**Structured Assessment Checklist for Robotic Scalpel Competency in Hand Surgery**

| **Competency Area** | **Task/Criteria** | **Assessment Criteria** | **Rating (1–5)** | **Comments/Feedback** |
| --- | --- | --- | --- | --- |
| **1. Surgical Knowledge & Expertise** |  |  |  |  |
| **1.1. Hand Anatomy** | Demonstrates thorough understanding of hand anatomy and pathology | Identifies relevant anatomy and conditions in patient cases |  |  |
| **1.2. Clinical Indications** | Appropriately selects cases for robotic-assisted surgery | Assesses when robotic surgery is indicated vs. traditional |  |  |
| **1.3. Preoperative Planning** | Develops an effective preoperative plan, including risk assessment | Utilizes imaging and patient data for surgical planning |  |  |
| **2. Technical Proficiency with Robotic System** |  |  |  |  |
| **2.1. Console Operation** | Navigates robotic console accurately and efficiently | Mastery of controls, ergonomic handling, and system setup |  |  |
| **2.2. Instrument Handling** | Demonstrates proper handling of robotic tools | Safely loads, unloads, and changes instruments during surgery |  |  |
| **2.3. Tissue Dissection** | Performs precise dissection and manipulation of tissues | Achieves accurate dissection without unnecessary trauma |  |  |
| **2.4. Suturing & Repair** | Completes fine motor tasks such as suturing | Efficiently performs suturing and tendon repairs using robotics |  |  |
| **2.5. Haptic Feedback** | Correctly interprets visual and haptic feedback | Adjusts actions based on system feedback |  |  |
| **2.6. Emergency Protocols** | Responds effectively to system malfunctions or complications | Demonstrates proper use of emergency stop and manual override |  |  |
| **3. Simulation Training & Assessment** |  |  |  |  |
| **3.1. Completion of Training** | Successfully completes required simulation sessions | Demonstrates competency in simulated cases |  |  |
| **3.2. Scenario-Based Assessment** | Completes simulation-based tasks such as tendon repair and carpal tunnel release | Scores passing mark in structured assessments |  |  |
| **3.3. Error Management** | Recognizes and corrects errors during surgery or simulation | Manages intraoperative errors, maintains patient safety |  |  |
| **4. Case-Based Surgical Experience** |  |  |  |  |
| **4.1. Supervised Surgeries** | Performs required number of surgeries under supervision | Demonstrates proficiency during supervised surgeries |  |  |
| **4.2. Independent Cases** | Performs surgeries independently after supervision | Logs required number of independent robotic surgeries |  |  |
| **5. Non-Technical Skills** |  |  |  |  |
| **5.1. Decision-Making** | Makes sound intraoperative decisions based on patient factors | Appropriately adjusts surgical plan based on complications |  |  |
| **5.2. Risk Management** | Identifies and mitigates risks during surgery | Recognizes patient and system risks, takes preventive measures |  |  |
| **5.3. Team Communication** | Provides clear and concise instructions to surgical team | Leads team efficiently, communicates effectively |  |  |
| **5.4. Patient Communication** | Explains the robotic procedure and risks to patients | Provides clear, informed consent discussions |  |  |
| **6. Continuing Professional Development (CPD)** |  |  |  |  |
| **6.1. Continuing Education** | Participates in robotic surgery updates and workshops | Attends and completes required CPD courses and training |  |  |
| **6.2. Regular Assessments** | Completes regular skill assessments on simulators or in surgeries | Demonstrates continued proficiency through periodic assessments |  |  |
| **7. Ethical and Professional Considerations** |  |  |  |  |
| **7.1. Ethical Decision-Making** | Adheres to ethical principles during robotic surgery | Ensures patient safety and well-being are prioritized |  |  |
| **7.2. Compliance** | Complies with regulatory guidelines and hospital protocols | Follows all necessary institutional and legal guidelines |  |  |
| **8. Overall Performance** | Achieves satisfactory overall performance in both technical and non-technical skills | Scores passing mark across all competency areas |  |  |

**Scoring Criteria:**

1 = Poor (Needs Significant Improvement) 2 = Below Expectations (Needs Improvement) 3 = Competent (Meets Basic Requirements) 4 = Above Expectations (Proficient) 5 = Excellent (Expert Level Performance)

**Instructions for Use:**

* **Evaluator Role**: Trained evaluators (senior surgeons, robotics trainers) will observe the surgeon’s performance during simulation training, live surgeries, and patient interactions.
* **Completion of Checklist**: Each competency area should be assessed based on real-life or simulated experiences. Ratings and comments should be provided to ensure constructive feedback.
* **Passing Criteria**: Surgeons should achieve a minimum average score (e.g., 3 or above) across all competencies to be approved for independent robotic surgeries.