AIM
To investigate the construct validity of a novel caries haptic simulation exercise which attempts to encourage cognitive cavity design rather than simply manual dexterity.

OBJECTIVE
To compare performance between clinical novices and experienced clinicians on previously unseen caries exercises.

MATERIALS AND METHODS
Virtual blocks containing unique variations of caries were created. The blocks were developed to encourage cognitive caries removal. The user had to feel for the spread of caries along the ADJ and decide whether deeper caries could be left in situ. First year dental students and teaching staff were asked to complete the exercises under controlled conditions.

RESULTS

- Experienced participants average score was 75% in comparison to novice performance of 65%.
- Experienced participants removed 69% infected dentine in comparison to the novice participants who removed 87%.
- Experienced participants spent less time (04:53 minutes) using the hand piece than novice participants who averaged 05:31 minutes.
- Experienced participants removed 10% non-infective tooth tissue in comparison to novice participants who removed 22%.

DISCUSSION
When applying the clinical principles of conservative caries removal to the data collected from the two study arms, the experienced group performed to a higher standard.

Experienced operators were more precise in their removal of caries at the ADJ, caused less iatrogenic damage to surrounding healthy tooth tissue and left more deep caries in situ; all practices consistent with minimally invasive dentistry.

Experienced clinicians spent less time drilling but averaged a greater precision score, indicating their caries removal was more efficient with regards to use of the instruments and time available.

These differences in performance may be as a result of alternative treatment approaches to caries removal. It may suggest participants in the experienced study arm were more efficient in differentiating between the layers of sound and infected tissue through tactile feedback from the slow speed hand piece. The outcome was removal of the optimal level of decay without compromising the integrity of the tooth.

CONCLUSIONS AND IMPACT
A first step to establish the construct validity of this caries removal exercise is presented. This lesson is the first to simulate more than simply manual dexterity, requiring the user to apply a cognitive approach to carious cavity design.