Milestone 2 (Team) – Cover Page

Team Number: 26

Please list full names and MacID's of all *present* Team Members

Full Name:	MacID:
Eloise Nguyen	Nguyt126
Rory Sucharov-Gluck	sucharor
Sohail Persaud	persas29
Hassan Bokhari	Bokharh

Any student that is ***not*** present for Design Studio will not be given credit for completion of the worksheet and may be subject to a 10% deduction to their DP-2 grade.

MILESTONE 2 (STAGE 2) – DESIGN FEEDBACK

Team Number: 26

Document design revisions in the fields below for each team member's proposed concept solutions:

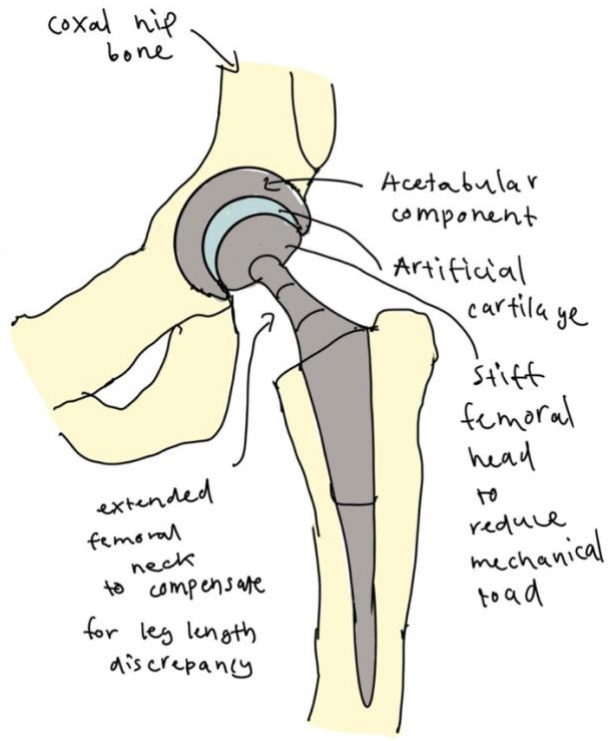
→ You can communicate your design revisions either by annotating directly on your team member's sketch or listing bullet-point descriptors

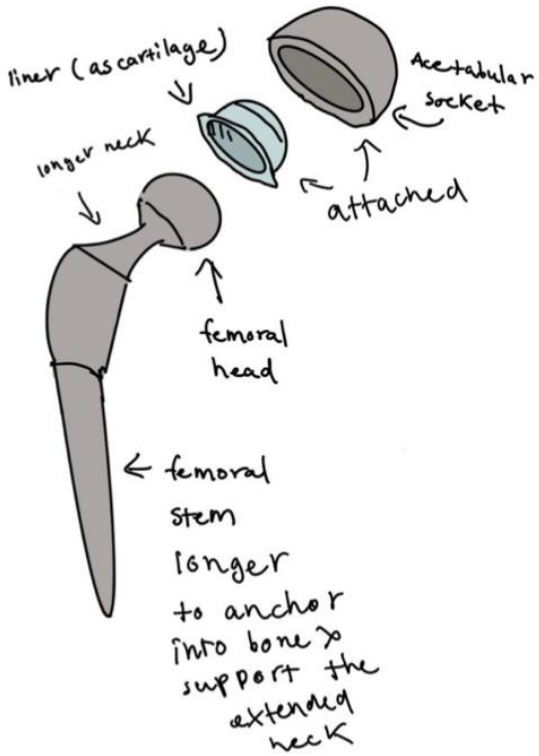
- If annotating directly on a sketch, save your file as a JPEG
- Insert your photo as a Picture (Insert > Picture > This Device)
- **Do not include feedback for more than one team member per page**
  - For each additional team member, copy and paste the table below

Design Feedback Entry

Your Name:	Eloise Nguyen	**Colleague's Name:**	ALL
Your MacID:	Nguyt126	**Colleague's MacID:**	ALL

Design Feedback:





Constraints:

- Left leg 1cm shorter than right
- Flattened acetabulum
- Biocompatible, safe for surgical implantation

Ideas:

- Liners can be grown from partients cartilage to mimic its function. Can secretes lubrication to reduce friction and wear. Improve mobility.

Feedback- Rory:

- Considers biocompatibility and materials- very important
- Introduces method of implantation
- Accounts for the shortened leg
- Should also explain how the socket will be modified to accommodate the new joint

Feedback- Sohail:

- Well thought out with lots of details and colour differences to show 3D modelling
- Takes into consideration the different leg heights and shape of existing bones considering the LCPD
- **Revision:** cartilage can be more of a cement fixation/glue instead to integrate into natural bone structure

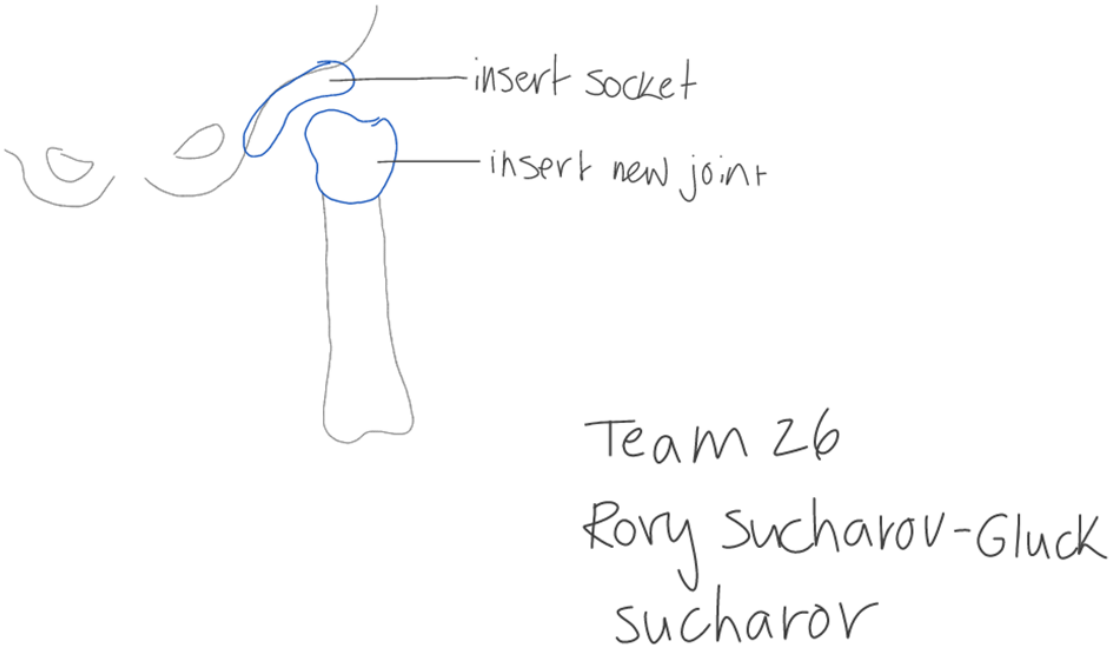
Feedback- Hassan:

- Very well detailed and love the color.
- The various things taken into consideration such as leg uneven and shape
- **Revision:** Possibly make it less thin at the end near the bearing as it could be a possible weak point for the device to fracture.

Design Feedback Entry

Your Name:	Rory Sucharov-Gluck	**Colleague's Name:**	ALL
Your MacID:	sucharor	**Colleague's MacID:**	ALL

Design Feedback:



Feedback- Eloise:

- The insertion of a new (artificial) socket is very innovative. We would need to consider how that will change the proportion and symmetry of the hip bone as it's adding thickness onto the flattened socket.
- The new joint is a good idea, however, further elaboration on how it would be attached to the leg bone.
- **Revision:** adding attachment to the new joint and bone to anchor it. It can be cement or a femoral stem.

Feedback- Sohail:

- Added material to socket is a potentially good idea to use for design solution
- Different colours make the key parts of design clear
- **Revision:** add a layer in between that acts as a cartilage to connect the head and socket

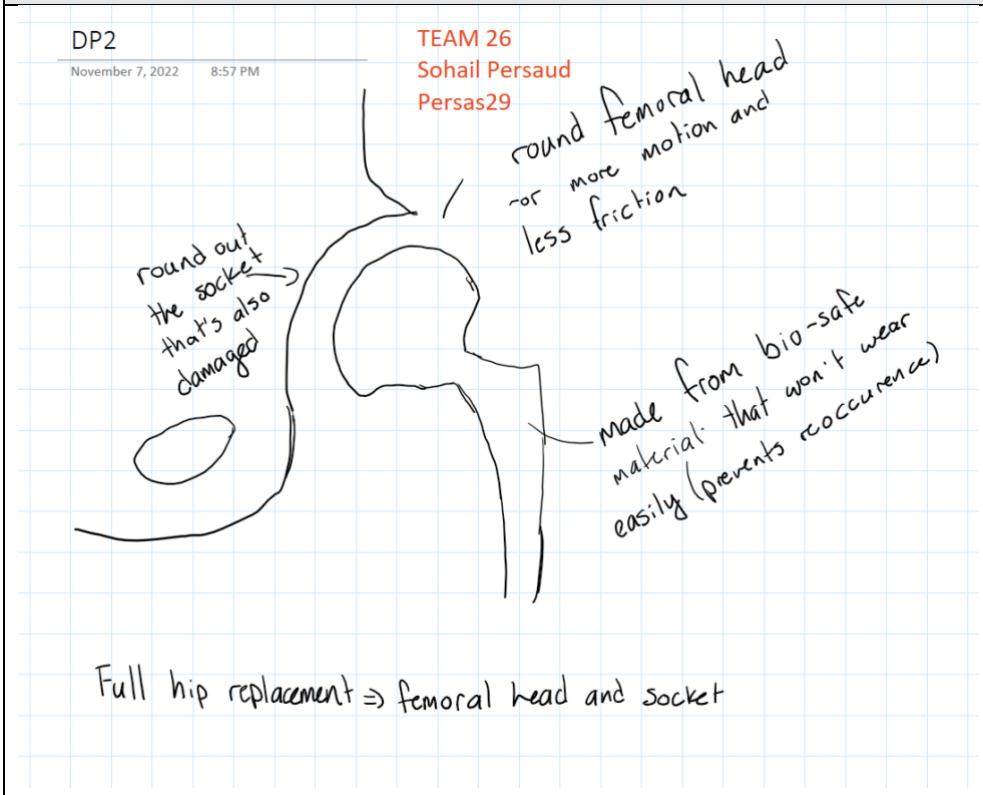
Feedback- Hassan:

- Shows an idea of like a joint where it is more compact and less extended
- **Revision:** Including a more specific and tighter method to anchor the socket and head to prevent it from sliding and stay in socket.

Design Feedback Entry

Your Name:	Sohail Persaud	**Colleague's Name:**	ALL
Your MacID:	persas29	**Colleague's MacID:**	ALL

Design Feedback:



Feedback-Eloise:

- A safe solution that ensures 100% compatibility since you're not introducing new materials. It might take some time to shave down the bone which can extend the surgery time.
- **Revision:** consider some sort of cushion between the hip socket and the femoral head such as a plastic liner.

Feedback-Hassan:

- Good consideration of materials
- Interesting to consider how procedure towards how it would be installed with the rounded bone
- **Revision:** Consider a more prominent socket within the hip as it doesn't seem like enough to really anchor the point

Feedback-Rory:

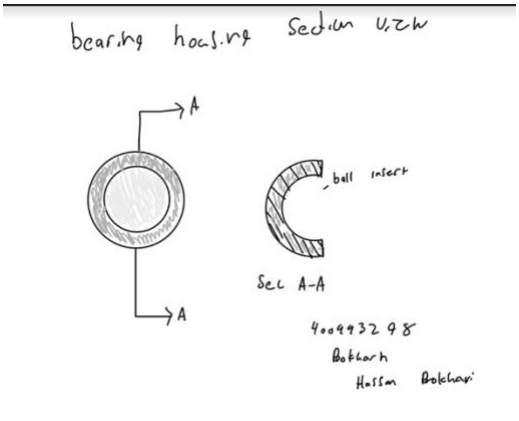
- Takes great care in considering effects of motion (e.g. frictional forces)
- Considers materials

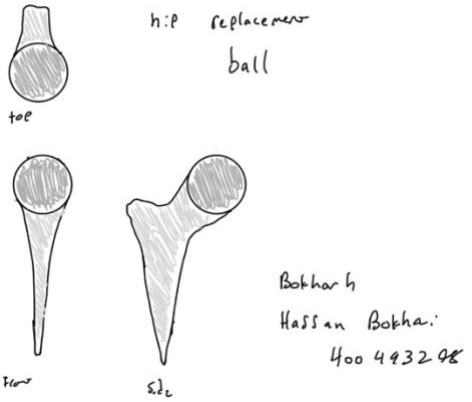
- Solid plan to round out socket- need to figure out how
- **Revision:** How will the new joint attach to the femur? Perhaps including nails/glue to anchor the new joint

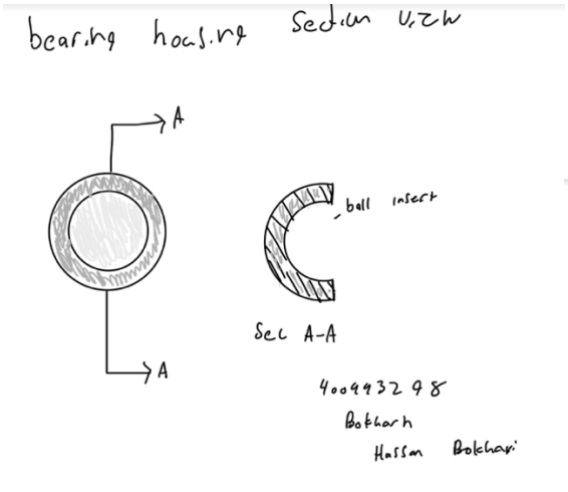
Design Feedback Entry

Your Name:	Hassan Bokhari	**Colleague's Name:**	All
Your MacID:	Bokharh	**Colleague's MacID:**	ALL

Design Feedback:







Feedback-Rory:

- Considers both pieces of the replacement

Feedback-Sohail:

- Bearing is an interesting idea that would allow for rotational motion
- While a good idea, considering integration with new materials would be important
- **Revision:** consider a biosafe material that the femoral head will be made out of (maybe titanium with some sort of coating)

Feedback-Eloise:

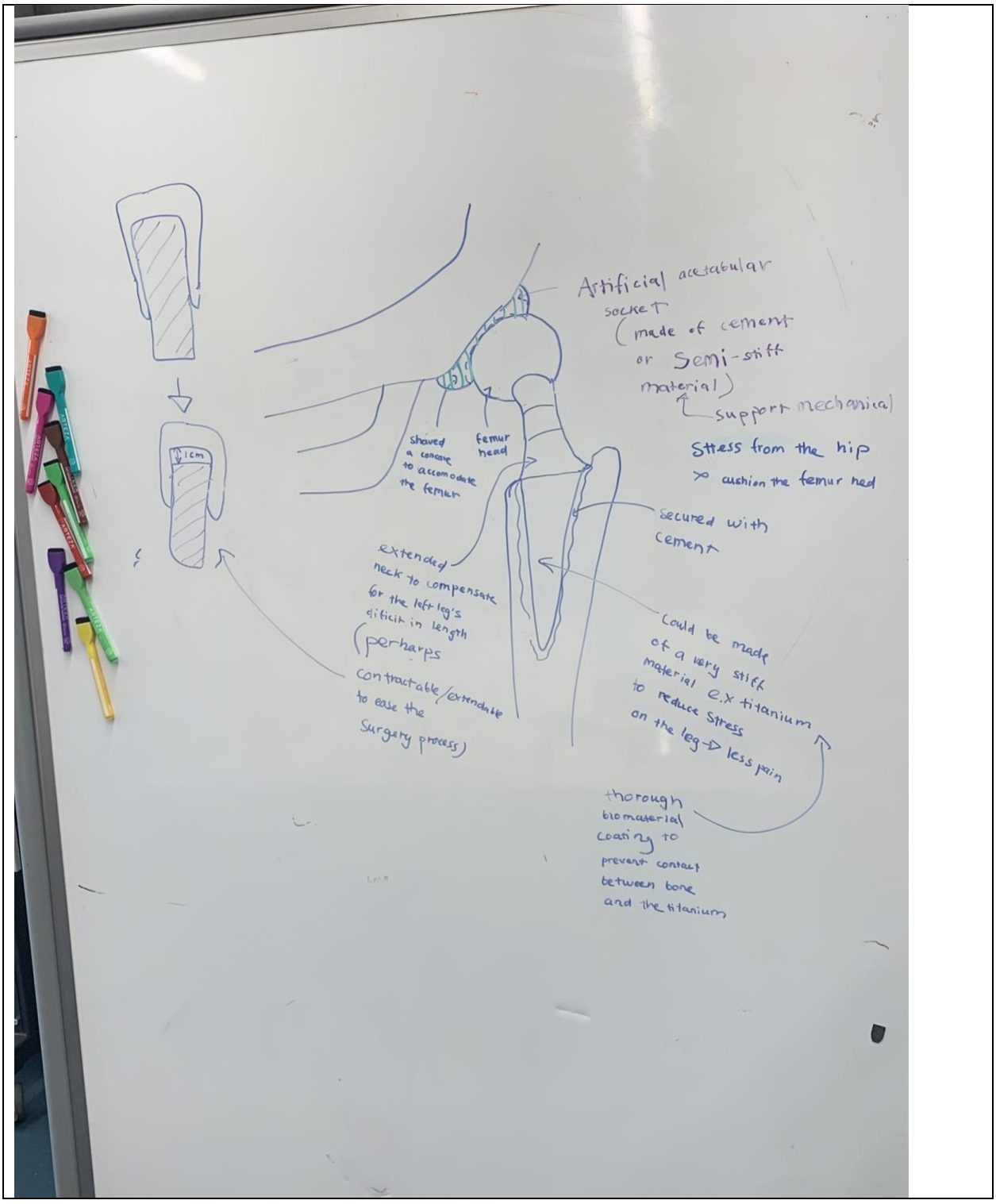
- Bearing is a really good idea. Try considering how there can be cushion to the artificial femur head and the bearing socket.
- **Revision:** add in a plastic liner between the femur head and the bearing.

MILESTONE 2 (STAGE 3) – REFINED CONCEPT SKETCH

Team Number: 26

1. Complete your refined sketch on a separate sheet of paper
2. Take a photo of your sketch
3. Insert your photo as a Picture (Insert > Picture > This Device)
4. **Do not include more than one sketch per page**

*Insert photos / screenshot(s) of your **refined concept sketch*** below



*For multiple photos / screenshots, please copy and paste the above on a new page

MILESTONE 2 (STAGE 4) – GROUP DISCUSSION

Team Number: 26

Discuss the advantages and disadvantages of your refined concept solution

Advantages	**Disadvantages**
• Allows the socket and joint to fit in place • Joint will be able to rotate in the socket while limiting pain • Compared to anchoring, cement fixation has increased longevity and reduced risk of creating new problems • Allow adjustment with the length of the device post-surgery	• Cementing the socket may not be extremely long-lasting • Joint can still erode socket • May require shaving the bone to insert the socket • Cement is susceptible to fractures, which can affect the actual bone of the patient

Discuss the extent to which your refined concept solution addresses the need statement

Conclusion:

The design solution would allow the socket and the joint to mesh properly, reducing stress and bone erosion. As the two components of the bone will fit in place, Mr. Chiles' ability to walk will be improved. Additionally, this accommodates objectives of being able to walk longer distances with reduced pain. This design will incorporate biosafe materials (e.g., cement) and materials to allow load bearing and range of motion. The integration of the artificial cement socket also minimize stress being applied onto the device and hip socket as its material is so stiff. The femoral head also help to reduce stress on the leg bone as it can be made of a stiff metal like titanium. This will overall alleviate the pain that Mr. Chiles feels around his left hip, as less compressive stress can be generated.

Overall, this solution combines preliminary sketches of the joint replacement, while incorporating a synthetic socket.