ANGIO Mentor

Cardiac Electrophysiology Basic Skills Training Curriculum

3DSYSTEMS

Barts Health **NHS**
NHS Trust

Description

Simulator training allows physicians to learn, practice and refine practical procedures without exposing patients to potential complications during the learning curve.
It allows for high intensity training without the restrictions of patient throughput.

Electrophysiology is a technically and intellectually complex specialty incorporating procedures with the potential for significant morbidity and mortality. Fundamental skills in electrophysiology involve catheter manipulation within the body guided by imaging displayed on two dimensional screens.

Training within a proficiency-based, virtual-reality training program can increase competency and reduce errors and complications during real surgical procedures.
The skills acquired in the simulated environment should be transferable to the real clinical environment.

The following curriculum is based on a validation study performed on Simbionix ANGIO Mentor EP Basic Skills module in the department of Cardiology,
St Bartholomew's Hospital, Barts Health Trust, London, UK and Department of Clinical and Experimental Medicine University of Insubria, Varese, Italy.
In view of the potential for complications associated with invasive EP procedures and the desire to provide trainees with high intensity/high yield training, the EP department at St Bartholomew's Hospital has proposed the adoption of mandatory simulator training for all new EP fellows, and trainees returning after a period of more than a year without clinical EP exposure.

The aim of the training curriculum is for an individual to acquire electrophysiology basic skills and reach a predetermined level of proficiency before progressing to more challenging cases.

Objectives

♦ To establish knowledge of intracardiac anatomy

♦ To practice and gain competence in EP catheter manipulation and navigation under fluoroscopic guidance

♦ To practice and gain competence in EP catheter manipulation and integration of knowledge related to 3-dimensional anatomy

Specialties

Electrophysiology

Target Audience

Individuals interested in following a structured curriculum to acquire cardiac electrophysiology skills before undertaking procedures on patients.
The suggested program can be implemented at the start of EP training, and after a period of more than a year without clinical EP exposure.

Assumptions

It is recommended to include a cognitive skills module at the front end of the training program. No previous EP procedural or technical knowledge is required.

Suggested Time Length

Completing one case successfully should take between 10 minutes to 40 minutes.

Distributed training schedules, with a maximum of two sessions performed per day, each at least one hour apart, until demonstrating the required level of skill by achieving benchmark level for all cases. The required skill level in this case is the mean score achieved by those with more than 1 year of EP experience for each module.

It is recommended that the entire curriculum will be completed in maximum of 5 weeks.

Authors

This curriculum is based on:

Two Centre Evaluation of the ANGIO Mentor Electrophysiology Simulator, presented by Ullah et al at HRC (Heart Rhythm Congress), 2013.

Introduction to Curriculum

This curriculum is based on:
Two Centre Evaluation of the ANGIO Mentor Electrophysiology Simulator, presented by Ullah et al at HRC (Heart Rhythm Congress), 2013.

Two-Centre Evaluation of the ANGIO Mentor Electrophysiology Simulator
W. Ullah, R. Marazzi, R. Hunter, M. Dhinoja, S. Sporton, R. De Ponti, R. Schilling.
Department of Cardiology, St Bartholomew's Hospital, Barts Health Trust, London, UK; Department of Clinical and Experimental Medicine University of Insubria, Varese, Italy.

Study results on which this curriculum is based upon:

Table 1 – EP Grades used in appraisal

Grade	Term	Experience
1	Expert EP	>5 years EP experience
2	Higher EP	>2 years EP experience
3	Intermediate EP	>1-2 years
4	Novice EP	0-1 year experience

Table 2 – Scores in EP cases 1 to 5

Case	Grade	Mean Score	SD
EP 1	1 (Expert EP)	114	18
	2 (Higher EP)	110	17
	3 (Intermediate)	94	22
	4 (Novice EP)	84	18
EP 2	1 (Expert EP)	121	38
	2 (Higher EP)	120	28
	3 (Intermediate)	105	26
	4 (Novice EP)	70	31
EP 3	1 (Expert EP)	63	21
	2 (Higher EP)	55	27
	3 (Intermediate)	49	14
	4 (Novice EP)	26	18
EP 4	1 (Expert EP)	129	24
	2 (Higher EP)	83	43
	3 (Intermediate)	126	30
	4 (Novice EP)	77	45
EP 5	1 (Expert EP)	50	26
	2 (Higher EP)	71	67
	3 (Intermediate)	35	12
	4 (Novice EP)	28	34

Table 3 – Target Scores

Case	Target Score
1	117/130
2	120/220
3	54/110
4	125/160
5	43/180

The required proficiency level is derived from the median score for participants beyond experience grade 4, not including first attempts at a case. In each case, a 4 minute (4.5 minutes for case 2) time limit is adhered to attain these scores.

1. Introduction to Training

An experienced operator provides an introduction to the simulator and outlines the aims of simulator training. The trainee is provided with their individualized login for the simulator, which allows their scores to be registered under their name. Under supervision, the trainee undertakes each case in turn once. During this initial run through, they are familiarized with use of the simulator, including set up for each case and manipulation of imaging during the case.

EP Basic Skills Cases - Proficiency

Instructions

The cases are undertaken sequentially on the Simbionix ANGIO Mentor by the trainee independently. Once a trainee has achieved the target score on a case, they can move on to the next one, until all 5 are completed.
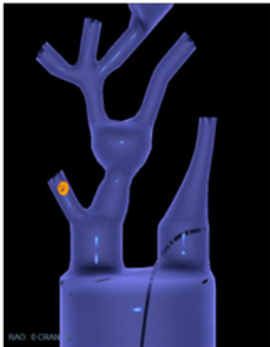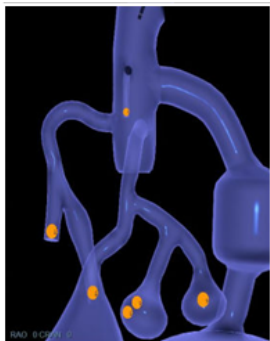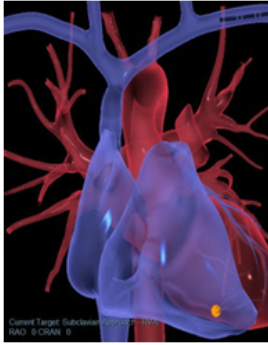

Case 1–Tube Maze

Task Description:
navigate through a simple 3D maze and attain different targets by manipulating the EP catheter.

Required Skill Level:
scoring of 117

Case 2–Tube Maze

Task Description:
navigate through a simple 3D maze and attain different targets by manipulating the EP catheter.

Required Skill Level:
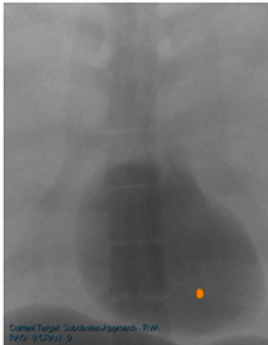scoring of 120

Case 3 – 3D Cardiac Anatomy

Task Description:
identify the anatomical location and manipulate the EP catheter in order to touch the targets within a 3D contracting cardiac shell model.

Required Skill Level:
scoring of 54

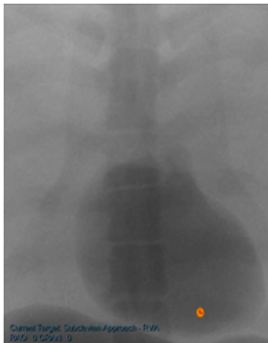## Case 4 – Heart Anatomy - Fluoroscopy

Task Description:
under fluoroscopic guidance, reach different anatomical targets by manipulating the EP catheter.
Targets:

♦   Subclavian approach – RVA, Coronary Sinus.

♦   Femoral approach – HRA, Coronary Sinus, HIS, Fossa Ovalis, LAA, LSPV, LIPV, RSPV, RIPV.

Required Skill Level:
scoring of 125

Case 5 – Heart Anatomy - Fluoroscopy

Task Description:
under fluoroscopic guidance, reach different anatomical targets by manipulating the EP catheter.
Targets:

♦   Femoral approach – HRA, Isthmus, AVNRT slow path, RVOT, RV apex, Fossa Ovalis, LAA ridge, LSPV, RSPV, RIPV

Required Skill Level:
scoring of 39

References

Two-Centre Evaluation of the ANGIO Mentor Electrophysiology Simulator. W. Ullah, R. Marazzi, R. Hunter, M. Dhinoja, S. Sporton, R. De Ponti, R. Schilling, Department of Cardiology, St Bartholomew's Hospital, Barts Health Trust, London, UK; Department of Clinical and Experimental Medicine University of Insubria, Varese, Italy.

http://www.heartrhythmcongress.com/archive-folder/HRC_2013_Abstracts_Shortlist.html