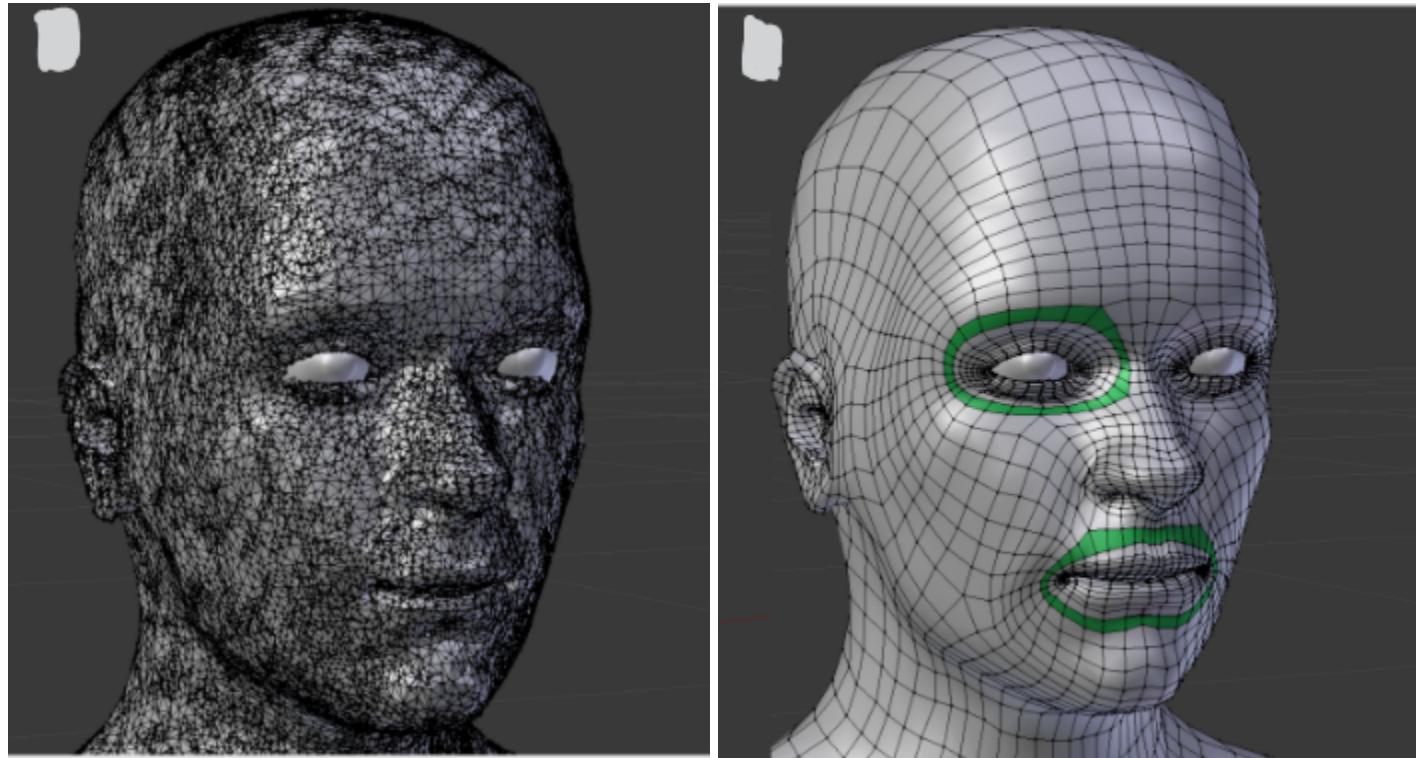


Retopology

Retopology is the remeshing of a digital model to have optimized edge flow. It is usually a manual process although there are automated ways of doing it as well.



(image on left is before retopologizing a model, notice the chaotic polygon layout with high density. Image on right is after retopologizing, notice the smooth edge flow and low polygon density)

Retopology is necessary for purposes that require a model with low polygon count such as animation, game assets, and rendering. Retopology also results in a model with clean and orderly geometry that is well suited for subdividing at a later time.

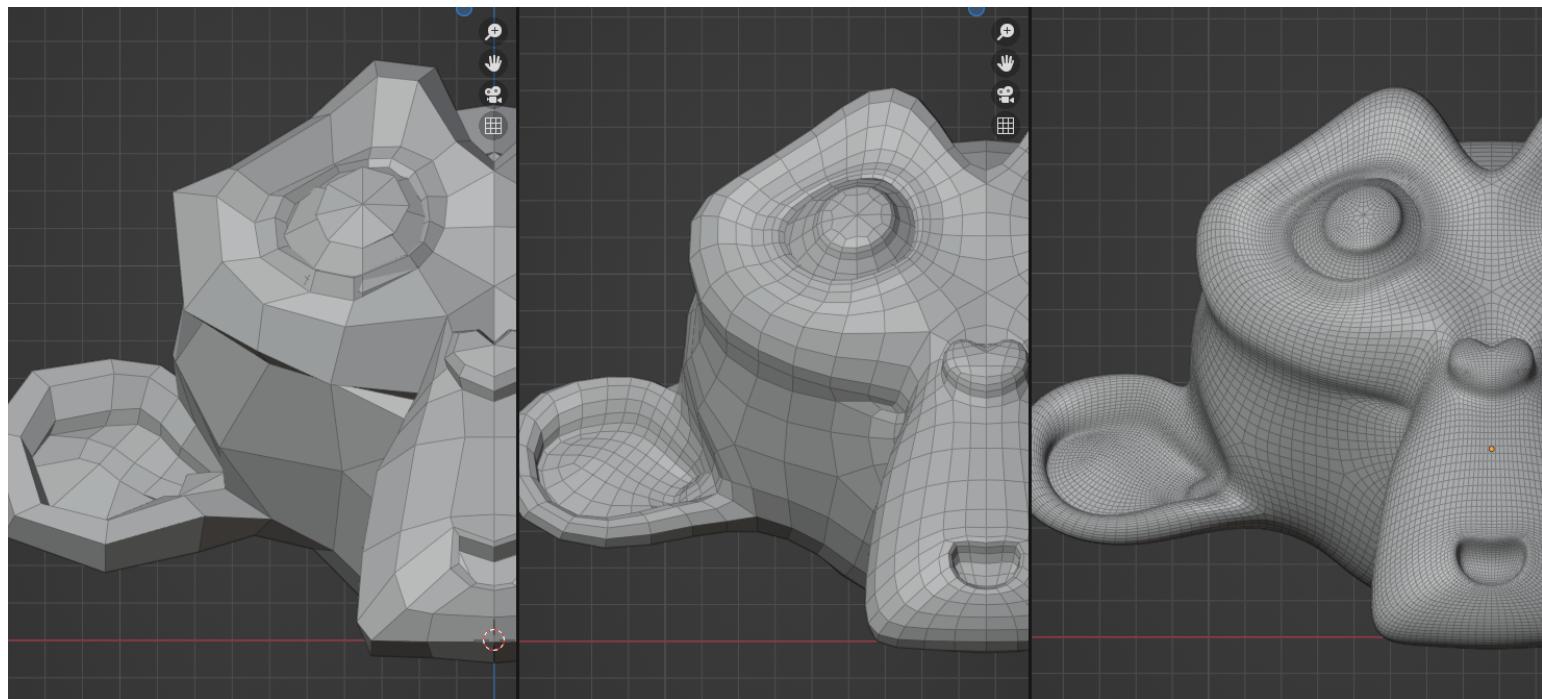


Siegecraft Commander - Design/Model/Texture

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(Image example of a low poly game character. The low polygon count renders quickly and consumes less memory. The image map applied over the low poly model adds additional shading and detail)

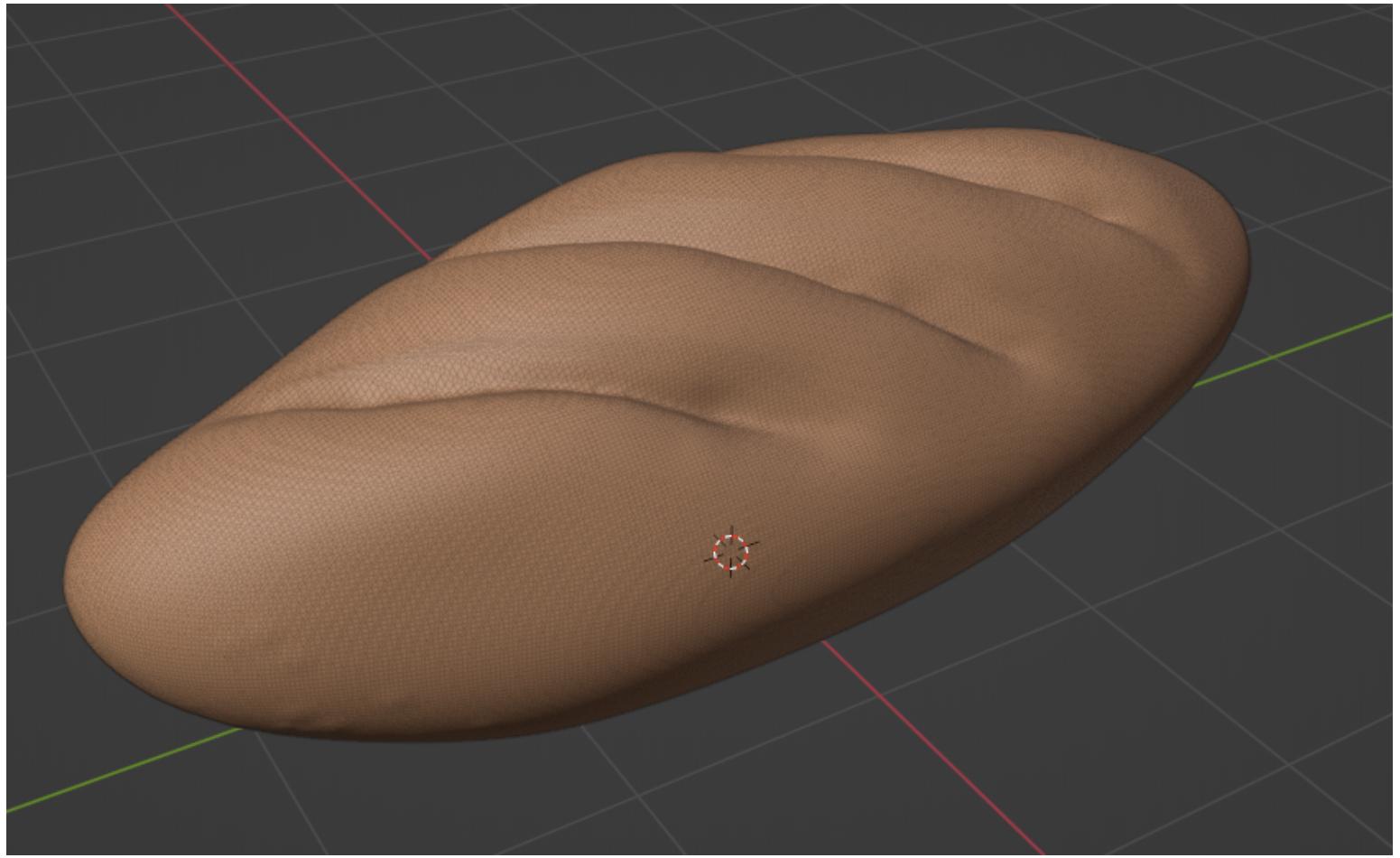
One of the main goals of retopology is to produce a mesh object that uses quads (polygons with four edges) rather than tris (triangular polygons) or ngons (polygons with multiple edges). Quads are easy to subdivide at a later time and present good topology for deformations.



(Image example showing how the retopologized model on the left can be subdivided smoothly and cleanly using the subdivision surface modifier in blender. The simplified geometry on the left is what we are after)

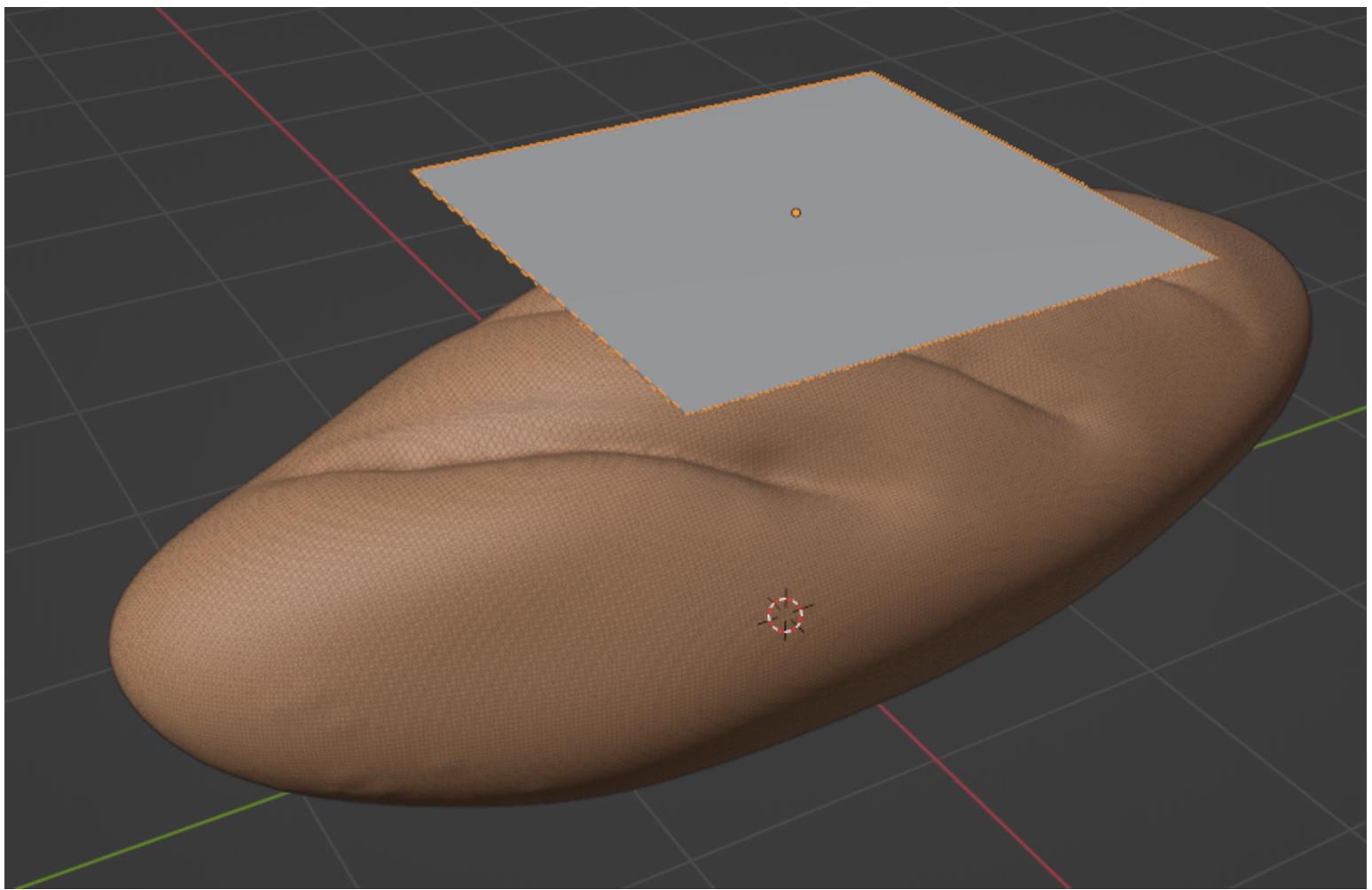
Setting up a retopology workflow in Blender

- Begin with your dense mesh in your scene.

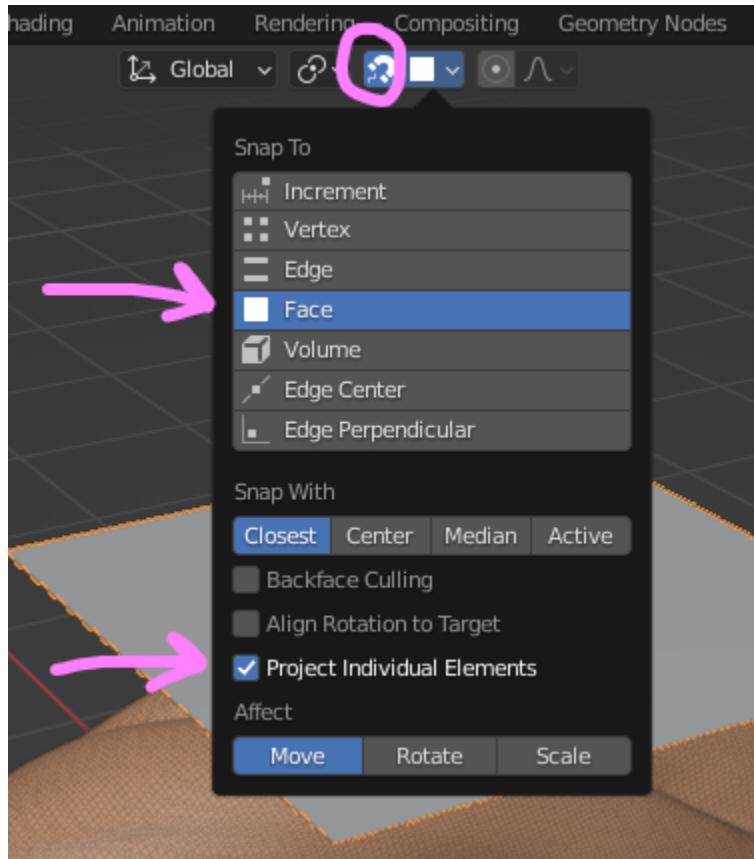


(Image - this french bread has a dense mesh with 100,000+ vertices.)

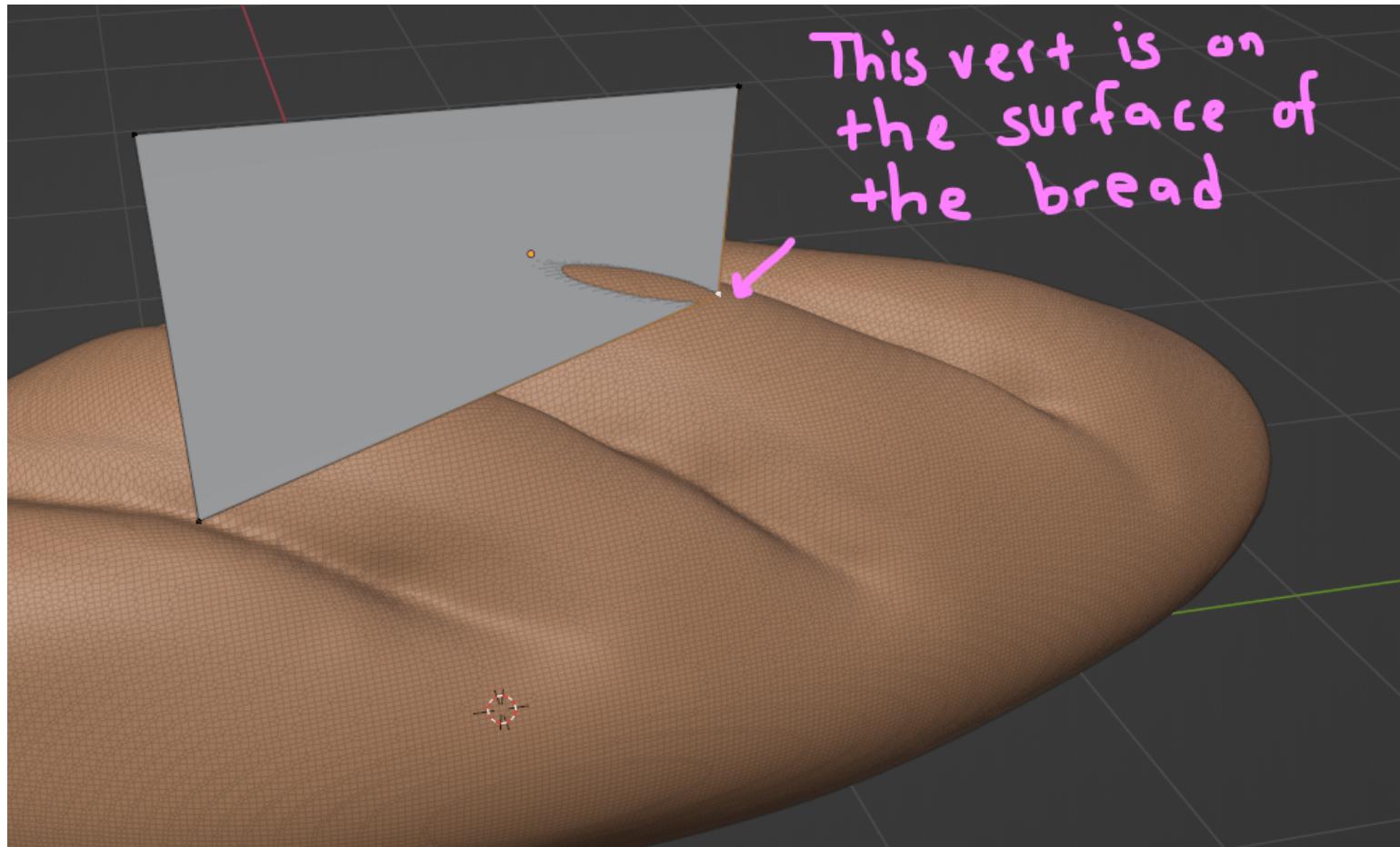
- Add a plane into your scene and position it above the dense mesh object



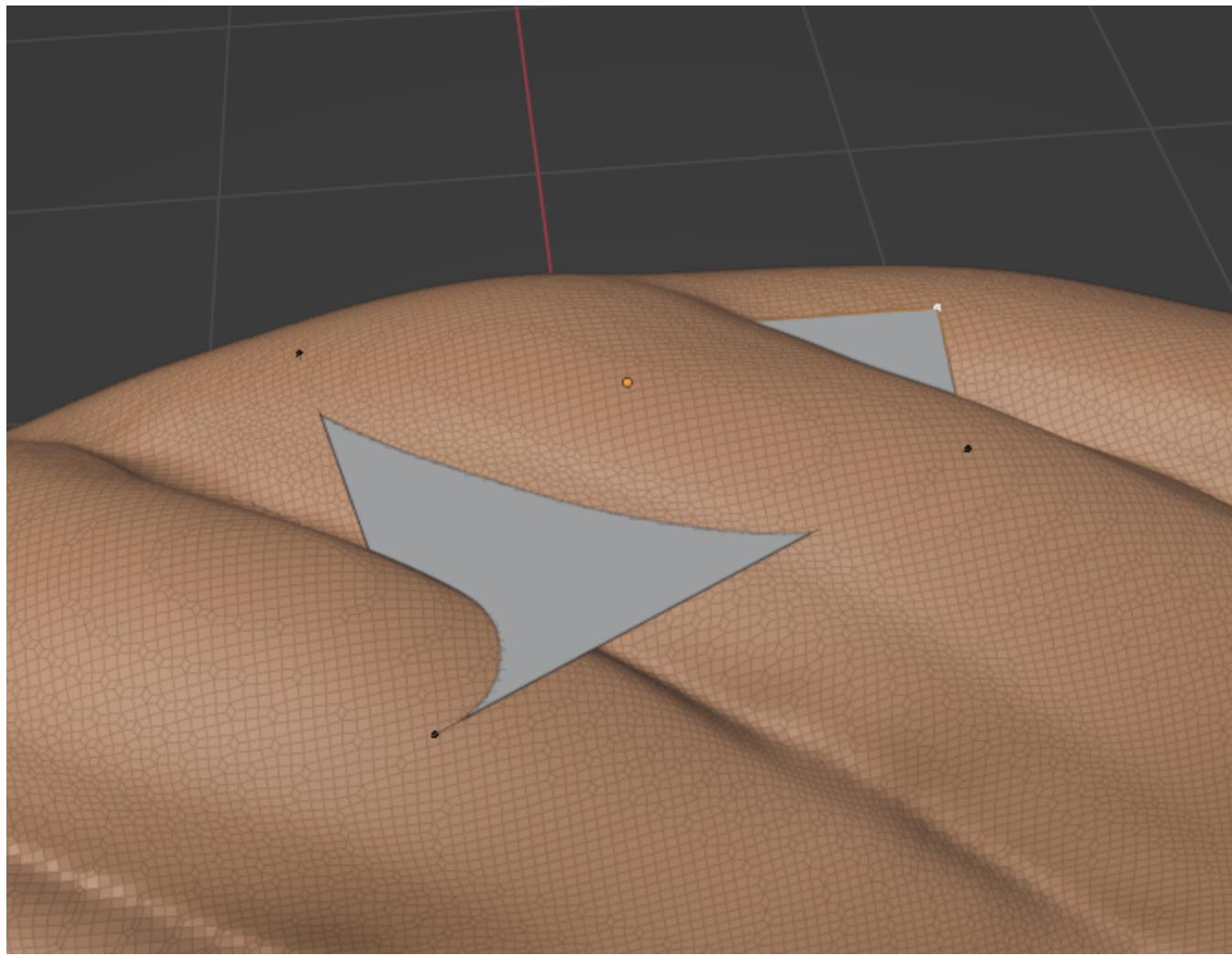
- Enable the “snapping” setting at the top by clicking the magnet icon and within the dropdown menu select “faces” and enable the checkbox for “Project Individual Elements. These settings will allow the vertices of your plane object to “snap” to the surface of the dense mesh object below, as will be seen next.



- With the plane selected, enter into edit mode. Click and drag a vertex of the plane close to the dense mesh object and the vertex will snap to the surface of the dense mesh object

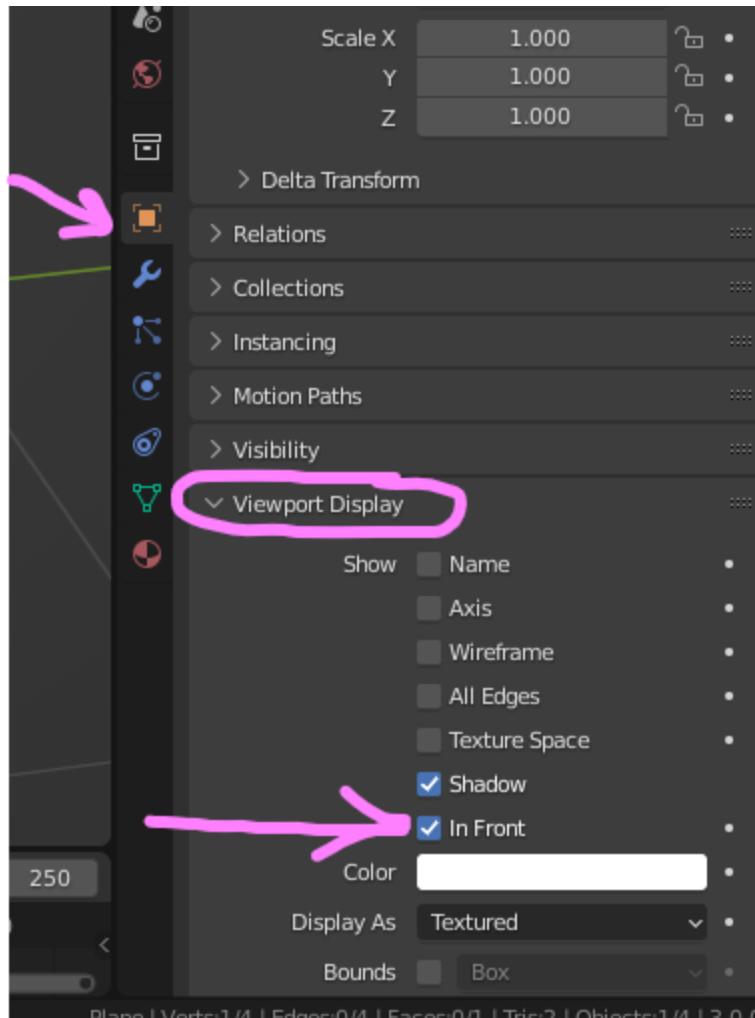


- Try moving all four verts to the surface of the dense mesh object

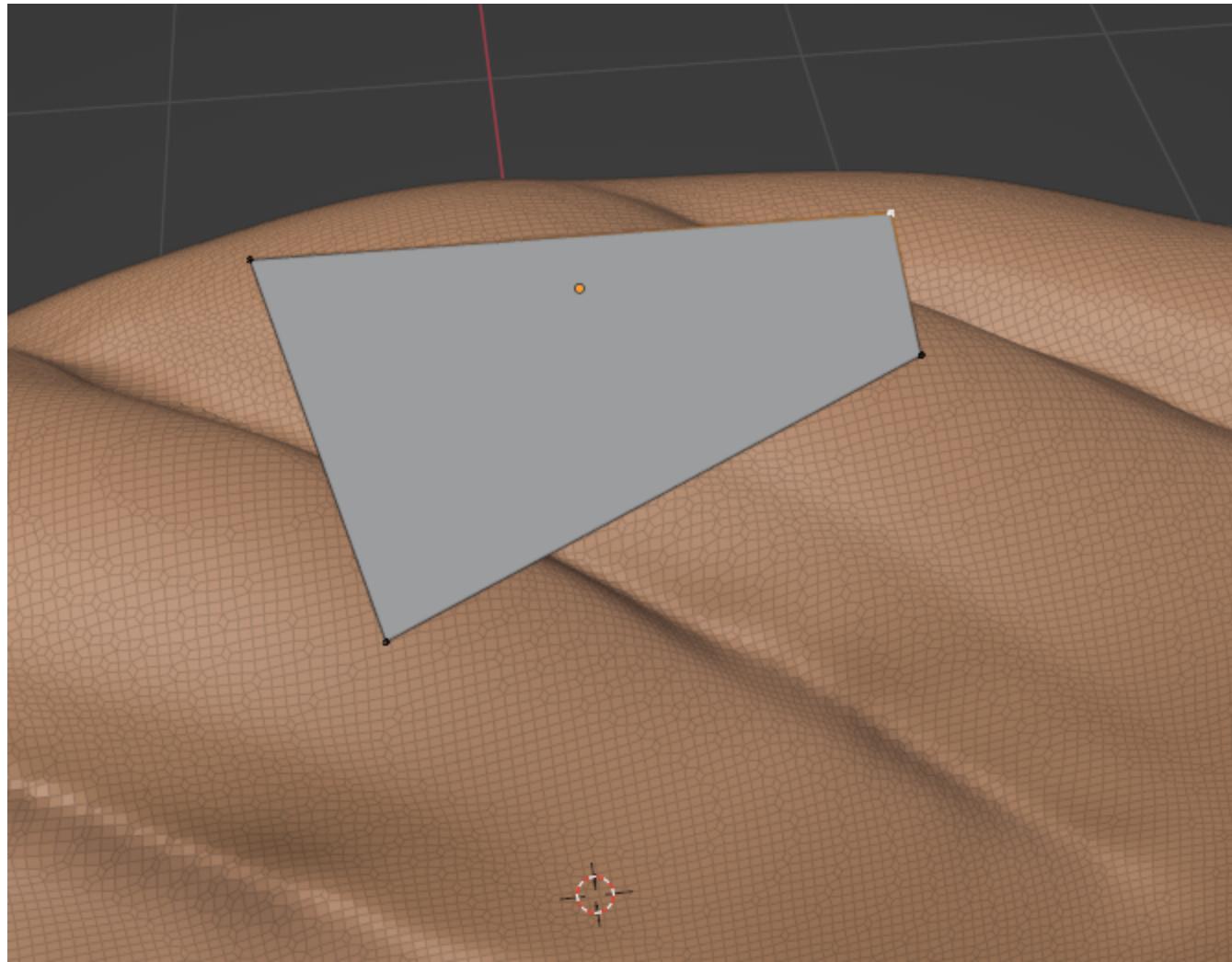


(image - Notice how the verts are all on the dense mesh object, but the plane is now difficult to see because it is partially hidden behind the surface of the bread. Let's fix that)

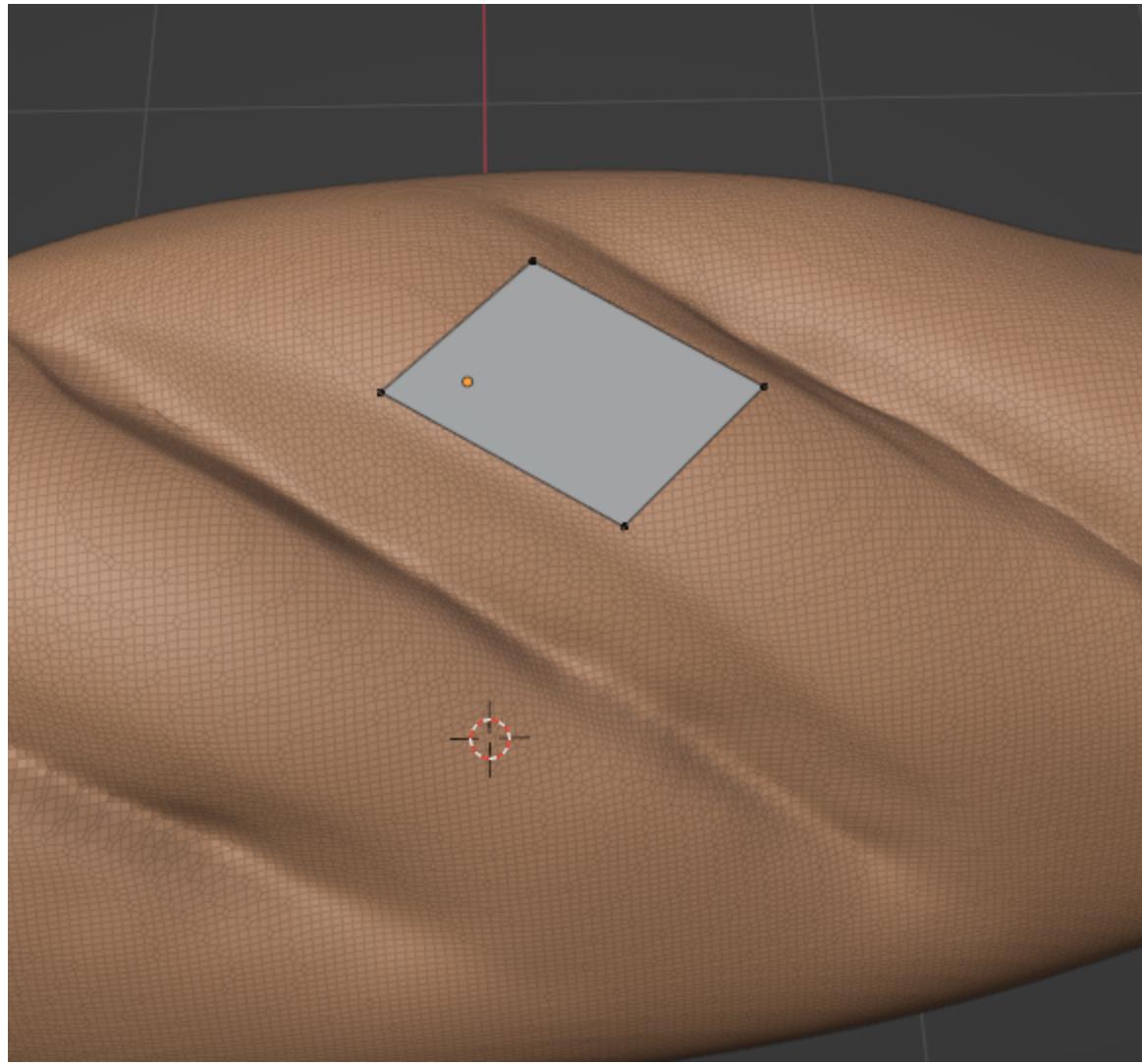
- While still in edit mode with the plane, select the object properties tab and open up the panel called “Viewport Display” and put a check mark in the box for “In Front”



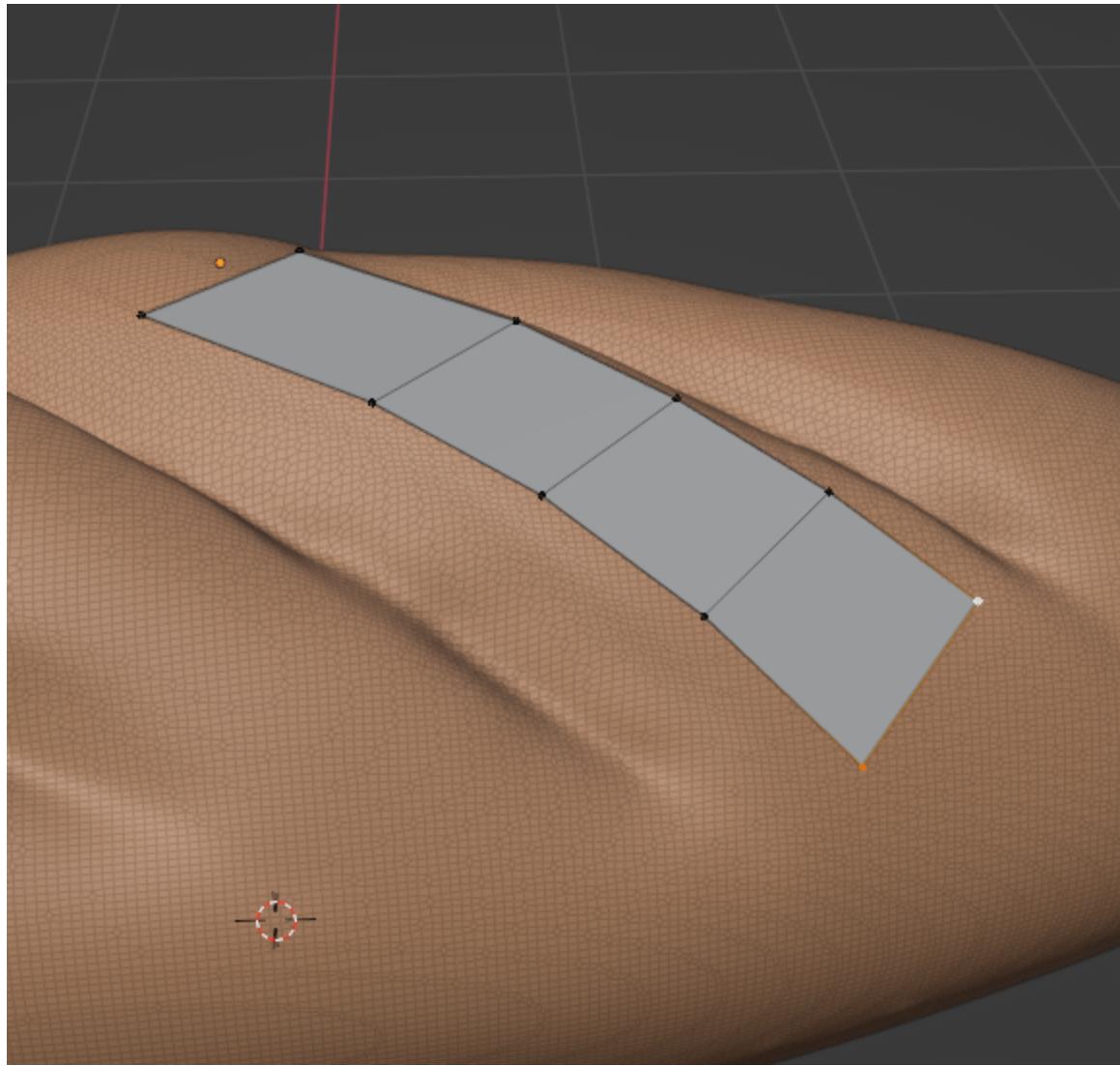
- Now the plane is displayed in front of the dense mesh, and it is always in front of it even when viewing it from different angles. This is what we want. It gives us a better view of the retopology while we build it, as will be seen next.



- Position the vertices of the plane in a desirable location to begin the retopology. Here is an example of a good starting position:

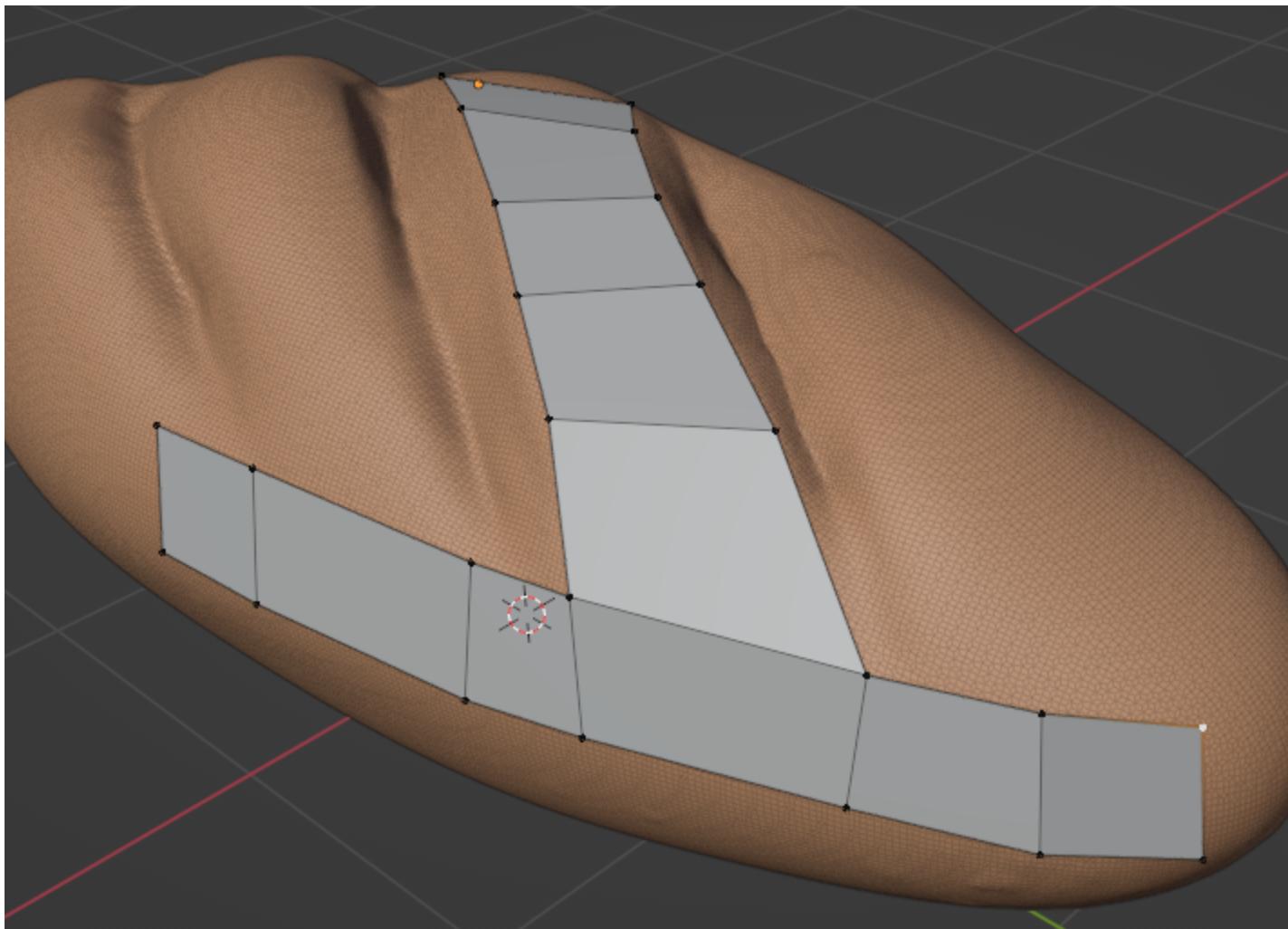


- Select two of the vertices on the leading edge and extrude them (“e” key) to begin building out the new retopology surface.



(image - Notice how the extruded edges “stick” to the surface of the bread as we extrude them. This is thanks to the “snap” settings that we enabled earlier.)

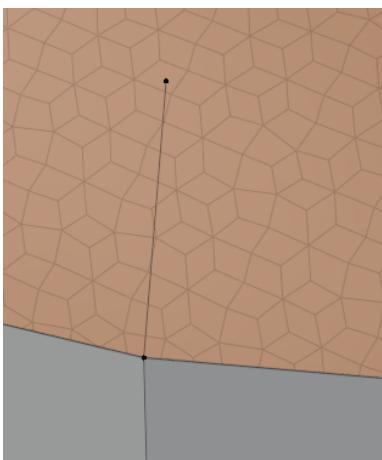
- Continue extruding edges in different directions to create a low-poly representation of the dense mesh surface. Move vertices around to give the new polygons more appropriate shapes to mimic the dense mesh geometry beneath it. The goal here is a smooth edge flow



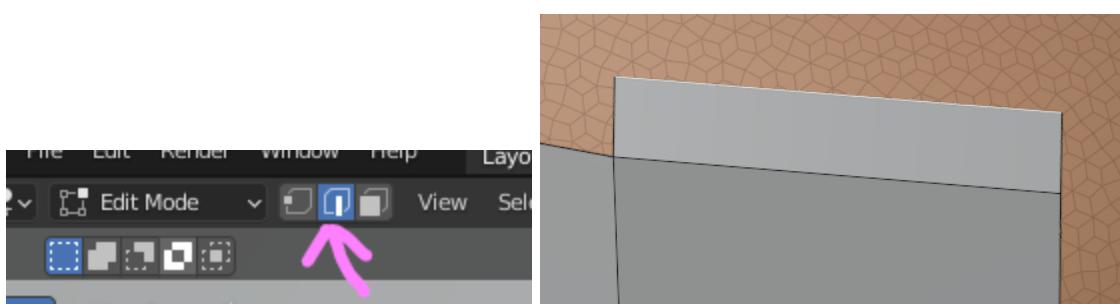
(image - Notice that I am extruding in different directions now. To extrude an edge, I have two adjacent vertices selected when I press the “e” key for “extrude”. I am readjusting the vertices as I go. For now, avoid any triangles and only work with quads.)

— More ways to extrude —

- If only a single vertex is selected when pressing the “e” key to extrude, then only that single vertex will be extruded. This results in an edge that is out in the open and is not yet forming a face (see picture)

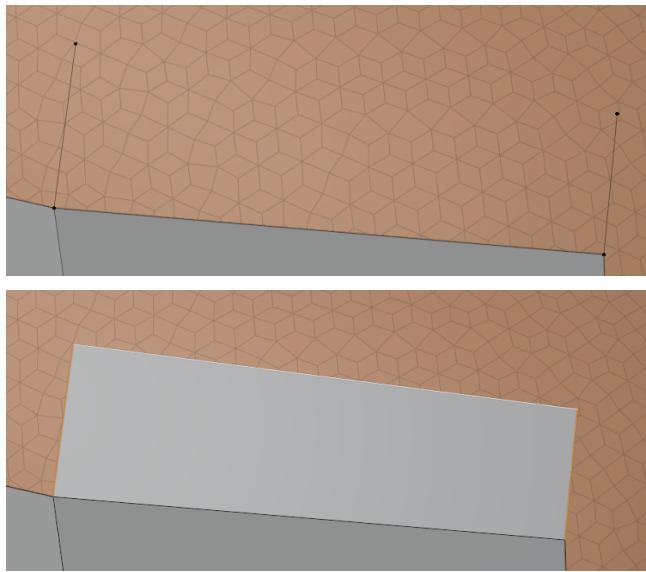


- Another way to extrude is with edges selection mode enabled instead of vertex selection mode. This makes it easier to select an edge. With the edge selected, press “e” to extrude as usual



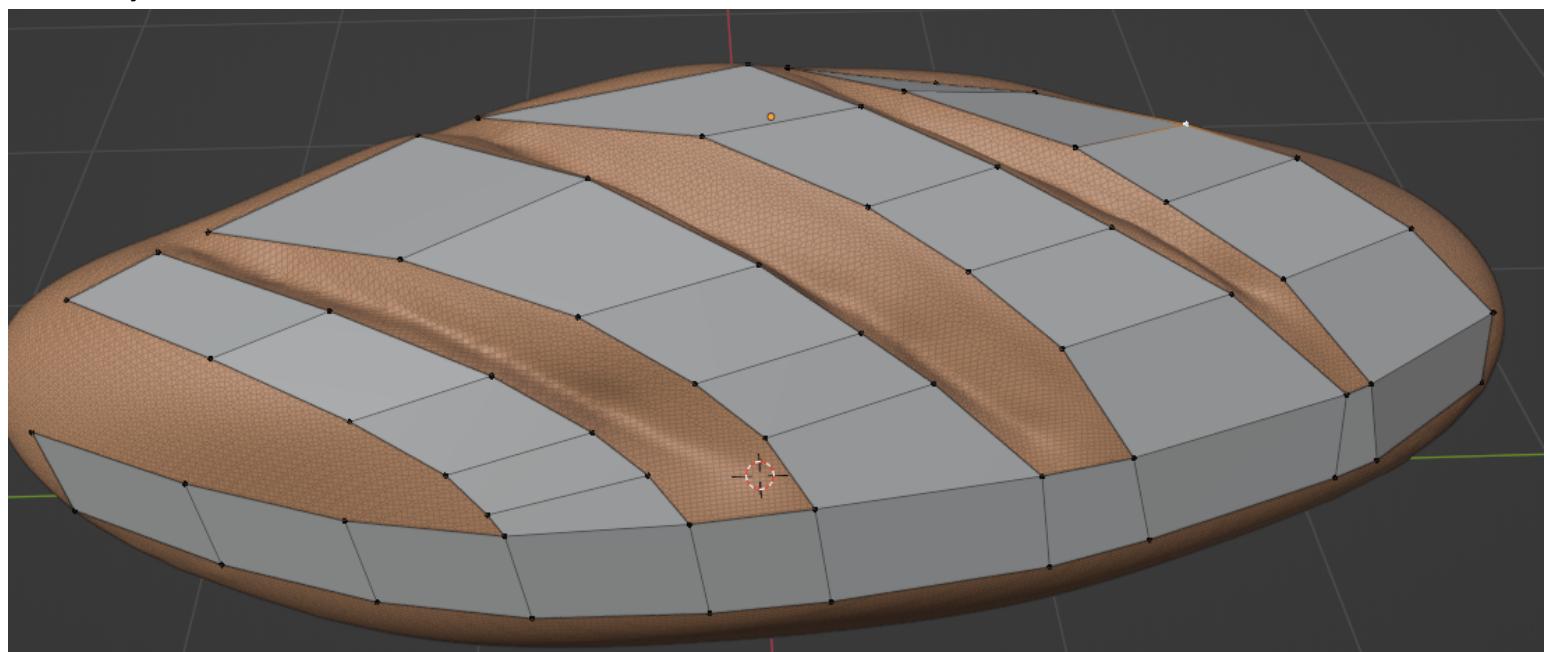
— More ways to Build —

- We can extrude lone edges and connect them using the “f” key (“f” for “face”). This connects edges with a face.

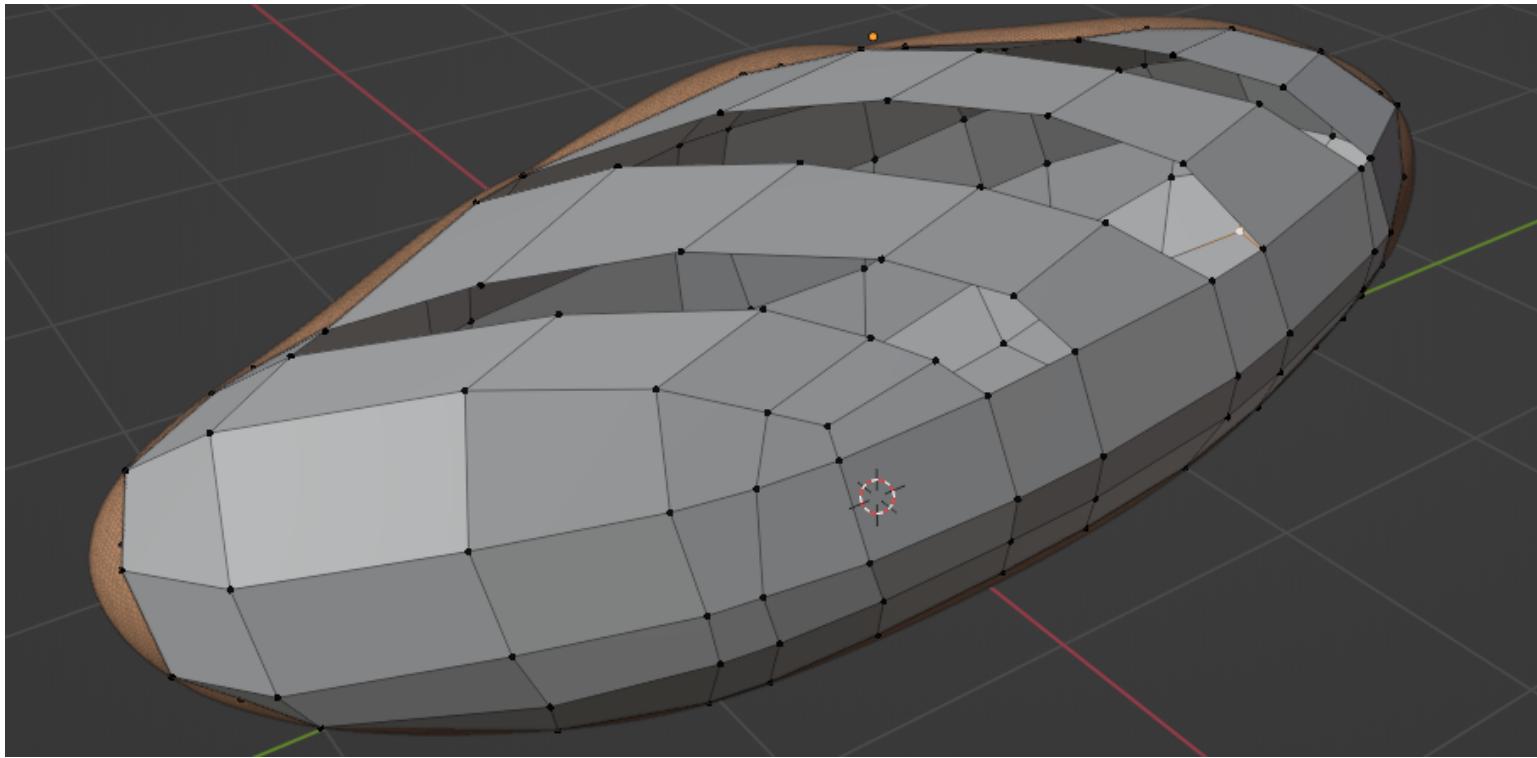


(images - show how two selected edges are connected with a face by pressing the “f” key.)

- Alternating between building by using the “e” key to extrude and connecting vertices and edges with the “f” key is common.
- Continuing with the retopology exercise, keep building out the simple surface geometry of the dense mesh object

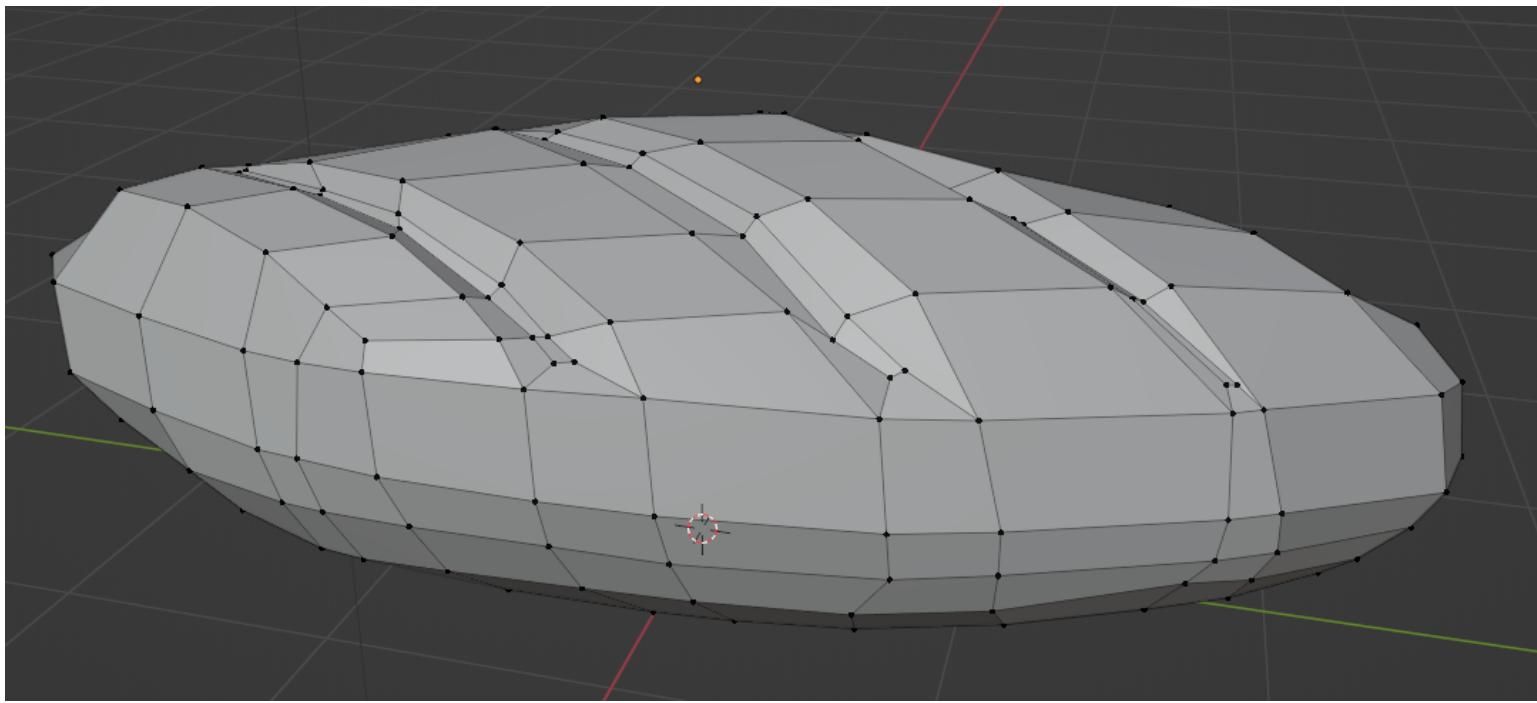


- Continue with the retopology until most of the dense mesh object is covered in a simplified geometry of quad shaped polygon. There will be areas that require clever logic to join... and you will need to use your best judgment to create a desirable configuration of quads for it.



(image - notice that “most” of the bread is now covered in quads. The remaining areas are the rifts/valleys at the top of the bread. The geometry can be straightened and aligned manually by clicking on each vertex and grabbing it with the “g” key or sliding it by double pressing the “g” key)

- Continue until the entire dense mesh is retopologized. Then hide the original dense mesh to remove it from view using the hierarchy.



— Take a moment to admire your dense mesh and celebrate your accomplishment! —

- Next analyze your low poly mesh and spend some time aligning the vertices for a edge flow
- Finally, switch to Object mode by pressing tab and add a Subdivision Surface modifier to the low poly model. You will now see the remeshed object appear in higher detail. Minor adjustments to the vertices in edit mode might be needed, (for example adding loop cuts using the **ctrl+r** keys) but for the most part your model is now retopologized and ready for use in animation, gaming, texturing, or other uses.

