direct Observation of Procedural Skills (DOPS)  
for Assessments in Podiatry

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**Abstract**

## Background

The Direct Observation of Procedural Skills (DOPS) is a form of workplace-based assessment widely used to assess a learner’s ability to execute a technical skill. The aim of this paper is to report on the development phase of the adaptation of the DOPS for the assessment of podiatry learners’ procedural skills in workplace-based clinical settings.

## Context

## Podiatry learners are required to practice and demonstrate a variety of procedural skills in the management of foot complaints. Such skills include the use of scalpel blades, needles and local anaesthetic applied to a variety of disorders. The DOPS provides an avenue by which learner’s procedural skills can be assessed and timely feedback provided in the workplace, or in simulated environments.

## Method

The DOPS was initially adapted for podiatry by a member of podiatry faculty, a clinical education specialist and clinical educator from another allied health discipline. That version was circulated among podiatry faculty at three Australian universities, their adaptations reviewed by the research team and clinical supervisors from the home university. The subsequent version, pDOPS was administered by (*n*=2) supervisors for (*n*=12) learners during real-time clinical events, and (*n*=11) learners peer assessed others during (*n*=5) real-time and (*n*=6) simulated learning events.

**Results and Conclusion**

A new tool, the Podiatry Direct Observation of Procedural Skills (pDOPS) has emerged from this process. Face and construct validity have been confirmed and faculty and students consider pDOPS contributes to learning. Further research is necessary to confirm the validity and reliability of the pDOPS to achieve assurance of achievement of podiatry competencies and standards.

KEY WORDS:

Direct Observation of Procedural Skills; workplace-based assessment; podiatry

# Introduction

Podiatrists employ a range of minor surgical and procedural skills in the management of foot complaints. These skills include nail care and debridement, wound care and local anaesthetic injections. Assessment of the podiatry pre-professional student’s application of procedural skills in-situ is undertaken consistently. Not only are the actual procedures assessed, the assessment includes the student’s ability to priorities tasks, manage the sterile environment, the patients concern and reactions and adhere to workplace health and safety matters of relevance. However there is a paucity of literature that describes the tools used and/or evidence to support their use.

Internationally recognised approaches to Workplace-based Assessment (WBA), the concept of a programmatic approach to assessment (Van Der Vleuten & Schuwirth, 2005), and the tools used by other disciplines (Ahmed, Miskovic, Darzi, Athanasiou, & Hanna, 2011; Barton, Corbett, van der Vleuten, & Programme, 2012; Norcini & Burch, 2007) provide stimulus for discussion and consideration and an avenue by which procedural skills can be assessed during patient care in podiatry. At the home university faculty are cognisant that formal evaluation of WBA tools is important to ensure the assessment practices are defensible and enhance learner learning outcomes, person-centred care and patient safety – all podiatry competencies and standards.

Regardless of whether WBA tools are designed to be formative or summative, effective assessments need to provide evidence of the direct observation of learners’ work as they continue to develop their clinical competency. Assessment tools provide evidence to support decision making – it is expected any assessment tool will demonstrate five identifiable features (Schuwirth & van der Vleuten, 2010):

1. **Validity** – whether the assessment measures what it claims to measure;
2. **Reliability** – the degree to which the measurement is accurate and reproducible;
3. **Acceptability** – the tools and processes are acceptable to learners, faculty and other stakeholders;
4. **Educational impact** – the assessment influences learners’ learning in several ways; and
5. **Efficient and affordable** – the time and costs associated with administering the assessment.

The Direct Observation of Procedural Skills (DOPS) is a WBA tool for evaluating technical and procedural skills in workplace settings (Naeem, 2013). The DOPS has been utilised in a variety of settings with some evidence in the literature to support its validity and reliability (Ahmed et al., 2011; Burnand, Fysh, Wheeler, & Allum, 2014; Naeem, 2013). The overall goal is to adapt the DOPS for podiatry, to build evidence to argue for the validity of the scores derived from an adaptation – the Podiatry Direct Observation of Performance Skills (pDOPS). Then aim of the initial phase of the study, the developmental phase, is undertaken simultaneously with preliminary exploration of the face and construct validity, acceptability, efficiency and affordability.

# Methods

The study was approved by the Southern Cross University (SCU) Ethics Committee (ECN-15-141). Informed consent was obtained from all participants. The study was conducted using an action research methodology which involved 8 stages:

**Stage 1: A literature review** to inform the first adaptation of the DOPS for podiatry. For that purpose we used the DOPS published by the (Royal Australian College of Physicans) and the rating scale modified to reflect a construct-aligned scale (Crossley, Johnson, Booth, & Wade, 2011).

**Stage 2: Establishing consensus**: Face and content validity was initially established through feedback from podiatry academics at three Australian universities who were sent the pDOPS by email and later provided written feedback or engaged in phone conference discussions to provide their feedback..

**Stage 3: Development of resources**: Following the uptake of the former groups advice, three short video recordings were made of learners undertaking two different clinical scenarios in which the pDOPS would normally be administered. This provided stimulus material for workshops in which clinical supervisors would be trained in using the pDOPS.

**Stage 4: Trial and Moderation:** Two academics from the home university then critiqued the pDOPS using the videos’ stimulus materials. ined the criteria and standards, the latter being informed by current thinking of learners developing increasing independence (Crossley et al., 2011).

**Stage 5: Administration of the tool in-situ**: The third iteration of the pDOPS was then introduced to two podiatry clinical supervisors and senior learners. The pDOPS was then trialled by them during the application of procedural skills in the university clinic or during simulated applications of procedural skills in associated skills laboratory. These assessments were formative and did not contribute to the learners’ grades.

**Stage 6: Supervisor interviews and student focus groups**: Learners were invited to focus groups and clinical supervisors to individual interviews with a clinical education specialist to explore their impressions of the educational value and usability of the pDOPS in the workplace-based teaching and learning environment. During the semi-structured interview conducted for up to twenty minutes questions included: Q1. In principle, do you regard the pDOPS to be an effective tool for assessing podiatry student’s clinical procedures in simulated and during real-time, clinical events? Q2. What are the strengths of the tool? Q3. What are the areas, points that need improvement? Why? What improvements do you suggest? Q4. Do you regard the pDOPS tool as a useful way to monitor student progress and provide feedback? The focus groups and interviews were audio recorded so they could, at a later stage, be interrogated by the podiatry academic.

**Stage 7: Data analysis**: Qualitative data from focus groups and interview were thematically analysed by the two investigators (KM and PB) who met to discuss differences until a consensus was formed. Their understanding of the responses emerged from their experience and each applied their individual inductive, and later deductive, analysis to identify patterns and allow themes in the data to emerge. Descriptive statistics were generated from quantitative data regarding the situations in which the pDOPS was administered and the associated health scenarios.

**Stage 8:** **Writing up**.

# Results

Thefeedback from podiatry academics at three Australian universities in Stage 2 focused, in the main, on the marking criteria and the categories of skills to be assessed. This resulted in a confirmation of the criteria and the subsequent amendment of the pDOPS. In Stage 4, the two supervisors at the home university further refined the marking criteria, categories of work to be assessed and standards, the latter being informed by current thinking of learners developing increasing independence (Crossley et al., 2011). In Stage 5, two podiatry supervisors and twelve learners (x=3) second year (x= 6) third year and (x=3) fourth years in the undergraduate podiatry course participated in the trial of the pDOPS at the home university. The pDOPS was used as a formative assessment tool. The two clinical supervisors assessed twelve different learners during seventeen real-time clinical events. Eleven learners participated in peer assessment during five real-time consultations and six simulated learning events. The observed components of student-patient consultations were: Biomechanical Analysis (3); Local anaesthetic administration (3); Nail Management (8); Musculoskeletal Chronic Conditions (1); Pre-Op consultation (1); Sharp debridement (7); Shockwave (1); and, Other (2). The category ‘Other’ could involve any other type of podiatric skill that is not accounted for in the other sections, for example “x-ray evaluation”

Clinical supervisors and learners were asked to indicate, on a 6-point Likert scale, their satisfaction in using pDOPS (1: Low – 6: High). The median score was 5. The average time taken for the assessment was ten minutes and the time for feedback four minutes.

The supervisors and a handful of learners found the rating of the complexity of the individual criteria difficult to manage and superfluous to assessment needs.

During the interview process, the learners were asked whether the pDOPS was a valuable contributor to their education. The response was positive, although specific grey areas were identified. For example, one learner commented that “… the question on ‘*demonstrates patient awareness*’, I think that needs to be explained more…”. Another learner commented that “… for different locations the task might be the same but the patient might be harder, so obtaining consent from a patient at a homeless clinic is different from a usual clinic”.

An interview with one of the clinical supervisors brought the following comment, “It is a fine balance between making it complicated enough to give us the information we need, and not making it too complicated that people just say “that’s too much…””. The second supervisor provided written comments that the usability of the pDOPS improved with use. The supervisor did not support the inclusion of the grading of the level of complexity of each criterion.

Learners commented that “… it (pDOPS form) was quite easy to fill out…”, and “… (if the category isn’t relevant), do you just leave it out?” There were also queries regarding how case complexity is determined between the relevant year levels, “…if a second year and a fourth year complete the same task, is the complexity the same?”

Another learner commented on the time commitment required, suggesting that “… assessing others was more time consuming”. Finally, another comment was “… although it flows well and is accurate with what we are doing … the section on communication is very broad.”

Overall, learners reported they found the pDOPS easier to use each time they used it either as a learner being assessed or when assessing others. They asked for a supportive manual to explain terminology. The feedback and final investigative team discussions resulted in the final version of the pDOPS (Appendix 1).

# Discussion

The present study has reported on the development and initial implementation of the pDOPS in a single Australian pre-professional podiatry program. Hitherto, the assessment of procedural skills in podiatry was unstructured and included in assessment of the student’s ability to manage a whole consultation. There are no standard assessment tools in podiatry. This study, and new tool development process and outcomes facilitates the specific observation and focus on application of procedural skills in-situ.

In accord with the five features of assessment tools that provide evidence to support decision making (Schuwirth & van der Vleuten, 2010) we have established in this case study at one university that the pDOPS:

* Has construct and face **validity** according to podiatry academics at four university and supervisors and students at the home university.
* Is **acceptable** based on feedback from stakeholders at the home university. Clinical supervisors and learners at the home university find the pDOPS acceptable and indicate familiarity with the tool is the key to efficiency.
* Has **educational impact -** students and supervisors agreed it stimulated and evaluated the application of learning in-situ.
* Is **efficient and affordable** - fifteen minutes to assess a learner’s application of a procedural skill may be onerous in some situations. Based on these figures, it is possible to cost the time taken to administer the pDOPS in any setting. To that, previous authors have commented that the time taken for the assessment is the actual time taken to do the procedures (Wilkinson et al., 2008) reported. Depending on the situation and setting, feedback can be offered at a more convenient time to remove the time pressures. Furthermore, an online version of the pDOPS could potentially expedite the administration of the tool.

Work based assessment feedback is an essential process to ensure the delivery of consistently high quality education within the academic and clinical setting. The pDOPS offers a time efficient process through which clinical skills can be reviewed and feedback offered with both internal and external accreditation requirements in mind. This is important as the podiatry profession requires its graduates to demonstrate competence at a particular standard for the safe use of scalpels, needles and application of surgical procedures.

# Conclusion

A tool, for assessing pre-professional podiatry learner procedural skills has been developed through a robust process involving podiatry academics from four Australian universities, a clinical educator from another allied health discipline, and a clinical education specialist. Administration of the pDOPS at the home university generated student and clinical supervisor feedback. Three iterations of the pDOPS were generated and each modified according to feedback mainly related to marking criteria and categories of podiatry procedures. The process outcomes infer the construct and face validity of the tool is sound, that the design is acceptable. At this initial phase, we report the pDOPS is feasible in both real-time and simulated learning scenarios, providing the learner with feedback about their performance across a range of procedural skills required for practice as a podiatrist. The time taken for the clinical supervisor/assessor to administer the pDOPS and provide learners with feedback is acceptable, the cost of supervisor’s time not prohibitive. There is the potential for the pDOPS to be used as a supervisor assessment of learners, a peer assessment or self-assessment tool.

Further research will explore if, from the pDOPS, the projected defensible and reliable decisions about learner learning and progress can be made. Collaboration with partner institutions is now necessary to ensure there is no conflation of their criteria or standards, that the interpretation of the cognitive, psychomotor and affective learning outcomes expected from the application of procedural skills is acceptable more broadly. What is yet to be determined is if the weighting of each criteria needs to be calibrated to emphasise the importance of different knowledge skills or attributes in order to avoid rewarding learners inaccurately and to align with university bands for grades from fail to high distinction. Agreement needs to be established as to the balance between comprehensiveness and manageability.

Discussions with a wider team of academics can be expected to fine-tune the development of a manual for the administration of pDOPS for both clinical staff and learners. This resource will moderate the different interpretations thus improving the consistent application of the pDOPS and therefore assisting in the generation of transparent and defensible assessment judgements. The pDOPS seems to be a useful tool for assessment of podiatry student’s procedural skills, but, as in medicine (Naeem, 2013) further research is required to prove its value.

**Limitations**

The limitations of this research is that the administration of the pDOPS took place at one university only with a small cohort of podiatry supervisors and students. nevertheless the involvement of podiatry academics from three other universities an academic from another discipline and a clinical education specialist added to the depth of discourse throughout the process.

**Future research**

Further research is necessary to confirm the validity and reliability of the pDOPS to achieve assurance of achievement of podiatry competencies and standards.

**References**

Ahmed, K., Miskovic, D., Darzi, A., Athanasiou, T., & Hanna, G. B. (2011). Observational tools for assessment of procedural skills: a systematic review. *The American Journal of Surgery, 202*(4), 469-480. e466.

Barton, J. R., Corbett, S., van der Vleuten, C. P., & Programme, E. B. C. S. (2012). The validity and reliability of a Direct Observation of Procedural Skills assessment tool: assessing colonoscopic skills of senior endoscopists. *Gastrointestinal endoscopy, 75*(3), 591-597.

Burnand, H., Fysh, T., Wheeler, J., & Allum, W. (2014). Feedback and performance scores for direct observation of procedural skills. *The Bulletin of the Royal College of Surgeons of England, 96*(7), e5-e8.

Crossley, J., Johnson, G., Booth, J., & Wade, W. (2011). Good questions, good answers: Construct alignment improves the performance of workplace‐based assessment scales. *Medical education, 45*(6), 560-569.

Naeem, N. (2013). Validity, reliability, feasibility, acceptability and educational impact of direct observation of procedural skills (DOPS). *J Coll Physicians Surg Pak, 23*(1), 77-82.

Norcini, J., & Burch, V. (2007). Workplace-based assessment as an educational tool: AMEE Guide No. 31. *Medical teacher, 29*(9-10), 855-871.

Royal Australian College of Physicans. Direct Observation of Procedural Skills (DOPS) Assessment Guide - Cardiology Cardiac Catheterisation,. Retrieved from <https://www.racp.edu.au/docs/default-source/default-document-library/dops-cardiology-cardiac-catheterisation-assessment-guide.pdf>

Schuwirth, L. W., & van der Vleuten, C. P. (2010). How to design a useful test: The principles of assessment. *Understanding medical education: Evidence, theory and practice*, 241-254.

Van Der Vleuten, C. P., & Schuwirth, L. W. (2005). Assessing professional competence: from methods to programmes. *Medical education, 39*(3), 309-317.

Wilkinson, J. R., Crossley, J. G., Wragg, A., Mills, P., Cowan, G., & Wade, W. (2008). Implementing workplace‐based assessment across the medical specialties in the United Kingdom. *Medical education, 42*(4), 364-373.

