Interprofessional airway microskill checklists facilitate the deliberate practice of surgical cricothyrotomy with 3-D printed surgical airway trainers.

James French1,2,3, Devon Maclean2, Kim David3, Amanda McCoy3, Susan Benjamin1, Jacqueline Fraser3, Tushar Pishe1,2,3, Paul Atkinson1,2,3
1- New Brunswick Trauma Program
2- Dalhousie University, Saint John Campus, NB
3- Department of Emergency Medicine, Dalhousie University, Saint John Regional Hospital, Saint John, NB

Background
Deliberate practice (DP) is the evolution of practice using continually challenging and focused practice of a particular task. DP involves immediate feedback, time for problem-solving and evaluation, and opportunities for repeated performance.

Microskills training breaks down larger tasks into multiple smaller subtasks and then adds opportunities for feedback and adjustment for each subtask. Microskills training is routinely used to achieve excellence in competitive sports, martial arts, military operations and music. Surgical cricothyrotomy is a rarely performed safety critical task.

Method
Two doctors and three nurses developed stepwise team microskills checklists from case review, needs assessments simulations and published evidence.

The prototype checklist was tested, evaluated and developed during four days of simulation faculty team training. The final 30 item checklist was used to facilitate skills training for doctors, nurses, respiratory therapists and ACPs in one level 2, and two level 3 trauma centers from April 2017 to October 2017. Commonly available airway trainers were retrofitted with 3-D printed larynx.

The microskills checklist was used in four phases: that mirror Kolb’s Learning Cycle.
1. Group discussion of each microskill step
2. Groups of three team members; operator, assistant and microskill facilitator (using the checklist) to enable the deliberate analysis of the team’s current performance.
3. Each subtask is performed with immediate peer and where necessary faculty feedback.
4. Changes are recorded.
5. Total task run though without interruption. Changes are recorded.
6. Once perfect, PETTEL visualization prior to each attempt.
7. Repetition and feedback using different team members, manikins, including time pressure.

User satisfaction surveys were collected after the skills training session as well as steps corrected.

Results
Teams were composed of Registered Nurses (8), Physicians (9), and Respiratory Therapists (2). All of the teams experienced a change in practice. The median number of microskills changed for MDs 12/21, RNs 6/12. The commonest changes in practice were equipment positioning (all teams). The median percentage of steps corrected for physicians was 57% and for nurses 50%. All professions agreed strongly that the approach produces a positive change in practice (median score 5/5).

Discussion
Limitations: This study examines the first two level of knowledge translation ie user experience. It showed a change in practice in the skills training environment only. Further Work: The effect of microskills training needs to be assessed in simulated cases, and understand the effect on patient care systems and patient outcomes. Conclusion: Microskills training identified and corrected a number of steps of surgical cricothyrotomy in interprofessional teams.