Introduction

Owing to the fact that dental students at the Khon Kaen University (KKU) were interested in laser therapy, an intensive course for laser therapy in dentistry was introduced to the final year students. The instructional design was based on transferring technology and translation research to practice. A classroom action research was conducted to evaluate this course. The results showed favourable knowledge and attitude of the learners. This article reveals a pattern of instructing laser dentistry to dental students.

Methods

The principle of instructional design was modified from the methods of technology transferring for professionals.1-3 This was based on transferring laser technology by learning both context and skills in laser dentistry in order to utilise laser dentistry for quality of life (Fig. 1). The instructional design (Fig. 2) comprised a twelve-hour interactive lecture on the basic and application of laser dentistry, a ten-hour related laboratory with co-operative learning after lecturing together with clinical demonstration from the dental students who had experiences in using lasers and a four-hour authentic evaluation and discussion using experiential-based learning. The laser techniques transferred to the students were as follows: soft tissue surgery4, tooth preparation, laser welding for...
chronic oral ulceration, photocoagulation and low intensity laser therapy. The laser regimes in this course were founded on calibration and research conducted by the LDRG KKU team. These were also used routinely for treating patients at the faculty of dentistry already.

This one-week intensive course called "Laser Therapy in Dentistry: Research transferring to practice" (Fig. 3) was carried out with 45 final-year dental students, Khon Kaen University, 2013. For evaluation of this programme, a combined quantitative analysis and a qualitative reflection of the data from summative academic evaluation, the satisfaction of the students using questionnaires with a 10 cm visual analogue scale (VAS) and an open question were used.

_Results_

The knowledge test ranges from 57 to 100 per cent (mean = 81.9, 95% CI = 79.2 to 84.6). The means of self-assessments of the students' knowledge and confidence in practice were 8.4 (95% CI = 8.0 to 8.8) and 9.0 (95% CI 8.5 to 9.5), respectively, with correlation at 0.496 (P value = 0.001). The students were satisfied with this learning method at the mean VAS of 8.0 (95% CI = 7.6 to 8.5). They thought that their skills were improved by the instructors’ advices and the analytic thinking at the mean VAS of 9.2 (95% CI 9.0 to 9.5) and 9.2 (95% CI 8.9 to 9.5), respectively. From qualitative analysis, the students reflected their impressive experiences with the instructors and the team offering an intensively inspired learning, opportunities to expose a new technology as laser therapy and the learning style. This included student-centred learning, comprehensive knowledge, relaxed share of funny activities and practical laser hand-on offering the possibility to apply the gained knowledge to real-life clinical practice.

_Discussion_

The intensive laser course for undergraduate dental students that we introduced was able to provide favourable knowledge, practical skills and attitude on laser dentistry in the learners. The important factors leading to this success were due to both instructional design for transferring technology and translation research to practice. Additionally, all of the laser therapy techniques taught in this course were created by LDRG KKU. The regimes of laser therapy were set up in the ranges of power and energy density. These allowed the students to practise the adjusting of lasers in detail and thereby to find out which were suitable for a variety of situations in real practice.

_Conclusion_

This integrated instructional design for technology transferring and translation research "Laser Therapy in Dentistry" provided the abilities and good attitudes on laser dentistry for dental students.

Editorial note: A list of references is available from the publisher.

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