Introduction to Systematic Approach and Mental Training

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Mental training is defined as the cognitive rehearsal of a task in the absence of overt physical movement, in which the systematic use of mental imagery is used to rehearse an action or skill symbolically without any physical movement [1]. This technique results in an activation of similar neural pathways to those used in the actual physical activity [2, 3].

Using functional magnetic resonance imaging, Roth et al. [4] measured the signals of the subject during actual and mental execution of finger-to-thumb opposition. The motor imagery group showed bilateral activation of the premotor cortex and rostral part of the posterior SMA, supporting the hypothesis that motor imagery involves virtually all stages of motor control.

Mental training has been shown successful in enhancing psychomotor performance in areas such as sports and music [4]. Weinberg et al. reported that mental training imagery is a skill that can be taught, learned, and improved with training [5].

Literature supports that mental practice not only enhances end performance, but also in some circumstances, it could be more effective than physical practice [1]. Although physical practice is indeed imperative in order to acquire physical skills, mental practice can considerably enhance physical proficiency [6].

Eberspächer et al. [7] describe four types of mental training:

1. External observative training: the trainee observes a model while performing the movement to be learned.
2. Subvocal training: the trainee calls up a clear visual image of the movement through external or internal self-talk.
3. Internal observative training: the trainee visualizes himself or another person from the outer perspective performing the movement he or she wants to practice.
4. Ideomotoric training: the trainee visualizes himself executing the movement and at the same time tries to feel and perceive as many sensory aspects of the process and environment as possible.

Also, there are known sensory modalities that enrich the subject's imagery experience, which enhance the task performance by facilitating a more accurate mental representation of the surgical skill to be developed; these prompts are visual (seeing oneself performing the procedure), cognitive (thoughts needed to perform the task), and kinesthetic cues (feeling of executing an action) [8].

This book contains the nodal points for the most common procedures performed by a general surgery resident. These will help as a guide to learn the surgical steps of a procedure or surgery, but most importantly this systematic approach in conjunction to mental rehearsal and with current literature that supports these techniques will facilitate residents the development of psychomotor skills. We propose the following steps:

1. Familiarize the anatomy and topic.
2. Memorize the operation or procedure primer.
3. During the resident's free time, they should mentally rehearse the procedure primers using subvocal training and ideomotoric training.
4. If possible both the day before and prior the procedure, residents should rehearse the primer.

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