

## Introduction

IV cannulation is an important skill to learn for all medical students and doctors. It is also an important skill for students in other health professions (specialist nurses, paramedics). The AMC (<http://www.amc.org.au/accredgoals.asp>) does not specifically list it as a task that students must be proficient in on graduation but it states that students must have "The ability to recognise serious illness and to perform common emergency and life-saving procedures such as caring for the unconscious patient and cardiopulmonary resuscitation." IV cannulation is assumed to be part of this suite of life-saving procedural skills. However, IV cannulation is one of the required skills for graduating students in the GMC's Tomorrow's Doctors.



In the past, students always learned clinical skills, including IV cannulation, on patients. Part of the burden of being a patient in a public hospital was that patients expected to have medical students learning on them. For IV cannulation, this was a painful and potentially dangerous burden with possible complications ranging from bruising to septicaemia. However, as patients become more aware of their right to refuse medical students, the use of patients as "learning tools" is no longer acceptable. Thus, we in clinical skills teaching are always looking for ways to teach students on non-patients. Hence the development of IV trainers.

The plastic IV arm (e.g. Adam Rouilly) is a common way of learning IV cannulation. Cath-sim (BD) was one of the first haptic IV trainers and the Virtual IV Trainer™ (Laerdal) is the latest version, which is the one that we are using in our study.

The Virtual IV Self-Directed Learning System (Laerdal) is "designed to provide both the novice student and the advanced practitioner with the opportunity to learn and practice the skills to perform intra-venous catheterization in the context of patient case scenarios" (product information).

It is run from a computer but the students need to insert the cannula in a haptic device which sits next to the computer screen.

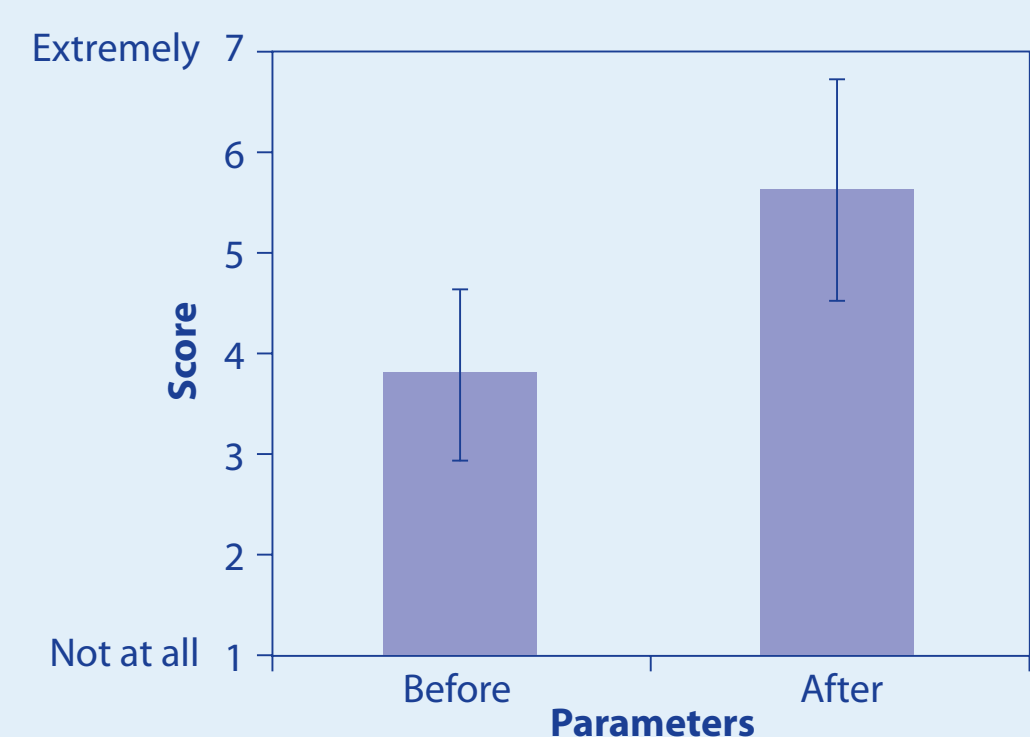
The computer program teaches the correct insertion of the intravenous cannula and the students practise cannulation in many different scenarios. Students need to choose equipment, site for cannulation, prepare the area for cannulation, perform the insertion of the cannula and make decisions about the fluid to be infused. The students are given feedback on all aspects of their performance. The program has 3 levels of scenarios for students (starting at basic cannulation for a healthy pre-op patient) and 3 levels for practitioners (including patients with significant health problems, difficult veins and complicated fluid requirements). Our students all used student level 1 as they were all beginners.

Our poster describes a pilot study of users' impressions of the Virtual IV™ trainer. There were 40 people involved in this study, including medical students from Year 2 (25), Year 3 (2), year 1 & 2 paramedic students (5) as well as nurses doing a revision course for work in the overseas missions (8). The students all used the IV trainer from November 2005 to June 2006.

## Results

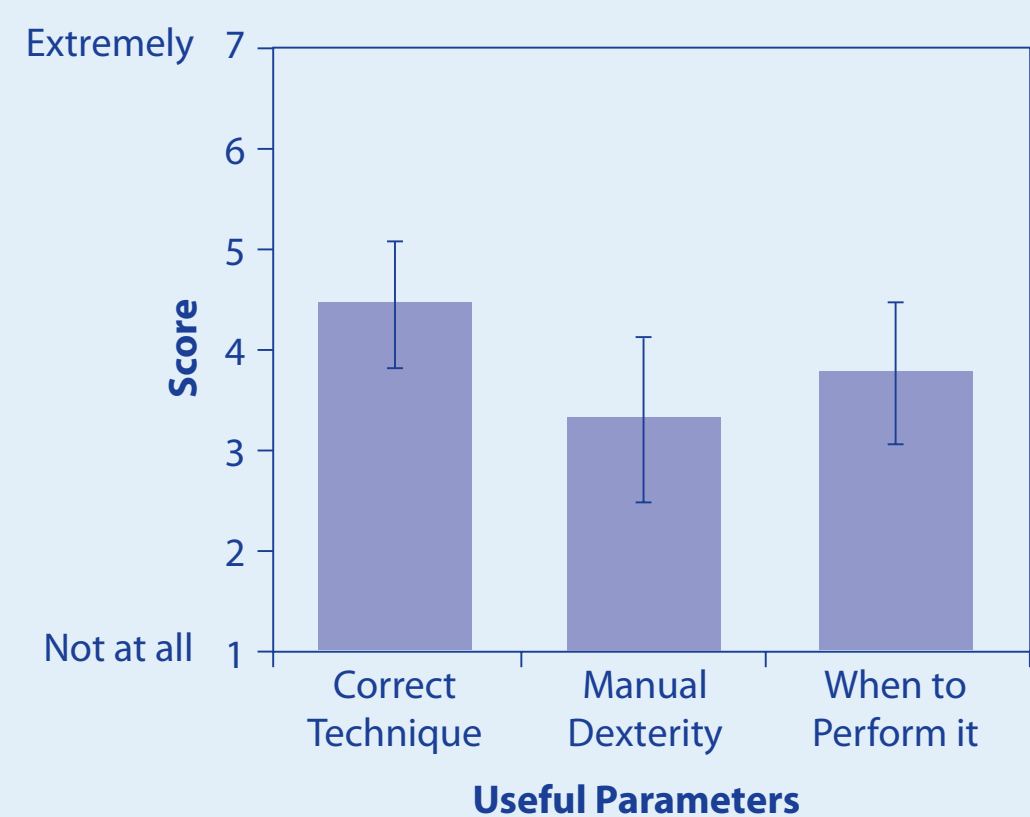
The students were asked how confident they would be of a successful outcome if they had to insert an IV cannula both before and after using the IV trainer (Fig 1).

**Fig 1.**  
How confident would you be of a successful outcome?  
n = 40



The students were also asked about the usefulness of the IV trainer in teaching them the correct technique, manual dexterity and when to perform IV cannulation (Fig 3).

**Fig 3.**  
How useful was the IV trainer in relation to teaching you the following?  
n = 40



Students were also given the opportunity to make some free text comments. Overall, the students were very positive about the IV Trainer. Their comments can be divided into the following categories.

### Positive aspects:

#### A. Practice on non-patients

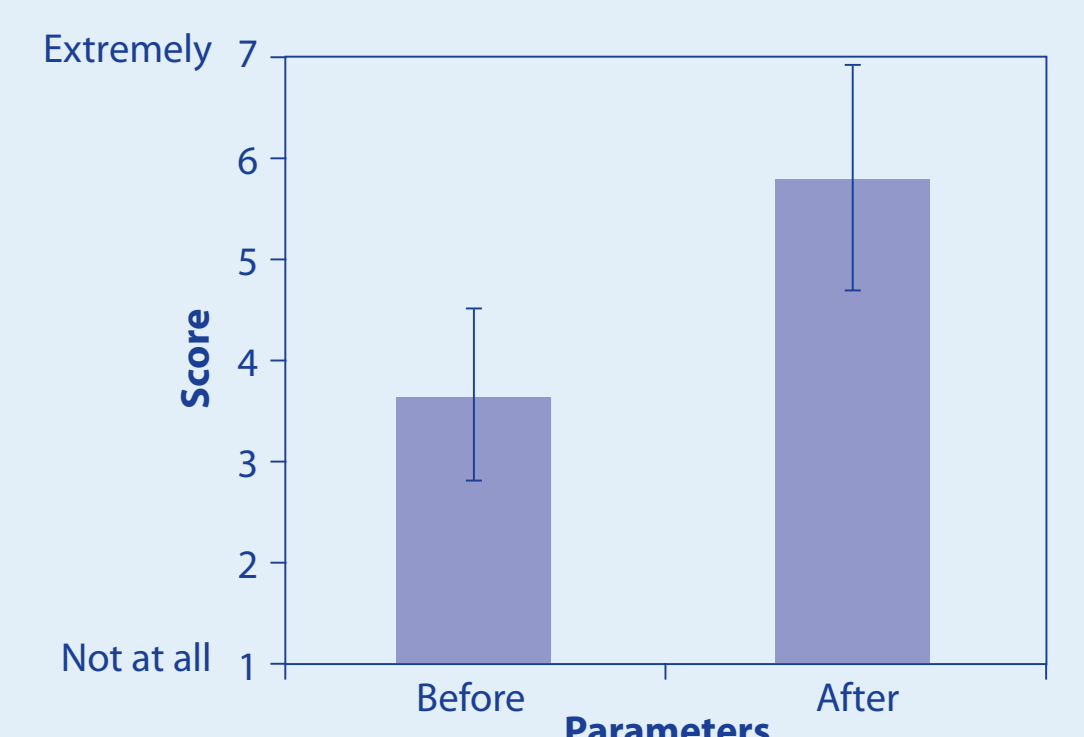
1. Saves some practice on "real patients"
2. It allows to try several times. "It allows people to try as many times as they needed at any time"
3. The chance to try several times using different scenarios without the feeling you will hurt someone
4. Builds confidence

#### B. Clear teaching

5. Clear instructional video
6. The feedback it provides after cannulation is very good "Good feedback after cannulation"
7. Explanation of procedures and equipment use
8. Helps develop consistent technique "Good practice remembering when to do things and what to use"

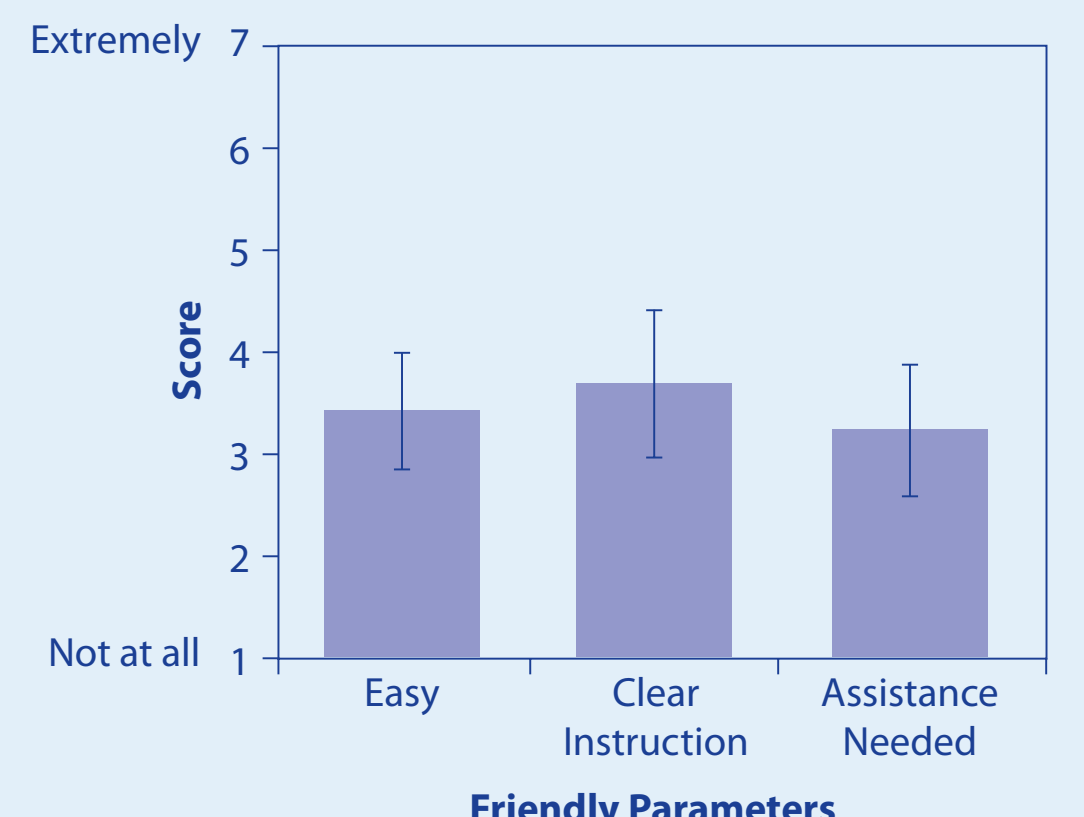
The students were also asked how confident they would be of using the correct technique both before and after (Fig 2).

**Fig 2.**  
How confident are you to use the correct technique?  
n = 40



Additionally they were asked whether the IV trainer was easy to use, how clear the programming and instructions were and how much assistance they required (Fig 4).

**Fig 4.**  
What was the IV trainer like to use?  
n = 40



9. Reinforced step by step cannulation procedure "Very detailed information"
10. Good anatomy presentation
11. Wide range of situations/scenarios "It takes you through multiple and different cases scenarios/very helpful for decision making"

#### C. Life like

12. Palpation was good

### Negative aspects:

There were some drawbacks with the use of the system. The students highlighted the following concerns:

#### A. Not life-like enough

1. Sensation/palpation/feeling of insertion poorly correlates with reality

#### B. Interface between haptic device and computer screen

2. Hard to get correct positioning of insertion
3. Difficult to go between the computer screen and the IV trainer
4. "Finding the vein". It is hard to know if you are on the right spot
5. Takes a while to coordinate using computer
6. Difficult to quickly pick up the dexterity/interactive program.

## Conclusion

No matter what background or what level, all students appreciated the opportunity to use the Virtual IV Trainer™. It was especially appreciated by those students who had not attempted an IV cannulation before (Year 2 medicine) but was also appreciated by nurses who needed revision in this skill. The fact that it allows practice of a routine and gives feedback on all aspects on the cannulation (and not just the insertion) were seen as very positive attributes.

All students stated that they would recommend the IV trainer to other students.

However, there was a level of skill and familiarity that was needed to be able to use the system. It took each student about 45 minutes to get to that level, where they could work independently and start to gain skills and knowledge from the IV trainer. We found that we needed to be there to supervise in the first hour while students were familiarizing themselves with the system. As the students progressed, we still needed to be in close proximity to troubleshoot.

We have not had the opportunity to let students progress to higher levels of expertise with the IV trainer. One assumes that as students become more advanced, the less input from staff would be needed and the more independent and self-directed their learning would be.

All students felt that they would now be more confident in achieving a successful IV cannulation and would be more likely to use the correct technique. However, it is important to remember that confidence does not always correlate with competence and the next part of this project would be to follow students who have used the IV trainer during their first attempts at insertion on real patients.

## Acknowledgements

1. Laerdal (Aust) who lent us the Virtual IV™ trainer.
2. All the students who took part in the trial, including 2nd and 3rd year medical students as well as the paramedics and nurses from Intermed.