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**Use of patient video cases in medical education**

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**Abstract**

Patient video cases (PVCs) are brief video recordings of patients during spontaneous or instructed activity. PVCs are true-to-life and can be replayed, enabling the establishment of highly interactive, contextual and safe learning environments, with a minimum of facilitation. This article describes the use of workshops in which PVCs are used to assist with the development of observational skills and clinical reasoning in medical students and postgraduates. We describe why PVCs are a valuable addition to an educator’s portfolio of resources, what evidence there is for their effectiveness, how to use videos for teaching, and some practical advice and tips on their collection and storage.

**1. Current challenges in achieving comprehensive apprenticeship experience in paediatrics**

The seasonal periodicity of diseases, changes in disease prevalence and short duration of hospital stay are some of the factors that limit chances to learn by, or from, direct patient contact [1]. Demand for maximal productivity erodes teaching time [2], putting meaningful apprenticeship learning at risk. Apprenticeship learning is desirable for the development of expertise in paediatrics, and may occur before, during or after an encounter with a patient when learners compare their own observations and reasoning skills with those of an expert [3]. The use of video cases to assist in the development of observational skills lends itself very well to apprentice learning. Furthermore, while governance issues remain fundamental to ensuring patient and parent confidence, patient video cases (PVCs) are being increasingly used in medical education [4]. We are therefore in a situation whereby technology as well as public acceptance have caught up with an obvious clinical need.

PVCs have a long history in paediatric neurology[5]. Their use for diagnostic purposes, for demonstration and for in-context learning is wide-spread, and most paediatric neurologists are comfortable with their use. PVCs have also been incorporated into teaching and learning in a number of other specialities, including general paediatrics[6][7], child psychiatry,[8] and primary care.[9] Additionally, careful analysis of a series of PVCs illustrating specific disorders has expanded our knowledge about clinical presentations, particularly in paediatric neurology, e.g. in epilepsy [10][11], movement disorders[12] and neuromuscular diseases.[13]

In this paper, directed towards paediatric training units, we describe how to build a library with authentic PVCs and how to use them for teaching and learning purposes.

**2. Important educational concepts**

* *Script theory:* Medical expertise develops when clinicians integrate knowledge into illness scripts,[14] i.e. cognitive schemas containing a large amount of clinically relevant information. Integration of knowledge into illness scripts occurs with each new meeting with a patient. These scripts are then effortlessly activated in a process sometimes named pattern recognition [15]. PVCs may therefore support illness script formation.
* *Authentic learning*: PVCs demonstrate real-life situations,[16] and are superior to static pictures at demonstrating movements of body parts such as those seen in association with behaviour, seizures, and disorders of movement or respiration. We know that authentic PVCs are superior to text cases in improving important clinical reasoning processes[5].
* *Align learning environment with intended learning outcomes.* A recent study suggested that video clips demonstrating movements that are not essential for diagnosis may actually be detrimental to learning[17]. This probably attests to an increased and unnecessary cognitive load on the learner[18]. Therefore clinical photos are likely to be superior to video if movements are not an essential part of the clinical picture. Conversely, in emergency paediatrics, for example, the dynamic nature of clinic signs means that PVCs are a fair representation of the clinical situation [19].
* *Collaborative learning:* Elaboration involving the sharing of cognition is an important feature of collaborative learning [20][21][22]. In these studies, group discussion and interaction concentrated learning around a particular subject. A large number of relevant clinical reasoning processes has been generated in non-experts as well as experts by watching paediatric neurology video cases[23].
* *Experts know where to look:* Clinicians of varying expertise analyse patient video cases differently [24]. Eye tracking studies show that experts are able to better focus their attention while they are thinking, i.e. reasoning clinically. A recent eye-tracking study showed that attention can be directed towards important aspects of a clinical problem by using teaching videos in which less important areas were blurred [25].
* *Some novice learners can’t see the wood for trees.* Novices may be distracted by the amount of detail in PVCs or when faced with real patients in real-life settings.

**3. Putting it into practice**

The intended learning outcomes for the group of learners in question should be taken into careful consideration. Desirable cases have one or more of the characteristics as shown in table 1. In some instances, the same video cases can be used for both undergraduates and postgraduates but with a different slant to meet curriculum objectives. Asking learners to prepare for the session by a peer-led approach is increasingly being shown to be of value[26].

We recommend a low number of PVCs for any one institution; as a few (5–10) relevant, key PVCs are much more likely to be used, discussed, learned from and taught from than a comprehensive library with a large number of PVCs. Considering the large number of variations seen in children with any disease and at any age, no library can be complete. A library with a low number of PVCs will limit time expenditure in connection with editing and managing.

We suggest that a single clinical teacher is responsible for the selection, availability and implementation of the PVCs in the curriculum at each institution.

Table 1

Characteristics of 10 conditions that involve movements that would be appropriate to illustrate in PVCs

|  |  |
| --- | --- |
| **Characteristic of condition** | **Example** |
| **Atypical or abnormal movements** | Motor stereotypy  Cerebral palsy (*See case study)* |
| **Diminished or compensatory movements** | Flaccid tetra paresis in spinal muscular atrophy  Gower sign in Duchenne muscular dystrophy |
| **Common disorders** | Pneumonia  Developmental delay |
| **Conditions that are intermittent** | Seizures  Infantile spasms |
| **Conditions that occur in seasonal outbreaks** | Respiratory syncytial virus bronchiolitis |
| **Conditions that require further investigation and/or treatment** | Meningococcal disease |

Teaching sessions in which PVCs are used may be formal, i.e. involve a time schedule and a teacher or facilitator, or they may be informal, i.e. near-spontaneous with a facilitator. The demonstration of newly admitted emergency patients on video at morning report or conference can be used to train viewing behaviour and clinical reasoning. For example, nasal flare in an infant with bronchiolitis can be demonstrated for those who have not seen it. If an authentic, new PVC recording is not available, a PVC from the department’s film archive can be shown at morning conference; illustrating similarities with or differences from the actual emergency case.

Conference rooms, departments, outpatient clinics or lecture theatres can all be used for collaborative teaching and learning with PVCs, provided a screen, a facilitator and one or more learner(s) are available. In any of these environments, the learners can interact with the facilitator or take part in a small group discussion of the material. A lecture-based situation promotes use of PVCs in which clinical signs are salient, whereas smaller groups allow a more detailed discussion about more subtle features of disease. In either case, the ability to rewind and replay clips makes PVCs potentially more powerful learning resources than actual patients.

Video is the optimal modality for displaying movements, and questions like “What important movements do you see?” or “Please describe this seizure” will direct learners attention towards important features (or facts). In this regard, PVCs should probably not be used for disorders without a dynamic component [19], and conditions like rashes may be better illustrated by photographs.

Healthcare professional education is becoming increasing multi-professional, and, although PVCs have principally been used in medical education, there is no reason why they cannot be used in the training of other health care professionals. Furthermore, inter-professional learning and collaboration can be facilitated by medical students and nurses viewing cases together.

To be included in a textbox:

**Case Study 1**

*If you are not familiar with it, you won’t see it, and you may miss the diagnosis.*

These three frames are taken from a PVC and reproduced with permission of the parents.

>>>>[Please insert figure 1 here]>>>>

History: A 6-month-old girl with a mild motor developmental delay.

*Tasks:*

* Please describe the important signs.
* What is the most probable diagnosis?

*Correct findings and diagnosis:*

* Signs include asymmetric use of hands and fisting of the right hand. The right thumb is positioned in the palm.
* The most probable diagnosis is unilateral spastic cerebral palsy.

This PVC would be appropriate for the teaching of medical students as well as physicians in training for careers in general practice and paediatrics.

*During the workshop session you should consider the following:*

* Start by acknowledging the families who agreed to the use of the video recording of their children.
* *Train visual attention*. Replaying parts of the PVCor slowing the speed of the video may help to demonstrate subtle features.
* *Train diagnostic accuracy*: A question like “Please make a probable diagnosis” will direct attention.
* *Activate learners by letting them elaborate*:Buzz groups of two or three will allow everybody to be active, *and* this approach reflects real-life practice and teamwork. To facilitate apprenticeship learning, the clinical experience of buzz group members should vary. It is important that students or junior clinicians can elaborate and verbalise their observations without fear of being misconstrued in front of a multitude of colleagues. Such a non-threatening learning environment with feedback allows the less experienced learners to compare their own observations with those of more experienced clinicians.
* After a discussion of the differential diagnostic possibilities, the discussion of plans for the investigation and management will be the logical, and highly focused, next step.
* The facilitator may think aloud and explain how she or he might go about describing and diagnosing this case.
* When the session is finished, the facilitator should summarise the case and ask learners what they will do to learn more about the topic covered.

**4. Practical advice on collection and storage**

Obtaining new footage is important to keep a collection relevant and up-to-date. Although a great deal of footage is already available via open access websites such as [www.spottingthesickchild.com](http://www.spottingthesickchild.com) and [www.reeldx.com](http://www.reeldx.com), use of your own local footage allows it to be better tailored to your educational requirements. Care should be taken when using videos from popular social media video sites. Thequality of the information is not standardised, although a study has shown that PVCs from YouTube can illustrate infantile spasms, and can be used for teaching if guided search practice is followed [27]. Some practices may not be compatible with local guidelines, and it would be unethical to advocate viewing footage where consent has not been obtained. Valuable recordings are often made by parents. Such recordings may need editing.

* *Have recording equipment easily available*

Clinical pathology is everywhere but is not possible to capture unless you have the equipment available. Security in hospitals is an issue, and leaving a video camera available for all to use may result in it being misplaced or stolen. A locked media cabinet containing videographer equipment, spare batteries, consent forms and information leaflets is a useful investment.

* *Obtain consent*

Consent is important, and this is emphasised in both national and local guidelines. Local guidelines may include, however, a prohibition on using your own mobile devices as recording tools. This may not seem pragmatic given the quality of current devices but does avoid any misinterpretation of intent. Clearly, it is important to explain to parents why you are filming. Parents usually agree when they know that future patients may benefit by being treated by doctors who have improved their diagnostic skills during training through the use of authentic patient video cases. Consent should be clear about to whom the footage is going to be shown and in what context. It must be clear whether the footage is for health care professional use only or might be available on a publically accessible website. Obtaining permission from parents or children who are severely ill is challenging. Delaying video recording until appropriate management has been initiated will likely enhance an appreciation of the importance of video recording for teaching purposes. Children and parents should be given the opportunity to watch the footage recorded of them in the screen of the camera prior to giving consent. The guide to the data protection act (DPA) from the Information Commission [28] does not have a separate section on data protection, although their guidelines on anonymisation infer that videos are qualitative materials [29]. Nevertheless, the data protection of the videos must be as robust as any piece of clinical data and follow the principles of purpose (education), adequacy and accuracy.

* *Obtain and use really short clips*

A big challenge for a cameraperson is restraining the urge to record everything you see. It is beneficial to have a wide shot at the outset and the end, a recording of any observations and a video of the consent form. Generally, 30–60 seconds of footage is appropriate.

* Storage

Accessible technology enables those without media backgrounds to record footage for use in their own institutions. It is important to use a coding mechanism that allows easy recall of clips and conforms to the DPA by not recording names and addresses. (The Spotting the Sick Child project team used the system in shown in table 2) [30]

|  |
| --- |
| Table 2 – A coding system for video cases |
| * Patient ID and clip ID within it * Patient age * Patient ID with link to consent form in a separate database, with each consent form scanned in as a read-only file * Clip key words ("croup" etc.) * Clip description and/or further key words * Section ID (if cataloguing for a particular purpose) * Cameraperson ID |

Footage should be downloaded onto a secure hard drive once taken, and then the memory of the camera should be deleted (this is a mandatory requirement of the national Data Protection Act). This helps to prevent inappropriate viewing of recordings by other patients and parents.

**Conclusion**

New, authentic teaching and learning modalities are needed.

Short video clips may enable establishing highly interactive, contextual and non-threatening learning environments with a minimum of facilitation. Initial analysis of PVCs including characteristic movements in patients, which may be subtle, periodic or infrequent, are suitable for use in buzz groups and optimise interactivity. Letting learners elaborate on their findings and compare them with the findings of more experienced clinicians enhances attention, clinical reasoning and diagnostic accuracy. Teaching and learning with PVCs in a workshop format may improve medical expertise for the benefit of the patients.

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**Competing Interests**

There are no competing interests

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**References**

[1] Morris C, Blaney D. Work-based learning. In: Understanding medical education. Evidence, Theory and Practice Ed: Swanwick T. Wiley-Blackwell 2010 p 69

[2] Cook M, Irby D Sullivan W et al. American medical education 100 years after the Flexner Report. NEJM 2006;355:1339-45

[3] Reece A, Klaber R. Maximising learning on ward rounds. Arch Dis Child Educ Pract 2012;97:61-67

[4] <http://reeldx.com/> last accessed 5th March 2015

[5]Balslev T. Learning to diagnose using patient video cases in paediatrics: perceptive and cognitive processes. PhD thesis, Maastricht, 2011 [Link](http://pub.maastrichtuniversity.nl/d0be7d8a-de35-49df-8eca-1603f2c4c025)

[6] Kamin C, O'Sullivan P, Deterding R et al. A comparison of critical thinking in groups of third-year medical students in text, video, and virtual PBL case modalities. Acad Med 2003, 78(2):204-211.

[7] Roland D, Coats T and Matheson D. Towards a conceptual framework demonstrating the effectiveness of audiovisual patient descriptions (patient video cases): a review of the current literature [BMC Medical Education.2012, 12:125.](http://www.biomedcentral.com/1472-6920/12/125)

[8] Parin A,  Dogra N. Making videos for medical undergraduate teaching in child psychiatry: the development, use and perceived effectiveness of structured videotapes of clinical material for use by medical students in child psychiatry Medical Teacher 2000;6

[9] Adams EC, Rodgers CJ, Harrington R et al.. How we created virtual patient cases for primary care-based learning. Medical Teacher 2011; 33: 273–278

[10] Andra´s Fogarasi, Frank Boesebeck,  Ingrid Tuxhorn. A Detailed Analysis of Symptomatic Posterior Cortex Seizure Semiology in Children Younger Than Seven Years*.*Epilepsia,44(1):89–96, 2003

[11] Derry CP; Harvey AS; Walker MC et al. NREM arousal parasomnias and their distinction from nocturnal frontal lobe epilepsy: a video eeg-analysis. *SLEEP* 2009;32(12):1637-1644

[12] Hansen JK, Balslev T. Hand activities with infantile masturbation. Video analysis of 13 cases. The European Journal of Paediatric Neurology 2008; Nov 13

[13] Richard F. Chang MD, Scott J et al.Pathomechanics of Gowers’ Sign. A Video Analysis of a Spectrum of Gowers’ Maneuvers.Clin Orthop Relat Res (2012) 470:1987–1991

[14] Schmidt HG, Rikers RMJP. How expertise develops in medicine: knowledge encapsulation and illness script formation. Medical Education 2007: 41: 1133–1139

[15] Swanwick T. Informal learning in postgraduate medical education: from cognitivism to ‘culturism’ Medical Education 2005;39:859-865

[16]Shaffer D, and Resnick M. Thick authenticity: New media and authentic learning. Journal of Interactive Learning Research 1999 10 (2): 195-215.

[17] Roy RB, McMahon GT Video-based cases disrupt deep critical thinking in problem-based learning Medical Education

[18] Merriënboer JJG, Sweller J. Cognitive load in health professional education: design principles and strategies. Med Educ 2010;44:85-93

[[19] Roland D, Charadva C, Coats T and Matheson D. Determining the effectiveness of educational interventions in paediatric emergency care Emerg Med J2014;31:787-788](http://emj.bmj.com/content/31/9/787.3.abstract) [20]Collins A. Cognitive apprenticeship. In: sawyer RK, ed. The Cambridge Handbook of the Learning Sciences, pp 47-60. Cambridge:  Cambridge University Press; 2009:47-60.

[21]Lebeau RB. Cognitive tools in a clinical encounter in medicine: supporting empathy and expertise in distributed systems. Educational Psychology Review 1998;10:3-24

[22] T Balslev, WS de Grave, AMM Muijtjens et al..The development of shared cognition in paediatric residents analysing a patient video versus a paper patient case.*Advances in the Health Sciences Education 2009;14(4):557-565*

[23]Balslev T, De Grave WS, Muijtjens AMM et al.Enhancing diagnostic accuracy among nonexperts through use of video cases. Pediatrics 2010, 125(3): e570-6

[xxvi]de Leng B, Dolmans D, van de Wiel M et al.How video cases should be used as authentic stimuli in problem-based medical education. Med Educ 2007, **41**(2):181-8.

[24]Balslev T, Jarodzka H, Holmqvist K et al. Visual expertise in paediatric neurology. Eur J Paediatr Neurol 2012;161(2):161-6

[25] Jarodzka H, Balslev T, Holmqvist K et al. Conveying Clinical Reasoning Based on Visual Observation via Eye-Movement Modelling Examples Instructional Science. An International Journal of the Learning Sciences 2012;40(5):813-827

[26] Jackson T and Evans D. Can medical students teach? A near-peer-led teaching program for year 1 students AdvPhysiolEduc 2012 36: 192–196

[27] Fat M, Doja A, Barrowman N et al. YouTube Videos as a Teaching Tool and Patient Resource for Infantile Spasms J Child Neurol2011 26: 804

[28] Information Commission: The Guide to Data Protection. 2015

[29] Information Commission: Anonymisation: managing data protection risk code of practice 2012

[30] Roland D, Wahl H, Lakhanpaul M, Blackwell N, Davies F: Education by video. BMJ 2011,[(Careers).](http://careers.bmj.com/careers/advice/view-article.html?id=20001865)

Figure One



These 3 frames from a patient video depict a 6 months old girl with a mild motor developmental delay. Observations include asymmetric use of hands and fisting of the right hand. The right thumb is positioned in the palm. The most probable diagnoses is unilateral spastic cerebral palsy.