



Life Forms & 3D Studio Max

Creating Motion for 3D Studio Max

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About this document

This document contains information using Life Forms with 3D Studio Max. This document has three parts:

- The Introduction section - gives background information about Life Forms.
- The Tutorial section - gives step-by-step instruction and sample files.
- The User Guide section - gives key procedures and reference information for using Life Forms with 3D Studio Max.

Introduction



Where does Life Forms fit?

Life Forms exchanges model and motion data with 3D Studio Max. Depending on your project and your personal preferences Life Forms can be used in various stages of your production process. It could be used to:

- planning your mocap sessions
- prototyping for a project bid
- editing motion captured data

Life Forms is also used as a source of models and premade motion sequences.

Using Life Forms for fast keyframing.

Life Forms straight-forward interface simplifies the task of keyframing. Because it has fast redraw Life Forms gives you instant feedback allowing you to work faster and more spontaneously. When you have finished roughing out the motion, you refine your animation further by adding continuity, and offsets keys in 3D Studio Max.

Using Life Forms as a source of motion data

Aside from the 600 + keyframed variations and 140 + motion captured animations from the **PowerMoves Library** that comes with Life Forms, you can use Life Forms for keyframing your own animations and for generating walk sequences with the **Walk Generator**. Life Forms is also supported by the PowerMoves - the On-line 3D Content series.

Using Life Forms to edit proprietary motion capture data.

You may be working in a project that has its own captured data sets. If you output the data as Acclaim or BioVision files, Life Forms will be able to import and work



with the motion data. In Life Forms you can create looping sequences, combine sequences, rotate paths, and blend animations.

How do I use Life Forms & Max?

Life Forms imports and exports motion data to 3DS Studio Max via the 3DS file format. This allows you to:

- 1 Create motion for segmented characters built in 3D Studio Max.
- 2 Create motion for animating single-skin characters using Physique modifiers.
- 3 Bring a Life Forms animations into 3D Studio Max for rendering.

What does Life Forms do?

Using Life Forms with Max requires you to export the scene into another package. You may ask, “Is it worth it?”. The reasons why it is worth the effort is as follows:

- Life Forms is an easy and cost-effective way to edit and work with motion capture data
- Life Forms is also known for its simple and effective keyframing interface.
- Life Forms is a rich source of 3D Content.

Life Forms editing functions allow you to recombine, blend, and edit frame ranges. You can also thin motion data and use premade sequences before importing motion data into 3D Studio Max. These features allow you to use motion capture animations more creatively. Here are some of these features.

Fast Keyframing

Life Forms makes it easy to keyframe by keyframing poses rather than objects. By representing the keyframe as a single body in the Timeline, Life Forms makes it easy to select keyframes for copying, and pasting. Life Forms also has a Pin-to-floor command that puts the figure on the floor so you don’t have to worry about aligning the figure to the floor for every keyframe.

Smart Paste Functions

Life Form is an excellent tool for blending and combining animations. In Life Forms you combine animations by pasting keyframes from one animation to another. Life Forms adjusts the path for you.

In addition to the automatically adjusting the path, Life Form’s is able copy and paste motion from selected joints only. For example, this allows you to combine the arm action from one animation with the leg action from another.



Editing a range of frames

Applying a relative offset or absolute rotation to a joint over a range of frames is very easy to do in Life Forms. You would use this feature when you want to apply a small change to all frames in the animation. For example, you can apply a relative rotation to the figure's upper back joints so that it bends over during the entire walk cycle.

Copy and paste to different skeletons

Motion data is never wasted in Life Forms. You can reuse the motion data by applying it to different models.

Source of animation content

Aside from the 600 + keyframed variations and 140 + motion captured animations from the **PowerMoves Library CD**, there is the **PowerMoves - Online 3D Content series**. This product consists of 3D models and motion sets that you can purchase on-line from <http://www.powermoves.com>.

In addition to premade motions, Life Forms can be used for keyframing your own animations and transitions, and for generating walk sequences using the procedural **Walk Generator**.

Thinning mocap data

In Life Forms, you can reduce the density of motion capture data by deleting or thinning keyframes. You may, for example, instruct Life Forms to remove one keyframe for every 5 keyframes.

Edit mocap animation easily

Life Form's specialized keyframing interface and range editing capabilities make it an affordable tool for motion capture editing. For example, to slow down an action simply select a range of frames in the graphical timeline and expand it. Other motion editing features, such as range editing, is described more fully in the User Guide.



About the Tutorials

This document contains three tutorials:

- **Tutorial 1: Bringing Animations into 3D Studio Max.**

This tutorial eases you into the Life Forms-3D Studio Max workflow by demonstrating how to bring Life Forms animation into 3D Studio Max. The process described in this tutorial is a fundamental part of using Life Forms for character animation.

- **Tutorial 2: Setting up Models for Animation.**

To use Life Forms to animate your custom models, you must provide it with an animatable model. This tutorial explains exactly how to setup a model in 3D Studio Max and export it to Life Forms.

- **Tutorial 3: Applying Motion using Physique.**

This tutorial explains how you can motion from Life Forms can be applied to single-skin meshes in 3D Studio Max. Although this tutorial refers specifically to Physique, the concepts and processes described apply to other mesh deformation systems too, for example, Bones Pro 2, KV Bones, and the native 3D Studio Max 3 mesh deformation system.

Sample files are provided for each part of the tutorial so that you can enter the tutorial at various points. Even though the tutorials span several pages they are actually quite short. Each tutorial should not take more than 45 minutes.

Note: These tutorials were tested with 3D Studio Max v 2.5.

For the tutorials you need:

- 3D Studio Max 2.5 or later.
- Life Forms 3 Studio or later. Version 3.5 is preferred.

Note: You can order a free Trial CD of Life Forms Studio 3.5.

Tutorial



Tutorial 1: Bringing Animations into 3D Studio Max

All Life Forms animations can be exported as 3DS files. You can then import the animation into 3D Studio max for rendering. Sample files for this tutorial are found in the **Tutorial 1(Exporting)** folder.

- 1 In Life Forms, open **Sundancer_move.lfa**.
- 2 Choose **File menu > Export**.



- 3 Select the **3D Studio Max** icon from the Export Format list.
- 4 In the Export dialog box, enter the range of frames you want to export. By default all keyframes are exported.
- 5 Select the export options as follows:
 - Select the **Merge** checkbox to merge keyframed animation to the Source 3DS file.
 - Click the **Merge File** button. In the Open dialog box, select the **Source 3DS** file. This file must contain the same model and scene elements as the animation you are now exporting.
 - Select the **Scale to original size** checkbox if you have scaled any model using the Life Forms **Height & Scale** command.
 - Clear the Keyframes Only checkbox. Two additional options will now appear.
 - Select the **Position Frames** option.
- 6 Click OK.
- 7 Name and Save the 3DS file.
- 8 In 3D Studio Max, choose **File menu > Import**. In the Import dialog box, select the 3DS file.
- 9 Click the **Completely Replace the Scene** radio button.

Tutorial



Tutorial 2: Setting Up Models for Animation

This tutorial walks through a typical procedure for setting up a segmented model that we can animate. We begin this tutorial by assembling objects to form a generic human model. Then, we set pivot points and link the model to make it *animatable*. You can use the process explained in this tutorial to set up any segmented 3D character.

The tutorial assumes some basic knowledge of 3D Studio Max. You should be familiar with the basics before attempting this tutorial.

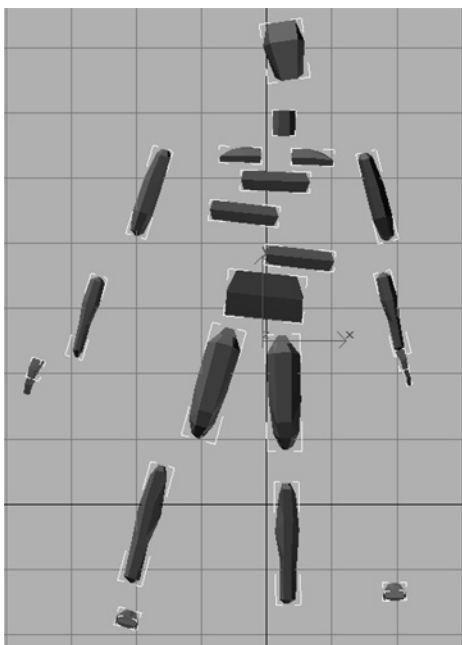
Sample files for this tutorial are in the **Tutorial 2 (Setting Up Models)** folder.

Part1: Assembling the Model

- 1 In 3D Studio Max, open **3Back_part1.max**.

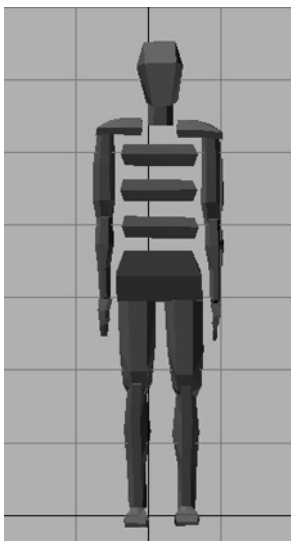


Notice that objects are scattered all over and are not aligned to form the model:



Note: This step mirrors the stage in the modelling process where each object has been modelled separately, or created by mirroring existing objects, but have not been positioned correctly to form the whole.

- 2 Move each object into position until the model is assembled as shown.



Results to this point are stored in **3Back_part2.max**.

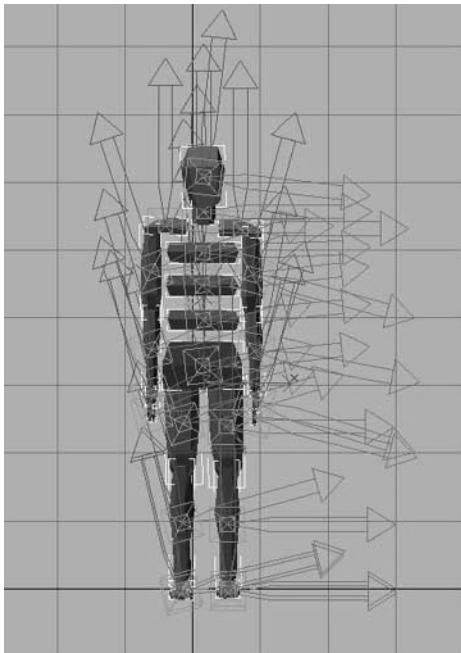


Part2: Setting the Pivot Point

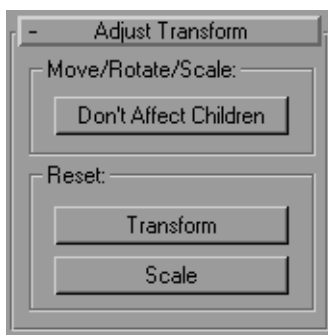
The position and orientation of the pivot points is very important. We must set the pivot points of each object so that it rotates correctly in relation to the objects it will be linked to.

- 1 Open **3Back_part2.max**.
- 2 Select all objects and display their pivot points. To display the pivot points, click the **Affect Pivot Only** button in the Hierarchy panel.

Notice that the arrows that represent the pivot points are not aligned to the gridlines. To align the pivot points we must reset their transformations.



- 3 While all pivot points are displayed, click the **Transform** button. This button is found in the Hierarchy panel's Adjust Transform roll-out.



Section of the Hierarchy panel



The pivot points are now aligned with the gridlines. Notice also that the pivot points are in the center of each object. Our next step is to reposition each pivot point.

Important: Always reset the transformations of a pivot point before moving the pivot point.

- 4 Make sure that the Adjust Pivot Only is selected and drag a pivot point to a new position. When the pivot point is in the correct position the object will rotate correctly relative to its parent. For example, the correct position of the pivot point in the forearm object is near the elbow area and so on. Adjust the pivot point of every object in this way. Results to this point is saved in **3Back_part3.max**.

Important: It is important to check the pivot point's position from at least two perspectives.

We have now assembled the model and adjusted its pivot points. The next step is to link all the objects so that the model can be animated as a whole entity.

Important: If you need to scale all objects uniformly, or adjust the shape or size of selected objects, do so before the objects are linked. To make changes to a linked model, you must first unlink it. Thus, it's a good idea to save an unlinked version of the model.

Part3: Linking Objects

We will now link the objects into an structure that can be animated. Before linking the objects, we must first reset Xforms and collapse the stack which stores the edit history of the objects.

- 1 Open **3Back_part3.max**
- 2 Reset Xforms as follows:
 - Select all objects.
 - Click the **Utilities** tab.
 - In the Utilities panel, click **Reset Xforms**. The **Reset Transforms** roll-out will appear.
 - In the Reset Transforms roll-out, click **Reset Selected**.

Tip: Resetting Xforms inverts objects mirrored objects making them look inside-out. To fix this, select the inverted object. Then, in the Modify panel, click **Edit Mesh**. In the Modifier Mesh rollout, set the Selection Level to **Face** in the Subobject drop-down menu. Then, scroll to the Normals section and click **Flip**.

- 3 Because the next step cannot be undone, save a copy of this file now.



- 4 Collapse the edit history of all objects as follows:
 - Select all objects.
 - Click the **Utilities** tab.
 - In the Utilities panel, under Output type, click the **Modifier Stack Result**.
Important: before clicking Collapse Selected, ensure that Output type is **Modifier Stack Result** and **not** Mesh. If Output type is Mesh, all objects will be fused into one mesh object.
 - Click **Collapse Selected**.
- 5 Start with the extremities (also known as *leaf objects*) and work towards to the pelvis linking one object to the next as follows:
 - Click the Select & Link button
 - Click on a child object and drag the cursor to the parent object.

The relationship between the objects can be seen by opening the Track view. The results so far is saved in **3Back_part4.max**. The next step is to export the model to Life Forms as a 3DS file.

Part 4: Exporting a 3DS file

Here we will learn how to export a 3DS file for Life Forms.

- 1 File open **3Back_part4.max**
- 2 Choose **File menu > Export**.
- 3 Select the **3D Studio Max** icon from the Export Format list.
- 4 In the Export dialog box, enter the range of frames you want to export. By default, all keyframes are exported.
- 5 Select the export options as follows:
 - Select the **Scale to original size** checkbox if you have scaled any model using the Life Forms **Height & Scale** command.
 - Clear the **Keyframes Only** option and select the **Position Frames** option. The export options are explained in the preceding table.
 - Ensure that the Merge checkbox is cleared.
- 6 Click Ok. Name and save the 3DS file.



Tutorial



Tutorial 3: Applying Motion using Physique

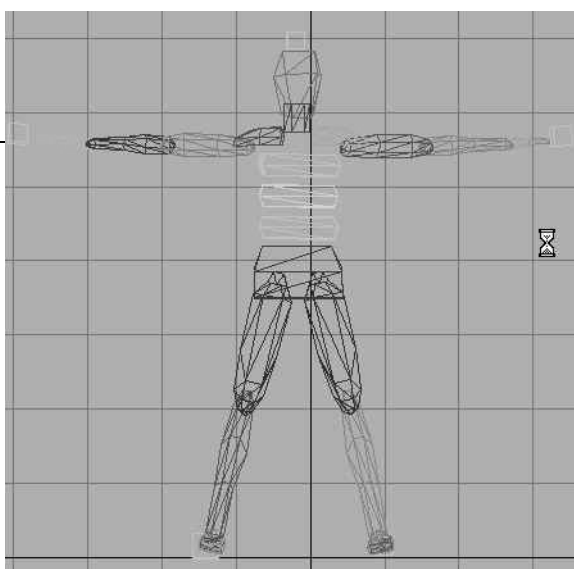
This tutorial explains how to use the Physique modifier to apply motion from a generic 3D model to a single-skin mesh.

For this tutorial we will use a single-skin mesh called Hero. We will use the generic skeleton that has been set-up for Life Forms and animated. The process of setting up a segmented model for animation was explained in Tutorial 2. Files for this tutorial are found in the **Tutorial 3(Physique)** folder.

- 1 Open **Physique_setup.max**.

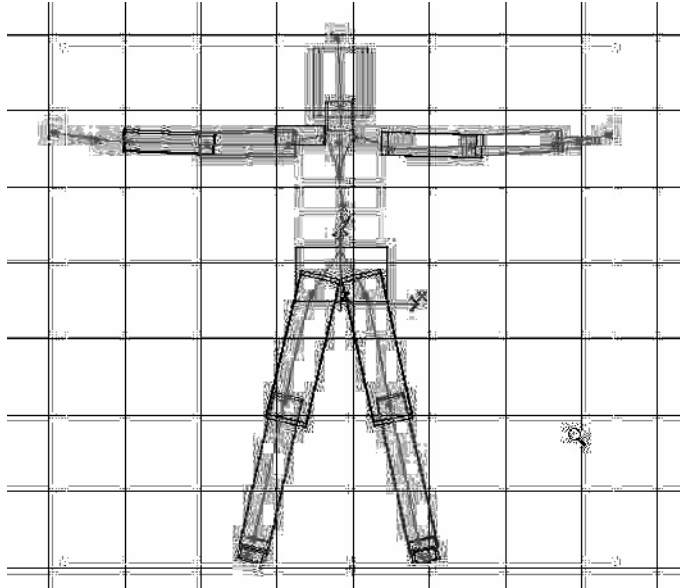
This file contains a segmented model with dummy effectors linked to each end joint.

Dummy effectors





Dummy effectors extend the influence of the Physique modifiers to include all the faces of the end joint.

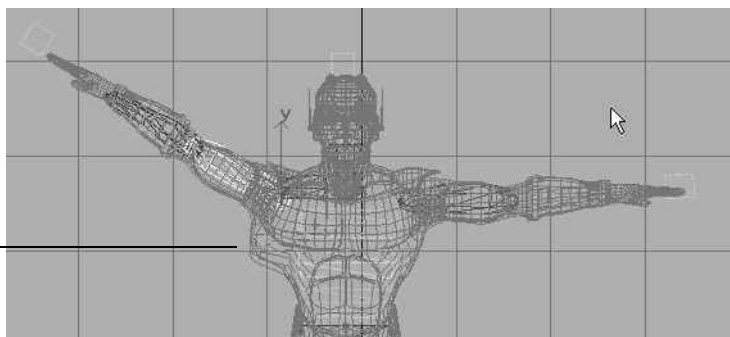


- 2 Open **Hero.max** and merge it to the file.
- 3 Position the single skin mesh so that it is centered over the segmented model.
Note: The segmented model was built to match the single-skin mesh closely. You can scale the entire model to fit the mesh if needed. However, if you want to scale selected objects you must unlink all objects before making the changes. You must then relink the objects before proceeding.
- 4 In the Modify Panel, Modifiers roll-out, Click **More**. Then select **Physique**.
- 5 Click the **Attach to Node** button and select the pelvis object of segmented model. This makes the pelvis the root node for the Physique modifier.



- 6 The vertices of your mesh may be assigned to the wrong link. You should test the model by rotating its joint. You may see, for example, that moving the arm distorts the chest as shown below.

Incorrectly
assigned vertices



You must assign the problem vertices to the correct link. For more details please consult your User guide.

- 7 Position the Mesh in the arms-down position. After you have set up the Physique modifier properly, save the scene. See **Hero-Flexiskel.max**.
- 8 To apply motion, select the pelvis of FlexiSkel and use the **Insert Tracks** command to paste the keyframe motion from **Sword-die.max**. (This animation is from the PowerPak CD, a collection of ready to use motions that can be purchased separately.)

Insert tracks as follows:

- Choose File menu > Insert Tracks.
- In the Open dialog box, select **Sword-die.max** file that contains an animated model.
- In the Insert Tracks dialog box, select the following options:
Pelvis as Source
Click **Subtree** checkbox
Click **Paste time**. Specify the frames to insert and the Insertion time.



Installing the 3DS plug-ins

Plug-ins for importing and exporting 3DS files are automatically installed with Life Forms. However, if you need to update your plug-ins or if you have removed the plug-ins, you must install the 3DS plug-ins again.

To install plug-ins



- Put the 3DS plug-ins files, **3ds.in.dll** and **3ds.out.dll**, in the *Plug-in folder* in the *Life Forms program folder*.

Building Models for Animation

Life Forms animates segmented models only. When you build a model that will be animated, consider how it is going to move. This helps you to determine how many segments the models should have and where the pivot points of each segment should be.

There are no restrictions to the model's zero-angle position (*the position where all joints have no rotation values.*) Life Forms can animate and apply motion to models with any zero-angle positions. However, when building a segmented model ensure that:

- object names are unique.
- object names have no spaces or special characters.
- the polygon count for the model is less than 10,000.
- the model is a reasonable size. Model height of 1 - 5 meters is recommended. Props must be no larger than 50 m by 50 m.

Tip: If your model is very detailed create a lower resolution. You can animate the low resolution model and apply the motion to the high resolution model before rendering. Note, however, that the low and high resolution models must be identical except for the resolution.

Opening 3DS files in Life Forms

To open a 3DS file in Life Forms

- 1 In Life Forms, choose **File menu > Open**.
- 2 In the Open dialog box, select **3DS** in the File types menu. Browse and select the 3DS file you want to open. Click Open.

Note: Geometry, Animation and Colour information is preserved when a 3DS file is opened in Life Forms. Textures are also imported, but their positions may not be accurate.

To scale a model in Life Forms

When a model is too large, it will be difficult to manipulate in Life Forms. You can scale down the model using Life Form's **Height and Scale command**.

- 1 In the Stage window, select a figure by clicking on it.
- 2 Choose **Figure menu > Height & Scale**.



- 3 In the Height & Scale dialog box, enter a height for the model, or scale it by entering a percentage (for example 80%). A suggested height is 1.7 m.
- 4 Click OK.

Exporting a 3DS file from Life Forms

You can export to a 3DS file by merging or by exporting a new 3DS file. Merging allows you to insert only the keyframe motion data into the original 3DS file. The advantage of merging is that it adds motion data to the scene without affecting other scene elements.

To merge keyframed animation to a 3DS file

- 1 Choose **File menu > Export**.
- 2 Select the **3D Studio Max** icon from the Export Format list.
- 3 In the Export dialog box, enter the range of frames you want to export. By default all keyframes are exported.
- 4 Select the export options as follows:
 - Select the **Merge** checkbox to merge keyframed animation to the Source 3DS file.
 - Click the **Merge File** button. In the Open dialog box, select the **Source 3DS** file. This file must contain the same model and scene elements as the animation you are now exporting.
 - Select the **Scale to original size** checkbox if you have scaled any model using the Life Forms **Height & Scale** command.
- 5 You can export the motion data by exporting only keyframes, or by exporting all frames. For exporting motion to 3D Studio Max, it is recommended that you clear the **Keyframes Only** option and select the **Position Frames** option.

The following explains the options and when to select them.

Merging is a good way to insert keyframes into a 3DS file without affecting the scene's lighting, camera, colour or texture set up.

Keyframes Only Select this option to export only the keyframes in the animation.
This option is not recommended for exporting to 3D Studio Max. When this option is selected, the motion data exported is thinner and easier to change. However, the motion may not be exactly the same as in Life Forms because it is dependent on the interpolation method selected in 3D Studio Max.



All Frames This option is available when the Keyframes Only option is cleared.
When you select this option, the motion is exported so that every joint in the model is keyframed in all frames. This create dense motion data that is difficult to modify. However, the motion will be accurately recreated because it is not dependent on interpolation by the third-party software. For example, this option is recommended when exporting motion to Cinema 4D.

Position Frames This option is available when the Keyframes Only option is cleared.
When you select this option, the pelvis is keyframed at all frames but other joints are not. This ensures that the location and altitude of the figure are independent of the interpolation method used. The motion will be accurately represented in 3D Studio max when this option is selected.
Thus, this option is recommended for exporting motion to 3D Studio Max.

6 Click OK. Name and save the 3DS file.

Note: When exporting an animation from Life Forms as a 3DS file, colors are exported. However, textures may not be exported properly.

To export a 3DS file

- 1 Choose **File menu > Export**.
- 2 Select the **3D Studio Max** icon from the Export Format list.
- 3 In the Export dialog box, enter the range of frames you want to export. By default, all keyframes are exported.
- 4 Select the export options as follows:
 - Select the **Scale to original size** checkbox if you have scaled any model using the Life Forms **Height & Scale** command.
 - Ensure that the Merge checkbox is not selected.
 - For exporting motion to 3D Studio Max, clear the **Keyframes Only** option and select the **Position Frames** option. Other options are explained in the preceding table.
- 5 Click Ok. Name and save the 3DS file.



Inserting Tracks in 3D Studio Max

The Insert Tracks command allows you to apply motion data from one model to another. This command works well when the source and destination figures are identical or have similar hierarchical structure.

- 1 Select the pelvis of the destination model. Choose **File menu > Insert Tracks**.
- 2 In the Open dialog box, select a Max file that contains an animated model.
- 3 In Insert Track dialog box, select:
 - Pelvis as Source
 - Click Subtree checkbox
 - Click Paste time. Specify the frames to insert and the Insertion time.
- 4 Click OK.

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