Lecture 4 Reflection – Motor Learning

My research goal is to develop instruments to facilitate transcanal endoscopic ear surgery (TEES) which is a minimally invasive technique that feeds an endoscope and instrument through the ear canal to perform ear surgery. This reflection relates the topic of motor learning to the process of acquiring a set of fine motor skills required to perform TEES.

I have watched my supervisor, an ear surgeon, perform a few TEES cases. He has been performing TEES for the past 11 years. We learned that engaging in a skill enhances motor learning and control. My supervisor has quite advanced fine motor control while performing TEES, and I think he has motor memory because it is very easy for him to do many tasks. This can especially be observed when I am watching a resident-in-training performing TEES as they have not enhanced their skill yet and do not have the same motor control and memory. As well, I tried to insert the endoscope in a cadaver once and it took me a while to get the endoscope inside the ear canal and pointed in the right direction – I was trying to “acquire” that skill; it takes my supervisor (and the residents whom have practiced for a few months) less than a second to get the endoscope inside the ear canal pointed in the right direction, safely. The same can be said when residents are learning to trim the ear hairs or inject anaesthesia – the surgeon makes it look easy as he has developed the motor memory and the residents take much longer and ask more questions as they are still in the skill acquisition/training phase. Some residents who have been practicing for a few months are quicker in performing these tasks. It would be interesting to measure the ‘offline improvement’ of the skill level. Based on the lecture, I would conclude that their skill level does enhance after ‘sleeping on it’ because they are able to easily insert the endoscope inside the ear canal safely and effectively.

It would also be interesting to see what skills are “transferable”. Say, for example, if the resident has learned and practiced how to trim the hairs, then perhaps the first time the resident tries placing an ear drum graft by the ear drum, the skill of moving the graft would be easier to learn.

During an introductory TEES surgical skills course, where many ENT surgeons tried TEES for the first time, they were given a cadaver, endoscope and instruments. After a day of learning by seeing, they were allowed to try out TEES. I could see them “exploring” the technique, trying to find the right motor movements and then once they got the hang of a few maneuvers they exploited them and practiced a lot.

Lastly, my supervisor learned this technique by himself after attending a few surgical skills courses. He did not have a mentor/teacher as this technique is pretty new. While learning this skill was not receiving feedback from a teacher, rather his feedback was whether he succeeded or failed to perform a maneuver. This internal feedback was what helped him gain the motor control required. While observing surgeries, I see him teaching his residents where he provides constant supervision and feedback which is positive or negative depending on how they are doing.

Thus, motor learning concepts can be used to understand how my supervisor learned and teaches TEES.