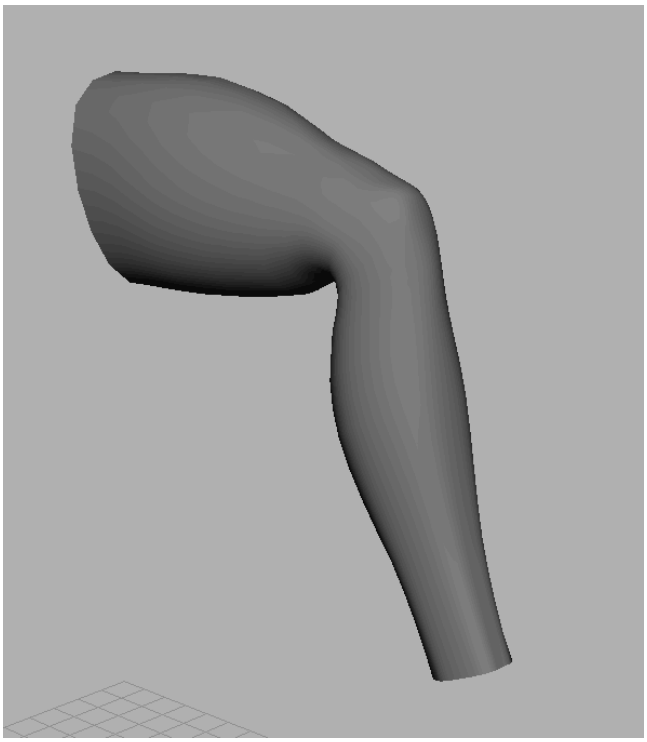
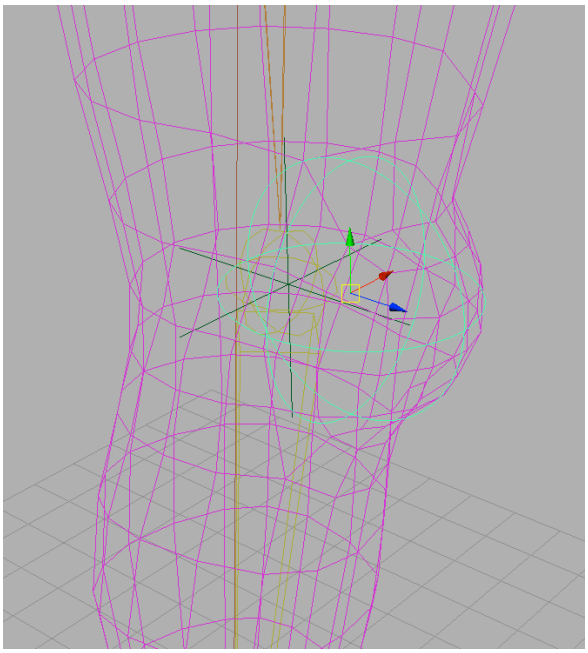


General deformers

Deformers are used to change the shape of objects using a control object or setting. They allow artists to work faster and more intuitively to reshape objects compared to the more tedious task of moving the hundreds or thousands of individual points that define the shape of objects. You can think of a deformer as a tool that can bend, squash or sculpt objects by affecting many points with a few controls.

Most deformers are assigned to points or cv's. You can either select a few points, the entire object or a hierarchy of objects (objects that are grouped or parented together). In Maya you can use the "edit membership" tool to control what points are affected by the deformer. Some deformers have weight, this is a value assigned to each point ranging from 0 to 1 that define the deformers amount of influence (0 being no effect and 1 being full deformation). These can be edited by several methods such as painting or setting values in an editor. Editing these values allows for more control over the results. In production deformers are used for everything from squashing a ball to simulating muscles and creating facial expressions. They are one of the most powerful tools for modeling and animation.



Sculpt

The Sculpt deformer by default creates a spherical deformation, which is a localized bulge effect around the surface of the sphere. You can control the amount of bulge and whether it pushes out or pulls in the surface. In the above example a sculpt deformer is used to create the effect of a knee cap under the skin.

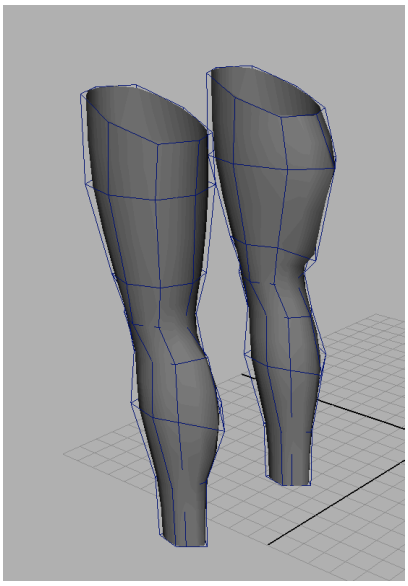
The sculpt deformer is a 2 part deformer that uses a Sculpt Scale Pivot (locator) and Sculptor. In order to reposition the Sculptor so that it affects another part of the deformed object you need to move both the sculptor and Sculpt Scale Pivot together,

Other advanced options allow you to use your own custom surface and paint a deformation texture with the Sculpt tool.

Common uses
Simple muscle systems
Skin sliding effects
Deformation control to avoid rubber-hosing issues with joints (maintaining volume)

Pro's
Fast
Easy to use
Can use custom geometry for sculpt shape

Cons
Needs to be parented or constrained to a rig
Can sometimes cause unpredictable flipping or stretching
Scale needs to be frozen when using custom shapes



Wrap

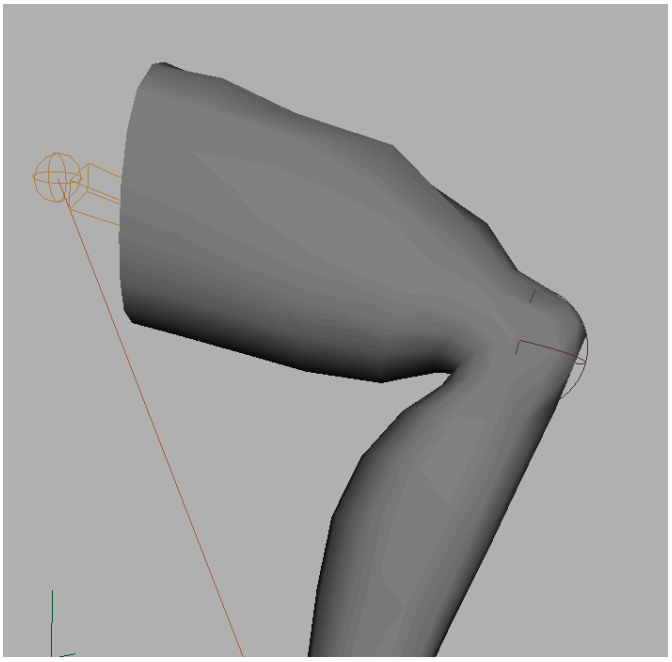
Wrap is similar to a lattice (a 3D grid of points) but is actual geometry, built as a cage around the object to be deformed. Moving a point on the cage (Wrap) will move surrounding points on the object being deformed. This tool is often used when you have a low and high resolution character. Above you can see the low resolution is used as a Wrap to deform the high resolution skin.

The Wrap also creates a base shape. You can use this base shape to scale or reposition the Wrap without deforming the object by moving both the Wrap and the base shape together.

Uses
Indirect skinning, using a low resolution character to drive a high resolution character
Muscle setups using a Wrap object inside the wrapped object.

Pro's
Wrap objects can be easily shaped and deformed using any type of deformer or joints
Allows simple transfer of deformation between different objects
You have full control of the Wrap object's shape

Cons
It has linear falloff, so deformation can be a little jagged
The Max distance setting can cause some point jumping at the borders
It can be slow if you have high resolution Wrap objects



Jiggle

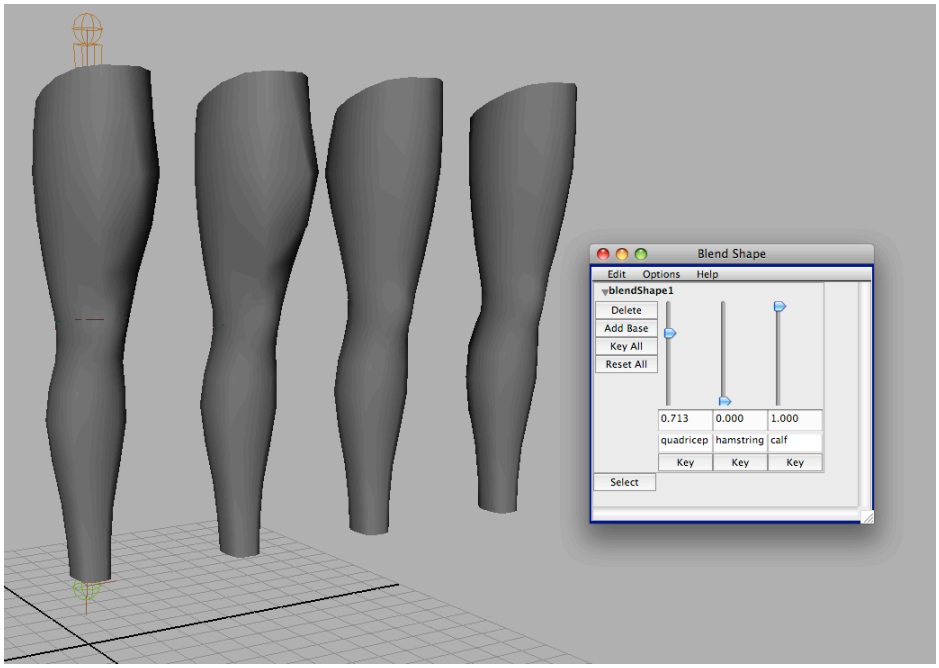
Jiggle is simulation type deformer, creating a jiggle or wobbling effect when objects are animated. It works by moving the deformed points in normal (out from the surface) and tangent (across the surface) directions back and forth as the object moves. By default if an object moves forward, the points will move back a little (or lag behind the surface) and then spring back to their original position with an overlapping type motion.

You can control the how much each point jiggles by assigning weight values to the points. You can also control the springiness of the Jiggle using stiffness and damping settings.

Uses
Good for making a muscle or fat jiggle on a character.

Pro's
It is much faster than a full soft body simulation
It's good for creating high frequency motion like a little jiggle on a muscle or fat
The Jiggle weights are easy to control

Con's
It's not a full simulation so it needs to be used in conjunction with animation
It doesn't have forces like gravity or wind
Being a partial simulation it's harder to art direct
Only shows when timeline is played or scubbed (?)



BlendShape

BlendShape is one of the most powerful and flexible deformers. It can pretty much do anything when it comes to controlling the shape of an object. It works by using duplicates (that have identical topology, same number of points and point order) as target shapes. These target shapes can be changed by moving their components. The BlendShape deformer calculates the differences between the target shapes and the base (original) shape. It creates a window of sliders that can blend the different shapes together. The most common use of a this tool is for facial animation setup. You can sculpt several facial expressions and mouth shapes and then use the sliders to change and blend the shapes. With a few well designed simple face shapes, you can use the BlendShape deformer to create complex facial expressions and dialog.

Uses
It is a great too for creating facial or muscle shapes

Pro's
It's very powerful and easy to setup
It's fully art directable
Keeping the target shapes allows you to change the shapes after applying the BlendShape deformer

Con's
You have to model all the shapes, which can be time consuming
It can be challenging if you need to change topology (but there ways to do this)
It uses linear Interpolation (points move in a straight line between shapes) making it problematic for large changes such as jaw movements