3:20 call connected

Go over chief design and see if there are any concerns that Chris has, then go over questions for Chris

Passed conversation Dave who will go over what we’ve done, where we’re going

Did he get photo about current design attached to email? Yes

Tony suggested modification, but Dave explain first design and then where we’re going with that

Does the photo that Dave sent to Chris of the current design look like it will work with what Chris expected?

* Chris a bit unclear on rotation degrees of freedom, Dave explained the links and their function in the device’s movement capabilities
* Also explained the importance of the tool mount (can move tool around without changing the position of the ‘end effecter’, the contact point of the tool to the bone)
* Chris would like to see a labelled photo/diagram, and perhaps an updated report
* (Chris) what types of shapes are we hoping to machine out of the bone with this design?
  + Tony led us to believe that we are going for a more uni-compartmental implant, so something between a flat surface and a hemisphere, perhaps like a 3D ellipse
* (Chris) Can we machine flat surfaces with the device?
  + Nic explained that we’ve made a couple physical prototypes to demonstrate that we can machine flat surface
* Chris is only seeing the two-degrees of freedom, having trouble visualizing where the 3rd degree comes from
* How do we know where the tool tip is in space?
  + Explanation of the angular encoders

Davy asked what kind of control system he prefers we implement, a PC connected, or stand-alone?

* (Chris) using a PC or stand-alone shouldn’t make much of a difference, but a PC might be useful to show the shape. If you want to use a PC, that would be fine
* Something about microcontroller vs laptop/pc
* If we can show that there are advantages to going with a microprocessor then that will be sufficient

What types of motors are we using?

* Electronic brushless DC motor, same as last year
* Based on our calculations, the one from last year is sufficient
* Explained the concept of the weightlessness and gravity comp, and thus that we have two motors instead of 1 (gave Chris the brand names of the motors)

Explaining gravity compensation and helping Chris visualize it by explaining how it works based on the photos (ie which links allow for what kind of motion, etc, to permit or not permit certain motions)

* (Chris) what about the friction etc in the links? Will that provide some sort of gravity compensation that will be enough?
* We decided to implement gravity comp because one of the major issues with last year’s device is it’s lack of this characteristic, so while friction might provide some compensation, it likely (based on our analysis of last year’s device) will not be sufficient
* Explaining the motors (from photo) and which one is for which purpose

The information that we’ve previously sent to Chris wasn’t clear in how our device works, which should be worked on for reports perhaps. After further explanation, he understands the gist of what’s going on with gravity comp etc, and the degrees of freedom permitted by each joints.

Have we considered sterilization? Parts that are going to be dirty?

* Parts of device are going to be cleaned but not necessarily sterilized. Explaining what kinds of material we can use for this purpose
* Sterilization is not a major focus point yet, we’re trying just to get to cadaver testing at this point

Asked about our use of the Praxiteles bone mount?

* Can we have a model or the dimensions of it?
  + He can send us 2D drawings of the model, and we’d have to remodel from that

How precise is the pinning of the bone mount to the femur (so that we can determine the machining envelope)? If there’s large variation, we need a bigger machining envelope

* Try to put it in the same spot every time, but in reality there is some variation. Probably varies on the order of at least 1cm in each direction from the target location

Is there anywhere that we can find the target location

Question about positioning: is this meant to be mounted only on one side of the bone at all times, or is it from both sides? Does the device need to reach across the entire width of the femur?

* Chris says: Interesting point!
* Some surgeons might be doing a medial and lateral at the same time, so this is a relevant question. So best case what we need to design for is that the device can do any of those operations at any given position
  + This isn’t a big issue, it just might affect the weight

Specific implant companies that we should design for? Or just like it to be able to take any implants?

* Just do general shapes, parametric spherical surface, etc. that should be fine

Does he have a general ballpark for us for general sizes of the femur (woman we saw seemed larger than average).

* Look back at Nikolai’s work because he has information on that
* Also some papers that talk about the general morphology of the knee, how wide it is, how big chondials are, etc, so do some literature searching on that and it should be okay.

Chris wants to know what our timeline is on this? Do we have a Gantt chart?

* We have a google calendar that we need to send to him. General timeline we want to have our first prototype finished by the end of February

All in all, he thinks our design is interesting. Perhaps our design is a little bit bulky with the linear slider, but keep in touch.