

Need Statement: Design a custom device for Djimon JOunsou that prevents bilateral hip dislocations, chronic pain and hip misalignment to address his hip dysplasia and improve his quality of life.

Concept	Pros	Cons
Tri-Flange Acetabular Cup	<p>Placed at an angle to account for hip misalignment</p> <p>Stable due to tri flange connection on the pelvis</p>	<p>Bulky part, may be heavy.</p> <p>Juts out from the pelvic bone</p>
Bipolar Liner	<p>By using this liner, the femoral head has more freedom of movement. It reduces friction against the acetabular cup and is easier to replace if another surgery is needed.</p> <p>The liner itself is deeper than typical liners, meaning that the femoral head would be more secure and would not pop out of the socket.</p>	<p>Too much freedom of movement may lead to muscle strain (if it is more movement than a typical leg)</p> <p>Since it has two moving components, there are more chances for failure.</p>
Femoral Implant	<p>The solid femoral implant completely replaces the bowed section of our patient's femoral shaft. This would help to fix the hip misalignment and the different lengths of legs.</p> <p>The implant is connected to the remaining femur shaft.</p>	<p>The femoral implant is connected to the remaining femur shaft with a screw that goes through the centre of the femur. However since the femur is hollow, this may not constrain the implant well</p> <p>The implant has a greater diameter than the bone at some points meaning that there may be more stress on the leg</p>