

# Face, Content, and Construct Validations of Endoscopic Needle Injection Simulator for Transurethral Bulking Agent in Treatment of Stress Urinary Incontinence

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## Introduction

Validation studies important part of simulator evaluation and considered important step to establish the effectiveness of simulation-based training. The endoscopic needle injection (ENI) simulator has not been formally validated, although it has been used widely at University of California, Irvine. We aimed to assess the face, content and construct validity of the UC, Irvine ENI simulator.

## Methods

At UCI, 6 urologists (experts group) and 6 urology trainees (novice group) completed urethral bulking agent (UBA) injections on a total of 12 porcine bladders using ENI simulator. Dissected female porcine bladders were mounted in a modified Hysteroscopy Diagnostic Trainer. Following the simulation, all participants completed structured quantitative questions which assess face, content and construct validities (Tables 1 & 2). These questions were designed to determine the perception of simulator on a 5-point Likert scale (1: poor, 5: excellent).

## Results

Fig 1: modified Hysteroscopy



Fig 2: Anatomical evaluation



Fig 3: cystoscopic views, A: before, B after injection



Fig 3: functional evaluation: Retrograde leak pressure



Table 2: content validation questionnaire

Question to subjects (based on 1-5 Likert scale, 5 = excellent)	Experts (mean)	Novices (mean)
The instruments were realistic	4	4.1
The urethra and the bladder tissue felt realistic	4	3.8
The spatial orientation of the urethra and bladder was realistic.	3.1	3.5
The injection of the bulking agent was realistic	3.3	4
The coaptations after the injection were realistic	4	4.1

Table 3: Technical Skill Assessment

Generic skill (based on 1-5 Likert scale, 5 = excellent)	Experts (mean)	Novices (mean)	P value
Time injection to the completion of the mound	4.2 min (2-6.9)	6.0 min (4.6-8)	< 0.002
Total procedure Time	6.1min (4.5-7.9)	12.1 min (10-14.6)	< 0.001
Occlusiveness score	4.5/5	3.6/5	< 0.0101
Overall performance	4.1/5	2.6	< 0.003
The quality of the final procedure (retrograde pressure measurement)	4.8	2.6	< 0.001

Table 1: face validation questionnaire

Question to subjects (based on 1-5 Likert scale, 5 = excellent)	Experts (mean)	Novices (mean)
How useful would the simulator be as a training methods for endoscopic UBA	4.2	4.8
Training with this simulator should be required before entering the OR for the procedure of urethral bulking agent injection for the treatment of urinary incontinence	4	4.6
I believe that practicing with this simulator will improve my skills in injecting urethral bulking agents for the treatment of urinary incontinence.	4.2	4.8
I found this simulator training helped me to understand the principles of UBA injections.	4	4.6
I believe that an attending's real-time evaluation of my technique on the simulator is an appropriate assessment tool for my skills in performing urethral bulking agent injections.	3.5	4.3

## Conclusions

Our study provides evidence to support the continuing use of the UCI ENI simulator in urology training as it clearly showed face, content and construct validities. Although few aspects of simulator were not very realist, it was considered a good training model. This study provides as base for the future formal validation for this simulator by expanding the sample size, which could be used to develop performance-based training curriculum.