## Appendix I Checklist

Examiner initials_____        Candidate ID_____
Sawbones            Virtual Simulator
Objective Checklist For Application Of Neutralization Plate Of The Ulna
Please check the item if the candidate has performed the task correctly.

| Application of Neutralization Plate | No (0) | Yes (1) |
|---|---|---|
| 1) Fracture anatomically reduced | ☐ | ☐ |
| 2) Template used to determine contour of plate | ☐ | ☐ |
| 3) Plate centered over fracture (onto bone) | ☐ | ☐ |
| 4) Place 2.5mm drill guide into plate hole closest to fracture line (proximal END) | ☐ | ☐ |
| 5) Place 2.5mm drill bit into drill guide (in hole) and drill first screw hole | ☐ | ☐ |
| 6) Drill did not plunge UNSAFELY for screw #1 | ☐ | ☐ |
| 7) Screw length measured with depth gauge | ☐ | ☐ |
| 8) Place 3.5mm drill guide into drilled hole | ☐ | ☐ |
| 9) Place 3.5 mm tap in 3.5 mm drill guide, and tap | ☐ | ☐ |
| 10) Appropriate 3.5 mm cortex screw inserted into first hole | ☐ | ☐ |
| 11) 2.5mm drill guide placed in other hole nearest fracture (distal END) | ☐ | ☐ |
| 12) Second screw inserted with correct steps | ☐ | ☐ |
| 13) Drill did not plunge UNSAFELY for screw #2 | ☐ | ☐ |
| 14) All the remaining screws are inserted alternating from one side to the other, utilizing proper sequence of steps and tools | ☐ | ☐ |
| 15) Drill did not plunge UNSAFELY for the remaining screws | ☐ | ☐ |
| 16) Time to completion (min:seconds) | | |

## Appendix II Global Rating Scale

Global Rating Scale – Sawbones and Virtual Ulna

| Please circle the number corresponding to the candidate's performance in each category. | | | | |
|---|---|---|---|---|
| Rating Key | | | | |
| 1 | 2 | 3 | 4 | 5 |
| Inferior | Poor | Average | Good | Excellent |
| Below minimally accepted | Minimally acceptable | Average/acceptable | Superior level of skill | Expert (Top 10%) |
| Principles of fracture fixation | | | | |
| 1 | 2 | 3 | 4 | 5 |
| Poor knowledge of principles | | Knows important concepts in this type of fracture fixation. | | Knowledge of both basic& advanced principles |
| Definitive fixation | | | | |
| 1 | 2 | 3 | 4 | 5 |
| Inappropriate fixation methods. | | Appropriate fixation methods. Stable fixation | | Achieves excellent fixation. |
| Flow of operation | | | | |
| 1 | 2 | 3 | 4 | 5 |
| Frequently stopped operating. Unsteady and hesitant of equipment. | | Demonstrated ability for forward planning with steady progression of operative procedure. Familiar with equipment. | | Well planned course of operation, effortless flow from one move to the next. Excellent knowledge of equipment. |
| Instrument handling | | | | |
| 1 | 2 | 3 | 4 | 5 |
| Repeatedly makes tentative or awkward moves with instruments | | Competent use of instruments although occasionally appeared stiff or awkward | | Fluid moves with instruments and no awkwardness |
| Time & motion | | | | |
| 1 | 2 | 3 | 4 | 5 |
| Many unnecessary moves | | Efficient time/motion but some unnecessary moves | | Economy of movement and maximum efficiency |
| Overall performance | | | | |
| 1 | 2 | 3 | 4 | 5 |
| Inferior | Poor | Average | Good | Excellent |

## Appendix III Questionnaire Completed After the Sawbones Procedure

Type surgical simulator used first: (circle) Sawbones Virtual

Using 5-point Likert scale please answer following questions:
(1 = Strongly disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree)

| Sawbones Model Environment | Strongly disagree | Disagree | Neutral | Agree | Strongly Agree |
|---|---|---|---|---|---|
| 1) The Sawbones model was responsive to the actions performed (overall) | 1 | 2 | 3 | 4 | 5 |
| 2) The tools were not problematic to use for the Sawbones model | 1 | 2 | 3 | 4 | 5 |
| 3) Visual representation of the forearm was realistic enough for the procedure | 1 | 2 | 3 | 4 | 5 |
| 4) Visual representation of the tools in the Sawbones model are important in the performance of this procedure | 1 | 2 | 3 | 4 | 5 |
| 5) The general performance using the Sawbones model was close in comparison to my general performance in the clinical settings | 1 | 2 | 3 | 4 | 5 |

Using 5-point Likert scale please answer following questions:
(1 = Strongly disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree)

| Sawbones Model Equipment | Strongly disagree | Disagree | Neutral | Agree | Strongly Agree |
|---|---|---|---|---|---|
| 6) The Sawbones model demonstrated precise movements of tools | 1 | 2 | 3 | 4 | 5 |
| 7) All tools/equipment required were accessible during the Sawbones model simulation | 1 | 2 | 3 | 4 | 5 |
| 8) Tactile force feedback was simulated accurately on the Sawbones model | 1 | 2 | 3 | 4 | 5 |
| 9) Placement of tools was properly simulated on the Sawbones model | 1 | 2 | 3 | 4 | 5 |
| 10) Drilling through bone was accurate on the Sawbones model | 1 | 2 | 3 | 4 | 5 |
| 11) Plunging (exiting second cortex) of the drill was easy to feel on the Sawbones model | 1 | 2 | 3 | 4 | 5 |

| Sawbones Model Psychological | Strongly disagree | Disagree | Neutral | Agree | Strongly Agree |
|---|---|---|---|---|---|
| 12) While performing this procedure on the Sawbones model, it felt like I was actually doing the procedure on a patient | 1 | 2 | 3 | 4 | 5 |
| 13) I felt comfortable performing the procedure | 1 | 2 | 3 | 4 | 5 |

| | Strongly disagree | Disagree | Neutral | Agree | Strongly Agree |
|---|---|---|---|---|---|
| 15) I felt like all my senses were engaged during the procedure | 1 | 2 | 3 | 4 | 5 |
| 14) The actual drilling made me feel as though I were performing a real procedure (in OR) | 1 | 2 | 3 | 4 | 5 |
| 16) The visual aspects of the environment (i.e. Sawbones, tools, table) made me feel as if I were performing the real procedure (in OR) | 1 | 2 | 3 | 4 | 5 |
| 17) The feel of the equipment made me feel as if I were actually doing the real procedure (in OR) | 1 | 2 | 3 | 4 | 5 |
| 18) The events around me made me feel as though I were actually doing the real procedure (in OR) | 1 | 2 | 3 | 4 | 5 |
| 19) My experience in the Sawbones environment (overall) seemed consistent with my real world experiences | 1 | 2 | 3 | 4 | 5 |
| Using 5-point Likert scale please answer following questions: (1 = Strongly disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree) | Strongly disagree | Disagree | Neutral | Agree | Strongly Agree |
| 20) The Sawbones model is an effective method for learning surgical fixation procedures | 1 | 2 | 3 | 4 | 5 |
| 21) The Sawbones model is effective for the introduction of basic surgical skills | 1 | 2 | 3 | 4 | 5 |
| 22) The Sawbones model is an effective method to practice previously learned techniques for my surgical training | 1 | 2 | 3 | 4 | 5 |
| 23) Sawbones model based examinations would be useful for the assessment of surgical fixation of the ulna | 1 | 2 | 3 | 4 | 5 |
| 24) The Sawbones model would be valuable for refresher skills | 1 | 2 | 3 | 4 | 5 |
| 25) People were available to answer my questions when needed during the procedure | 1 | 2 | 3 | 4 | 5 |
| 26) The Sawbones model (overall) provided a challenging surgical experience | 1 | 2 | 3 | 4 | 5 |
| 27) Further development of the Sawbones model is needed prior to formal evaluation tool | 1 | 2 | 3 | 4 | 5 |
| 28) Prior Sawbones course/experience is needed prior to examination using the Sawbones model | 1 | 2 | 3 | 4 | 5 |
| 29) I would likely use a Sawbones model in my spare time for practicing procedures, if it were readily available | 1 | 2 | 3 | 4 | 5 |
| 30) I would be more likely to use a Sawbones model in my spare time than the virtual reality model for practicing procedures, if both were readily available (answer only if second procedure completed) | 1 | 2 | 3 | 4 | 5 |
| 31) Fracture fixation using the Sawbones model was a valuable experience | 1 | 2 | 3 | 4 | 5 |
| 32) This Sawbones model should be included in residency training program | 1 | 2 | 3 | 4 | 5 |
| 33) A surgical skills laboratory would be valuable to my surgical training | 1 | 2 | 3 | 4 | 5 |

Short answers: (write on back if more space is needed)
1) What were the strengths and weakness of the Sawbones Surgical Simulator?
Advantages:

i.

_____

_____

ii.

_____

_____

iii.

_____

_____

Disadvantages:

i.

_____

_____

ii.

_____

_____

iii.

_____

_____

2) What were your frustrations with the Sawbones Simulator?

a.

_____

_____

b.

_____

_____

c.

_____

_____

3) What would you change on the Sawbones simulator?

a.

_____

_____

b.

_____

_____

c.

_____

_____

4) What do you see as being the benefits of using a Sawbones simulator:

a.

_____

_____

b. _____

5) Other Comments ? (please write on back if need more room)

_____
_____
_____
_____
_____
_____

_____

Thank you