

## 7.3.8.1 Rigging - Armatures - Editing - Editing Bones

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### Editing

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## Editing Bones

### Reference

Mode: *Edit mode*

Hotkey: Tab

You'll learn here how to add (Adding Bones), delete (Deleting Bones) or subdivide (Subdividing Bones) bones. We will also see how to prevent any bone transformation (Locking Bones) in *Edit* mode, and the option that features an automatic mirroring (X-Axis Mirror Editing) of editing actions along the X axis.

## Adding Bones

To add bones to your armature, you have more or less the same options as when editing meshes:

- *Add* menu,
- extrusion,
- Ctrl-LMB clicks,
- fill between joints,
- duplication.

### Add Menu

### Reference

Mode: *Edit mode*

Hotkey: Shift-A

In the 3D view, Shift-Apop-up ▸ Bone to add a new bone to your armature.

This bone will be:

- of one Blender Unit of length,
- oriented towards the positive Y axis of the view,
- with its root placed at the 3D cursor position,
- with no relationship with any other bone of the armature.

### Extrusion

### Reference

Mode: *Edit mode*

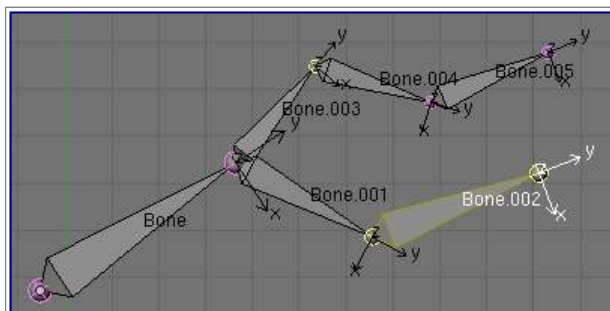
Menu: Armature ▸ Extrude

Hotkey: E, Shift-E

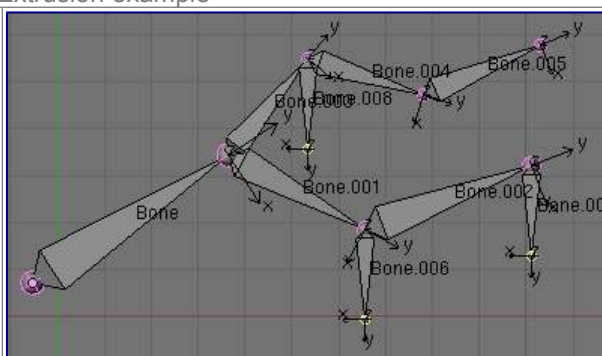
When you press the E key, for each selected tip (either explicitly or implicitly), a new bone is created. This bone will be the child of “its” tip owner, and connected to it. As usual, once extrusion is done, only the new

bones' tips are selected, and in grab mode, so you can place them to your liking. See (*Extrusion example*).

Extrusion example



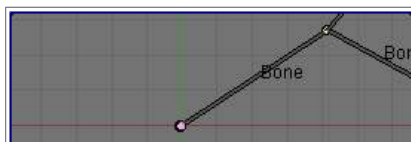
An armature with three selected tips.



The three extruded bones.

You also can use the rotating/scaling extrusions, as with meshes, by pressing respectively E - R and E - S - as well as *locked* extrusion along a global or local axis.

Mirror extrusion example



A single selected bone's tip.



The two mirror-extruded bones.

Bones have an extra “mirror extruding” tool, called by pressing **Shift - E**. By default, it behaves exactly like the standard extrusion. But once you have enabled the X-Axis mirror editing option (see X-Axis Mirror Editing), each extruded tip will produce *two new bones*, having the same name except for the **\_L/\_R** suffix (for left/right, see the next page). The **\_L** bone behaves like the single one produced by the default extrusion - you can grab/rotate/scale it exactly the same way. The **\_R** bone is its mirror counterpart (along the armature's local X axis), see (*Mirror extrusion example*).

### Warning

Cancelling the extrude action causes the newly created bones to snap back to the source position, (*creating zero length bones*). These will be removed when exiting editmode, however they can cause confusion and it's unlikely you want to keep them. If you realize the problem immediately undo the extrude action.

In case you're wondering, you cannot just press **X** to solve this as you would in mesh editing, because extrusion selects the newly created tips, and as explained below the delete command ignores bones' ends. To get rid of these extruded bones without undoing, you would have to move the tips, then select the bones and delete (Deleting Bones) them.

## Mouse Clicks

### Reference

Mode: *Edit mode*

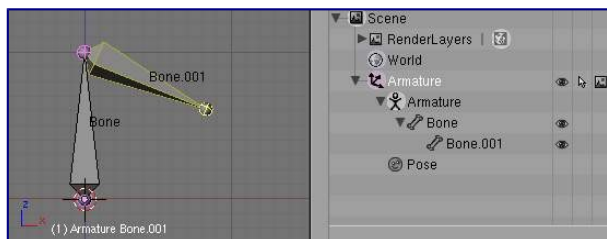
Hotkey: **Ctrl - LMB**

If at least one bone is selected, **Ctrl-LMB**-clicking adds a new bone.

About the new bone's tip:

- after you **Ctrl-LMB**-clicked it becomes the active element in the armature,
- it appears to be right where you clicked, but...
- ...(as in mesh editing) it will be on the plane parallel to the view and passing through the 3D cursor.

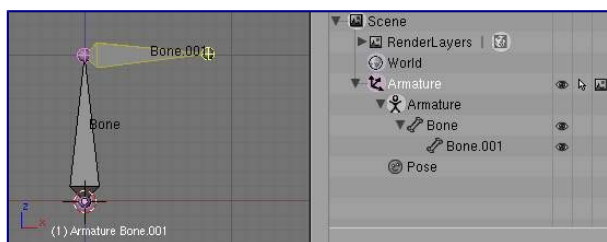
The position of the root and the parenting of the new bone depends on the active element:



Ctrl-clicking when the active element is a bone

If the active element is a **bone**

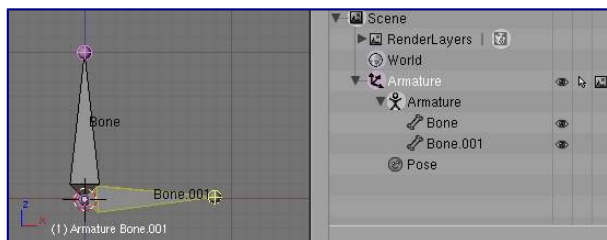
- the new bone's root is placed on the active bone's tip
- the new bone is parented and connected to the active bone (check the outliner in *Ctrl-clicking when the active element is a bone*).



Ctrl-clicking when the active element is a tip

If the active element is a **tip** :

- the new bone's root is placed on the active tip
- the new bone is parented and connected to the bone owning the active tip (check the outliner in *Ctrl-clicking when the active element is a tip*).

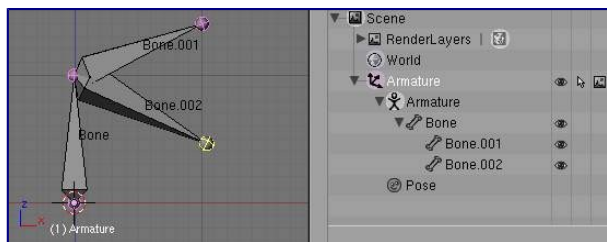


Ctrl-clicking when the active element is a disconnected root

If the active element is a **disconnected root** :

- the new bone's root is placed on the active root
- the new bone is **NOT** parented to the bone owning the active root (check the outliner in *Ctrl-clicking when the active element is a disconnected root*).

And hence the new bone will **not** be connected to any bone.



Ctrl-clicking when the active element is a connected root

If the active element is a **connected root** :

- the new bone's root is placed on the active root
- the new bone **IS** parented and connected to the parent of the bone owning the active root (check the outliner in *Ctrl-clicking when the active element is a connected root*).

This should be obvious because if the active element is a connected root then the active element is also the tip of the parent bone, so it is the same as the second case.

As the tip of the new bone becomes the active element, you can repeat these ctrl-clicks several times, to consecutively add several bones to the end of the same chain.

## Fill between joints

### Reference

Mode: *Edit mode*

Menu: *Armature > Fill Between Joints*

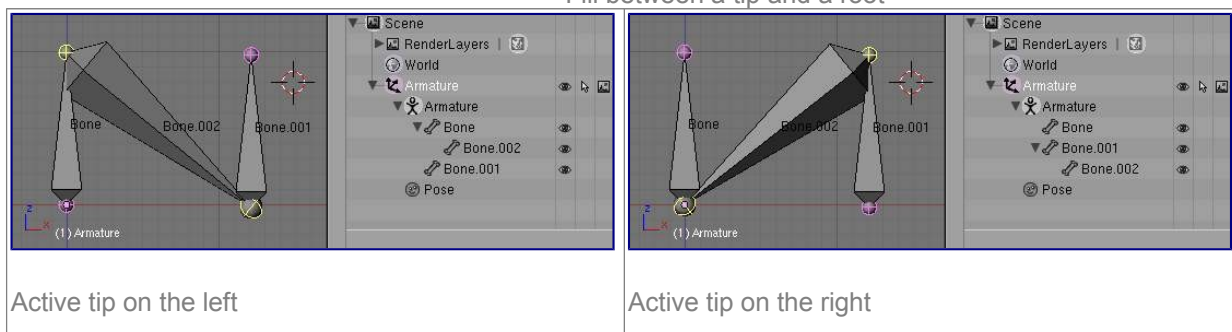
Hotkey: *F*

The main use of this tool is to create one bone between two selected ends by pressing *F*, similar to how in mesh editing you can “create edges/faces”.

If you have one root and one tip selected, the new bone:

- will have the root placed on the selected tip
- will have the tip placed on the selected root
- will be parented and connected to the bone owning the selected tip

Fill between a tip and a root

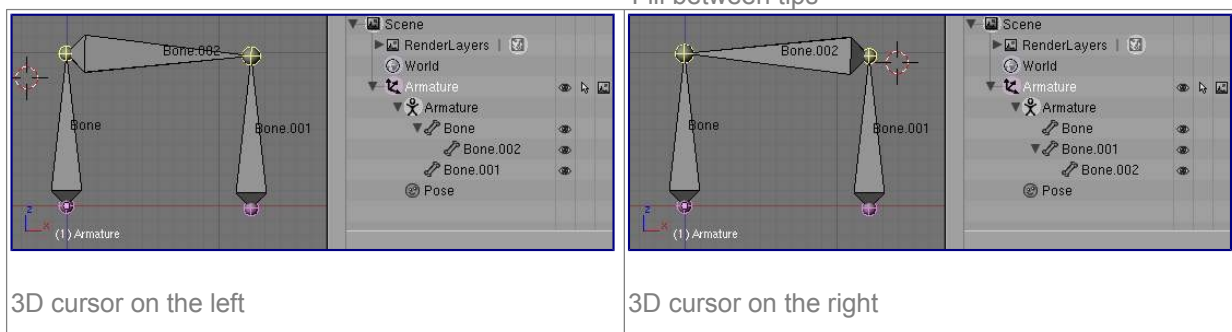


If you have two tips selected, the new bone:

- will have the root placed on the selected tip closest to the 3D cursor

- will have the tip placed on the other selected tip
- will be parented and connected to the bone owning the tip used as the new bone's root

Fill between tips



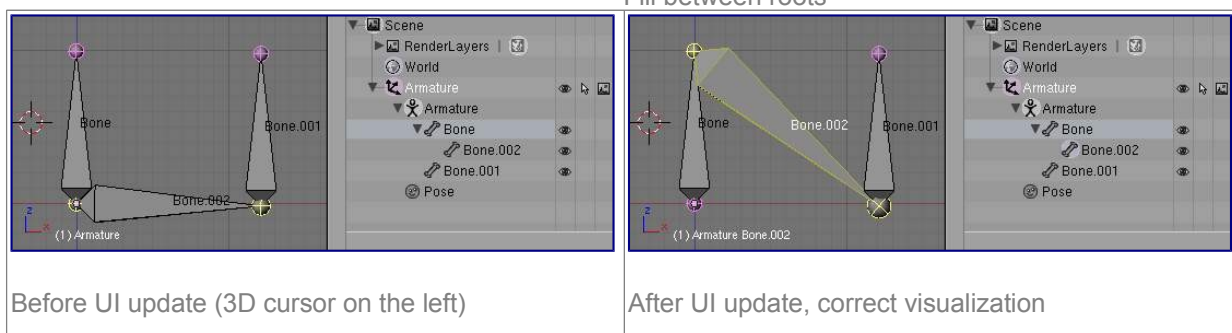
If you have two roots selected, you will face a small problem due to the event system in Blender not updating the interface in real time.

When clicking F, similar to the previous case, you will see a new bone:

- with the root placed on the selected root closest to the 3D cursor
- with the tip placed on the other selected root
- parented and connected to the bone owning the root used as the new bone's root

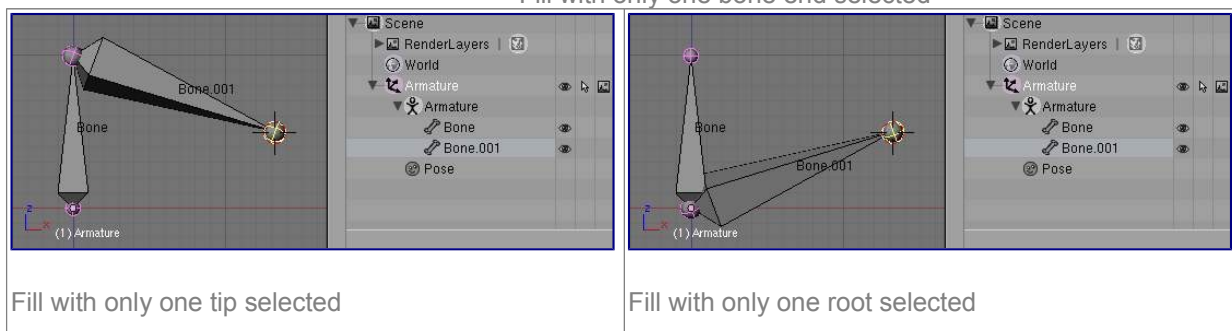
If you try to move the new bone, Blender will update the interface and you will see that the new bone's root moves to the tip of the parent bone.

Fill between roots



Clicking F with only one bone end selected will create a bone from the selected end to the 3D cursor position, and it won't parent it to any bone in the armature.

Fill with only one bone end selected



You will get an error when:

- trying to fill two ends of the same bone, or
- trying to fill more than two bone ends.

## Duplication

### Reference

Mode: *Edit mode*

Menu: *Armature ▸ Duplicate*

Hotkey: *Shift-D*

### Note

This tool works on selected bones; selected ends are ignored.

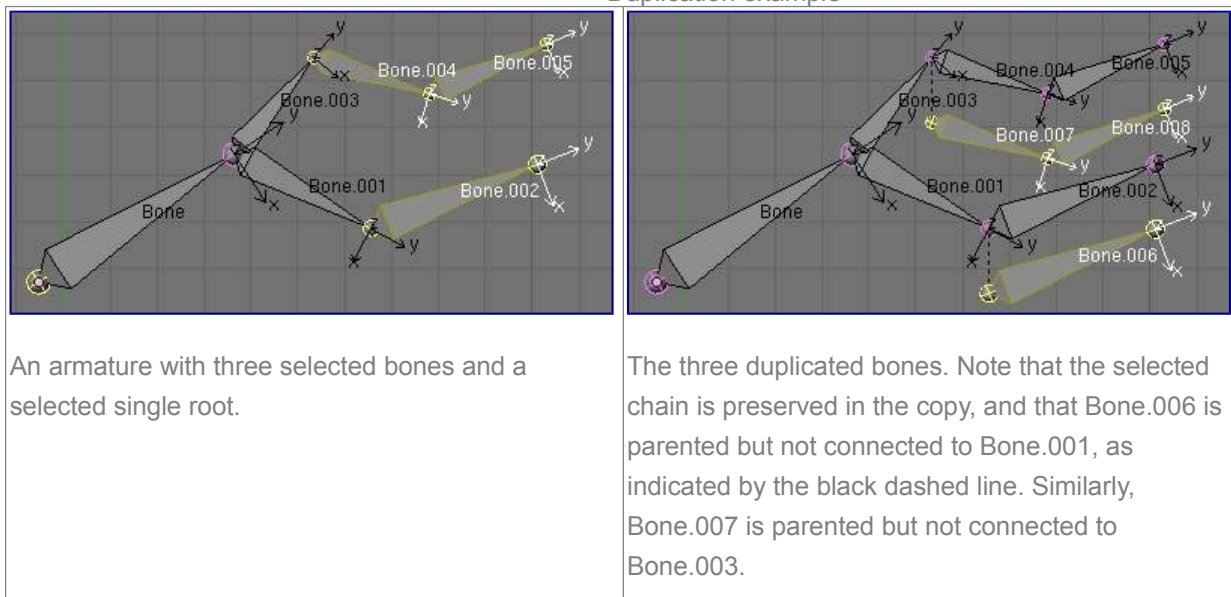
As in mesh editing, by pressing *Shift-D*:

- the selected bones will be duplicated,
- the duplicates become the selected elements and they are placed in grab mode, so you can move them wherever you like.

If you select part of a chain, by duplicating it you'll get a copy of the selected chain, so the copied bones are interconnected exactly like the original ones.

The duplicate of a bone which is parented to another bone will also be parented to the same bone, even if the root bone is not selected for the duplication. Be aware, though, that if a bone is parented **and connected** to an unselected bone, its copy will be parented **but not connected** to the unselected bone (see *Duplication example*).

Duplication example



An armature with three selected bones and a selected single root.

The three duplicated bones. Note that the selected chain is preserved in the copy, and that Bone.006 is parented but not connected to Bone.001, as indicated by the black dashed line. Similarly, Bone.007 is parented but not connected to Bone.003.

## Deleting Bones

You have two ways to remove bones from an armature: the standard deletion, and merging several bones in one.

### Standard deletion

#### Reference

Mode: *Edit mode*

Menu: **Armature** ▸ **Delete**Hotkey: **X****Note**

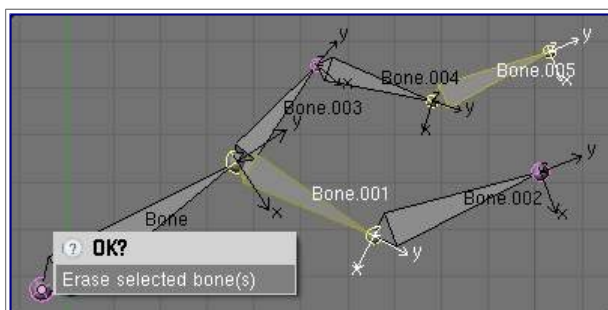
This tool works on selected bones: selected ends are ignored.

To delete a bone, you can:

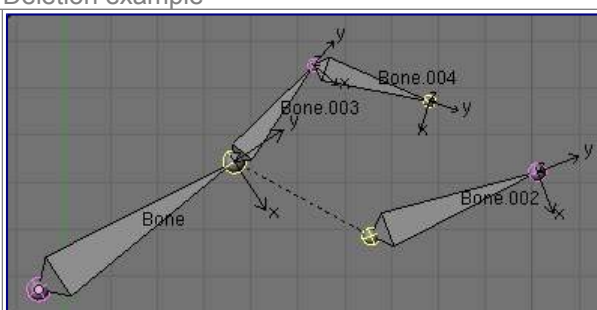
- press the standard X key and confirm, or
- use the menu **Armature** ▸ **Delete** and confirm.

If you delete a bone in a chain, its child(ren) will be automatically re-parented to its own parent, **but not connected**, to avoid deforming the whole armature.

Deletion example



An armature with two selected bones, just before deletion.



The two bones have been deleted. Note that Bone.002, previously connected to the deleted Bone.001, is now parented but not connected to Bone.

**Merge****Reference**Mode: *Edit mode*Menu: **Armature** ▸ **Merge**Hotkey: **Alt - M**

You can merge together several selected bones, *as long as they form a chain*. Each sub-chain formed by the selected bones will give one bone, whose root will be the root of the root bone, and whose tip will be the tip of the tip bone.

Confirm by clicking on *Within Chains* in the *Merge Selected Bones* pop-up.

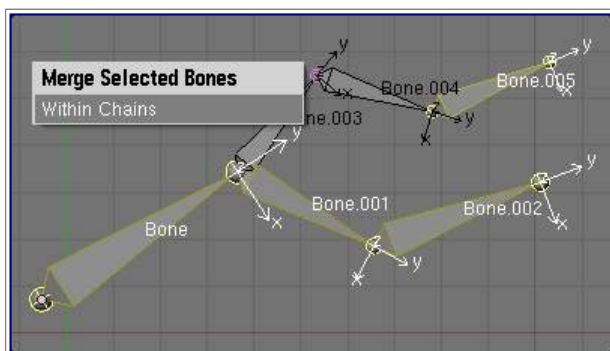
If another (non-selected) chain originates from inside of the merged chain of bones, it will be parented to the resultant merged bone. If they were connected, it will be connected to the new bone.

Here's a strange subtlety (see *Merge example*): even though connected (the root bone of the unmerged chain has no root sphere), the bones are not visually connected - this will be done as soon as you edit one bone, differently depending in which chain is the edited bone (compare the bottom two images of the example to

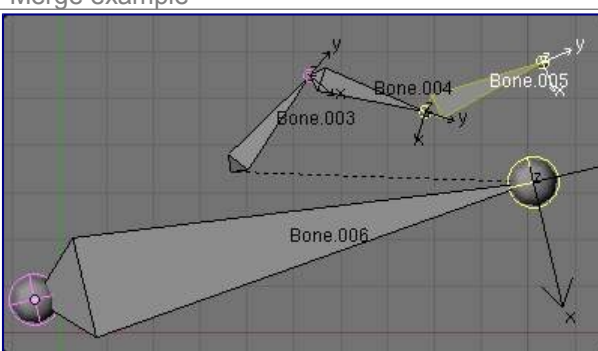


understand this better).

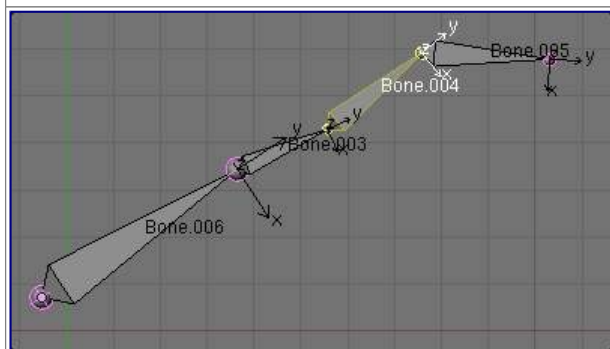
Merge example



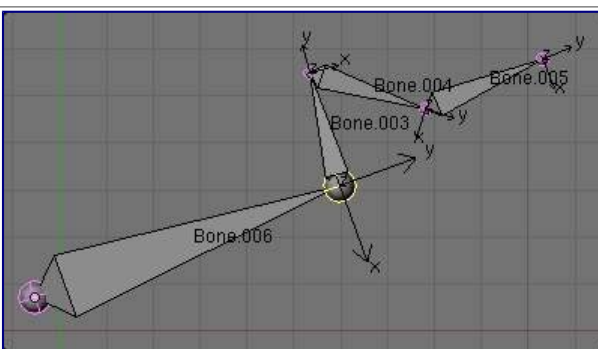
An armature with a selected chain, and a single selected bone, just before merging.



Bones Bone, Bone.001 and Bone.002 have been merged in Bone.006, whereas Bone.005 wasn't modified. Note Bone.003, connected to Bone.006 but not yet "really" connected.



Bone.004 has been rotated, and hence the tip of Bone.006 was moved to the root of Bone.003.



The tip of Bone.006 has been translated, and hence the root of Bone.003 was moved to the tip of Bone.006

## Subdividing Bones

### Reference

Mode: *Edit mode*

Menu: Armature ▸ Subdivide, Armature ▸ Subdivide Multi

Hotkey: W-1, W-2

You can subdivide bones, to get two or more bones where there was just one bone. The tool will subdivide all selected bones, preserving the existing relationships: the bones created from a subdivision always form a connected chain of bones.

To create two bones out of each selected bone:

- press Wpop-up ▸ Subdivide, same as W-1, or
- select Armature ▸ Subdivide from the header menu

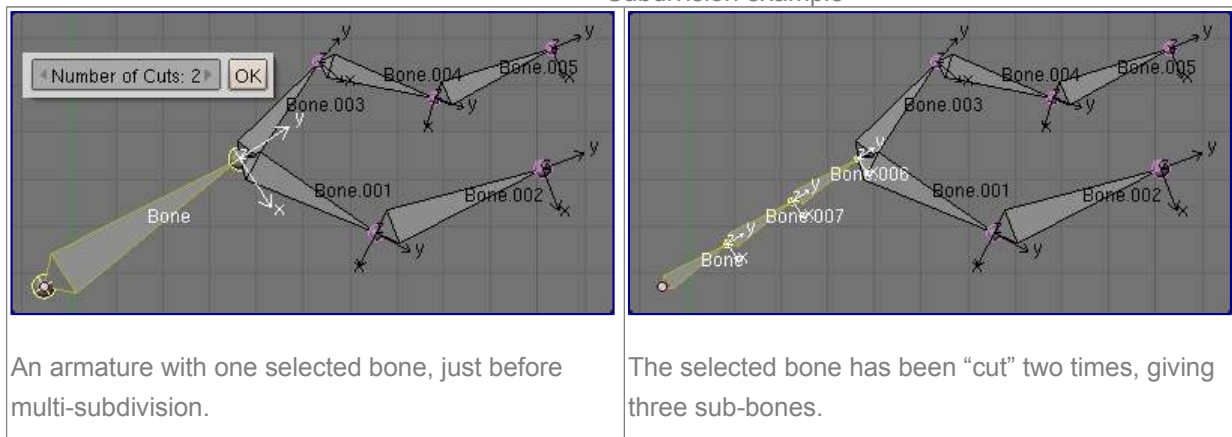
To create an arbitrary number of bones from each selected bone:

- press Wpop-up ▸ Subdivide Multi, same as W-2, or

- select **Armature** ▸ **Subdivide Multi** from the header menu, an

Then specify the number of cuts you want in the pop-up. As in mesh editing, if you set  $n$  cuts, you'll get  $n+1$  bones for each selected bone.

Subdivision example



An armature with one selected bone, just before multi-subdivision.

The selected bone has been “cut” two times, giving three sub-bones.

## Locking Bones

You can prevent a bone from being transformed in *Edit mode* in several ways:

- The active bone can be locked clicking on *Lock* in the *Transform Properties* panel (N in a 3D view);
- all bones can be locked clicking on the *Lock* button of their sub-panels in the *Armature Bones* panel;
- press **Shift-W** pop-up ▸ **Toggle Settings** ▸ **Locked**
- select **Armature** ▸ **Bone Settings** ▸ **Toggle a Setting**).

If the root of a locked bone is connected to the tip of an unlocked bone, it won't be locked, i.e. you will be able to move it to your liking. This means that in a chain of connected bones, when you lock one bone, you only really lock its tip. With unconnected bones, the locking is effective on both ends of the bone.

## X-Axis Mirror Editing

Another very useful tool is the *X-Axis Mirror* editing option (*Tool panel* > *Armature Options*, while Armature is selected in *Edit Mode*). When you have pairs of bones of the same name with just a different “side suffix” (e.g. *.R* / *.L*, or *\_right* / *\_left* ...), once this option is enabled, each time you transform (move/rotate/scale...) a bone, its “other side” counterpart will be transformed accordingly, through a *symmetry along the armature local X axis*. As most rigs have at least one axis of symmetry (animals, humans, ...), it's an easy way to spare you half of the editing work!

### See also

- naming bones.

## Separating Bones in a new Armature

You can, as with meshes, separate the selected bones in a new armature object (**Armature** ▸ **Separate**, **Ctrl-Alt-P**) - and of course, in *Object mode*, you can join all selected armatures in one (**Object** ▸ **Join Objects**, **Ctrl-J**).

