Animator Friendly Rigging
Part 2b

Creating animation rigs which solve problems, are fun to use, and don't cause nervous breakdowns.

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Review The Requirements

In Animator Friendly Rigging part 2a, we determined our Torso Animation Requirements, and our rig requirements. Let's review them before we continue.

Torso Animation Rig Requirements

1. Allows for rotation of hips and shoulders
2. Allows for rotation in all axis – Bend, Side to Side ,and Twist
3. Allows for independent motion of shoulders and hips.
4. Allows for relocation of pivot.

Remember, for each control we have a set of requirements that must be met.

Rig Requirements – CONTROL

1. **Simple controls**
2. **Animation should be easily transferable.**
3. **Controls should be unique and make immediate sense.**
4. **Controls should have the correct rotation orders.**
5. **Controls should be named correctly.**
6. **Only be able to set keyframes on controls we want animators using.**

And we have a set of requirements that the *entire* rig must have.

Rig Requirements – ALL

These are general rig requirements that all animation rigs should have. Usually these are done at the end of the rigging process.

1. **Only be able to select what the animators can use to animate.**
2. **Clean outliner when finished.**
3. **Can move the rig to any position and orientation and have it work.**

Creating the Torso Rig

Now let's move forward and actually create the torso rig for our character. We'll be using the character **JJ** that comes with the DVD. He's a relatively simple character, and should suit our purposes for demonstrating the rigging techniques.

The first step is making sure that we have a good working directory to work with **JJ** for creating our rig.

1. **Add JJ Model to the Library**

    - Create a new directory called JJ in **Library > Characters**
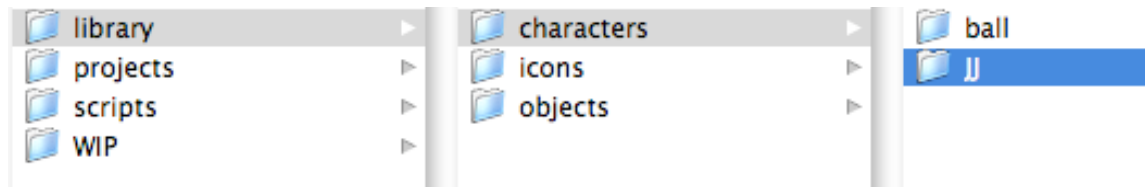
Figure 78 - Creating a JJ directory

    - Add a **model** directory inside the **JJ** directory

    - Copy **example_files > jj.ma** to **library > characters > JJ > model**

2. **Open File *jj.ma***

    - Choose **File > Open**
    - Navigate to your new **model** directory
    - Choose *jj.ma*
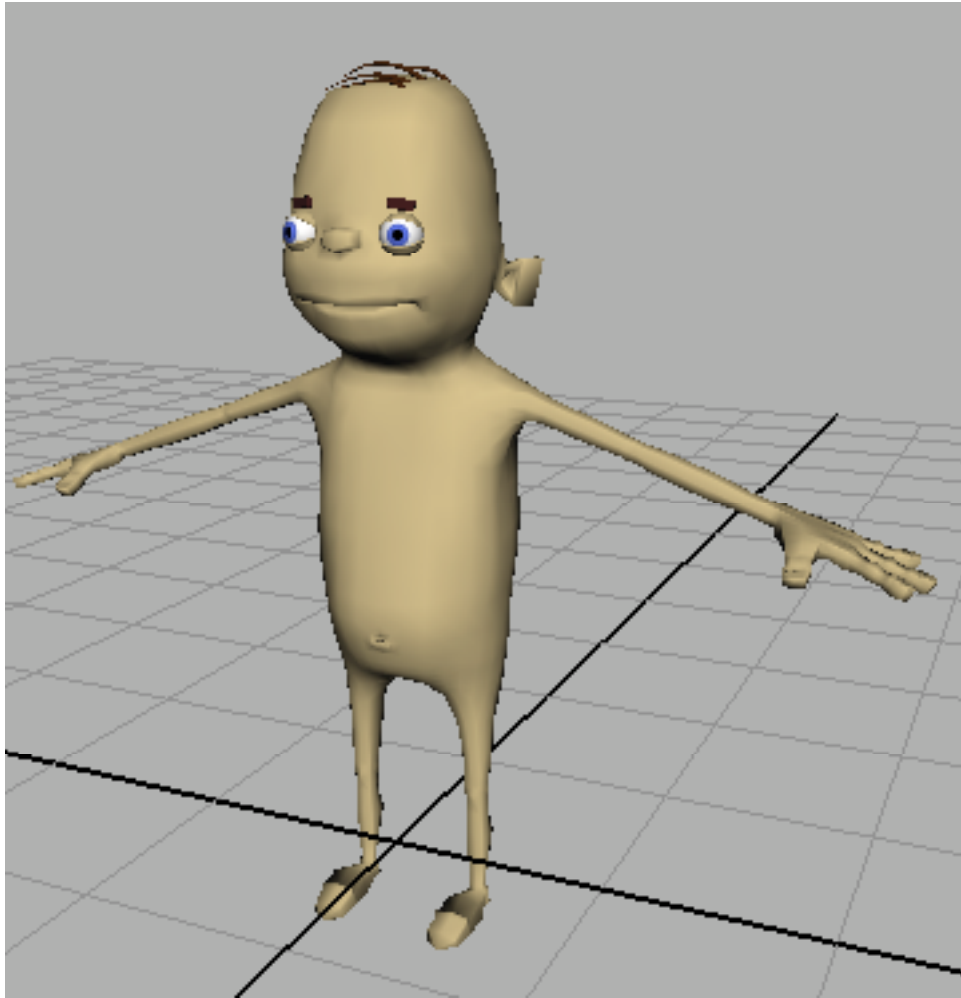
Figure 79 - jj.ma loaded into Maya

One of the first things that we're going to do with our rig is break it apart into smaller pieces. Each of these pieces will be parented to the joints that will make up our animation rig.

This will be our **Low Resolution** model.

Why do we create a **low resolution** version of our character? Because it's *much faster than a skinned model*.

A fully skinned character can take seconds to update each frame. A model with geometry simply parented to the joints will update in *real time*. The faster the updating, the faster the animator can work, and the better their resulting animation will be.

Remember this equation, because it's one of the most important ones you'll ever learn:

FASTER = YES!!

If you ask any animator if they'd like something faster, their answer will be an extremely loud and shocking "YES!!".

We want our animation rig to be as fast as possible, so instead of providing the animator with a final skinned character to animate, we're going to give them a fast, trimmed down character. A low-resolution / fast-animating machine.

To do *that*, we must break apart the model into pieces that we can parent to the joints.

Since we're going to be working on JJ in various stages, we will need to segment him into separate parts. I recommend doing *gross* segmenting (not blood and guts, *large* segments) first. Just break him apart by the torso, arms, legs, head, etc.

Then later we'll refine those segments into smaller bits for us to use as we need them. I also recommend keeping those segments all together in a singe file that we update each time we break apart another section. This way, at the very end of the rig you will have a single file you can import with the character broken into segments that you can use very easily.

Animation Rigging Vs. Skinning

Before we continue on with the creation of the rig, I want to clarify one item. This course is focused on creating an animation rig that your animators like. It's focus is *not* on creating the final skinned character. That topic could easily cover 4 *more* DVDs, and is definitely not the focus here. Standard practice in studios does dictate a separation between the two systems. Usually there are two separate rigs.. a skinning rig that deforms the geometry and has a full skin/ muscle system driving it, and an animation rig that is controlled by the animators. There's generally some way that the animation is transferred *from* the animation rig *to* the skinning rig. This can be done by copying the animation from the skeleton on the animation rig to the skeleton on the skinning rig, by constraining the skin rig *to* the animation rig, or a myriad of other ways.

This course *will not cover* that aspect of rigging. It is meant merely to introduce you to interesting and useful techniques of creating an animation rig.

There. Now that that's out of the way, let's continue with our character!
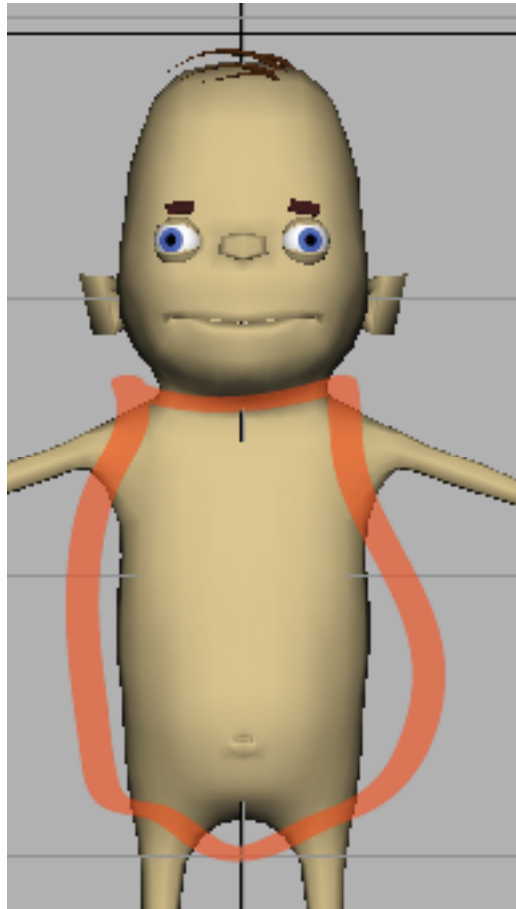
Breaking Apart The Character

Figure 80 - the area of JJ that we're going to separate

One of the great things about starting with the torso, is that it separates each part of the body. So we can use this as a great starting point to breaking apart the body for each piece of the rig.

3. Select the faces on the torso mesh

- Select **jj_geo**

- Choose **RMB > Face** so you can select the faces of the polygons.

- Select the faces that make up the torso. You can see them in the images below. Your goal is to pick everything except the neck, head, arms, and legs.
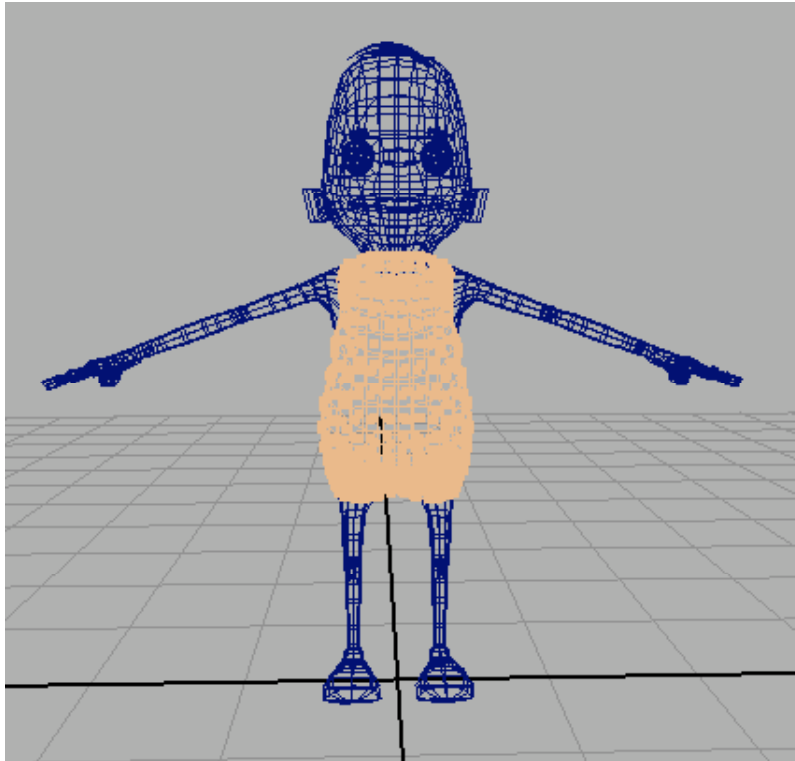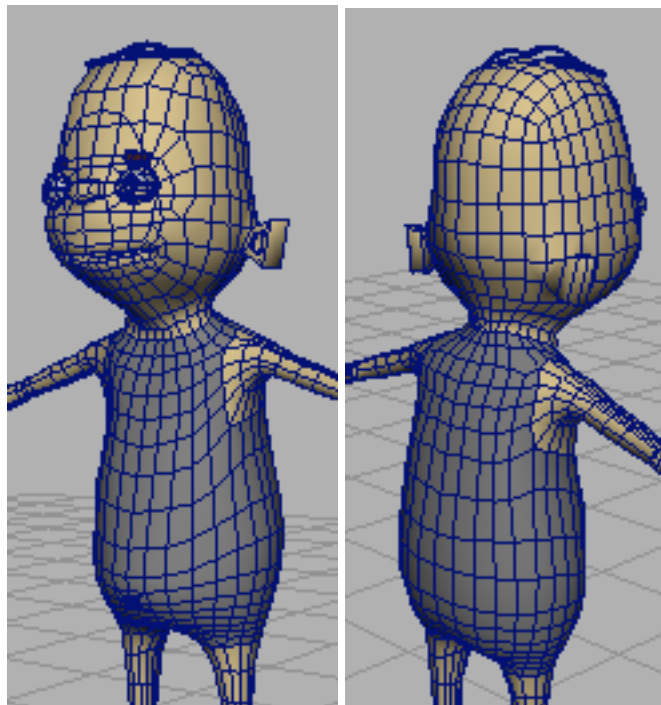
Figure 81 - torso faces

Figure 82 - You can see a close up of various areas of what is selected for the torso faces.

4. Separate those polygons

- Choose **Edit Meshes > Keep Faces Together** and make sure it's
  checked **ON**. If it's off, when you separate the character each individual
  face will be it's own polygon. *Nasty!*

- Choose **Meshes > Extract**

- Choose **Meshes > Separate**

You now have separate body parts for JJ, and in fact if you select the torso,
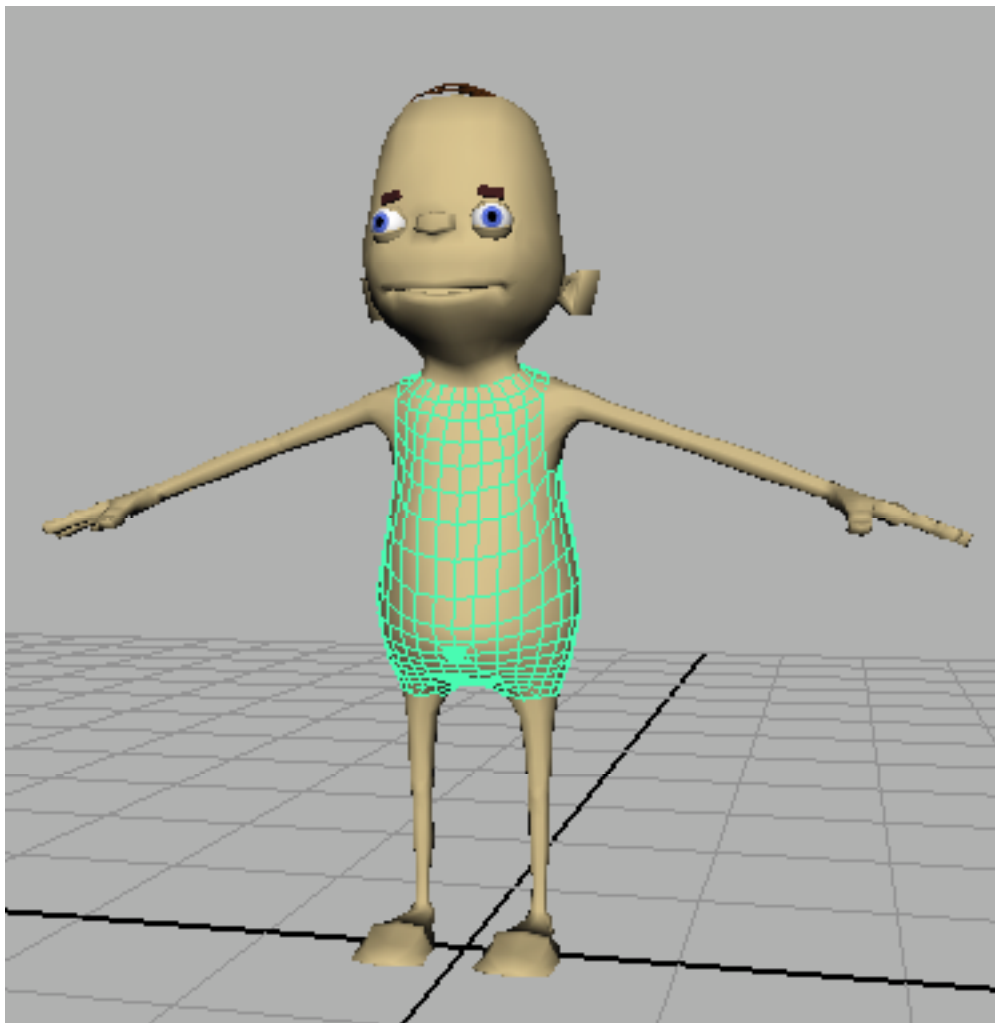you'll see that you just have it selected on it's own.

Figure 83 - JJ torso

**5. Rename each of the new pieces of geometry**

- Open the **Outliner**

- Open **jj_grp** by clicking on the little ⊞

- Open **jj_geo** by clicking on the little ⊞
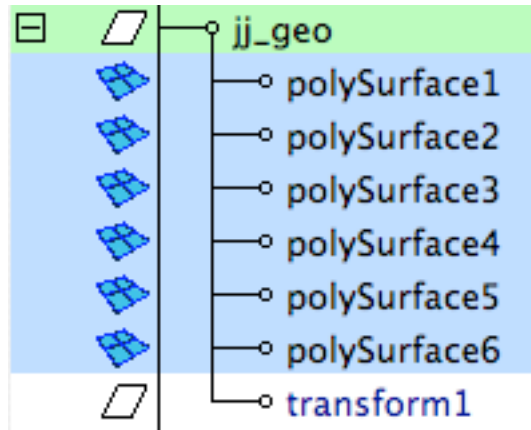
- Notice you now have a list of polySurfaces

Figure 84 - Resulting Polygonal Surfaces after Separating the geometry

- Name each polySurface based on the body part, so the result looks something like:
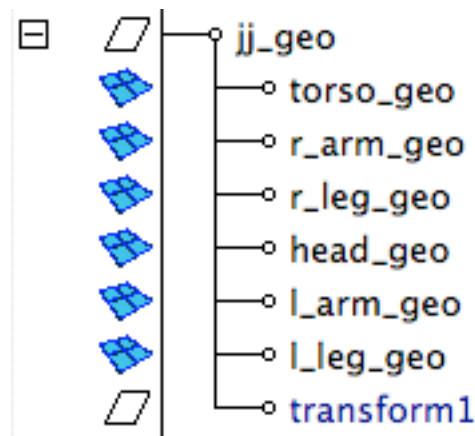

Figure 85 - Surfaces renamed

6. **Delete the construction history on the model**

- Select the six resulting surfaces (**torso_geo, r_arm_geo, r_leg_geo, head_geo, l_arm_geo, l_leg_get**)
- Choose **Edit > Delete By Type > History**
- This will remove that **transform1** object, and remove the construction history on the object.

7. **Save the broken apart geometry in a file that we will keep working on**

Since we're going to be working with this character a number of times, and we're not sure exactly how broken up he's going to need to be for the final rig, it's important to begin saving him in his current state in a place we can easily come back to.

I like to create a directory called **model_lowRes** in the library for my character. This means that we can use these pieces as our low resolution geometry. Note, you don't have to use actual broken pieces of your final model as your low resolution geometry, but it helps the animator get an idea for the shape of the model they should expect to see.
- Create **model_lowRes** in the **Library > JJ** folder

Figure 86 - creating model_lowRes folder

- Save the file as *jj_lowRes.ma*

We now have a file we can keep breaking apart as we need to while working on our rig. In the end, we'll have a fully segmented model with all the proper naming.

Segment The Torso

When determining how to break up the torso, it's important to think about what how many segments you need to get the type of motion you want. The more segments, the more flexibility, and the easier it is to control. However, with too many segments, the rig could run too slow.

What is a segment? A segment is one section of geometry. Look at the figure below for an example.
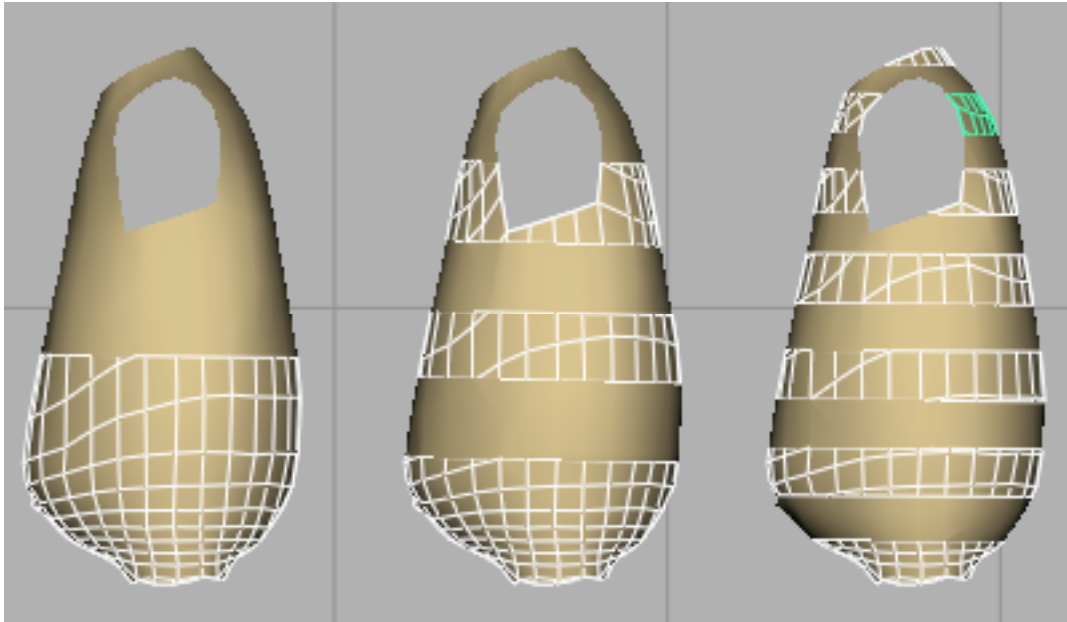

Figure 87 - the torso broken up into 3 different amounts of segmentation. The torso on the right has 2 segments. These aren't enough to really animate the body. The middle has 6 segments. This can give you a pretty good range of motion. The right one has 13 segments. Probably a few too many unless your character has a reason to be that bendy.

How many segments should you use? It depends on your character. On average, I'd say you should have at least 5 or 6 segments to work with for your character. This will give you enough joints to manipulate the character with the speed necessary for the animator to love you forever.

How to segment the torso.

One of our requirements for our torso rig is to keep the hips and shoulders steady. The best way to do that is to make sure that they are *100% controlled by our animation controls*. The center part of the back will be the part that is controlled by the splineIK. Thus, you want to segment your character in to even chunks with enough segments in the middle so that the back can bend easily. That means 5 or 6 segments *excluding* the hips and shoulders.
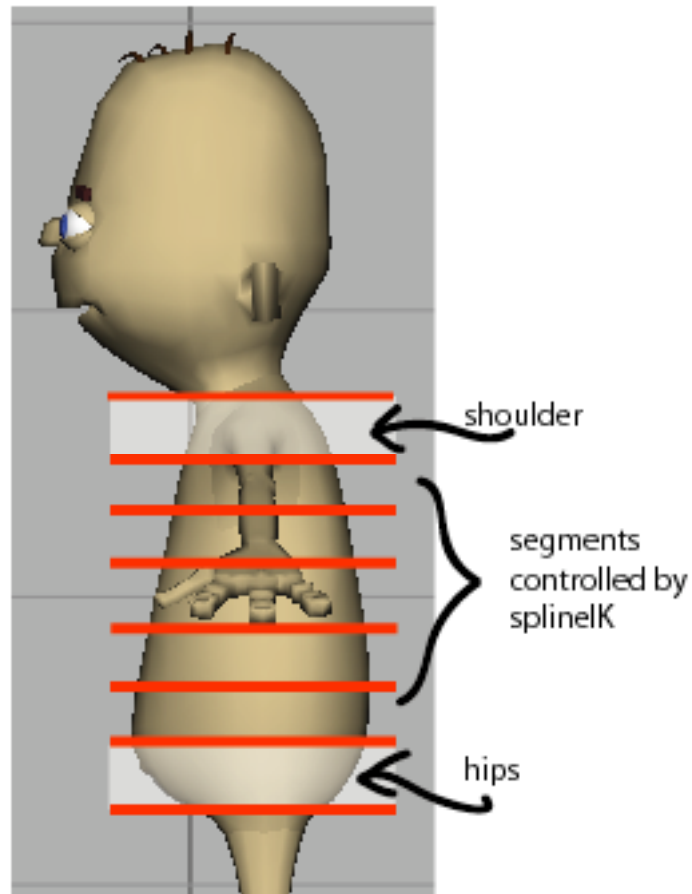
Figure 88 - Segment the body enough for the hips, shoulders, and *back sections.*

A quick way to segment the torso is to use the **js_cutPlane.mel**[i] script which will allow you to take a series of nurbs planes and cut the polygon in half.

Want to learn more? Purchase the entire DVD at:

http://jasonschleifer.com