

## Objectives

The purpose of this study was to assess the most effective learning method to identify the panoramic anatomical landmarks and to evaluate whether group discussion could enhance the students' learning ability.

## Methods

Fourth-year dental students (n=120) were divided into three groups by stratified random sampling (n=40/gp). Following the anatomical landmark lecture, they were assigned to have different learning method as a supplementary learning material, which are 3D dental panoramic interactive application, film-traced diagram and lecture note respectively. A pretest (PT1) was administered before the lecture started, then the students' knowledge was measured again by immediate post-test (PT2) at the end of the class. Small group discussion was conducted 72 hours later to promote deep learning and followed by another immediate post-test (PT3). Mean differences between the groups were analyzed by two-way ANOVA and paired t-test.

## Results

The prior knowledge of students assessed by PT1 showed no difference between three groups. The students exposed to 3D dental panoramic interactive application and lecture note performed significantly better on PT2 in comparison to film-traced diagram as well as compared to their own PT1 scores ( $p < 0.05$ ). Whereas PT2 scores from 3D dental panoramic interactive application group and lecture note group have shown no difference. The implementation of small group discussion increase students' knowledge (PT3) in all learning methods with statistically significant difference in comparison to PT1 and PT2 ( $p < 0.05$ ).

## Conclusions

From our study, it may conclude that 3D dental panoramic interactive application and lecture notes were the most effective learning methods in identification the panoramic anatomical landmarks of preclinical dental students. Group discussion could enhance the students' learning ability and may helpful for teaching oral and maxillofacial radiology.