



Body Modeling - Modeling with Meshsmooth

By [Michael B. Comet](#) - This article, all images and character designs are Copyright ©1999 Michael B. Comet All Rights Reserved.

WARNING: Since this page is about modeling the human figure, it contains nudity and may not be suitable for those under 18.

Introduction

This article gives a basic overview of how I created my 3D anime character. It is loosely based off of a spline modeling tutorial from Hash Animation Master. While I utilize 3D Studio MAX r2.5 as the example here, the basic principles should be useful even if modeling with other packages, such as Lightwave's Metanurbs, or even splines in AM. Some sections of this article only give an overview, and show the basic low poly mesh. It is assumed that the reader has or will have the basic 3D skills to create and model their own characters, using what is here as a guide.

NOTE: For the images in each step of this tutorial, you can click on the image to bring up a larger, more detailed version with wireframe references and more information!

The Basics

The basic technique is taking 4 sided faces (essentially 2 polygons with the shared edge set to "invisible") and then extruding new faces, welding points and turning and hiding edges such that you have a low poly, 4 sided looking model. In some cases, 3 sided polygons are inevitable, but for meshsmooth it's important to try to keep "quads".

If you are using 3D Studio MAX, the tools used are Edit Mesh with sub-object vertex: "weld targeted" and sub-object edge: "turn edge" and "visible edge", as well as sub-object face: "extrude face". Also used is Meshsmooth with "quad output", "apply to whole mesh", "smooth result" and an iteration of 2. In addition the "slice **modifier**" is used. Note when I refer to slice here I always mean the stand-alone modifier version, not the version within the editable mesh mod.

A MAX Meshsmooth Warning

A word of warning if you are using MAX and plan on creating *Hi-res* morph targets from the low poly model: MAX 2.5 and earlier likes to change point count and order when edges move a certain way. MAX 3.0 and higher now have a "keep faces convex" option to fix this.

One, don't make morph targets for the high poly version. Instead use bones and simply setup the character via a skeleton. The second, export the mesh to another package which works, make the Hi-Res morph targets there, and then reimport to MAX for animation. This is actually what I did. I created the model in MAX, exported a DXF which I loaded into Lightwave. Using a Lightwave script to convert tri's to quads (which worked stupendously well) I metanurb'd the model, saved out the hires targets, and

imported back into MAX where I texture mapped, and setup facial/body morphing with MorphMagic. Amazingly, this all worked fine.

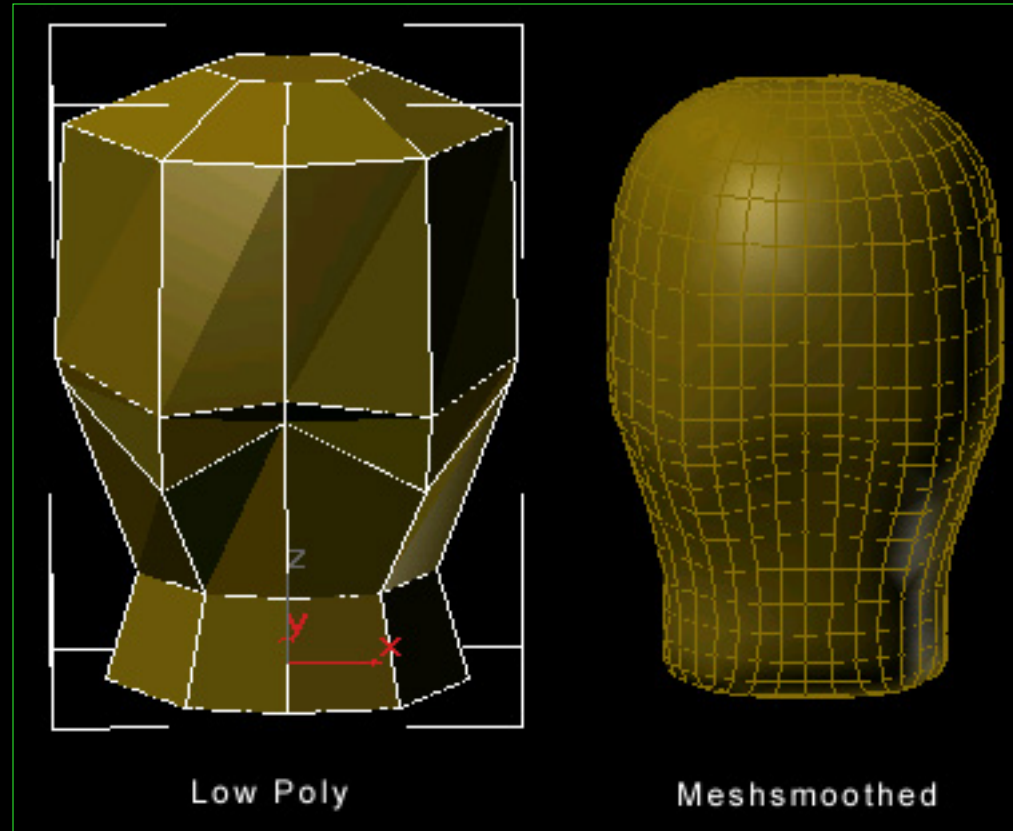
Finally, my opinion of the best method in any version, is to keep the mesh low poly. And create targets that are low poly, and setup the skeletal system, all low poly. Then at the very very top of the stack add meshsmooth before rendering. This allows you to animate very quickly since the mesh is low detail, including facial animation, and then up the res on previews/renderers.

Modeling Steps

Step 1

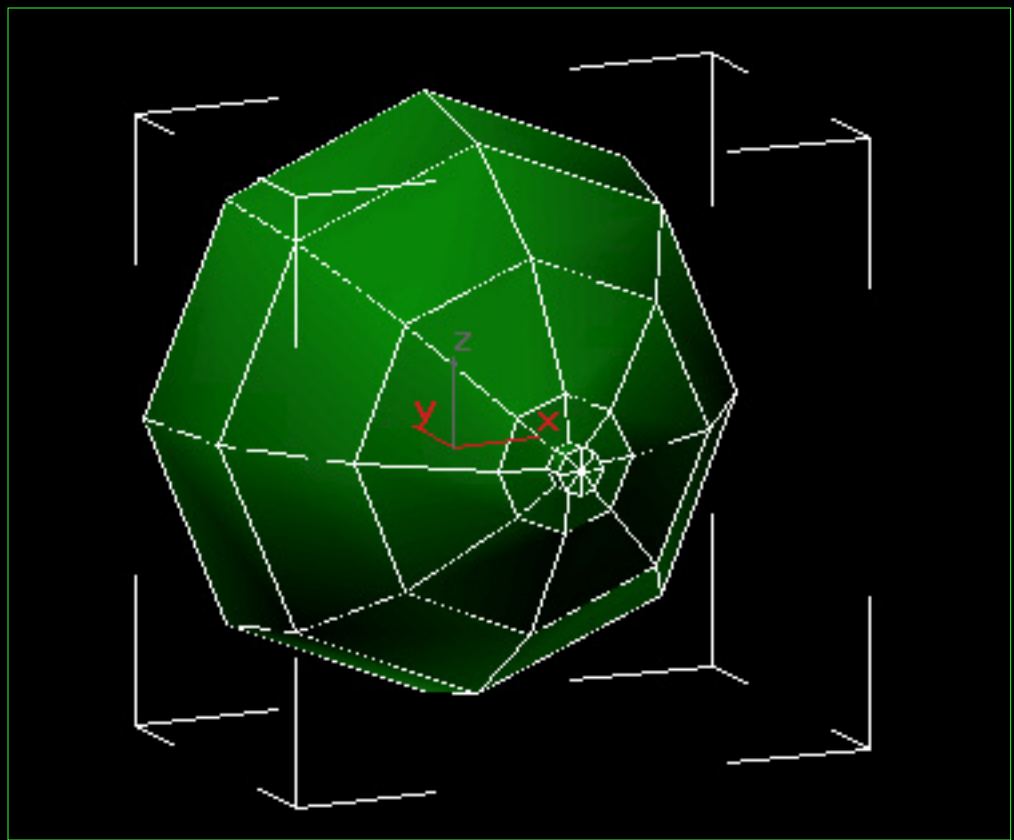
The first thing to do is to create the basic torso object. Create a hard corner spline shape in top view with 8 points. Then extrude this flat polygon up 5 times. This should give you a basic cylinder type object. Next, adjust the points so they are more torso-like shaped as shown.

Remember that you can click the images on the right for a more detailed view.



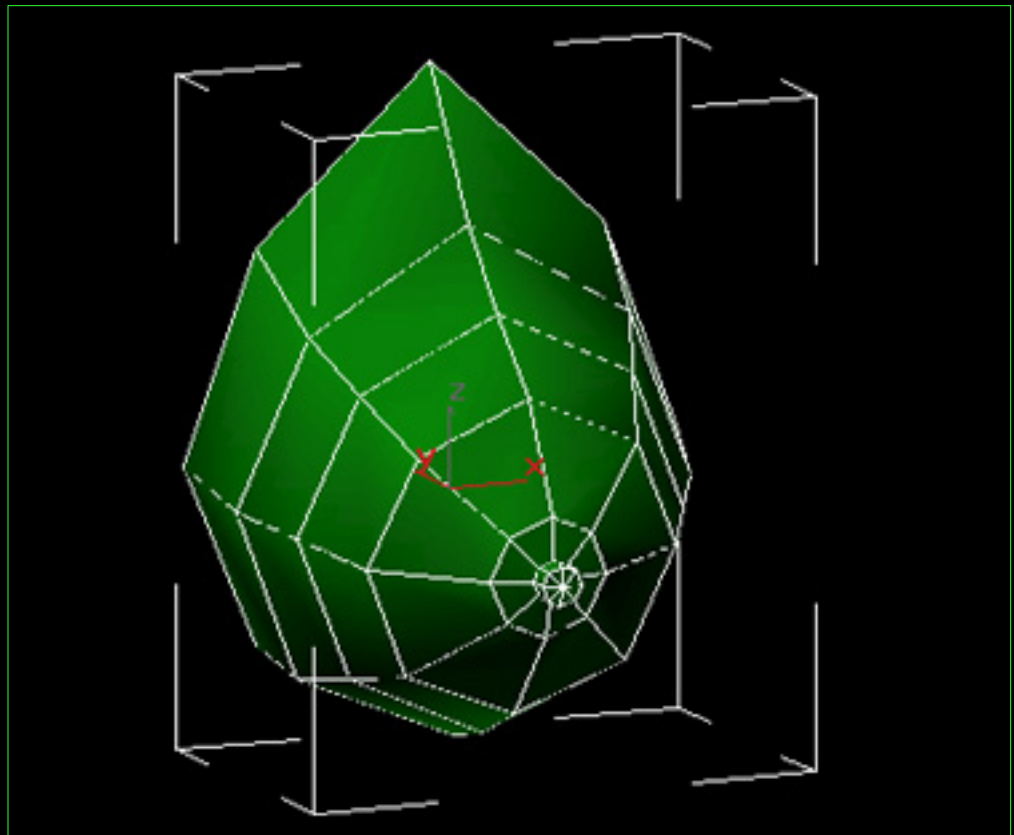
Step 2

Next, for female characters, create a 7 pointed spline in top view, with the shape of half a breast. Then lathe this object with 8 segments to create the form shown.



Step 3

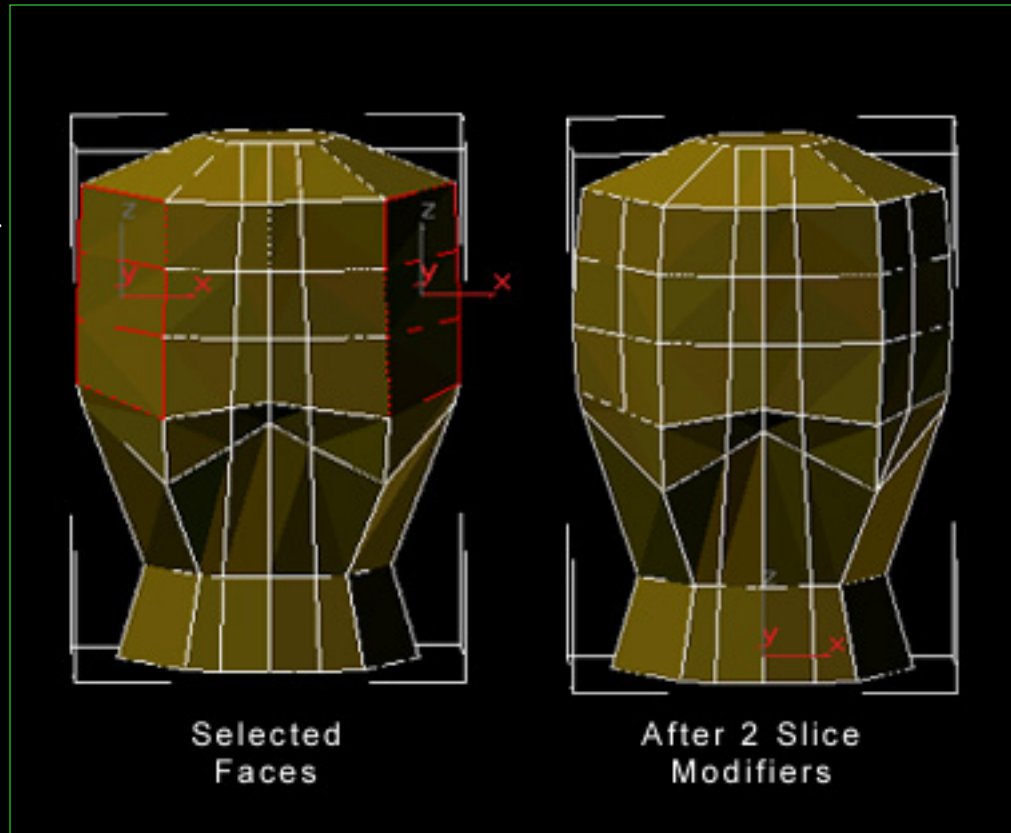
Pull up some of the points and rotate the mass downward to create a more natural shape.



Step 4

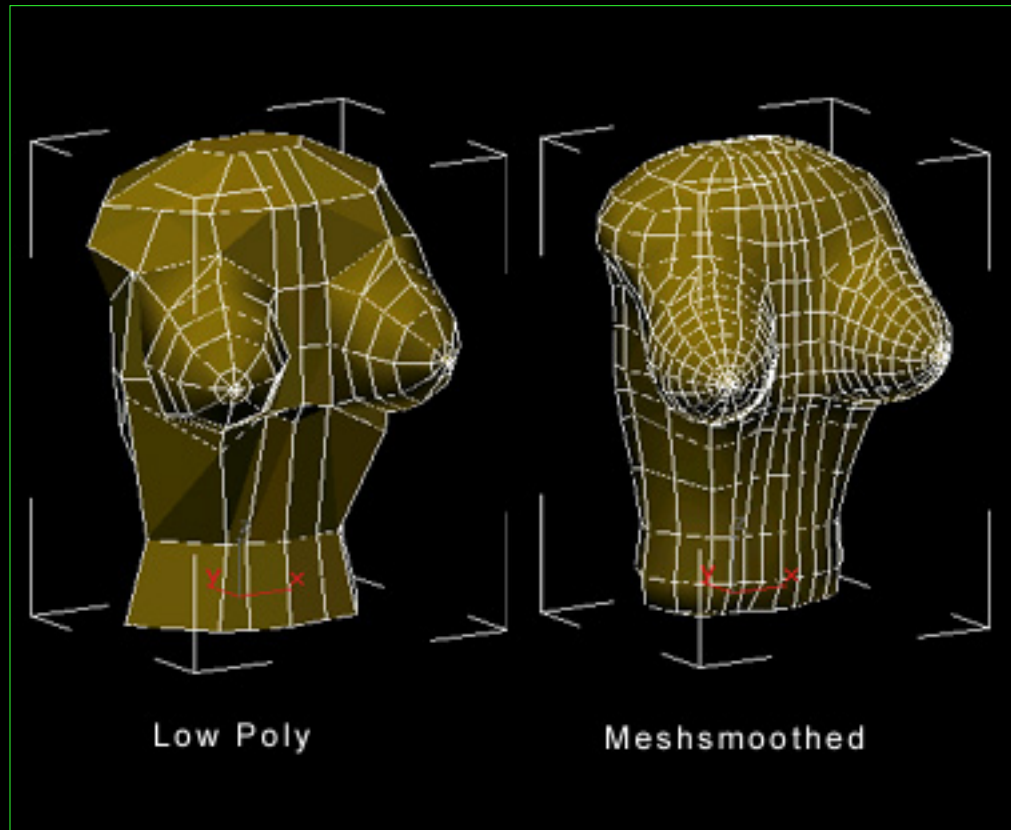
At this point, we want to add the breast objects onto the torso mesh. However they have 8 points, and the torso doesn't have enough detail to really add them. Therefore, in order to add enough detail, select the set of faces on the left and right as shown and using the slice modifier, create extra edges. Because the slice modifier usually creates extra points on hidden edges in MAX, you will probably have to go back and weld targeted vertices at a few places on the model after slicing. Another alternative is to manually "divide edges" and "turn edges" to create the new 4 sided faces.

In addition you should also create some new inner edges as well in the front view. In the end you should have at least the detail pictured here.



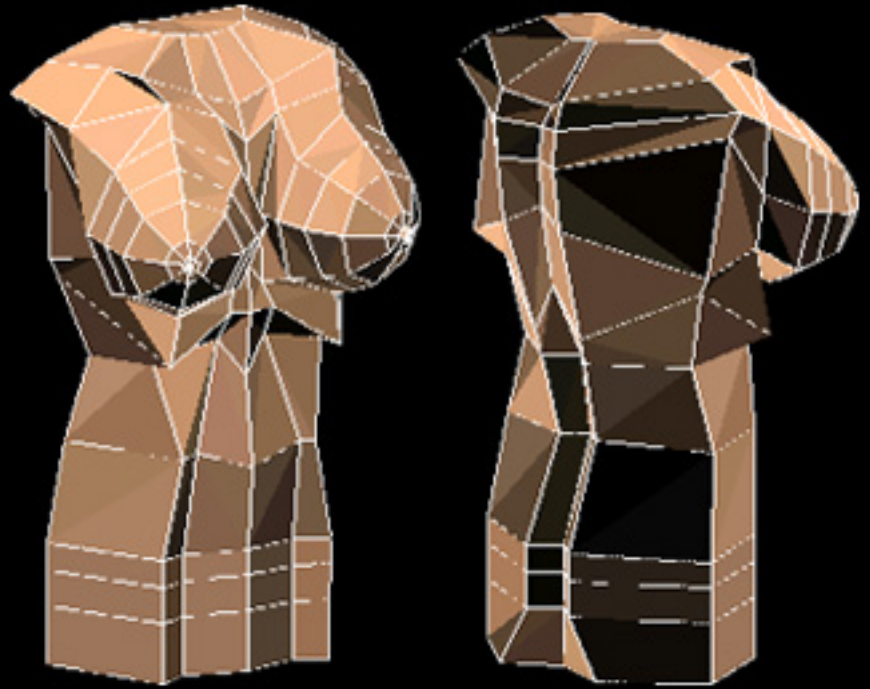
Step 5

Now duplicate the breast object, and attach both to the torso. Using Edit Mesh's "weld targeted" vertex allows you to click and drag a vertex onto another one for easy welding. Everything should line up nicely now since the correct number of points were created in the previous step. Make sure that you delete any interior faces.



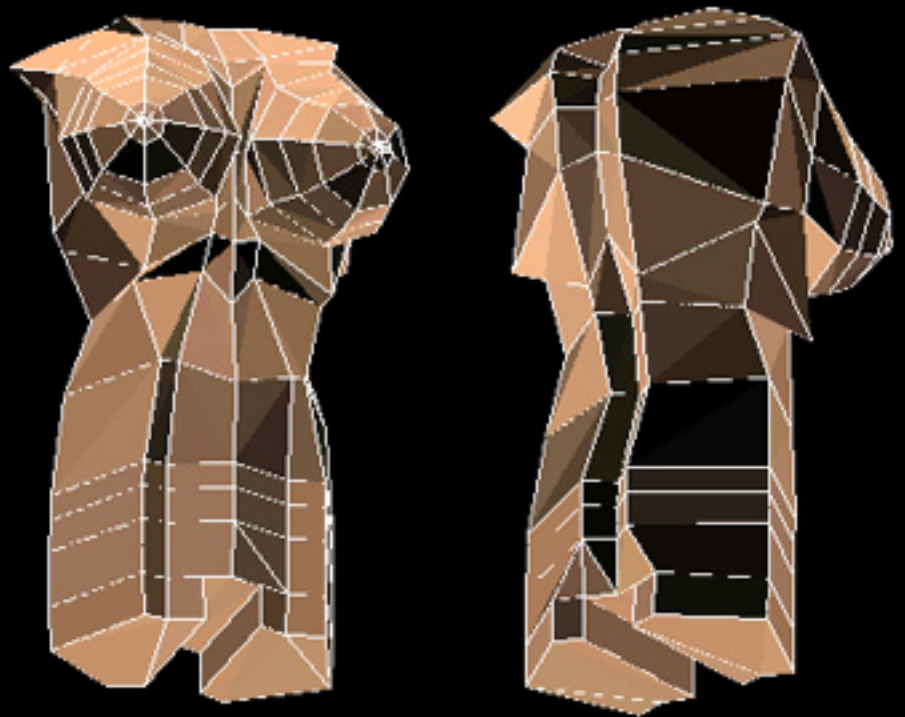
Step 6

Now you can start to adjust the mesh and points as you work. The next main section is to extrude the bottom torso polygons down several times to create the pelvic area. Then move the vertices around to create a more normal body shape.



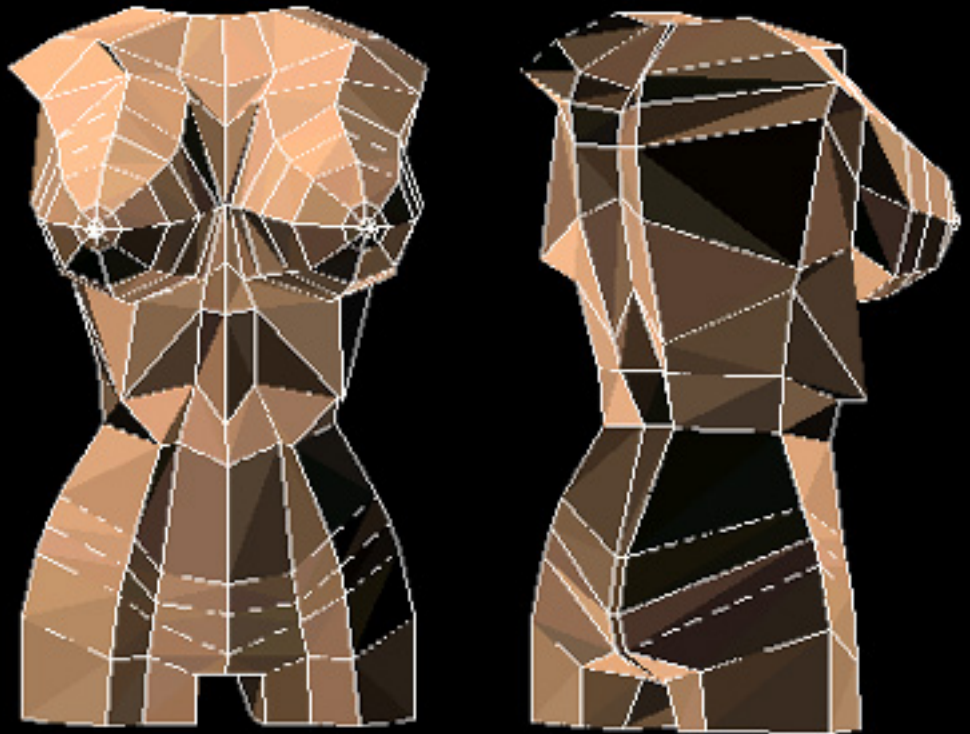
Step 7

Slice the bottom faces and/or turn edges such that you can extrude separate polygons for the left and right legs.



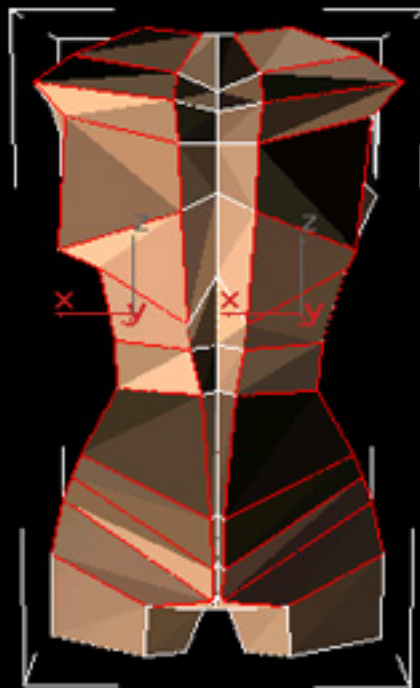
Step 8

Now tweak the mesh some more, moving points around for a more proportionate shape. You will probably note that there isn't enough control in some areas for the right roundness, particularly in the back.

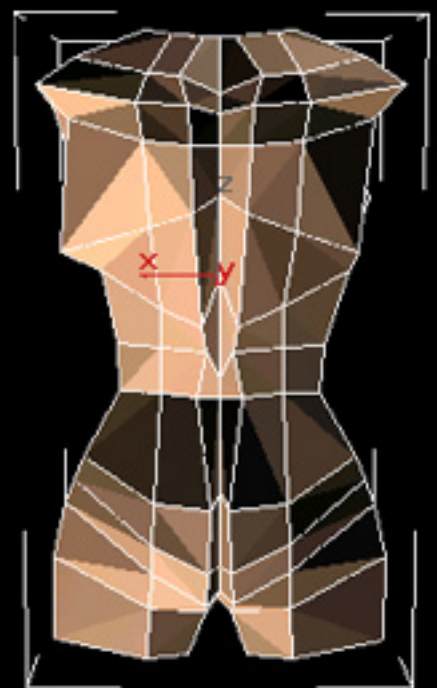


Step 9

In order to get a more correct rounded shape, select the faces on the back sides, and slice or divide edges. Then adjust the points to look rounded.



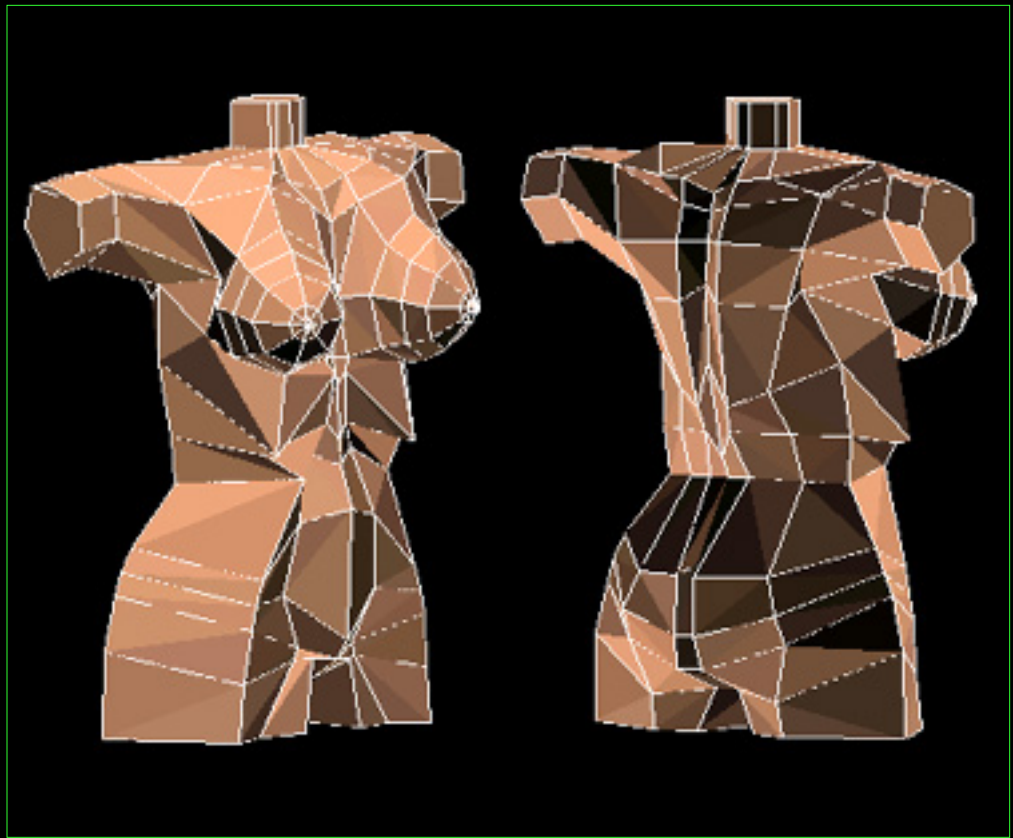
Selected
Faces



After 2 Slice
Modifiers

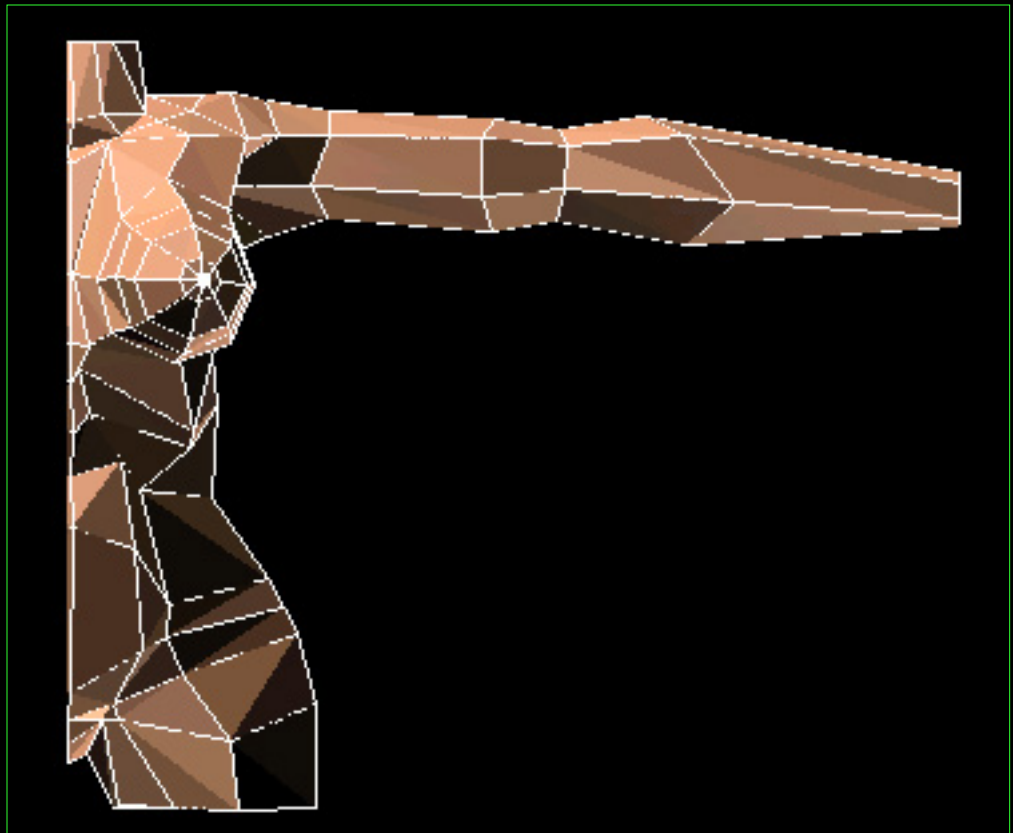
Step 10

Arms are created by turning edges on the sides of the torso to create a general 5 sided shape, and then extruding those sets of faces.



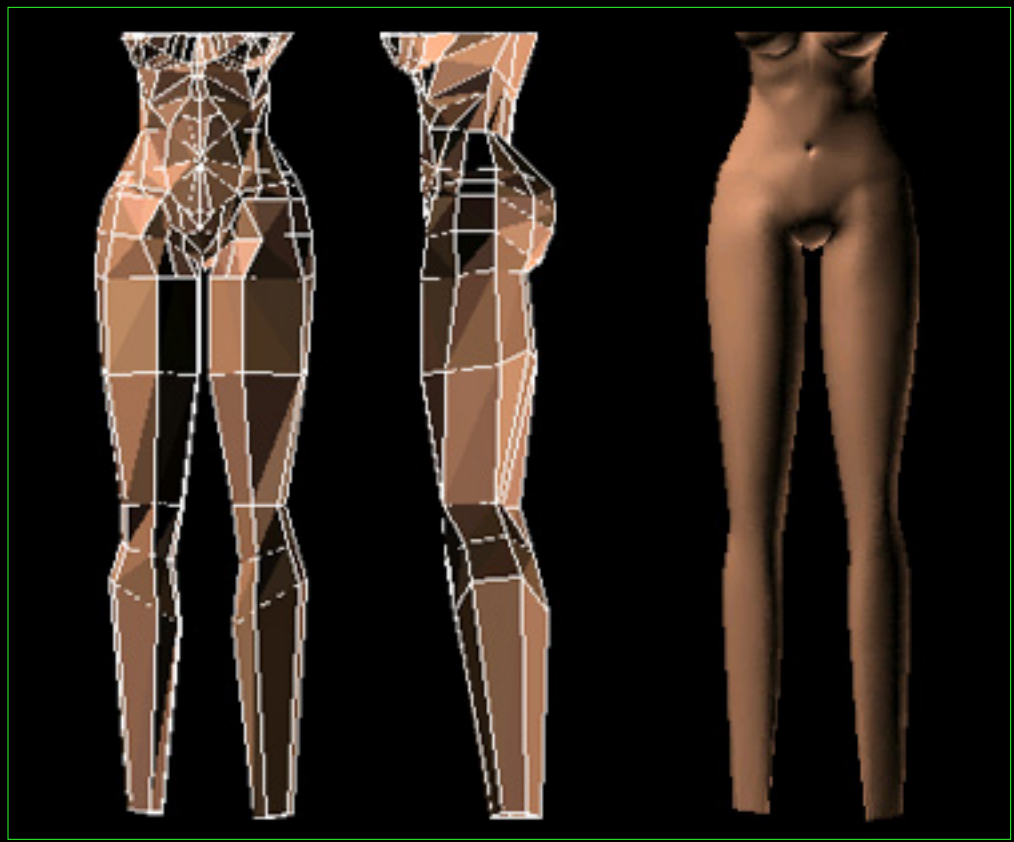
Step 11

Continue to extrude the arm polygons, then go and move the points around in the proper proportion.



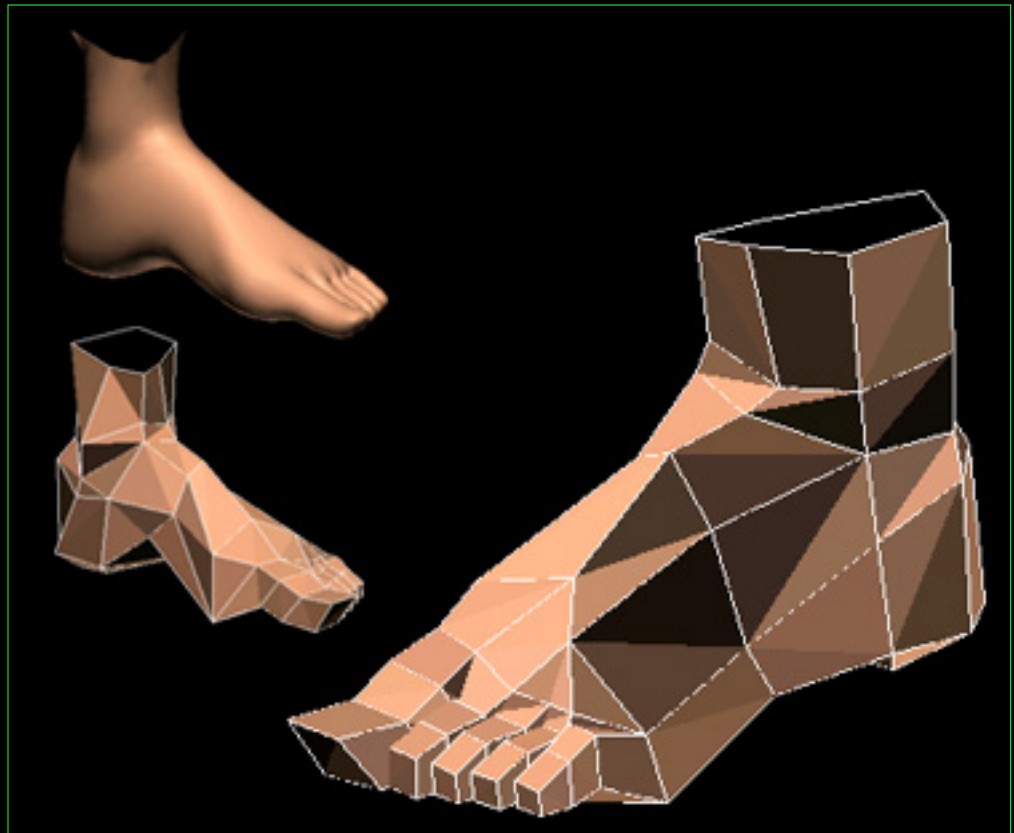
Step 12

While adjusting the overall look of the model, slice the torso area to create a navel indentation. Then, select the faces on the bottom of the body and extrude downwards to create the legs. You can start to slice and modify the mesh at other locations to create more detail where needed.



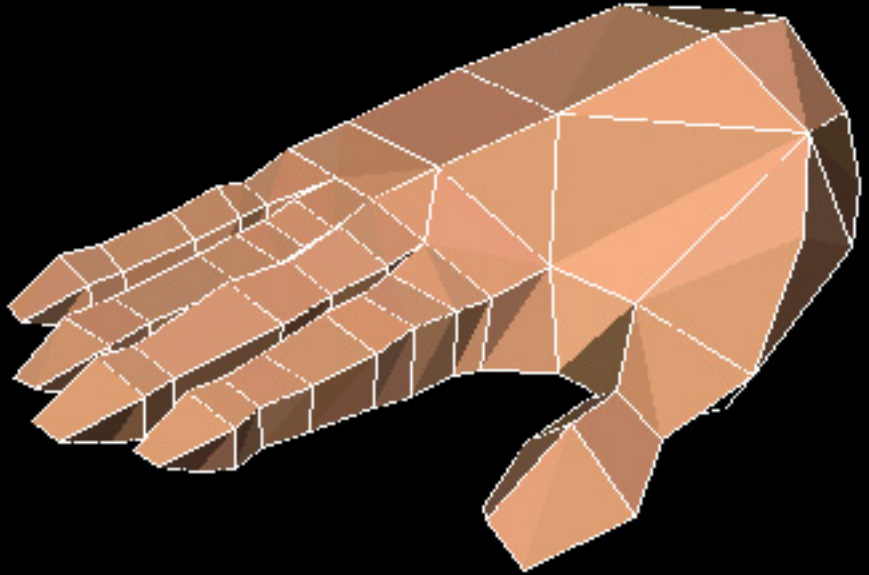
Step 13

To create the feet, extrude the bottom ankle face down several times. Next, take some of the front faces and extrude them forward a few sections as well. Then, move points and divide as needed to get an appropriate shape. The front face can be sliced or divided several times so that individual toe faces can be extruded out of it. Note that turning edges here can be very important if you are using MAX.



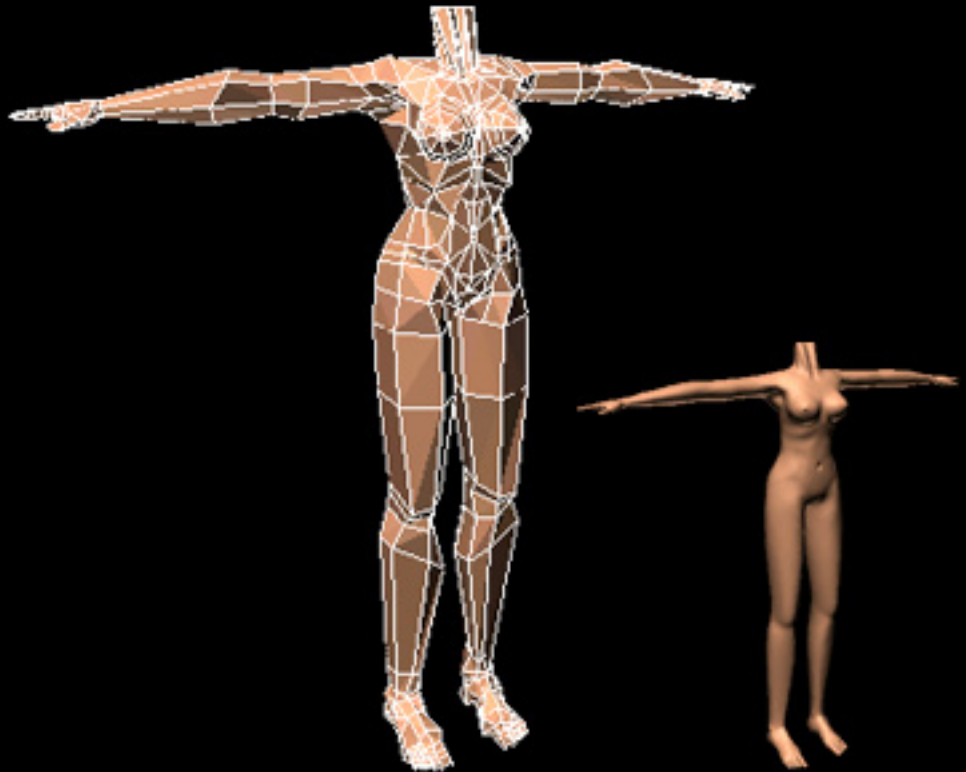
Step 14

The hand is created in a similar fashion. Either starting with the end of the wrist face on the arm, or with a box, extrude several segments, then adjust and divide sections to give the proper shape. Once again the front face can be sliced to allow separate finger faces to be extruded. The hand used here is pretty basic, one could easily add more detail.



Step 15

You should now have something pretty close to a basic humanoid mesh. Continue to add details and move points around to fix proportion mistakes, and to make things look more rounded.



Step 16

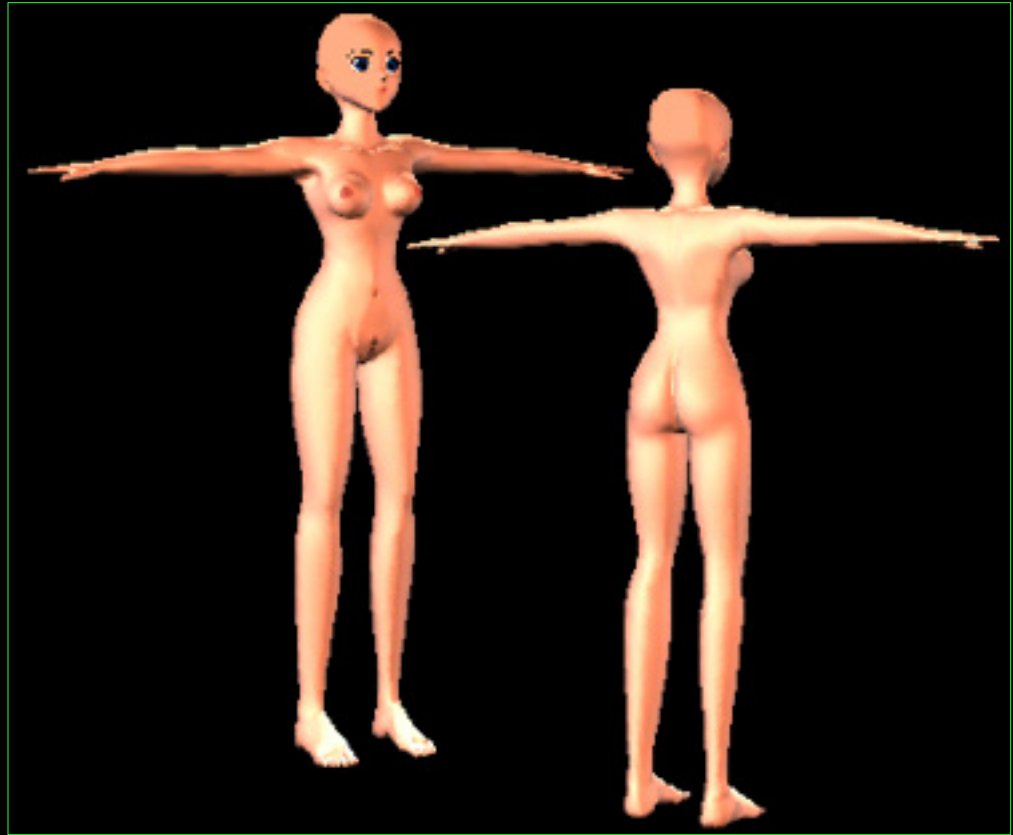
Finally, you can apply meshsmooth as shown (if you haven't already). You can select faces and give them different material id #'s for a multi subobject material mapping. You can also UVW map selected faces and texture them as needed.

In this case I took the spline head I created earlier in a different article, then converted it to a low poly head using a surface setting of 0 in surface tools. I then adjusted the low poly head and corrected the proportions and details on it, using the meshsmooth techniques as above. Using the same attach and weld processes also mentioned, I joined the low poly head mesh onto the low poly body to create one seamless character.

Final

In the end you should plan on spending a lot of time simply moving points and adjusting edges to get the proportion and model looking correct.

The hair on this character was created by making a simple spline shape and then creating a MAX loft object of a flat ellipse type spline down its length. Using MAX's auto UVW map coordinate generation for loft objects allowed me to map the hair with a photoshop drawing for color and opacity I hand painted. You do have to adjust the V parameter of the loft mapping to be a little off from 1.0 (like 1.12), or you will end up with a hard edge on the bottom.



In addition by keeping the hair objects each in their loft form, I was able to link x-form, or bone the spline path of the hair. This allows me to animate the spline hair path, and raise or lower the detail of the hair mesh itself afterwards. It's also easier to setup a few spline control points than a detailed high poly hair mesh.



These are the basics of how I created the character shown here and on my web pages. Hopefully this will yield a good starting point for creating your own 3D characters. Since this was my first attempt at meshsmooth modeling there are definitely areas where I could have saved time by dividing faces earlier, or adjusting the mesh a little differently. In addition, the mesh is pretty dense because of the detail needed to round out some of the shapes for meshsmooth. While I like the tools for low poly modeling more than splines (it's a lot easier to extrude faces and weld targeted vertices instead of having to create spline lines and manually weld), in many ways spline modeling still gives you more control. As to what I'd use next time, I guess it depends.

Render On!

Special Thanks

Special thanks to [Matt Kresge](#) for helping me deal with proportion issues and anime style issues in 3D. Also [Hoang Pham](#) and Peter Han for helping with basic critiques as well.

About the Author

Michael Comet is an animator and artist currently working at the video game company [Volition, Inc.](#), where he animated most of the cinematic sequences for Descent: Freespace. He can be reached via email at comet@comet-cartoons.com, and has a personal homepage at: <http://www.comet-cartoons.com/> which has more information and samples of his work

About the Sample Images

The character is part of a personal project I am working on.

This article, all images and character designs are Copyright ©1999 Michael B. Comet All Rights Reserved.

This article may be reprinted for personal use only. It may not be packaged or sold in part or in whole, either alone or as part of another package. Unauthorized duplication is strictly prohibited. This article and related artwork, samples or text, are not to be copied onto other sites without prior written consent from the author. When in doubt, ask.