Teaching in the clinical environment  
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Context

The latest AMEE Guide to Teaching in the Clinical Environment ( Ramani & Leinster 2008) notes that good teachers understand and incorporate key principles of adult learning (Knowles 1990, Walker 1998) in their teaching strategy. The meaning and relevance of key concepts are best reinforced when clinical cases are used to illustrate important and often difficult to understand processes in the context of their clinical occurrence (Coles 1990, Clough 1996). In addition teachers need to know whether students have really understood by engaging them in activities that enable students to apply their interpretations and to demonstrate their clinical skills, thereby providing the basis for outcome assessment and formative intervention.

Indeed early exposure to clinical cases and patient encounters is a key feature in the New Integrated Curriculum (NIC), at the Medical Faculty of The Chinese University of Hong Kong (www.cuhk.edu.hk).

When and how the subject of gait is introduced and taught in the NIC is a relevant example of how contextual learning enables students to understand clinical concepts during the formative years of medical studies.

Activity

As part of their musculoskeletal clinical examination skills, students are expected to identify abnormal gait. Yet, human gait is not an easy subject to understand, as it involves a complex series of musculoskeletal and neuromuscular interactions. The identification of gait abnormalities depends on one's ability to integrate anatomic and physiological concepts and demands good observational skills. Hence the subject of gait has always been regarded as difficult for inexperienced students. In the old curriculum (OC), gait was introduced at Year 3 of the 6-year medical undergraduate study programme. The subject matter was taught during a 4-week Orthopaedic Clinical attachment, as part of the general evaluation of the musculoskeletal system in any given patient. In the first week of the clinical module, students were asked to see a 45-minute video tutorial on hip examination and assessment of gait, following which a tutor conducted a bedside clinic on "How To" evaluate gait. In their final year (Year 5) students attended a second 4-week clinical module in Orthopaedics, during which this tutorial was repeated.

In the New Curriculum (NIC), Gait was introduced at Year 1, as part of a large-group tutorial. The tutorial was held at the end of a 6-week period during which the anatomy of the lower extremity was taught. In this 45-minute tutorial, students were taught to identify individual components of gait (stance and swing phase) and their synchronization at the foot, knee and hip, in a normal subject. Several additional patients (6-8) with clearly defined gait abnormalities were used to illustrate the differences.
between normal and altered gait. Several volunteer students were asked to mimic the altered gait patterns of the demonstration patients as a means to reinforce key anatomic concepts.

Evaluation

We (authors and three other tutors) assessed and compared 235 students from the NIC (n=113) and the OC (n=122) for their ability to identify abnormalities in gait. Several groups of Year 3 (n=64 NIC; n=68, OC) and Year 5 (n=49 NIC; n=54 OC) were chosen at random, during their 4-week Orthopaedic rotation. They were asked to identify abnormal components of gait in a single test subject with 7 clearly identified abnormalities.

In the OC, students were tested at the end of their Orthopaedic rotation, while the NIC students were tested in the 1st week of their Orthopaedic rotation. Students were expected to identify at least 3 components of the gait abnormality for minimum competency, and those who could identify 5 or more were considered to have attained superior skills in recognition of Gait. Individual student responses were collected, assessed and tabulated for analysis. Students in Years 3 and 5 of the NIC did better than their peers in the OC, (Minimum or superior competency Year 3: NIC 68% vs 31% in OC, p=0.0001, Year 5: NIC 85% vs 61% of OC students, p=0.0029).

In Year-3 NIC students fared better than their OC counterparts considering failure rates (p=0.0001) and demonstration of superior skills (p=0.014). In Year-5, NIC students’ performance was better than OC students only as far as failure rates were concerned (p=0.029). There was no statistical difference between Year-5 NIC and OC students when compared for superior skills (p=0.2524).

Conclusion

When the new curriculum was first introduced, members of the faculty had doubts on the feasibility of teaching a complex subject such as gait to Year 1 medical students. Some teachers felt it was unrealistic to expect them to acquire and retain a difficult skill at an early stage of a medical clerkship. However, our study has shown that students are indeed able to acquire, retain and apply difficult skills requiring clinical reasoning, when exposed to appropriate clinical material. In an integrated course, students may not appreciate the significance of what is being taught unless it is well illustrated with real examples at an opportune time. In our study, patients with gait-abnormalities offered stark visual perspectives on the functional anatomy of the lower extremity that reflected the required learning objectives. Therefore students were able to appreciate and understand the various phases of gait.

It is reassuring to note that knowledge retention, even though the subject matter was taught years earlier, was superior in Year-3 and Year-5 NIC students when compared to their OC counterparts. Year 5 students demonstrated an incremental increase in skills as evidenced by reduction in failure rates and increase in competency skills in the NIC as well as the OC. Given that no statistically significant difference was found when comparing Year-5 OC and NIC students for superior competency, one tends to conclude that the good students are able to perform well regardless of curricular variances.

The research and data that support the concept of contextual learning and its ability to enhance the acquisition of knowledge and practical skills, is concrete and overwhelming (Barrows 1987, Walker 1998, Verkoeijen 2004). Our study also suggests that early exposure to challenging clinical material combined with interactive and contextual teaching significantly enhances student learning. Students are able to recruit and retain complex information and skills into their long-term memory.
References


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