

Here are some simple practical exercises to develop and master two-hand, eye-monitor coordination for two-handed endoscopic ENT surgery:

ETHENTS Training: www.ETHENTS.in

1. Eye-Hand Coordination Exercises

Objective: Improve synchronization between hand movements and monitor visualization.

Exercise 1: Coin Stack Challenge

- Use two forceps to stack small coins while looking at a monitor.
- Gradually reduce coin size to increase difficulty.

Exercise 2: Threading the Needle

- Hold a suture needle with forceps and pass a thread through it under endoscopic view.
- Repeat with both dominant and non-dominant hands.

Exercise 3: Mirror Drawing Exercise

- Draw simple shapes (square, circle, triangle) using forceps while watching a mirror or monitor.

- Progress to complex patterns and letters.

2. Hand Independence & Dexterity Training

Objective: Train both hands to work independently yet in sync.

Exercise 4: Bead Transfer with Two Hands

- Use two forceps to pick and place small beads into a grid.
- Start with different colors and place them in a sequence.

Exercise 5: Paper Cutting with Forceps

- Hold a small piece of paper with one forceps and cut it with scissors held in the other forceps.
- Try cutting different patterns to improve precision.

Exercise 6: Ambidextrous Instrument Handling

- Switch forceps between hands and repeat the same task.
- Example: Lift and place small objects using the non-dominant hand.

3. Depth Perception & Spatial Orientation Drills

Objective: Adapt to working in a 2D endoscopic field with precise depth judgment.

Exercise 7: Rubber Band Stretching

- Hook a rubber band onto two forceps and stretch it evenly without breaking it.
- Try placing the band over pegs using endoscopic vision.

Exercise 8: Building with Small Blocks

- Pick and place small toy blocks to form a stable structure.
- Avoid dropping them while maintaining good depth perception.

Exercise 9: Endoscope Target Tracking

- Move a marked target on a board using forceps while maintaining it in the center of the endoscope view.

4. Instrument Coordination & Precision Training

Objective: Master controlled and stable movements with both hands.

Exercise 10: Suction & Dissection Simulation

- Hold a sponge with one forceps and gently scrape the surface using a blunt dissector in the other hand.
- Progress to finer surfaces requiring controlled movements.

Exercise 11: Knot Tying with Two Instruments

- Practice tying surgical knots using two forceps.
- Start with simple square knots and progress to surgeon's knots.

Exercise 12: Controlled Water Drop Transfer

- Use forceps to pick up a small water drop on a sponge and transfer it without losing shape.
- Helps improve fine motor control.

5. Advanced Cadaveric & Simulated Model Training

- Perform Goat Head Dissections using two-handed techniques.
- Introduce EndoHold system to stabilize the endoscope while practicing instrument handling.

- Work on synthetic ENT models for structured dissection drills.

Daily Practice Plan:

- Day 1-7: Eye-hand coordination & dexterity (exercises 1-6).
- Day 8-14: Depth perception & precision training (exercises 7-12).
- Day 15-21: Simulated model training & endoscopic cadaver dissection.
- Week 4+: OT observership & real-case coordination application.

Here are some additional exercises to further refine two-hand, eye-monitor coordination for two-handed endoscopic ENT surgery:

6. Fine Motor Control & Stability Training

Objective: Reduce hand tremors and improve controlled, precise movements.

Exercise 13: Rice Grain Pick & Place

- Use two forceps to pick individual grains of rice and place them in a pattern (e.g., initials, geometric shapes).
- Increases precision and control over delicate structures.

Exercise 14: Cotton Thread Dissection

- Place a cotton thread over a firm surface and use forceps to separate individual fibers.
- Enhances delicate tissue handling skills.

Exercise 15: Steady Hand Line Tracing

- Draw a straight line on paper and trace it using a fine-tip instrument while looking at the monitor.
- Reduces unnecessary hand movements.

7. Non-Dominant Hand Strength & Independence

Objective: Train the non-dominant hand to function equally with the dominant hand.

Exercise 16: Rubber Band Resistance Training

- Place a rubber band around both forceps and stretch it apart using the non-dominant hand.

- Strengthens grip and improves controlled force application.

Exercise 17: One-Handed Object Manipulation

- Use only the non-dominant hand to pick and move small objects with forceps.
- Increases comfort and confidence in using both hands.

Exercise 18: Non-Dominant Hand Writing

- Hold a pen in the non-dominant hand and practice writing letters while looking at a monitor.
- Improves brain-hand coordination.

8. Multi-Tasking Coordination Exercises

Objective: Train hands to perform independent but synchronized tasks.

Exercise 19: Alternating Hand Tasks

- Use one hand to hold an object steady while the other hand performs a precise action (e.g., lifting a small item).
- Mimics suction-dissection coordination.

Exercise 20: Metronome Timed Movements

- Set a metronome at a slow tempo and perform alternating hand movements (pick and place) in rhythm.
- Enhances controlled, structured movements.

Exercise 21: Two-Handed Instrument Switch

- Pick an object with one hand, transfer it mid-air to the other hand, and place it down.
- Improves smooth instrument exchange during surgery.

9. Depth Perception & Endoscopic Maneuvering

Objective: Improve visualization and instrument control in a 2D endoscopic field.

Exercise 22: Thread Passing Through Tubes

- Pass a thin thread through a series of small tubes of varying diameters using forceps.
- Sharpens precision under endoscopic vision.

Exercise 23: Multi-Layer Paper Lift

- Place several thin sheets of paper stacked together.
- Use forceps to lift only one layer at a time under the endoscope.

Exercise 24: Glass Bead Sorting

- Use two forceps to sort glass beads of different colors into separate trays.
- Enhances tactile feedback and precision.

10. Endoscopic Suturing & Knot-Tying Challenges

Objective: Master advanced control over forceps for intraoperative suturing.

Exercise 25: Loop & Pull Suture Practice

- Create a small loop with a suture and use both hands to pass the needle through while maintaining tension.
- Helps in fine control of suture manipulation.

Exercise 26: Simulated Wound Closure

- Place small cuts on a synthetic model and practice closing them with endoscopic suturing.
- Develops confidence in intraoperative knot tying.

Exercise 27: Continuous Running Suture

- Perform a continuous suture under an endoscopic view without twisting or missing a loop.
- Strengthens steady hand coordination.

Training Progression Plan

- Week 1-2: Fine motor & depth perception (Exercises 13-18).
- Week 3-4: Multi-tasking & coordination (Exercises 19-24).
- Week 5+: Advanced suturing & knot-tying (Exercises 25-27).

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