

**Advanced Neural Science for Engineers**  
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**Lecture Number - 48**  
**Neurosurgery-based MEA Implantation – III**

Hi welcome to this video number 3 and we are looking at the module where we are looking at the rat's brain surgery and how we can use MEA which is microelectrode array implanting on the rat's brain. So, in this video we will be looking at several things. The first thing is sealing of the craniotomy defect. Once you do the craniotomy how you will seal it back. So, we will show it to you.

How that entire acrylic is used to fix after placing back the skull bone at the craniotomy defect. So, once the skull bone is taken out, when it is place back how we can use dental cement to seal that particular defect with the bone that was taken out during the craniotomy which is surgically removed and then how much time it takes to solidify that particular cement and followed by how we can get the signals out.

So, all these things are very important from the surgery point of view and once you understand this third video you will have kind of idea of how to perform surgery and you cannot do surgery you can just understand how the surgery is done and until we do lot of practice it is not so easy. Well, at least you will now know that if you have learn how to fabricate devices.

You have learn this fabrication devices you learn the previous thing. If you know understand whatever we are or wherever we are from where we started we started something called substrate, when we look at the PVD, we look at the CVD, we look at the lithography, we look at the wet etching, dry etching and then we move to micro fabrication in which we look at the micro machining.

Whereas the bulk machining or surface micro machining then we look at the different diagram, different sensors, then fabricated few sensors. Flexible device with 32, flexible device with 10, the needle with single set needle with 11 channels, there are 3 set needles, 5 set needles, 5 set needles and many more then we move to EEG, we understood how the EEG can be used.

We further find to understand the epilepsy from the EEG patients then we move next one about how the MEA can be done for epilepsy, for understanding the efficacy of the AEDs then we moved up and we came here to understand now if you talk about this since I have little bit understanding about how to fabricate device, how the signals will look like, how can I use this understanding and implant the device into the rat's brain.

And when you want to implant the device in rat's brain what are the surgical procedures. So, that is the reason of how we started, where we are moving and one more lecture after this or two more lectures after this will finish up your entire course. So, let us focus on the video number 3 and like I said video number 3 would have a very interesting stuff for you to see because how to place the board back, how to use the dental cement, how to take out the data.

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### Rat with Implanted MEA



So, you have seen this schematic if you remember we can use this head cap and this is the dental cement you can see the dental cement right over here. The head cap is placed such that it will not move, this is not moving like it will not be just moved because the rat is moving it will not vibrate that is what I am saying. So, any noise we can avoid because of the movement of the rat.

And this wire set are coming out are all connected to your MEA which is implanted on the rat's brain these wires are connected to your signal acquisition module. In this case we are using inovio, but you can use the existing signal acquisition modules as well then from there

we will get a raw data, we can do the pre processing and then we can understand what are the signals after reviewing the noise.

So, with this we will finish the video number 3 and then we have one more video which will be on a little bit different aspect more like how we can implant the wires. That is a last video; video number 4 let us stop here you look at the video and then we will continue with video number 4 as a part of the next module say sub module you can say. So, it is not overwhelming for you. So, I will see you in the next class with the video number 4 and that will be the last video about how to perform surgery in rat's brain till then you take care, bye for now.