A CreativeCOW Cinema 4D Tutorial

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Cactus Dan Libisch:

Building a Stable Soft IK Leg Rig

Cinema 4D R8 Mocca Tutorial

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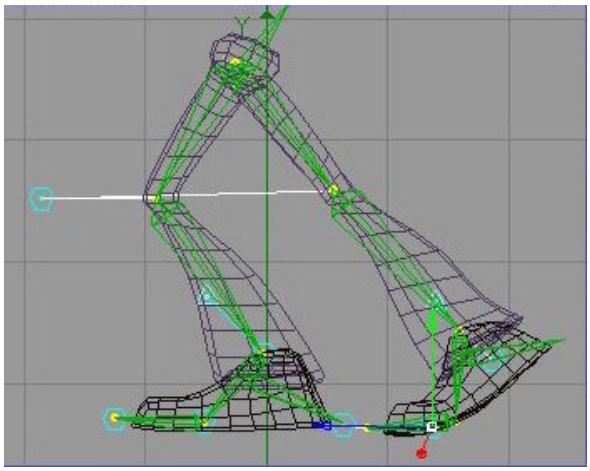
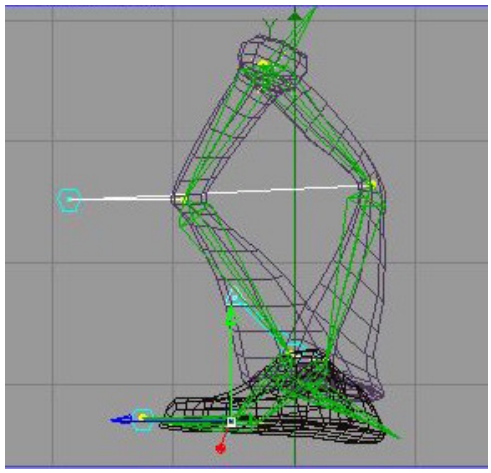
Article Focus:

After going through Maxon's Mime Mocca tutorial, Cactus Dan discovered that when he moved the controllers around, the rig didn't behave as he expected. He was quite discouraged and found himself almost at the point of giving up on Mocca and Soft IK, but needless to say, Cactus Dan is not one to easily give up. In this tutorial, Cactus Dan Libisch shares what he learned by working through the problems.

After going through Maxon's Mime Mocca tutorial, I discovered that when I moved the controllers around, the rig didn't behave as I expected. This was very discouraging and I found myself almost at the point of giving up on Mocca and Soft IK but, I'm not one to quit too easily. There had to be a way to make it work with Soft IK, so I kept at it. This is not to say that the rig in the tutorial is bad, just that it didn't work for the way I wanted to animate the legs. In fact, the tutorial in the manual is an excellent starting point for beginners like me (who know absolutely nothing about character animation, but want to learn). Remember, that no matter how good something is, there's always room for improvement, even with the leg rig we're going to build in this tutorial.

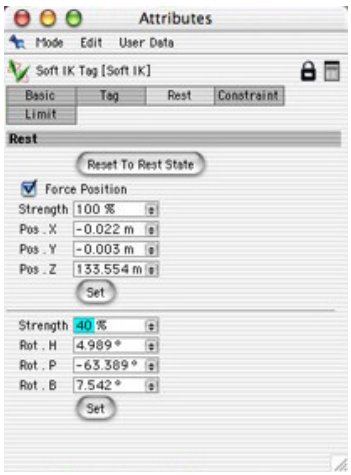
This tutorial is an explanation of the problems I was having controlling the legs of the rig and the solution that I managed to come up with. My goal was to set the leg rig up so that I only need to animate the Foot Controllers and the pelvis and still have the legs move predictably without any secondary controllers to animate. The first problem that I noticed was the knee's behavior when the Foot Controller was moved around. A prime example of this problem is, if you move the foot all the way back and then hit undo, the knee will stay back causing the leg to be bent backwards like this:





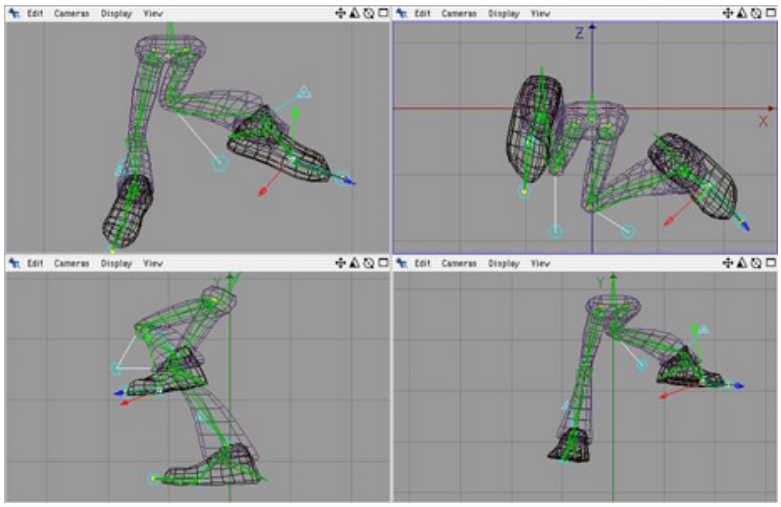
If you have Automatic Redraw enabled, Soft IK will slowly return the knee to the proper position but not fast enough for recording an animation. So what's the answer? Well I found it right in the Mocca manual on page 12; the Strength setting for the Rest Rotation. It says in the manual that the Rest Position and Rest Rotation strengths work against the Goal and Up Vector strengths and the chain will try to resolve itself between the two forces. For example:

Select the Left Thigh's Soft IK tag and go to the Rest page in the Attributes Manager and set the rotation strength to 40%. Now, with Automatic Redraw and Soft IK enabled, move the Left Foot Controller back and then hit undo. This time the knee snaps right back where it belongs.



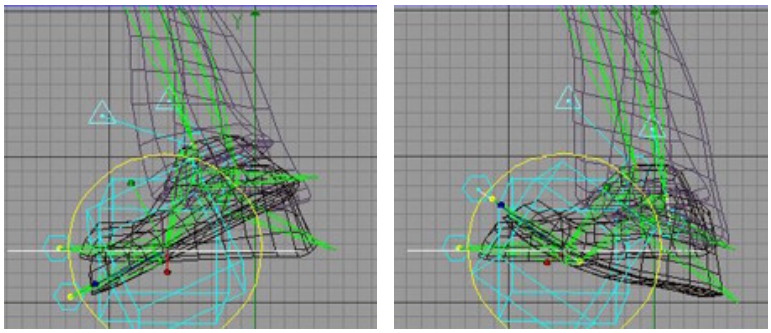
Another problem I noticed was that the shin bone keeps rotating around it's Z axis when you play an animation over and over until the polygon mesh is twisted beyond recognition. Here again the Rest Rotation Strength (for the shin bone) solves the problem.

Also, another problem is that the Knee Goals are in front of the character and a child of the Pelvis bone so that if you lift the foot and rotate it to the side, the knee wants to point forward and down like this:



If you take a look at your own leg, you'll notice that you can only rotate your foot a few degrees before your knee starts to follow your foot. Most people can comfortably rotate their feet at least 150 degrees from each other, but not without their knees following behind their feet.

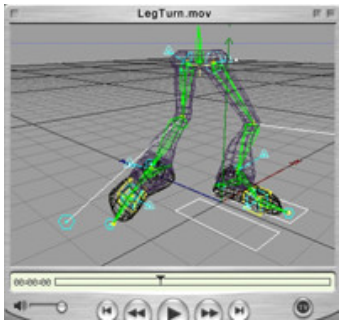
Still, yet another problem is that when you rotate the Foot Controller forward and backward the toes and heel still go through the floor even though the Foot Controller has a Clamp expression on it.



So, the conclusions I came up with are:

- Since the knee goal only has a strength setting of 22%, then the Rest Rotation strengths (of the bones affected by the goal) need to be increased.
- The Knee Goal needs to be a child of the Foot Controller so that it points in the same general direction as the foot.
- A few more expressions are needed for the toes and heel to also prevent them from going through the floor as the foot is rotated forward and backward.

With all this in mind, I'll show you how I put together a leg rig that is easy to use and allows you to easily control an entire leg by just animating the Foot Controller. The animation at the right is a good example.



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