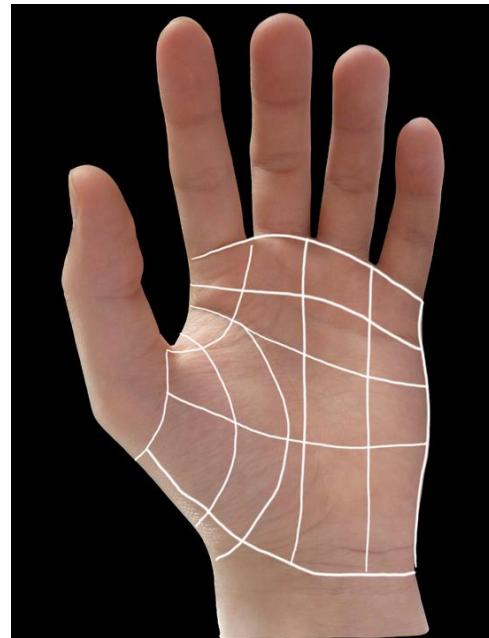


## Human Hand

Arguably one of the most challenging aspects to master within Maya is the creation of the human hand. There are a multitude of “best practices” out there and to be honest we’ve seen professional results achieved from many of them. The most common techniques reside around a box, having the fingers extruded from the front and the thumb from the side; however hands do not have this physical makeup as in reality your thumb takes up over one third of your palm. Therefore the more time you spend modelling; you’ll discover these techniques (as with ours) are open to interpretation and what you learn from one technique, book or tutorial may not provide you with everything you need. As stated earlier the approach we will take is based around edge flow from the outset meaning the general physiological makeup is there from the very beginning making the process seemingly more logical.

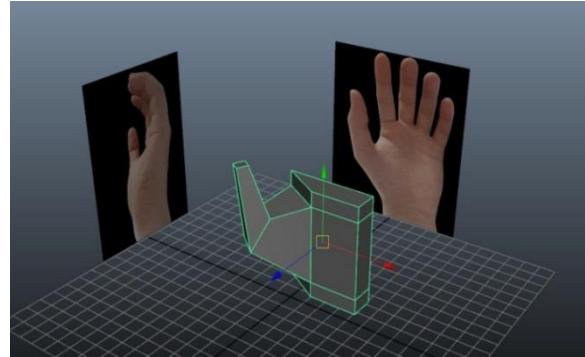
### Before we begin:

- Familiarise yourself with the edge flow.
- Ensure you have set up image references within your scene (pg 62).
- Use multiple real-life images.
- No hands are identical.
- The thumb **isn't** stuck onto the side of a hand.  
Try to visualise the edge flow to help you during the modelling process (image Right).
- Moving individual vertices are imperative to achieving a true to life organic representation.
- Fingers should subtly vary in size and shape.
- Throughout the modelling process ensure you smooth preview to help you manipulate your geometry.



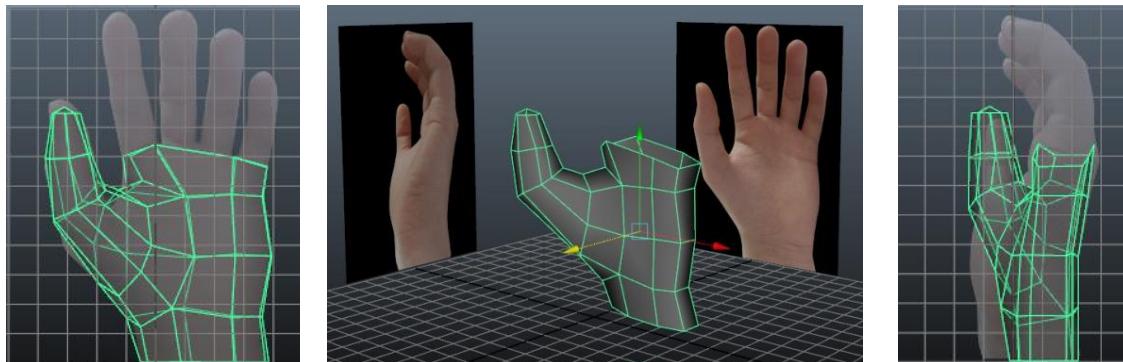
### Step 1: Creating the base edge flow (palm and thumb)

- Create > Polygon Cube (1 x 1), Extrude the top and bottom faces then position the cube to cover the palm.
- Take the front LHS row of vertices, move right towards the centre.
- Extrude the LHS centre section (thumb), scale in, rotate up, and position slightly to the left
- Extrude in the same point, again scale in and position higher (being the tip of the thumb)



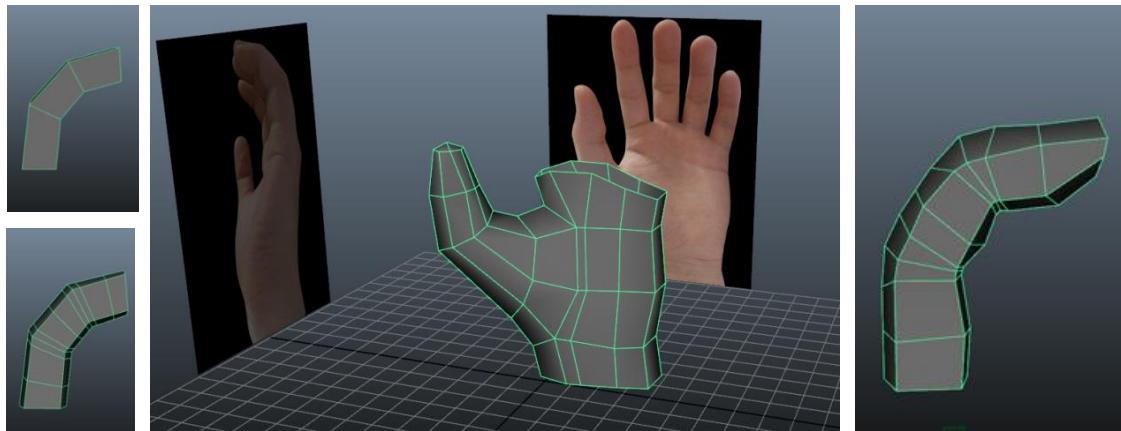
### Step 2: Shaping the Geometry

- Remove the top and bottom faces then perform a smooth, which will enable you to shape the hand further, whilst ensuring basic shape of palm and thumb are achieved.
- Manipulate your geometry whilst remembering the image references are there to assist you during this early phase.



### Step 3: Creating the finger

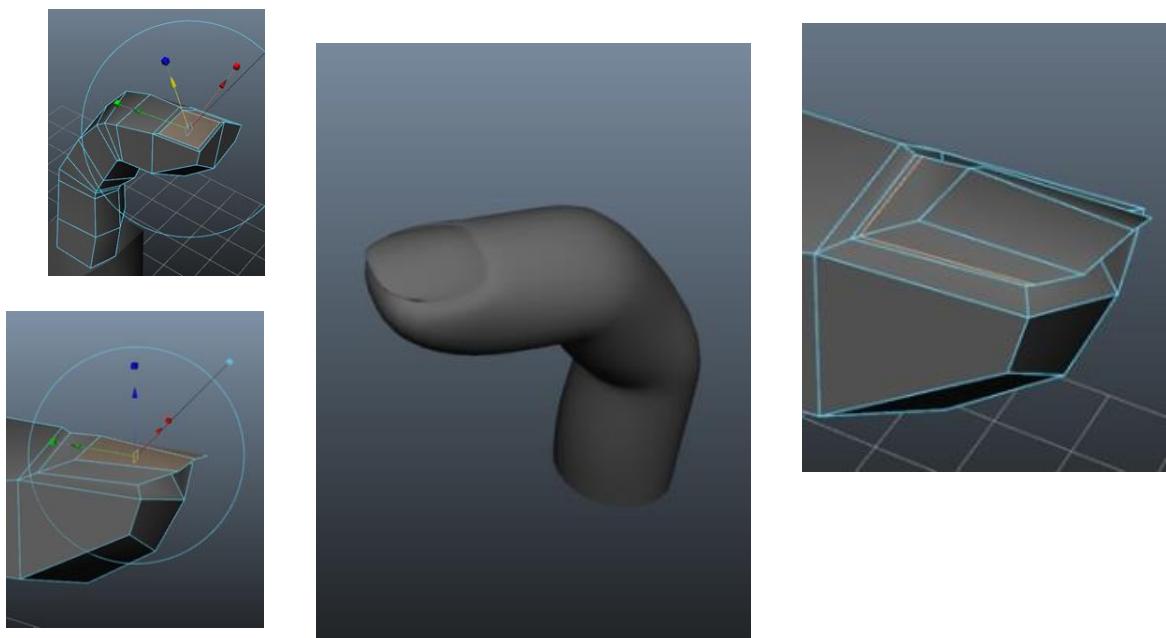
- *Edit Mesh > Insert Edge Loop Tool* to create the vertices required in the centre of the palm.
- *Create > Polygon Primitives > Cube* add 3 divisions to create the finger.
- Add no more than one edge loop down the centre and on each side of both knuckles, ensuring you keep the underside geometry close and the upper geometry spaced out.



- To create the fingernail, select the top two faces and extrude them inward and then down slightly. Move the foremost 3 vertex (of the finger) down and forward to assist in shaping the fingertip.

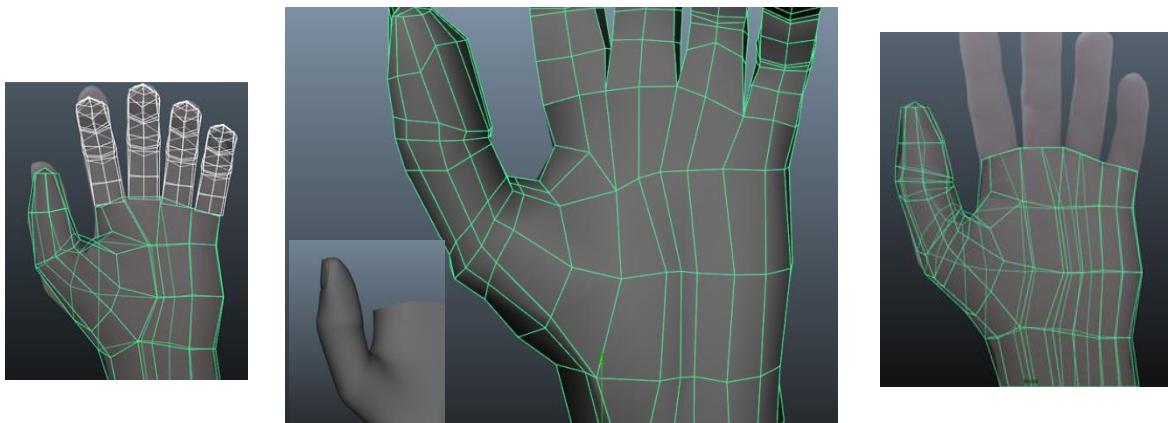
**Note:** Nails can be made as separate geometry if you would like.

- Then select the same two faces and extrude them up, in and forward, creating the nail. Depending on the look at this point you may wish to bring in the edges slightly and add in an edge loop to define the nail.

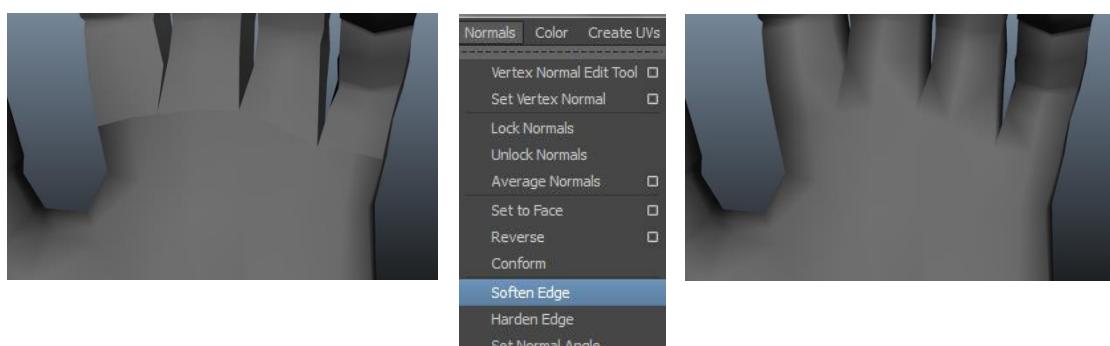


#### Step 4: Combining the Geometry

- You can (for a uniquely organic feel), replicate step 3 for each individual finger or for convenience duplicate it (*Ctrl-d*) three times.
- Spend some time applying the skills just learned to the thumb.
- Once you are happy with your thumb, and have all your fingers aligned add in extra edge loops on the palm to compensate for the ones we added in the centre of each finger.
- Before joining the geometry, ensure the scale has been adjusted appropriately spend a little time altering the fingers vertices independently to uniquely differentiate them from one another.
- Pick one finger, snap the corresponding vertices together (*v-MMB*). Combine them one at a time (*Mesh > Combine*) then merge the vertices (*Edit Mesh > Merge*) repeating for the remaining fingers.



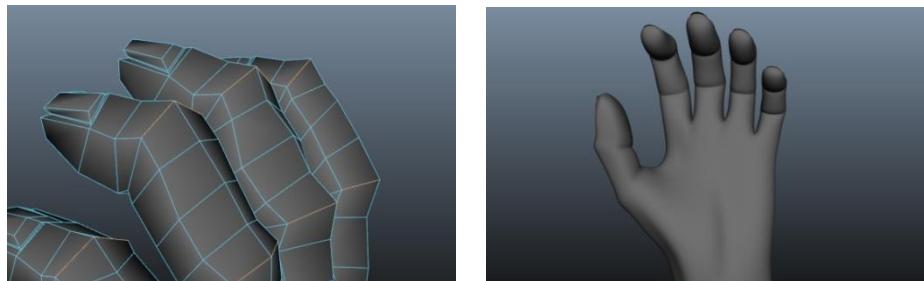
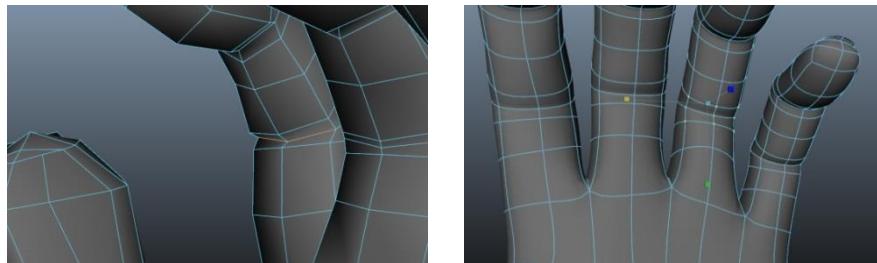
- You may come across the below issue when combining geometry. To rectify navigate to *Normals > Soften Edge*.



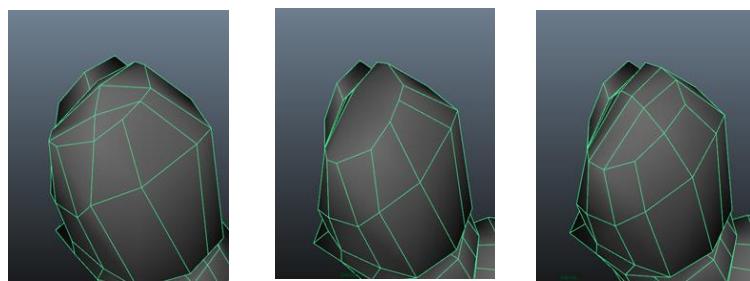
### Step 5: Tweaking the Fingers

The most common issue when people model hands in the concept of “Bendy Fingers”, which means they appear to have little or no joint definition and curve rather than bend. The reason we’re addressing this now rather than before we duplicated the fingers is because this section really helps give individual character, especially if you duplicated them from the original.

- In the crease use the edge tool to move the centre edges inward.
- The knuckles:
  - Use the Edge tool to loft them above the rest of the geometry
  - Use the scale tool to increase the width around the knuckles.



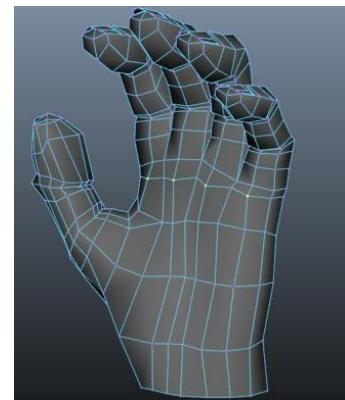
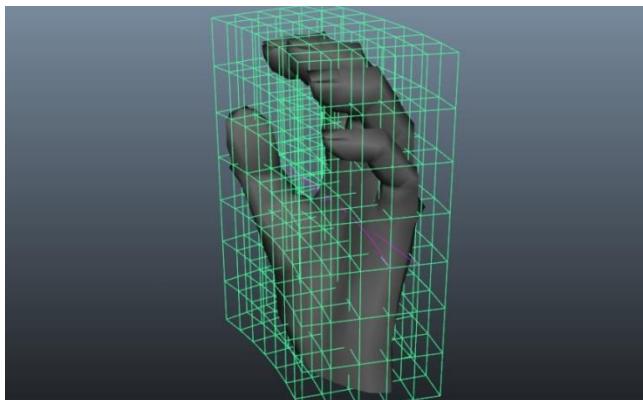
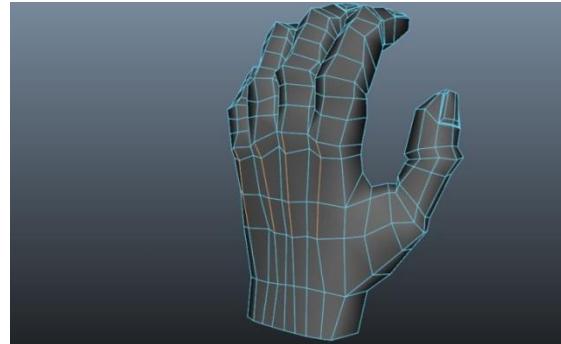
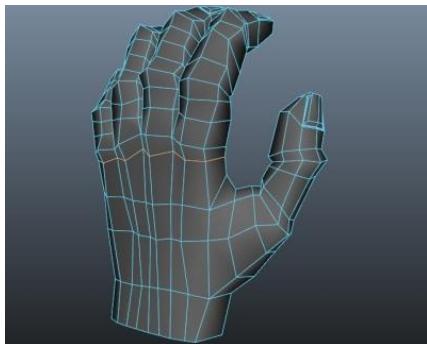
- Fixing the thumb Geometry: It appears that on our model when we added an edge loop for the fore finger to be attached we arrived at some unusual geometry at the tip of the thumb. To rectify RMB click *Edge* then *delete all edges* on tip, then using the *split polygon tool*, rebuild them.



### Step 6: The Back of the Hand:

The last major section to address is the rear of the hand

- Add in an edge loop at the top of the palm
- Raise the edges that run down the back of the hand
- An optional step is adding a little extra curve to the model. To do so select the Animation Menu Set then highlight the hand:
  - Delete History – *Edit > Delete by Type > History*
  - Create Lattice – *Create Deformer > Lattice*
    - *S Divisions 8 T Divisions 8 U Divisions 6*
  - Add Bend deformer - *Create Deformer > Nonlinear > Bend*
    - *Rotate X&Y 90 Curvature -0.3*
  - Delete history (once happy)



**Conclusion:**

Currently the model is relatively low resolution and no re-arrangement of edge flow was required, however using the skills you have just learned you can spend some time perfecting your geometry by either manipulation or the addition of more edges (if required).

**Note:** *To add more acute detail you should consider using textures. Jump to page 97 where we take you through setting up a basic skin shader.*

