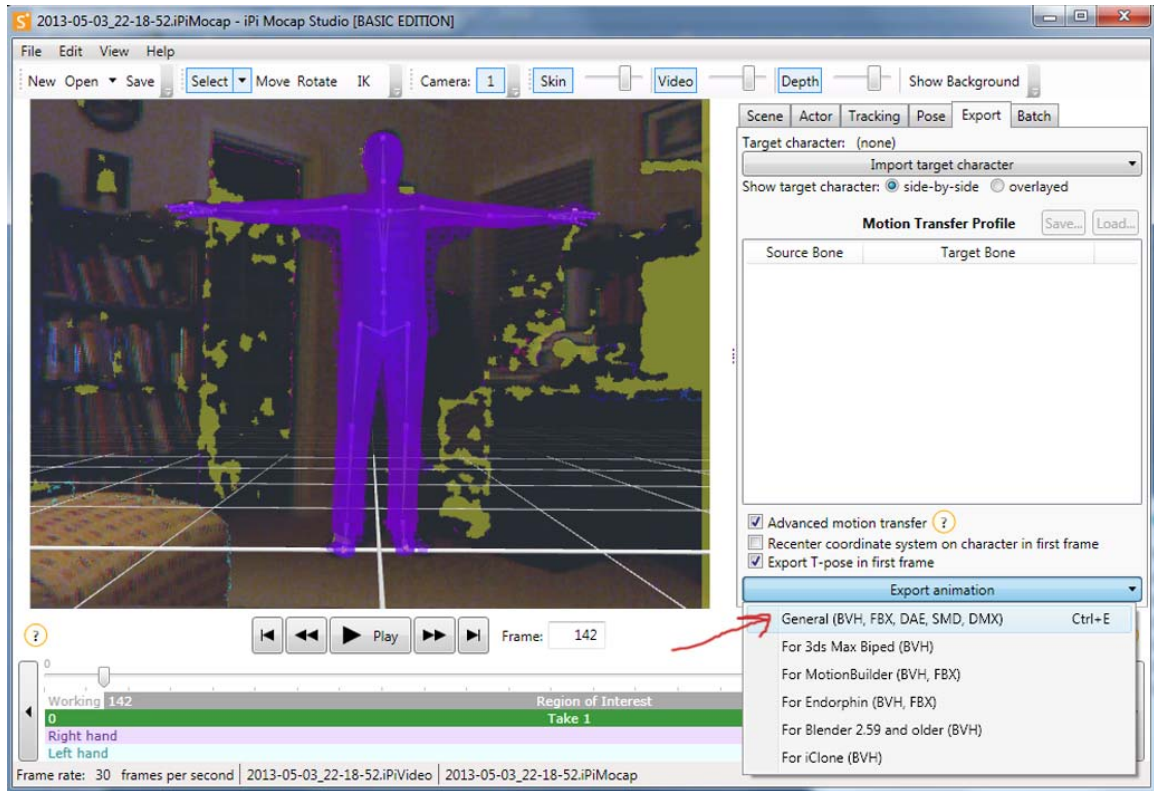# Mocap in Carrara - by CyBoRgTy

Animating in Carrara can be a lot of fun, especially when you combine keyframe animation with your personally captured motions. As a hobbyist creating mocap, I like to use the markerless kinect-based solutions. Some are free but don't have the features and usually cannot provide the results possible with more costly solutions. When comparing affordable kinect-based mocap solutions, I found iPiSoft tools (iPi Recorder and iPi Mocap Studio) using the dual kinect configuration provided the best results. So, my mocap to Carrara workflows will usually include iPisoft.

When using mocap to animate my characters in Carrara, there are two categories of workflows to consider; one for pre-rigged characters (such as the Daz or Poser models) and the other for characters that are not rigged yet (personal creations, others from public domain, etc.). I mostly work with my personally created characters, such as the Lego characters in a few of my movies. Since Carrara does not have rig retargeting like what is in Maya or in Lightwave with Nevron Motion plug-in, I need to make sure my characters use rigs that have bone naming conventions compatible with the tools used to create the motions. Of course I could import a motion file and apply the 'Track' modifier to various bones to get my characters to track/move with the imported bvh bones regardless of naming conventions. Instead, my characters' bone / skeletal rig hierarchies are either based on the bones exported from iPiSoft tools or based on structures exported from iClone. The bone naming hierarchy used depends on my chosen workflow for the project.
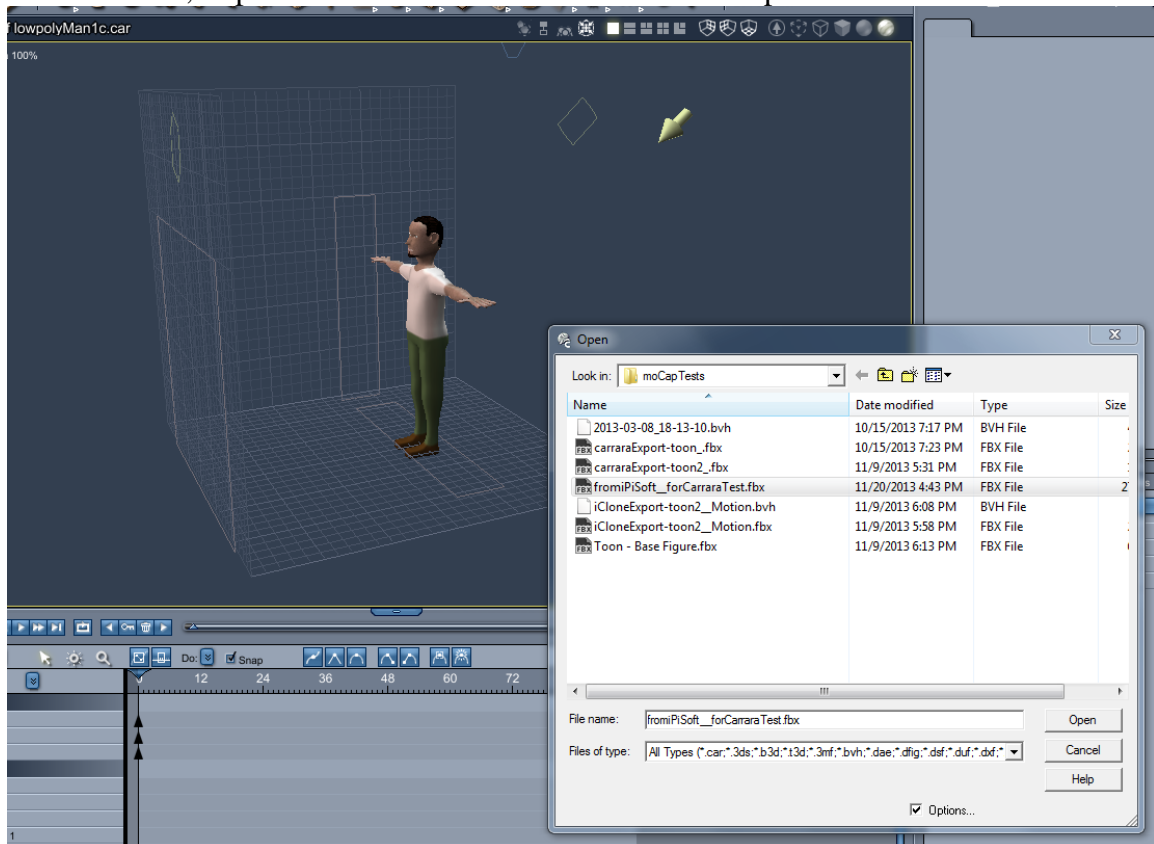
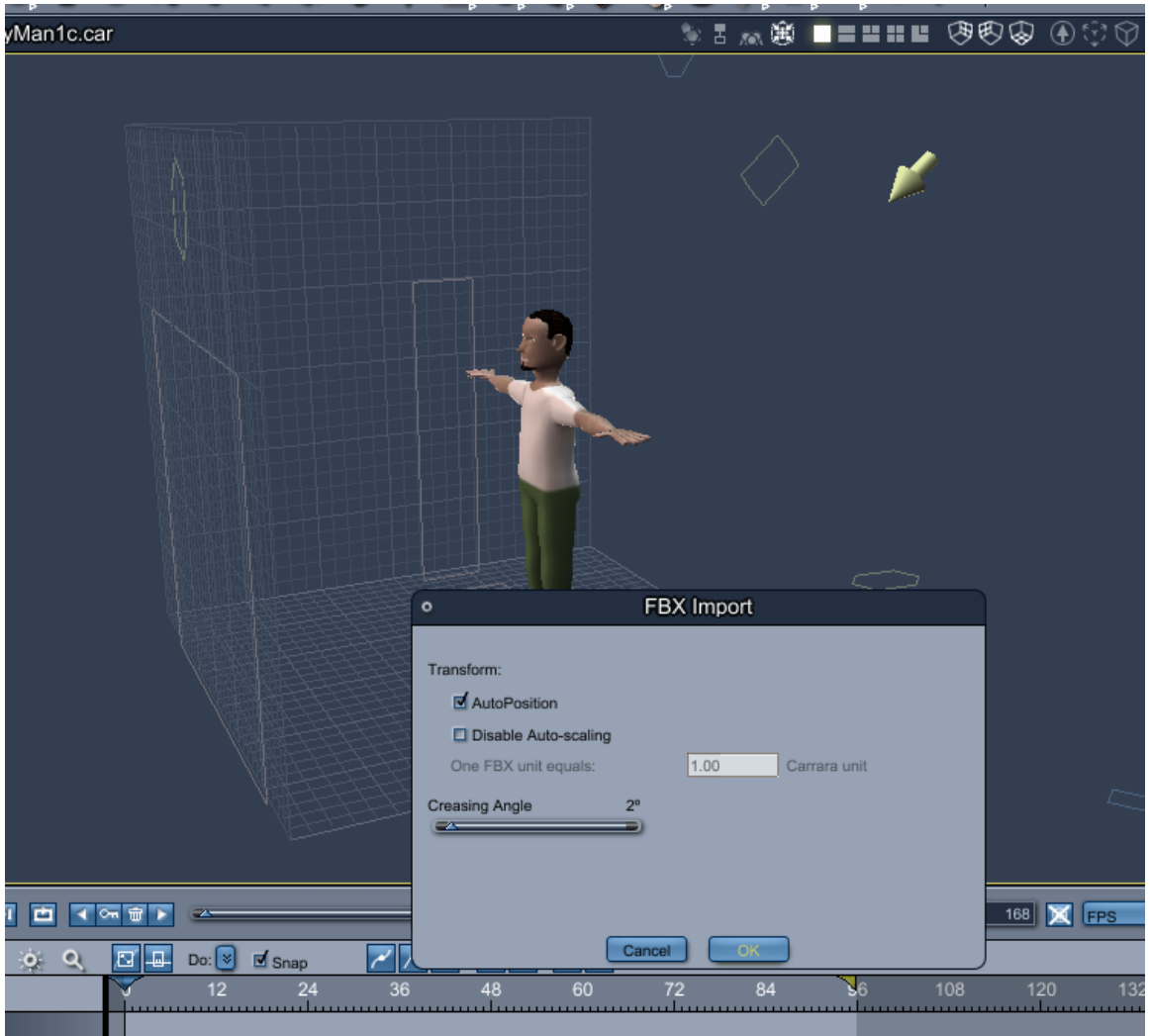## Using Carrara and iPiSoft tools with unrigged characters

This is what I use most with my personally created animated characters. If you are like me and not afraid to model or if you locate unrigged characters around the internet, this might be of interest to you. With this procedure, you are applying the iPi exported rig directly to your character. This speeds up the rigging process and creates the shortest/fastest path for taking iPi created animations to Carrara. The general workflow is:
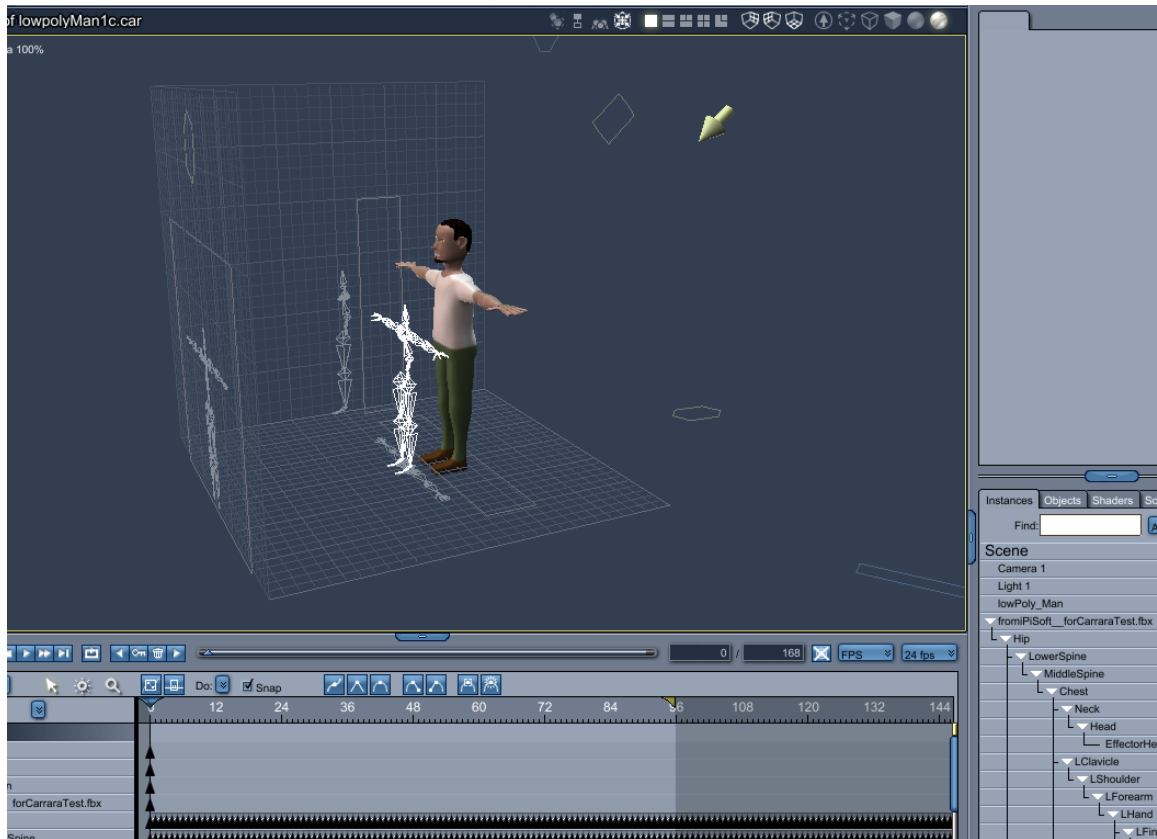
1. Create story, design set, storyboard, etc.
2. Create or acquire unrigged character
3. Use iPi Recorder and iPi Mocap Studio to create motions required by the story for that character (I use either one or two xbox Kinect cameras)
4. Export motions including T-pose from iPi Mocap Studio using general FBX export

5. In Carrara, import FBX motion file created in iPi Mocap Studio.

FBX Import

Transform:

☑ AutoPosition

☐ Disable Auto-scaling

One FBX unit equals: [1.00] Carrara unit

Creasing Angle   2°

Cancel   OK

168   FPS

Do: ☑ Snap

12   24   36   48   60   72   84   96   108   120   132

6. Align motion bones with character size and shape.
   You should select the bone group and scale it to the character's height. Then, translate the bones to place the joints where they should be on the character.
7. Attach bone hierarchy to character and adjust weights as needed.
   Scrub through the timeline to watch the animation and to check bending as well as bone influence on the character mesh. The character shown above is a simple low poly man that I created in Carrara (around 2000 polygons). I almost did not have to adjust any of the bone weights (I had to adjust a little around the fingers and thumbs). But you might have more to adjust with more complex characters.
8. Add character and bones to animation group.
9. Create animation clip from motion data.
   I usually will covert the animation to Animation Clips, which helps with reuse of animation sequences as well as retiming.

   If you need to import additional motions for this character, you should select the 'Create New Skeleton' option when importing. Add this new skeleton to an animation group. Now you should add the motions to a new animation clip and this clip could be used with your previously rigged character.

Using Carrara and iPiSoft with rigged characters

If using iPiSoft tools with rigged characters such as Daz or Poser models in Carrara, there are a few workflows/procedures that I have used. But here I will only cover the procedure

that requires iPiSoft tools, Daz Studio, and Carrara (including the aniblock plugin). You may wonder why I'm not describing a procedure that applies the iPiSoft created bvh directly to the Daz character in Carrara. Well, the main reason is the naming convention of the iPi bones does not match those of the standard Daz characters. So, we need to bring a copy of the Daz character bone hierarchy to iPi Mocap Studio and go through a retargeting process to produce the Daz compatible bvh.

I must admit I'm a Carrara user and not a Daz Studio user. Since I primarily used it to FBX export models and to perform the following procedure, I'm not very familiar with Daz Studio,
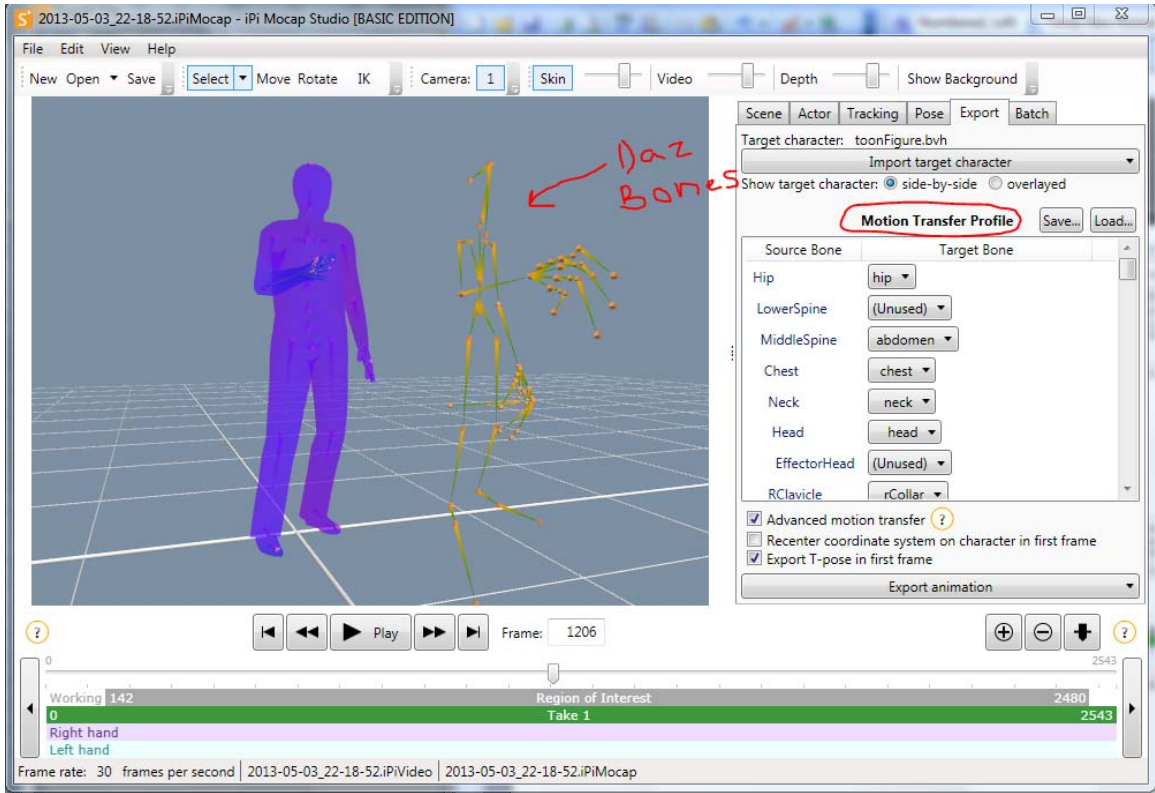
1. Create your motion(s) in iPiSoft.
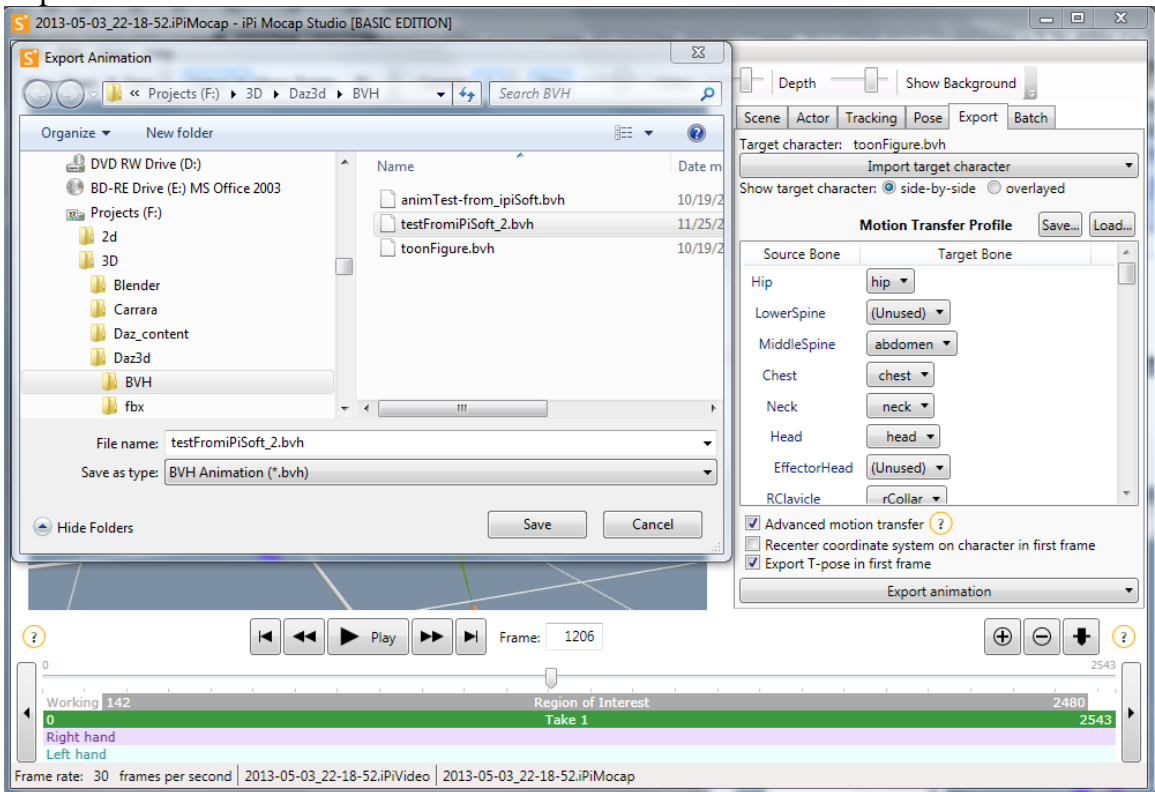2. Export bvh of the character from Daz Studio.
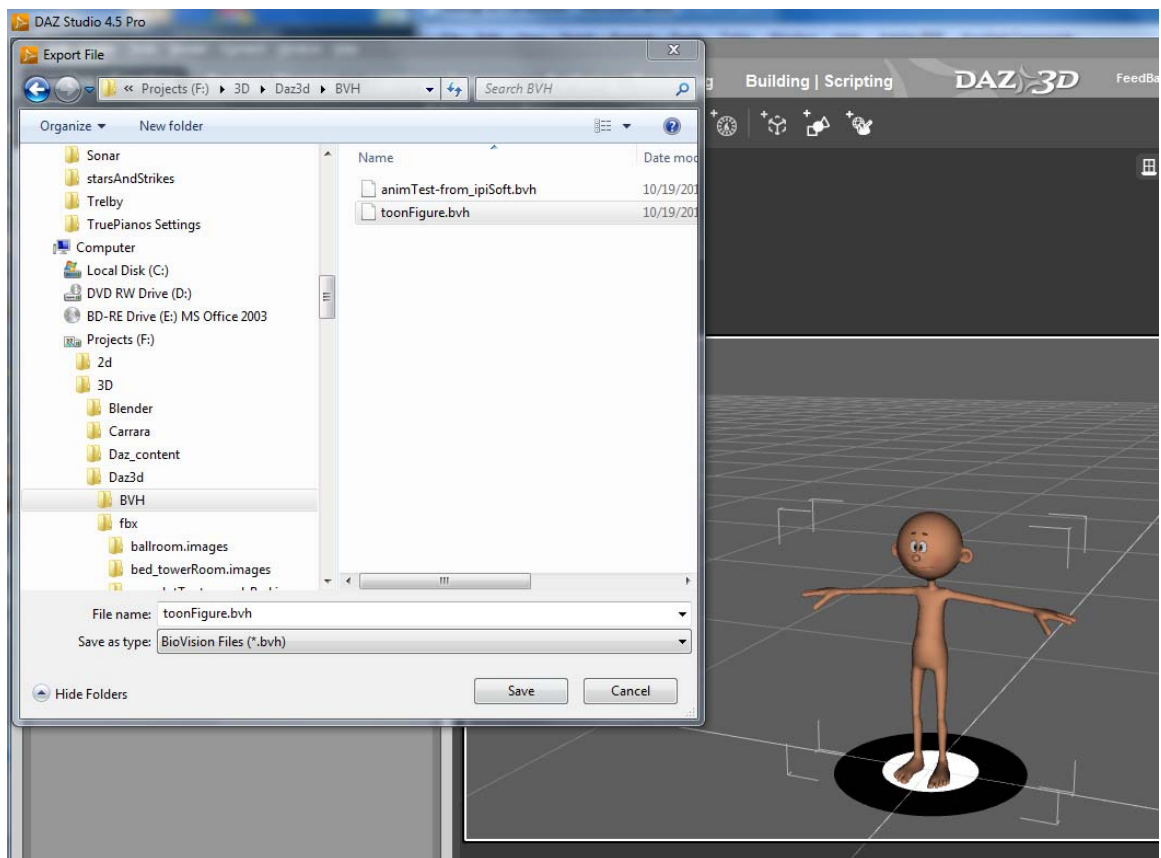
3. Import the bvh into iPiSoft.
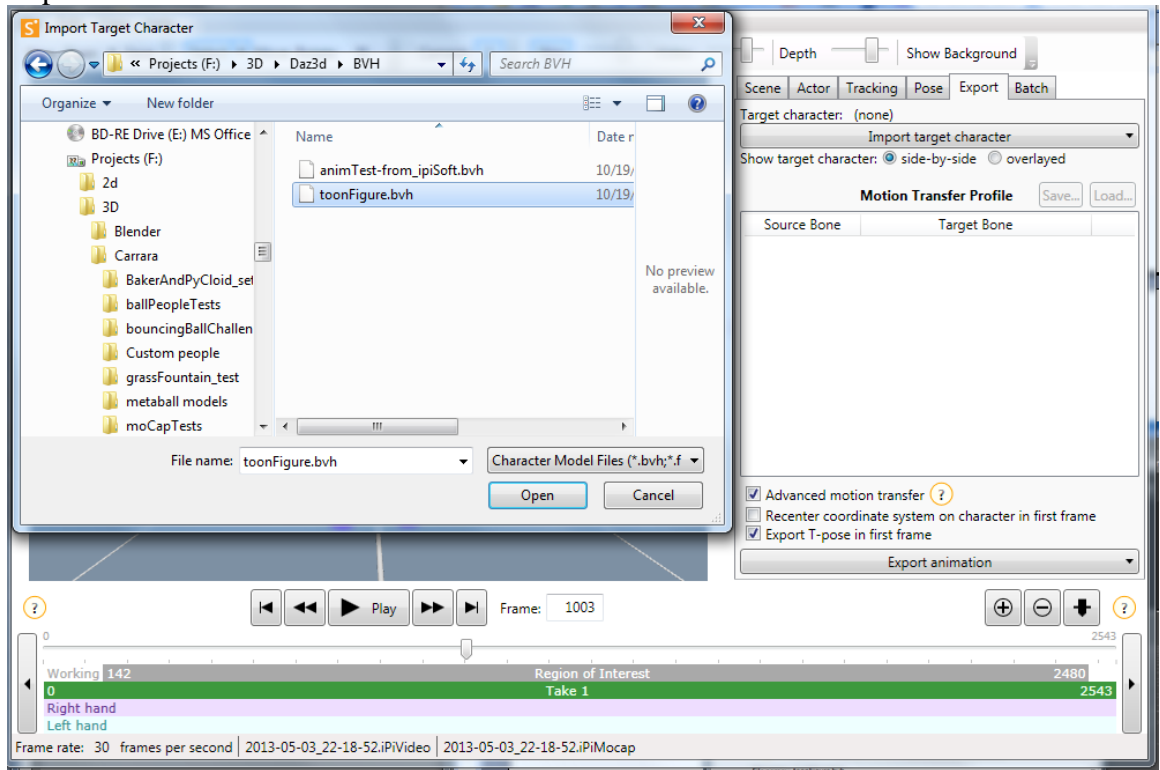
iPiSoft should recognize the bone hierarchy and your Daz bones should move in sync with your created motions. Adjust associated target bones in 'Motion Transfer Profile' section if needed.
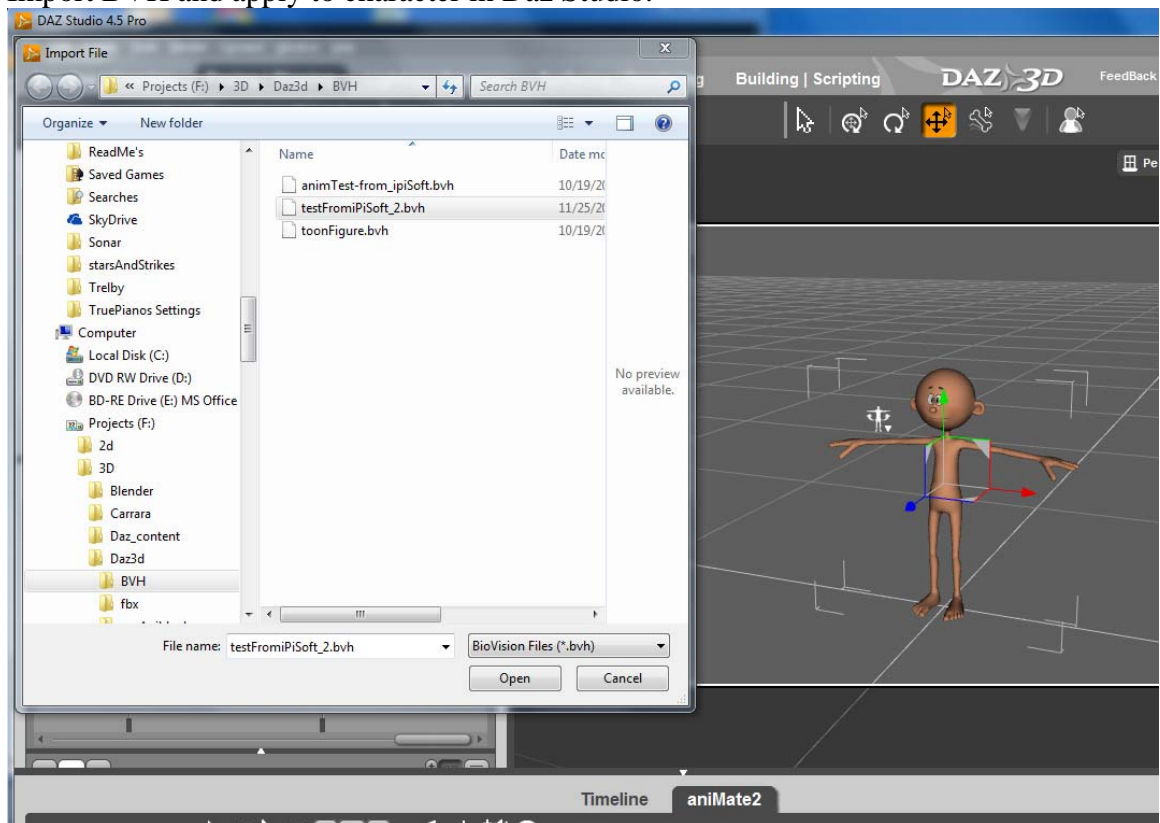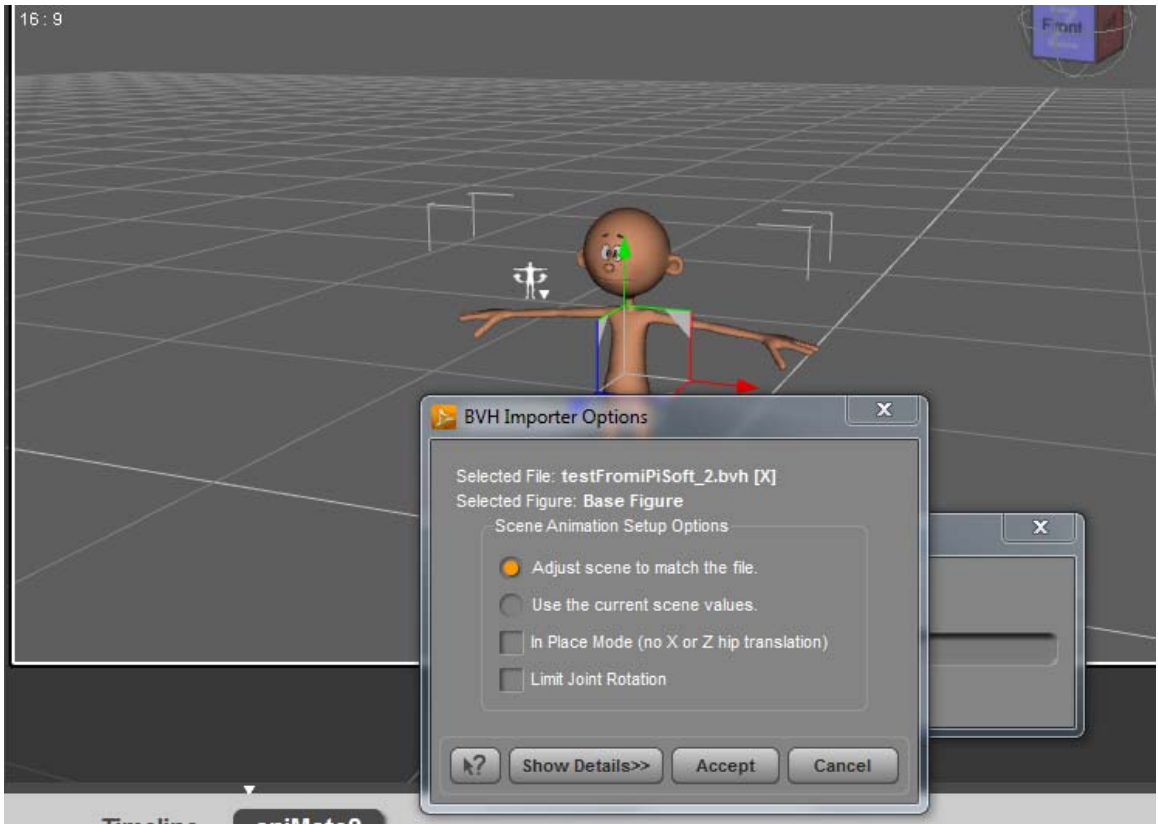
4. Export motion from iPiSoft in BVH format.

This creates a Daz compatible bvh. Unfortunately, you cannot bring this bvh
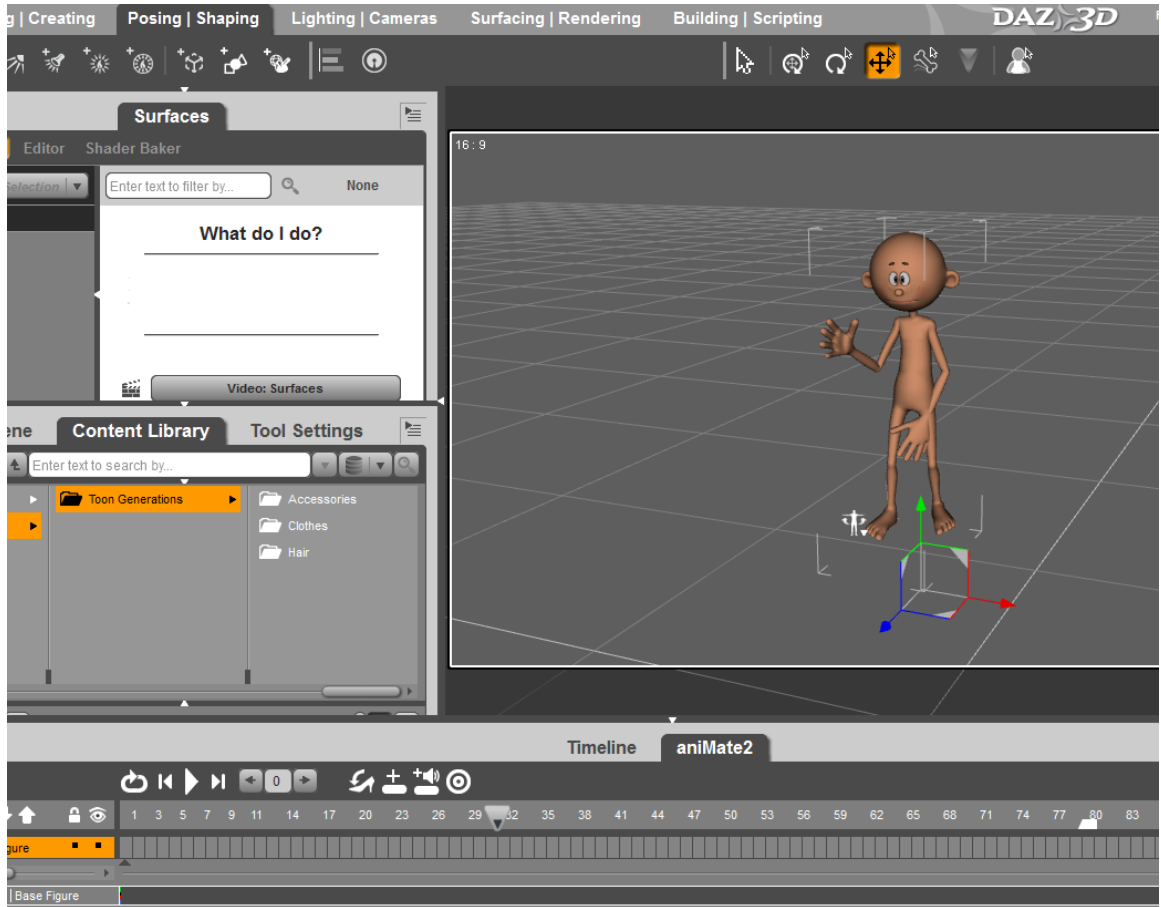
directly to your character in Carrara. In Carrara versions prior to 8.5, the imported iPi Mocap Studio bvh/fbx motion was unusable. You could see the skeleton but the rotations of the joints were completely wrong (appeared as rotation order issue, but not easily resolved) and what motion you saw was erratic. In 8.5, the bvh and fbx import support has been improved. As a result, this iPi Mocap Studio produced Daz bvh appears more useable, but to me the x and y motion does not appear quite right (a little exaggerated; might be considered acceptable to some people; don't know why I see the issue especially since the character bones move correctly in iPi and the extra x / y motion is not seen when following the '*Using Carrara and iPiSoft with unrigged characters*' procedure above).

Bringing this bvh to Daz Studio and creating the aniblock to import into Carrara appears to produce the most desirable results.

5. Import BVH and apply to character in Daz Studio.

16 : 9

Front

BVH Importer Options

Selected File: testFromiPiSoft_2.bvh [X]
Selected Figure: Base Figure

Scene Animation Setup Options

● Adjust scene to match the file.
○ Use the current scene values.
☐ In Place Mode (no X or Z hip translation)
☐ Limit Joint Rotation

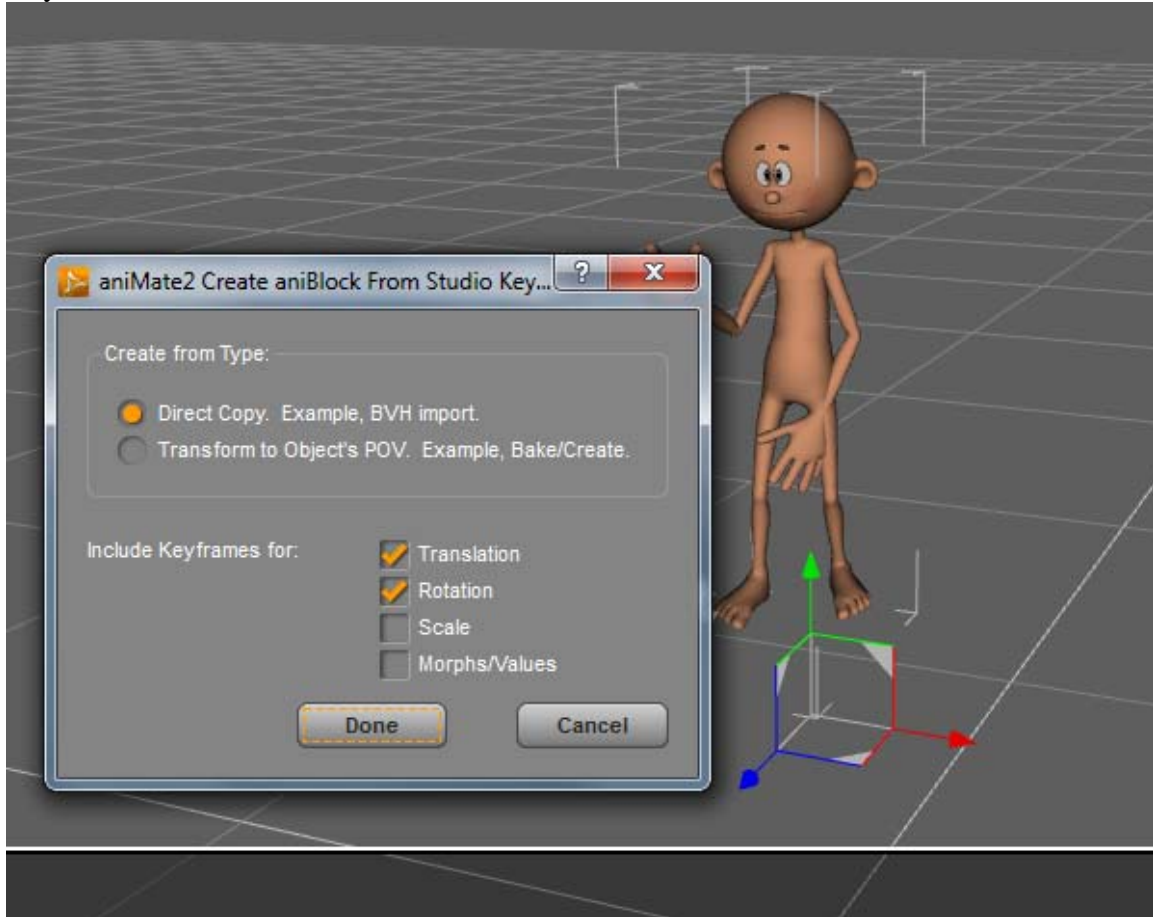? | Show Details>> | Accept | Cancel

Timeline   aniMate2

6. Next, you should convert the motion to an aniblock. Right click on the Animate2 timeline and select 'Create aniblock from Studio keyframes'.
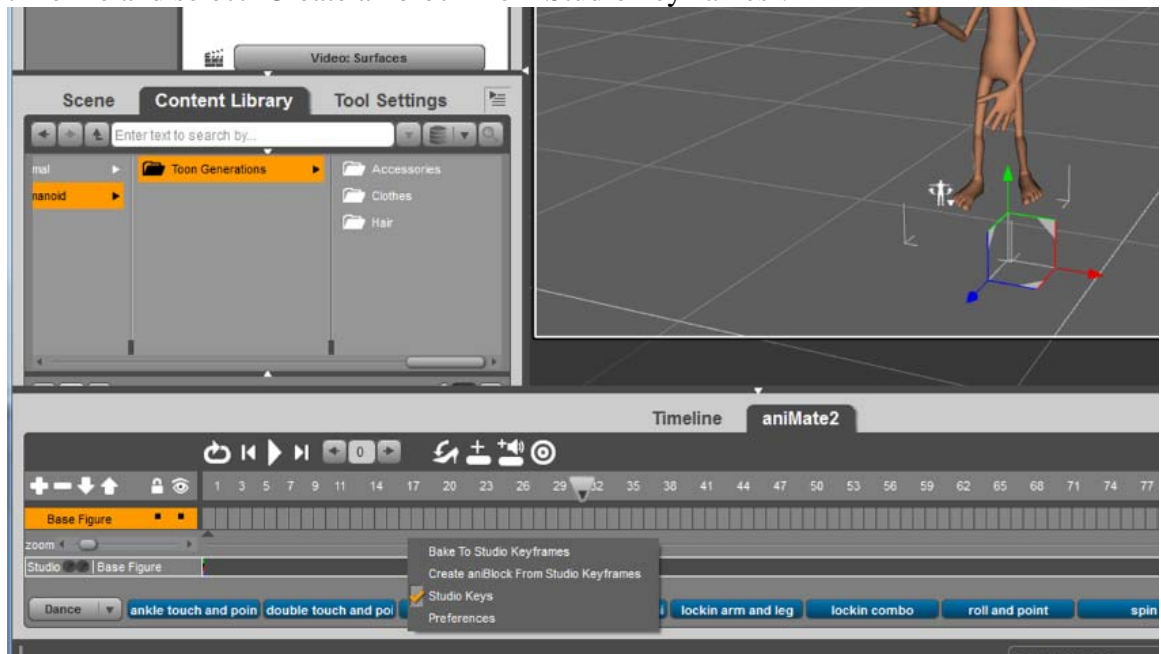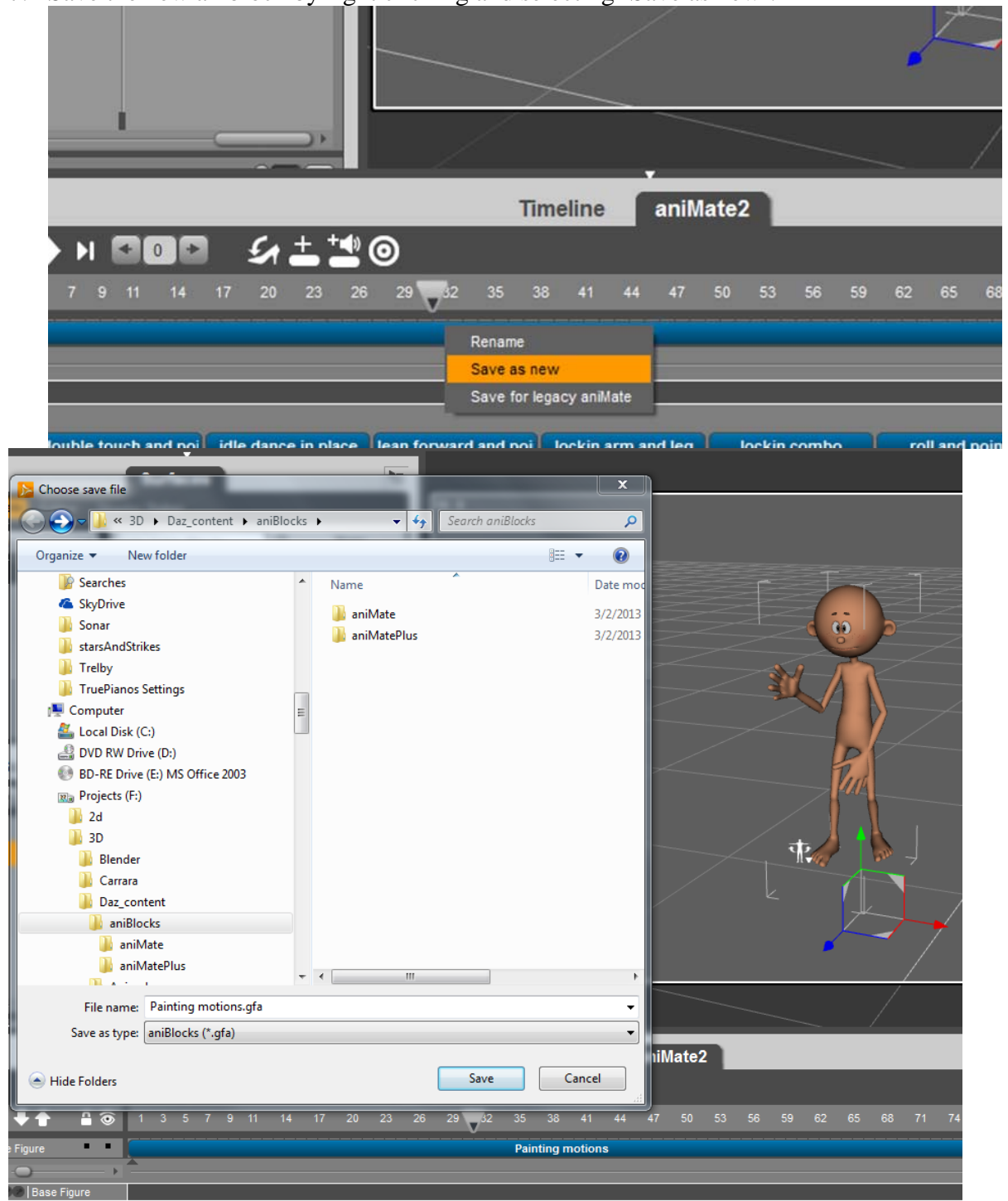
Use the 'Direct Copy' and at least 'Translation' and 'Rotation' from the 'Include Keyframes for' section. Select 'Done' and continue.

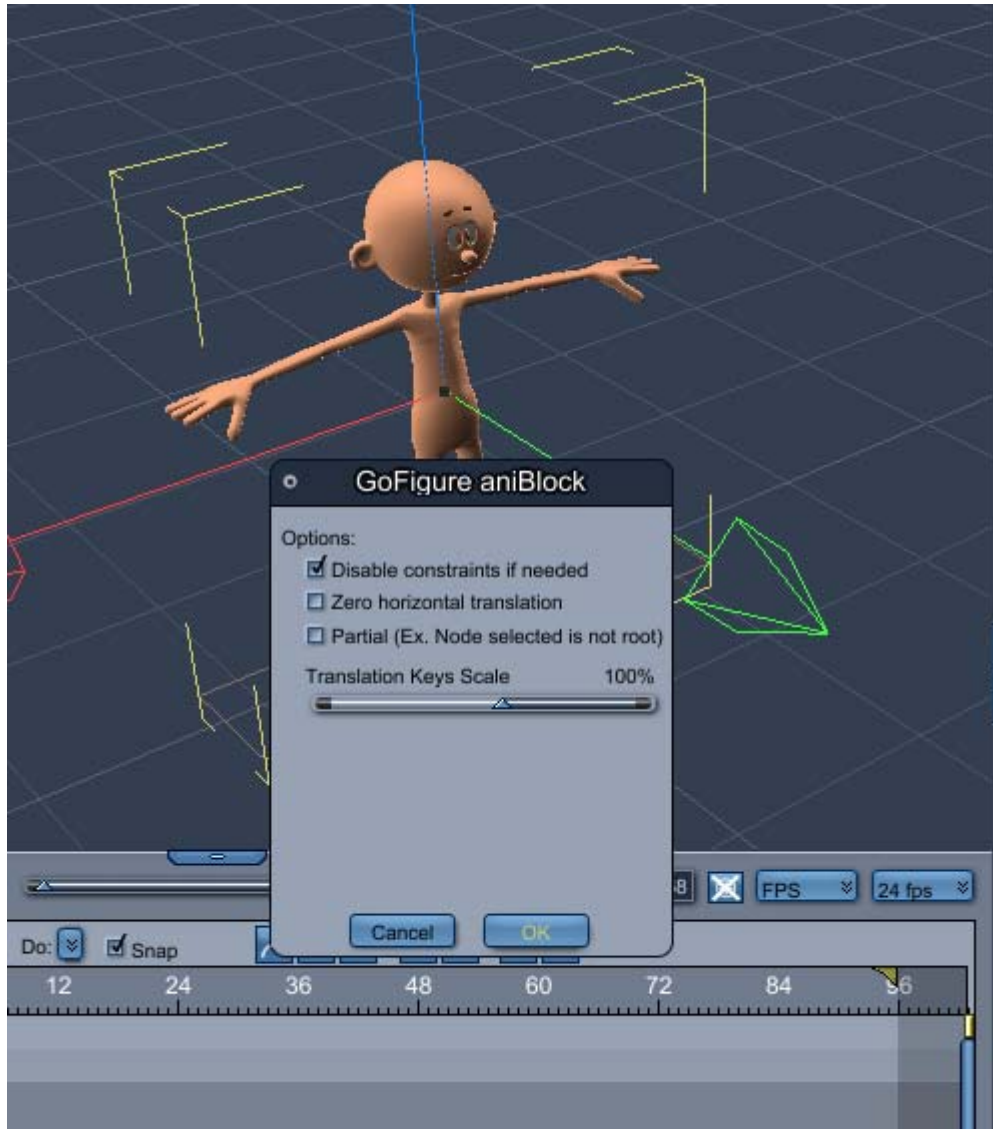You should now see a bar named 'unnamed' on the base figure line in the Animate 2 timeline. This is the new aniblock. If you want to rename it, right it click and select 'Rename'.
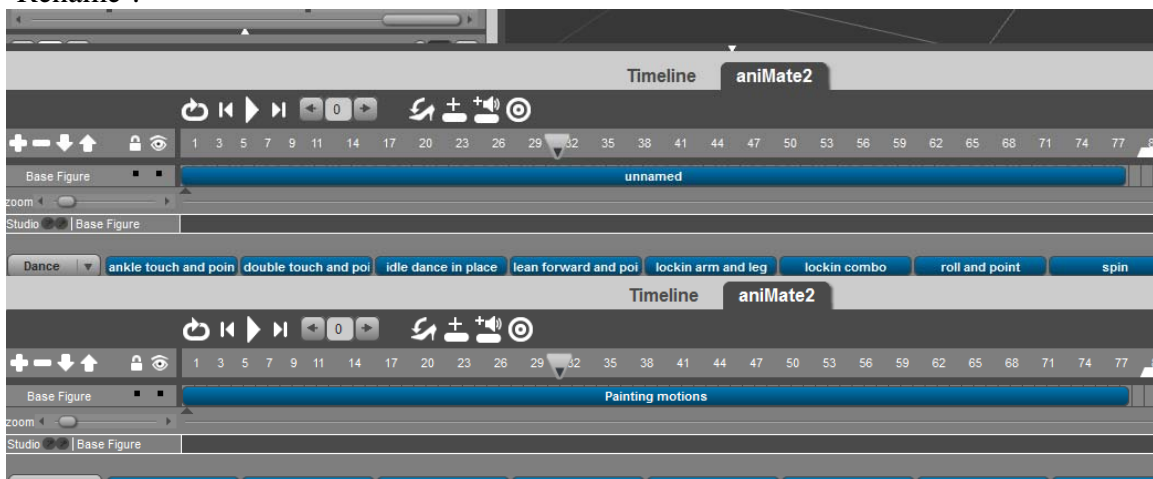
7. Save the new aniblock by right clicking and selecting 'Save as new'.

8. Go to Carrara and select the character. Now import the aniblock (import with the following options appears to work best when the character's animation group is selected).

GoFigure aniBlock

Options:
- ☑ Disable constraints if needed
- ☐ Zero horizontal translation
- ☐ Partial (Ex. Node selected is not root)

Translation Keys Scale   100%

Cancel   OK

Do: ☑ Snap

12   24   36   48   60   72   84   96

FPS   24 fps
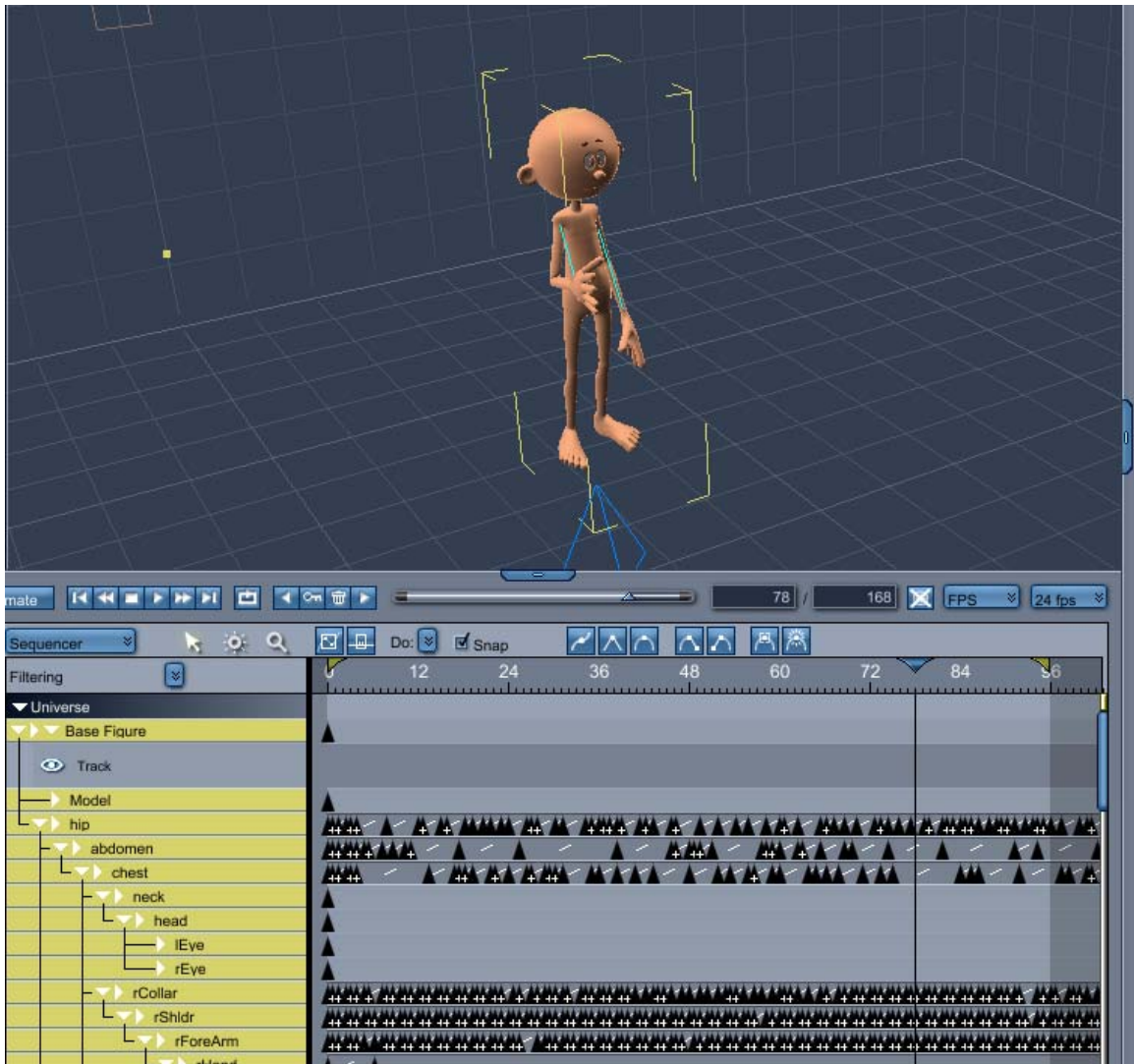
If the aniblock import is successful, the sequencer timeline will be populated with keyframes as seen above.

Since I'm more familiar with Carrara, I make my adjustments to the motions here. This could include making changes to the original keyframes. Generally, I create additional NLA tracks and set the mode to Additive or sometimes Override,

depending on what needs adjusting.
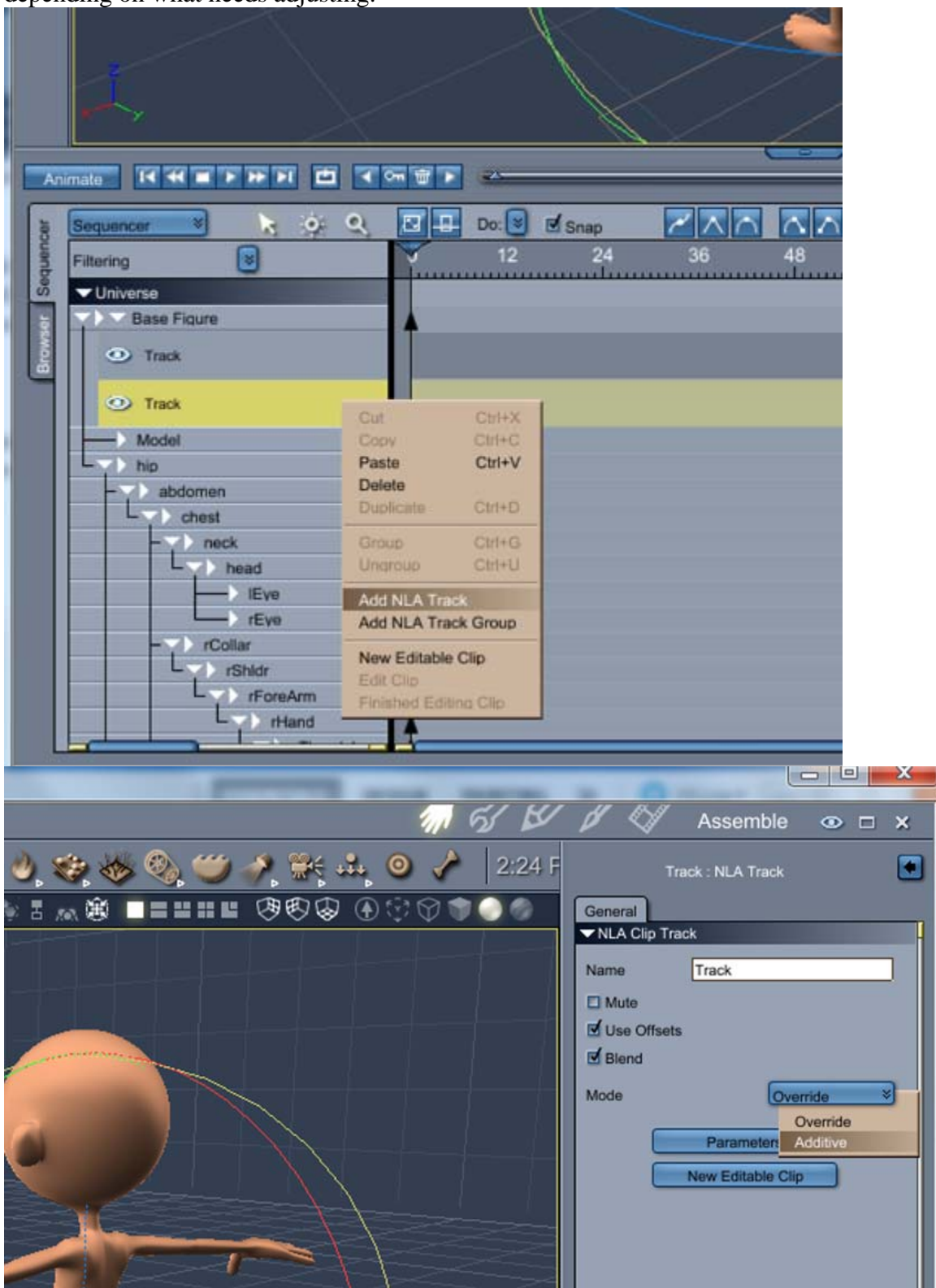
I would then create animation clips that contain the changes that I desire.

Facial Motions/Expressions

Whether it's a pre-rigged or unrigged model, above provides procedures that may help with animating the character's body. If you want to animate the face, you could look into popular marker-less facial mocap solutions such as Brekel Kinect Pro Face and FaceShift at the lower and upper price ranges respectively. I don't own either of these. I have NuiCapture, which can capture body motions as well as create facial mocp using a Microsoft Kinect camera. The functionality appears similar to what you get with Brekel Kinect Pro Face (and maybe what the Nevron Motion plug-in can do in Lightwave; I still need to set aside time to play with Nevron Motion). My early test results have not convinced me to add it to my Carrara character animation pipeline yet.

So, my characters' facial animations tend to be manually added. However, I usually create the necessary phoneme poses and use Mimic for Carrara to help with the lip sync.

Other Options

As mentioned above, the FBX and BVH support was quietly improved in Carrara 8.5. With the update, it is possible to consider workflows that include programs like iClone. Within iClone you can generate motions by using its realtime mocap plugin or generate motions based on a library of motion presets. Also, iPi Mocap Studio also has an export option specifically for iClone. Prior to 8.5, the FBX or BVH from iClone were unusable (FBX imports were mashed into weird balls; bvh's were erratic). But now it's possible to create a rig based on the imported iClone FBX/bvh and use as the basis for the rig of an unrigged character. iClone also has bones/rig retargeting. So you can export your character from Carrara, import into the iClone 3Dexchange, retarget the bones, and apply iClone based motions. You could then export the generated motions, or export the character mesh along with the motions. These motions could be applied directly to your character in Carrara.

I own Lightwave 11.6 and recently started becoming acquainted with it (taking time from Carrara endeavors). The Nevron Motion plug-in provides real-time body and facial motion capture. I haven't tried it yet but you should be able to create mocap in Lightwave and import into Carrara.

Conclusion

'A Pirate's Quest' (https://www.youtube.com/watch?v=d55xyOPtAqs) is one of my animated movies created using iPiSoft tools and Carrara workflow. On the raft, the Pirate animation is all keyframe generated. But once he gets to the island, his motions are based on mocap (I'm reminded of me trying to walk like a pegged leg pirate). The outside scenes/shots were rendered in Carrara, but the cave scene/shots were rendered in iClone.

Another example would be 'Lego Jedi vs Pirates' (https://www.youtube.com/watch?v=pKdlOjtcvxg) in which most of the character motions were based on iPi/Carrara based mocaps. Since I decided to use iClone's real-time renderer to render the entire movie (originally planned to render in Carrara, but

needed to speed up the rendering process), the characters were brought into iClone as animated props. This was necessary especially with the talking characters. Their phonemes were vertex morph based (not bones) and at that time iClone could not directly control vertex based morphs. But you could bring props in with animated vertices. So I used iPi, Carrara, and its Mimic plug-in to help with the lip sync and FBX exported the characters to import and use as animated props in iClone.

Above provides a brief description of a few procedures that I used to incorporate mocap in my animated movies. Using one of several workflows, motion capture data can easily be imported and used to animate characters in Carrara.