

*ARTHRO Mentor*

# ***Comprehensive Triangulation Curriculum***

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## **Description**

Performing arthroscopic procedures requires the surgeon to coordinate complicated hand motions ambidextrously without direct visualization.

This course is designed to gradually train the learner on maneuvering the camera and the instrument to thoroughly obtain the necessary skills. The course includes 4 assignments- each one is focused on a specific skill and in increasing levels of difficulty:

- ◆ Camera handling

Neutral environment

- Camera in right hand
- Camera in left hand

Anatomical environment

- Knee joint
- Hip joint

- ◆ Probing stationary non-directional targets

Neutral environment

- Camera in right hand
- Camera in left hand

Anatomical environment

- Knee joint
- Hip joint

- ◆ Probing stationary directional targets

Neutral environment

- Camera in right hand
- Camera in left hand

Anatomical environment

- Knee joint

- ◆ Linear probe movement

Neutral environment

- Camera in right hand
- Camera in left hand

Anatomical environment

- Hip joint

## **Objectives**

- ◆ The learner will be able to hold the camera steady.
- ◆ The learner will become experienced in moving the camera between targets with minimal movement.
- ◆ The learner will become experienced in navigating the probe while holding the camera steady.
- ◆ The learner will acquire the hand-eye coordination capabilities relevant for arthroscopic procedures.

## **Target Audience**

- ◆ Orthopedic surgery residents from PGY1 through PGY3
- ◆ Practicing orthopedic surgeons with limited experience performing arthroscopic surgery
- ◆ Beginning arthroscopists

## **Assumptions**

- ◆ The learner has little or no prior knowledge or experience with arthroscopy.
- ◆ The learner has not had prior arthroscopic motor skills practice.
- ◆ The learner has prior anatomical knowledge of the knee and hip joints and the arthroscopic portals.

## **Suggested Time Length**

Completion of the entire course should take between 2-3 hours.

## **Authors**

3D Systems - Simbionix

## Curriculum Steps and Tasks Description

The program was designed to enable trainees to obtain the required skills in a gradual and structured manner. The trainee is required to follow the curriculum steps according to the following:

To optimize training, an experienced operator should demonstrate each hands-on task according to the following instructions.

### Camera Handling for Stationary Non-directional Targets

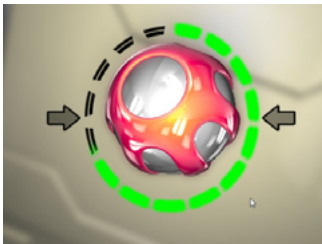


#### Task 1: Steadiness of the Camera and Arthroscope- R/L

##### Task Description

Hold the camera steady over the target until it disappears.

- ◆ Camera: 0°
- ◆ Required demonstration: 2 targets
- ◆ Task repetition: 1 time

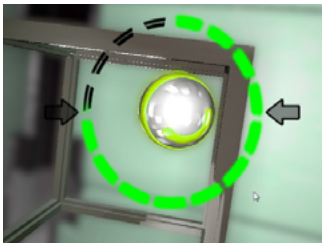


#### Task 3: Image Centering- R/L

##### Task Description

Move the camera until the circle is aligned with the target. Hold the camera steady until the target disappears.

- ◆ Camera: 0°
- ◆ Required demonstration: 2 targets
- ◆ Task repetition: 1 times

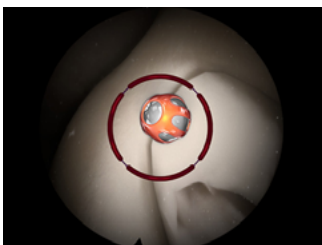


#### Task 5: Deliberate Linear Scope Motion- R/L

##### Task Description

Move the camera linearly in a two-dimensional plane until the circle is aligned with the target.

- ◆ Camera: 0°
- ◆ Required demonstration: 2 targets
- ◆ Task repetition: 1 time

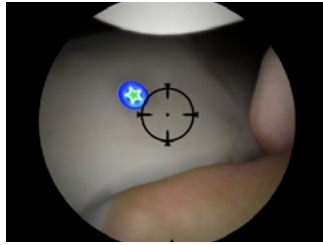


#### Visual Examination (Knee Joint)

##### Task Description

Locate the targets next to the anatomical structures by aligning the viewfinder with the targets until the viewfinder is colored in yellow and the targets disappear.

- ◆ Camera: 30°
- ◆ Required demonstration: 2 targets
- ◆ Task repetition: 2 times



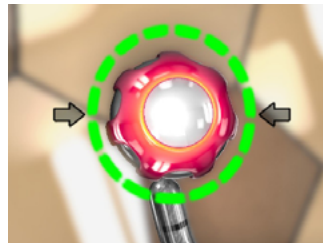
### Visual Examination (Hip Joint)

#### Task Description

Locate the targets next to the anatomical structures by aligning the viewfinder with the targets until the viewfinder is colored in yellow and the targets disappear.

- ◆ Camera: 30°
- ◆ Required demonstration: 2 targets
- ◆ Task repetition: 2 times

## Probing Stationary Non-directional Targets



### Task 8: Basic Probe Triangulation- R/L

#### Task Description

Move the camera until the circle is aligned with the target. While the camera is steady over the target, touch the target with the tip of the probe until the target disappears.

- ◆ Camera: 0°
- ◆ Required demonstration: 2 targets
- ◆ Task repetition: 2 times



### Task 9: Touch and Probe of a Stationary Target- R/L

#### Task Description

Touch the target with the tip of the probe until the target disappears.

- ◆ Camera: 0°
- ◆ Required demonstration: 2 targets
- ◆ Task repetition: 1 time

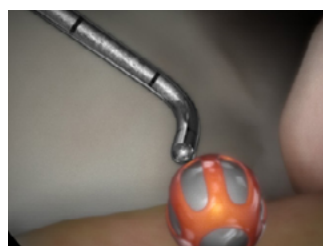


### Basic Probe Examination (Knee Joint)

#### Task Description

Probe the targets next to the anatomical structures until they spin and disappear.

- ◆ Camera: 30°
- ◆ Required demonstration: 2 targets
- ◆ Task repetition: 2 times



### Basic Probe Examination (Hip Joint)

#### Task Description

Probe the targets next to the anatomical structures until they spin and disappear.

- ◆ Camera: 70°
- ◆ Required demonstration: 2 targets
- ◆ Task repetition: 2 times



### Task 11: Measurement of Articular Dimensions with the Tip of the Probe- R/L

#### Task Description

Measure the length of the orange stripe by placing the tip of the probe along it from edge to edge and use the probe like a ruler:



- ◆ Camera: 0°
- ◆ Required demonstration: full task
- ◆ Task repetition: 3 times



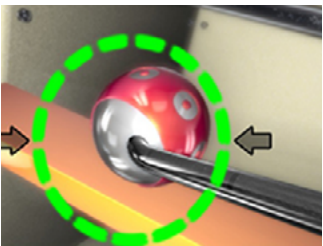
### Advanced Probe Examination (Knee Joint)

#### Task Description:

Probe the targets on the anatomical structures until they spin and disappear.

- ◆ Camera: 30°
- ◆ Required demonstration: 2 targets
- ◆ Task repetition: 2 times

## Linear Probe Movement

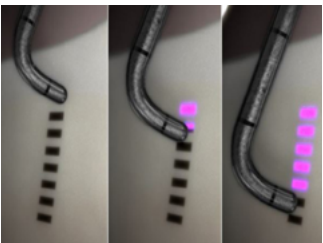


### Task 10: Simultaneous Image Tracking and Probing of a Moving Target- R/L

#### Task Description:

Move the camera until the circle is aligned with the target. While the camera is steady over the target, touch the target with the tip of the probe until the countdown starts. While the target moves, follow it with the camera and probe until it reaches the end of its path.

- ◆ Camera: 0°
- ◆ Required demonstration: full task
- ◆ Task repetition: 3 times



### Advanced Probe Examination (Hip Joint)

#### Task Description:

Probe the line targets on the anatomical structures from end to end (direction is not important), until they are colored in pink and disappear.

- ◆ Camera: 70°
- ◆ Required demonstration: 2 targets
- ◆ Task repetition: 2 times