Lecture 4 Reflection – Motor Learning

This reflection is going to try and relate motor learning to acquiring the fine motor skills required to perform transcanal endoscopic ear surgery (TEES) which is the type of surgery that I am designing new tools for.

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 enhance motor learning and motor control. This can be seen when comparing my supervisor’s skill vs. a new resident’s skill in TEES. Since my supervisor has been enhancing his skill for a decade longer than the new residents, he has quite advanced motor control while performing the technique, and I think he has motor memory because it is very easy for him to do many tasks. For example I tried to insert the endoscope in a cadaver once and it took me a while to even get the endoscope inside the ear canal and pointed in the right direction – I was trying to acquire that skill, whereas it takes him not even one second to get the endoscope inside the ear canal pointed in the right direction, safely. 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’.

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, maybe the first time the resident has tries placing an ear drum graft, their skill of moving the graft down the ear canal would be easier to learn.

Learned feeding then were able to sort -> learning is not specific

Movement variability: explore then exploit -> need to explore the space and then when you find the right movements, you can use those -> when learning TEES this is likely what happened – the surgeon tried many maneuvers to move a piece of tissue (for example) to find the right way to position it and once that method was found, they use it a lot

The surgeon while learning this skill was not receiving feedback as he was just learning it/teaching himself -> feedback was when he succeeded/failed to perform a maneuver (internal feedback)

* When I see him teaching his residents then he gives constant supervision and is giving the resident feedback – positive or negative depending on how they are doing