Chapter 3. Polygonal Modeling of the Character's Accessories

In this chapter, we will cover the following recipes:

- Preparing the scene for polygonal modeling
- Modeling the eye
- Modeling the armor plates
- Using the Mesh to Curve technique to add details

Introduction

In the previous two chapters, we did the following:

- Quickly modeled a simple base mesh, as close as possible to the shape of the reference templates
- Sculpted this base mesh, refining the shapes and adding details to some extent

We have also quickly modeled very simple teeth and talons, and placed bare UV Spheres as placeholders for the eyes.

It's now time to start some polygonal modeling to complete the eyes, but especially to build the armor that our character is wearing.

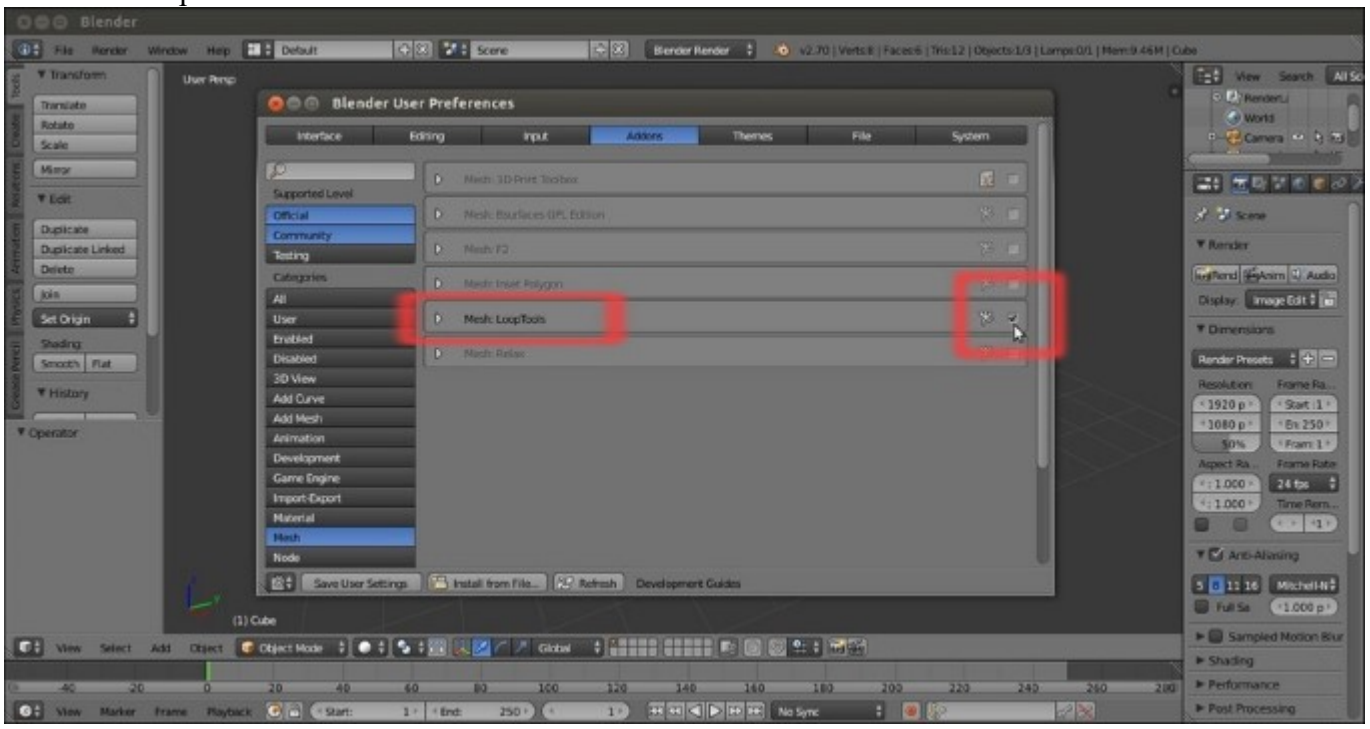
Preparing the scene for polygonal modeling

Coming from a sculpting session, our `.blend` file must first be prepared for the polygonal modeling, verifying that the required add-ons are enabled and all the character's parts are easily visible and recognizable; for this, even though the topic of **Materials** is complex and there will be an entire chapter dedicated to it later in this module, we are going to assign basic materials to these parts so that they have different colors in the 3D viewport.

Getting ready

First, we are going to look for the **LoopTools** add-on, an incredibly useful script by Bartius Crouch that extends the Blender modeling capabilities (and that also has other functionalities, as we'll see in the next chapter about retopology); this add-on is provided with the official Blender release, but still must be enabled. To do this, follow these steps:

1. Start Blender and call the **Blender User Preferences** panel (*Ctrl* + *Alt* + *U*); go to the **Addons** tab.
2. Under the **Categories** item on the left-hand side of the panel, click on **Mesh**.
3. Check the empty little checkbox on the right-hand side of the **Mesh: LoopTools** add-on to enable it.
4. Click on the **Save User Settings** button at the bottom-left of the panel to save your preferences and close the panel:



The Blender User Preferences panel

5. Open the `Gidiosaurus_Dynatopo_Sculpt.blend` file.

How to do it…

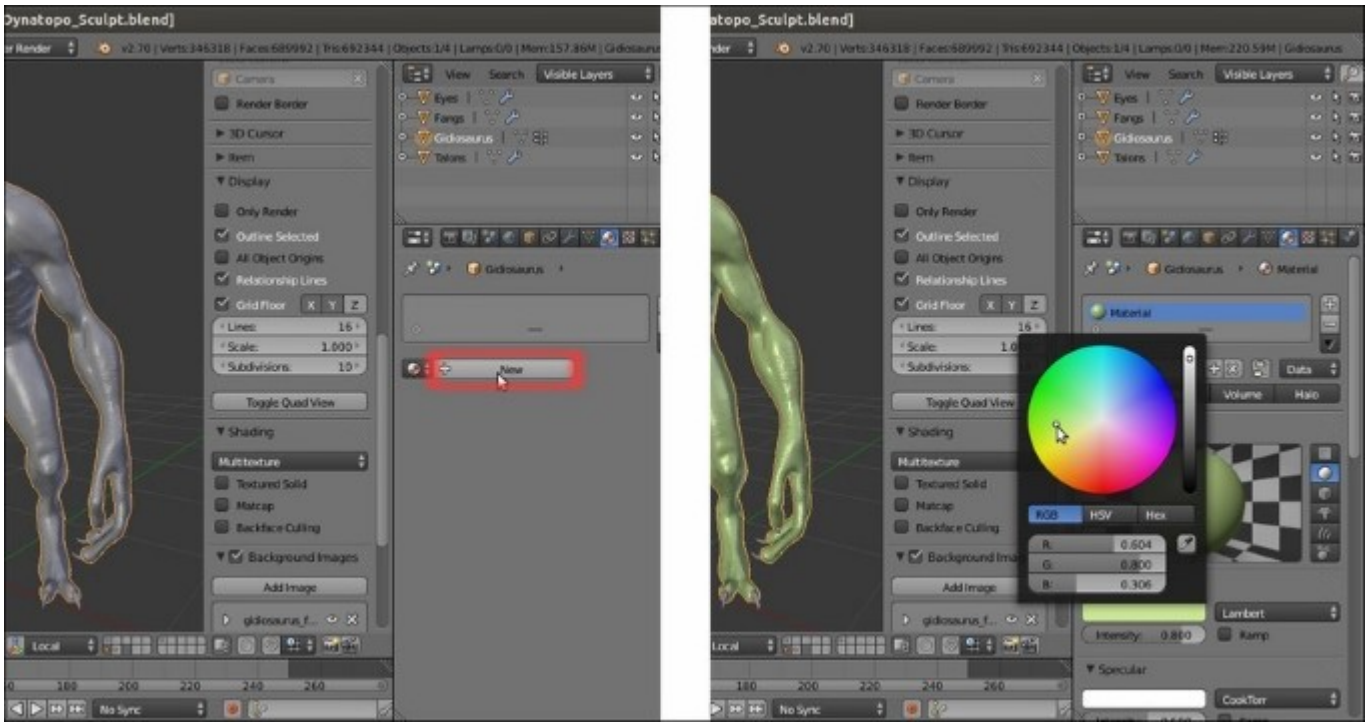
Now, we can start with the scene setup:

1. Click on the **11th** scene layer button (the first one in the second row of the first-left layer block of **Visible Layers** in the toolbar of the 3D window) to make it the only one visible (or else, just put the mouse pointer on the 3D viewport and press the *Alt* + *11* keys; the *Alt* button is to allow for double digits).
2. Press *Shift* + left-click on the **13th** button to multiactivate it (or use the *Shift* + *Alt* + *13* shortcut).
3. Go to the **Outliner** and click on the little grayed arrow icons on the side of the **Eyes**, **Fangs** and **Talons** items to make them selectable again.
4. If not already present, show the **Properties** 3D window sidepanel (*N* key) and go to the **Shading** subpanel; uncheck the **Matcap** item:

Disabling the Matcap item

5. Select the **Gidiosaurus** mesh; go to the **Material** window under the main **Properties** panel to the right and click on the **New** button to assign a material (note that, at least at the moment, we are using the default **Blender Internal** engine); click on the **Diffuse** button and change the color to **RGB 0.604**, **0.800**, **0.306** (a greenish hue, but in this case you can obviously choose any color you wish). Double left-click on the material name inside the data block slot to rename it as `Body`.
6. Select the **Eyes** object and again in the **Material** window under the main **Properties** panel to the right, click on the **New** button to assign a new material; click on the **Diffuse** button and this time change the color to **RGB 0.800**, **0.466**, **0.000**. Rename the material as `Eyes`.

7. Select the **Fangs** object and repeat the process; change the diffuse color to **RGB 0.800**, **0.697**, **0.415**. Rename the material as `Enamel`.
8. Select the **Talons** object and go to the **Material** window under the **Properties** panel to the right; click on the little arrows on the left-side of the **New** button and from the pop-up menu, select the `Enamel` material:



Assigning a material and choosing a color

9. Go to the **UV/Image_Editor** window on the left-hand side of the screen and press *Shift* + left-click on the **X** icon on the right-hand side of the data block name to get rid of the `gidiosaurus_trequarters.png` image. Then, click on the **Open** button, browse to the `templates` folder, and load the `gidiosaurus_armor1.png` image.
10. Save the file as `Gidiosaurus_modeling.blend`.

The armoured character's image loaded in the UV/Image Editor for reference

How it works…

We have deselected the **Matcap** view, assigning also differently colored basic materials to the four parts making up the character's mesh (**body**, **eyes**, **fangs**, and **talons**) to have a clearer way of differentiating the different pieces of the mesh. Then, we have replaced the template we used as reference for the sculpting of the **Gidiosaurus** body with a new one showing the armor as well (in the `templates` folder there are actually two slightly different versions of the armor; we chose the first one).

We have also activated the **13th** scene layer to be ready for the modeling of the **armor** (in the **11th** we have the character's mesh and in the **12th** we have the **fangs**, **talons**, and **eyes**).

Note that, in this cookbook, I will always specify scene layers to indicate the **20** 3D layers accessible from the buttons on the viewport toolbar and distinguish them from other types of layer systems present in Blender, such as for the **bones** or the **Grease Pencil** tool and so on.

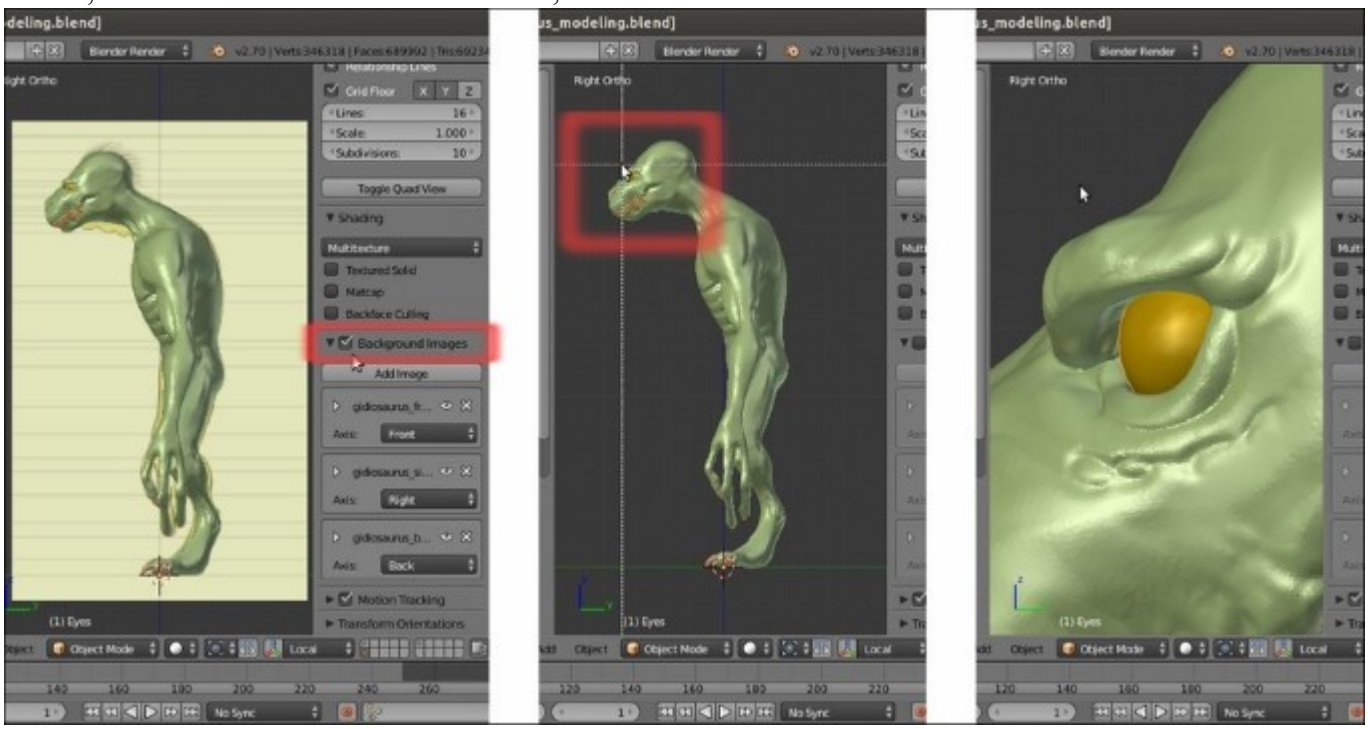
Modeling the eye

It's now time to start to define the creature's **eyes**. We already had **UV Sphere** placeholders, but we're going to refine this mesh to deliver a more convincing eye. By the way, keep in mind that a good portion of the expressiveness of the eye will be due to the use of appropriate textures; for more information, see Chapter 12, *Creating the Materials in Cycles*, and Chapter 13, *Creating the Materials in Blender Internal*.

Getting ready

Following the previous recipe, there is nothing particular to be prepared before starting, except for the following:

1. Go to the **Properties** 3D view sidepanel (*N* key if not already present) and uncheck the **Background Images** item.
2. Press *3* on the numpad to go in **Side** view and zoom to the **UV Sphere** location, by pressing *Shift* + *B* and drawing a box around the point you want to zoom at; as you release the mouse button, the selected area will be zoomed in;



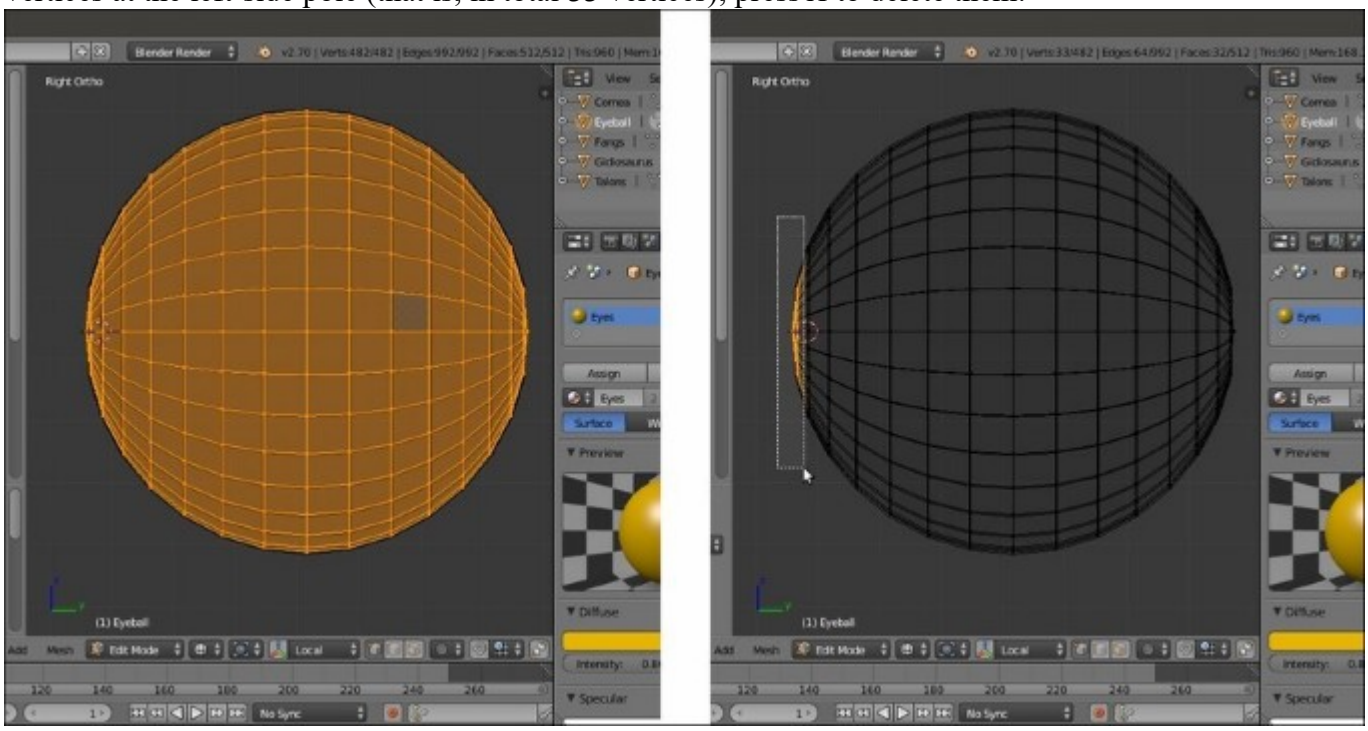
Disabling the background images and zooming to the eyes area

3. Go to the **Outliner** and click on the eye icon on the right-hand side of the **Gidiosaurus** item to hide it; or else, select the mesh in the 3D viewport and press the *H* key. Alternatively, you can also press the slash (*/*) key in the numpad to go in **Local** view, a particular view mode where only the selected objects are still visible (press the slash (*/*) again to go back to the normal view mode).

How to do it…

Without further ado, let us begin to build the eye:

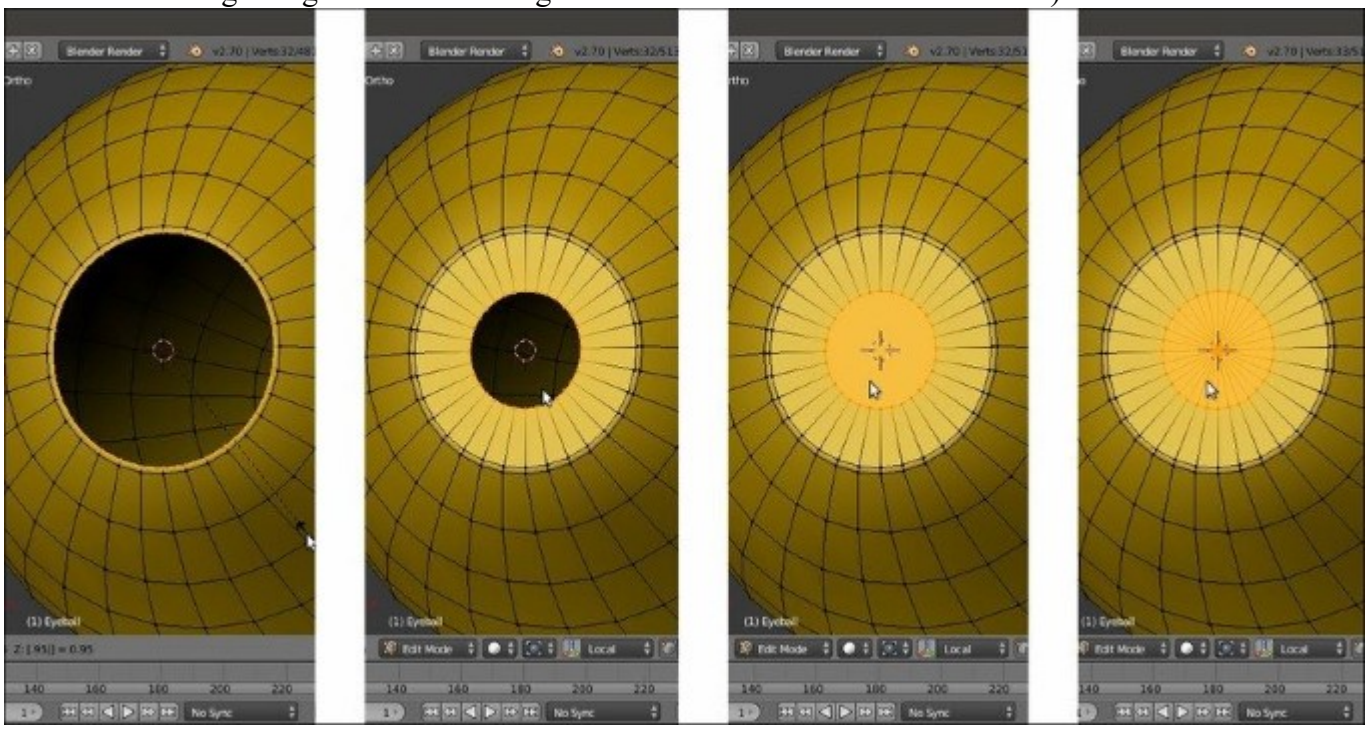
1. Press *Z* to go in the **Wireframe** viewport shading mode.
2. In the **Outliner**, select the **Eyes** item (or else, if you wish, in the 3D viewport, select the **UV Sphere** object) and rename it as **Cornea**.
3. Press *Shift* + *D* and then immediately press the *Esc* key or right-click to cancel the *Grab/ Translate* function, obtaining a duplicated object that now shows as **Cornea.001**; in the **Outliner**, rename the new object as **Eyeball**.
4. Press *Tab* to go in **Edit** Mode; if necessary, press *A* to select all the vertices and scale them to **0.990** (*S* | **.99** | *Enter*).
5. Press *A* to deselect all the vertices. Then, box-select (*B* key) the pole vertex and the first row of vertices at the left-side pole (that is, in total **33** vertices); press *X* to delete them:



Box-selecting the vertices at the UV Sphere pole

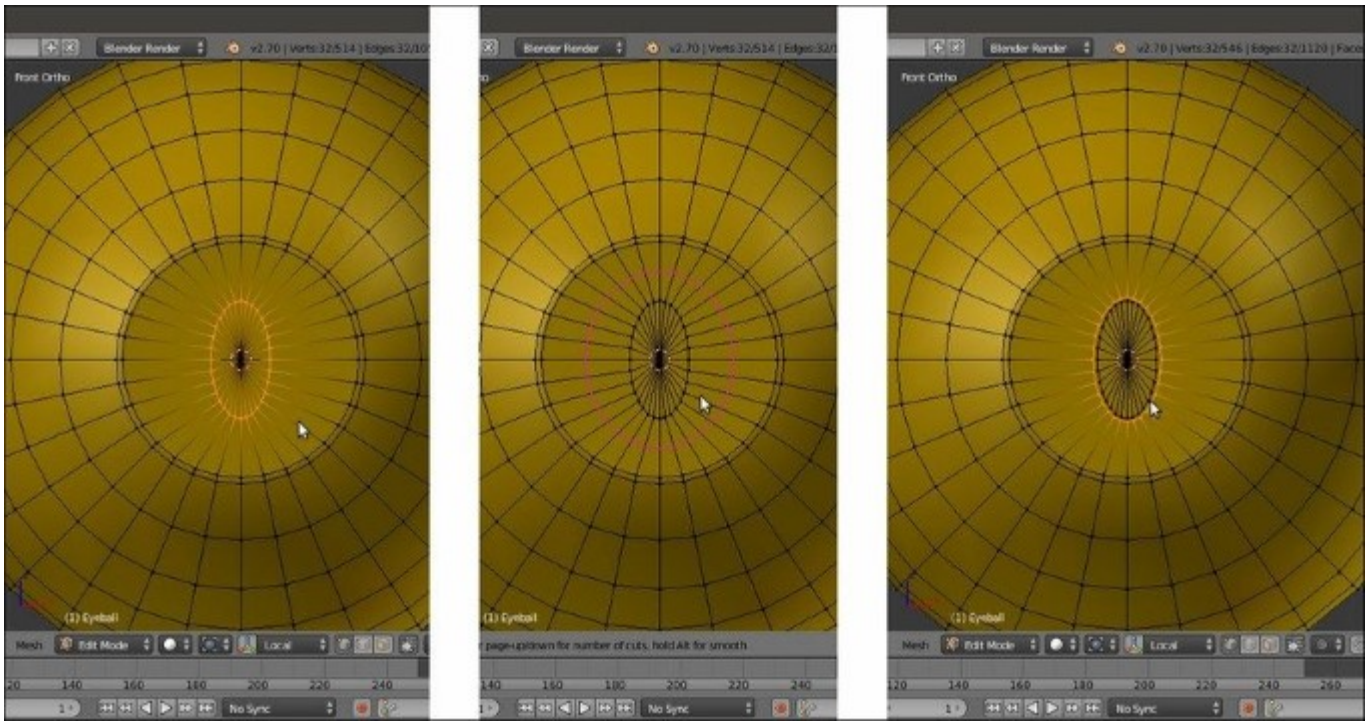
6. Reselect all the remaining vertices; then, press the period (.) key on the numpad to center the view on the selection.
7. Go to the **Outliner** and click on the eye icon on the left-hand side of the **Cornea** item to hide it.
8. Rotate the view to align it with the hole in the **UV Sphere** and, if necessary, press the *5* key on the numpad to go in **Ortho** mode.
9. Press *Z* to go in the **Solid** viewport shading mode and press *A* to deselect everything.
10. Select the first row of vertices around the hole (*Alt* + right-click on the edge-loop). Press *E* to extrude them and then *S* to scale them; keep *Ctrl* + *Shift* pressed and scale to **0.9500** (or else, press *S* | **.95** | *Enter*).

11. Press *E* and *S* again to extrude and scale the vertices to **0.500**.
12. Press *F* to fill the selection and *Alt* + *P* to poke the created N-gon face (that is, to automatically subdivide the single N-gon face into triangular faces connected to a central vertex).



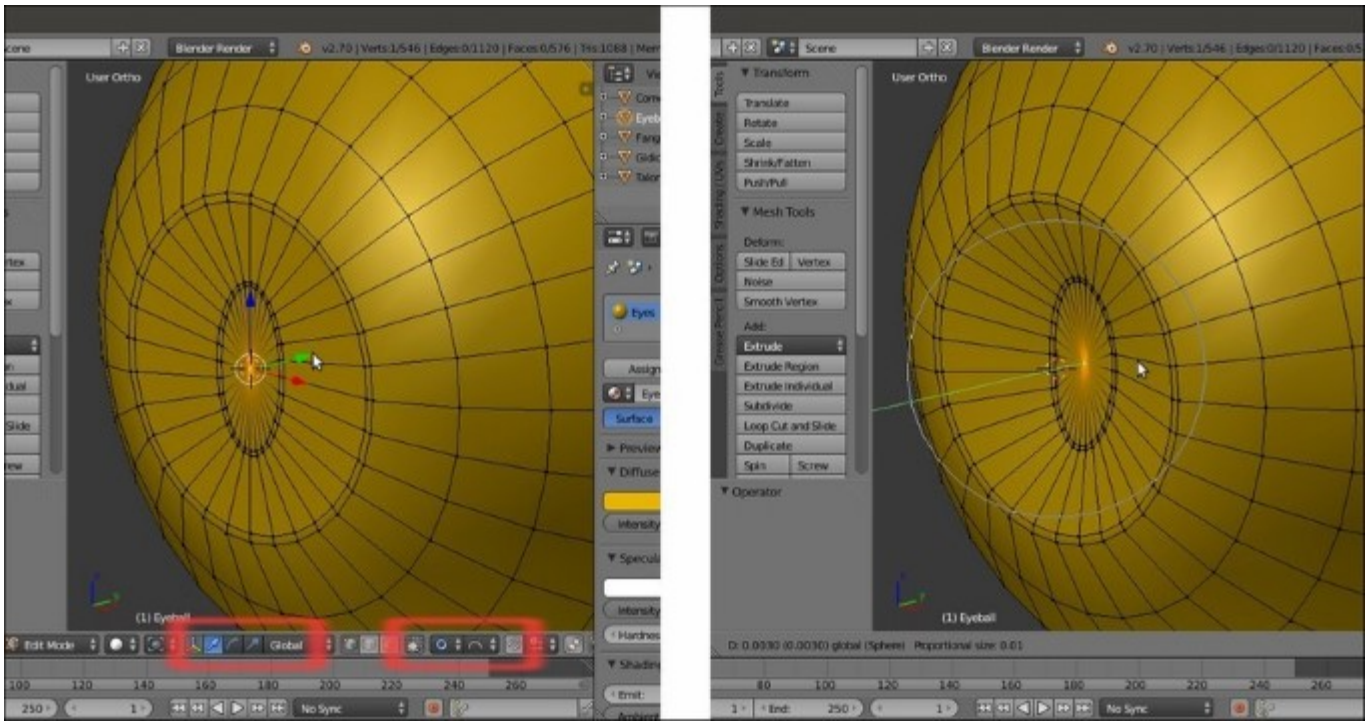
Extruding and closing the eye

13. Press *1* on the numpad to go in **Front** view. Scale the selected vertices to **0.500** on the *x* axis (*S* | *X* | **.5** | *Enter*).
14. Press *Ctrl* + *R* and add an edge-loop outside of the iris; keep *Ctrl* pressed and move the mouse to edge-slide it to **-0.900**.



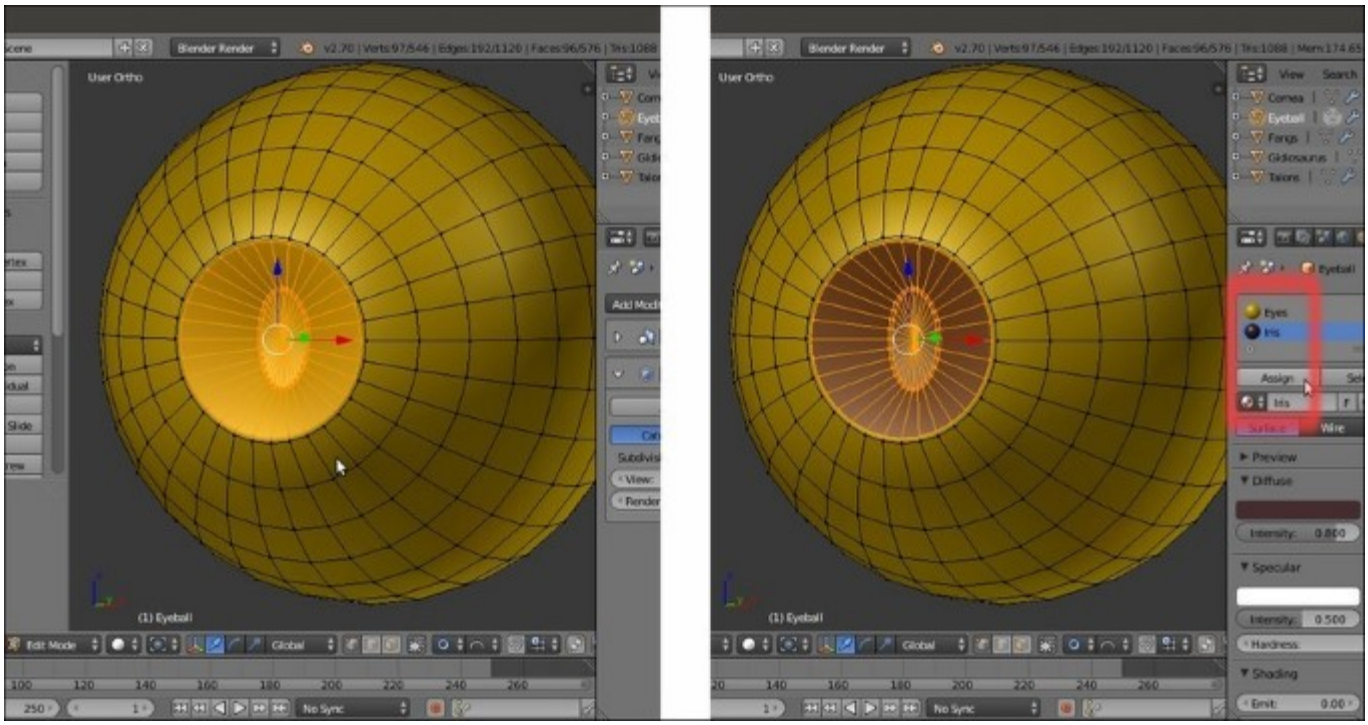
Making the pupil

15. In the toolbar of the 3D window, enable the **PET** (the **Proportional Editing** tool); set it to **Connected** and the **Proportional Editing Falloff** option to **Sphere**.
16. Enable the widget, set it to *Translate* (the second icon from the left, the one with the arrow), set **Transform Orientation** to **Global**, and select the central vertex of the pole. By using the widget, move it on the *y* (green) axis to **0.0030** (click on the green arrow and hold *Shift* for a finer control as you move the mouse on the *y* axis), while with the middle mouse wheel, set the **Proportional size** value of the **PET** to a quite small radius, or **0.01** to be precise:



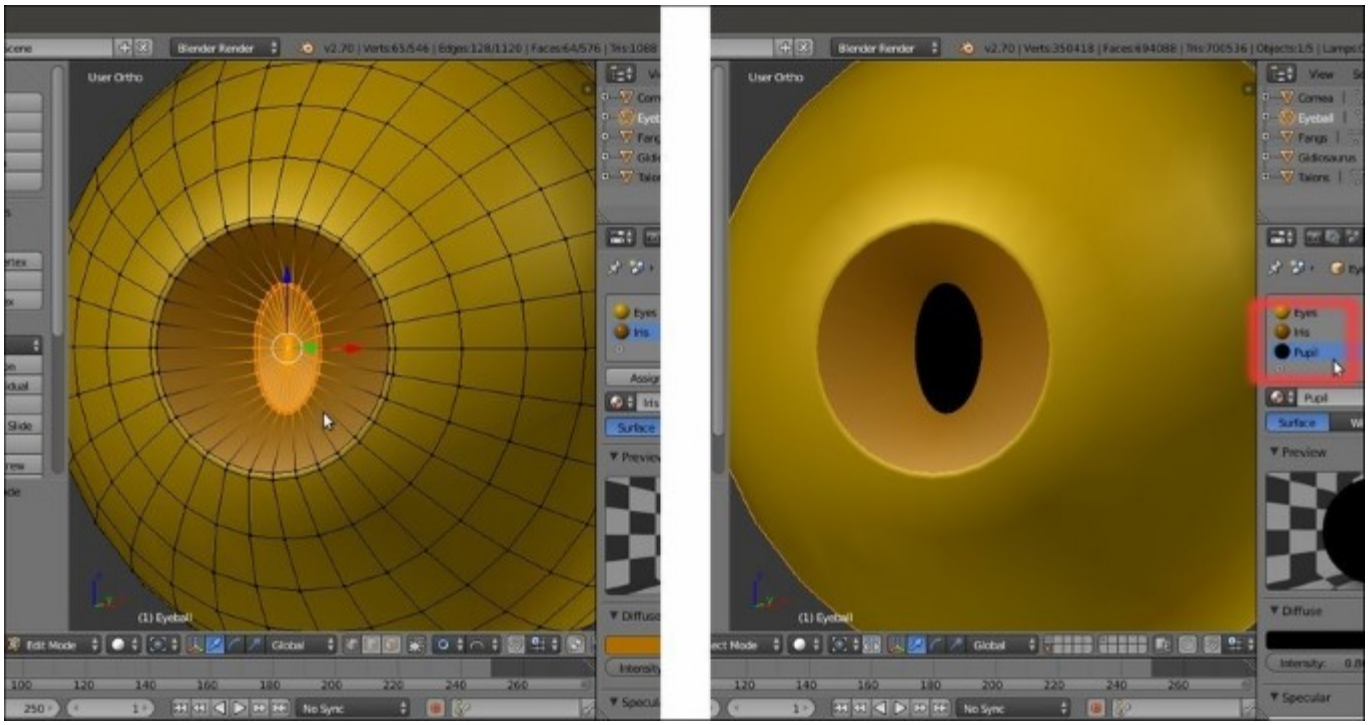
Creating the iris concave shape

17. Press *Ctrl* and the + key on the numpad **3** times, in order to grow the selection starting from the single selected vertex at the center of the iris.
18. Go to the **Material** window, create a new material, and rename it as `Iris`; change its diffuse color to something like **RGB 0.061**, **0.025**, **0.028** and then click on the **Assign** button:



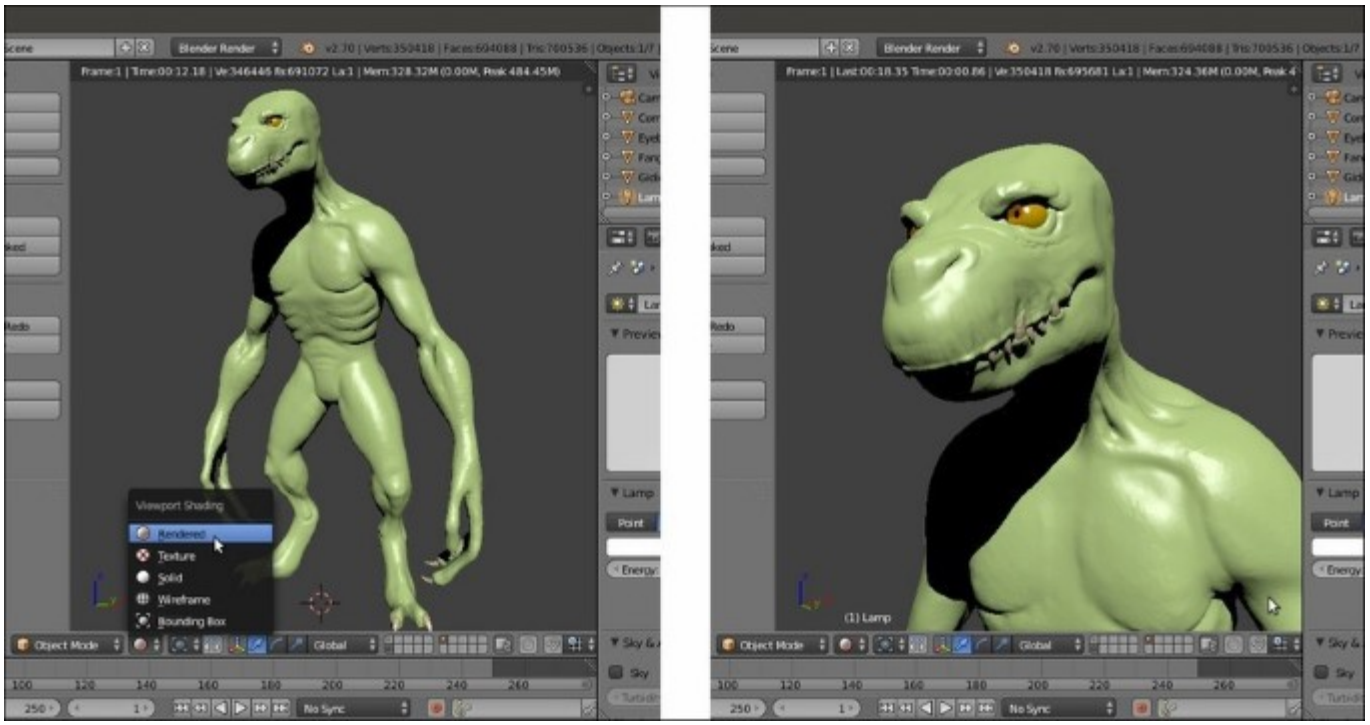
Assigning a material to the iris

19. Press *Ctrl* and the - key on the numpad just **1** time, in order to reduce the selection to the pupil. Go to the **Material** window, create a new material, and rename it as `Pupil`; change its diffuse color to plain black and then click on the **Assign** button.
20. Press *Tab* to go out of **Edit Mode**.



The almost completed eye

21. Go to the **Object Modifiers** window under the main **Properties** panel on the right-hand side of the UI and assign a **Subdivision Surface** modifier; check the **Optimal Display** item.
22. In the **Outliner**, unhide the **Cornea** object and assign a **Subdivision Surface** modifier as well; check the **Optimal Display** item and then hide it again (you can also use the *H* and *Alt* + *H* keys to do this).
23. Select the **Eyeball** object and go to the **Material** window; select the `Pupil` material and go to the **Specular** subpanel to set the **Intensity** value to **0.000**. Set the **Specular Shader Model** option of both the `Eyes` and `Iris` materials to **WardIso** and the **Slope** value to **0.070**. Set the `Iris` material's **Emit** value (under the **Shading** subpanel) to **0.050**.
24. In the **Outliner**, select the **Cornea** object and in the **Material** window, click on the little icon reporting **2** on the right-hand side of the material name (it's the display of the number of users for that material). The name `Eyes` automatically changes to `Eyes.001`: rename it `Cornea`; then, go to the **Transparency** subpanel and enable it. Set the **Fresnel** value to **1.400** and the **Blend** factor to **2.000**. Go to the **Options** subpanel further down and uncheck the **Traceable** item.
25. Unhide the **Gidiosaurus** mesh (*Alt* + *H*) and enable the **6th** scene layer (the one with the **Camera** and the **Lamp**). Select the **Lamp** and in the **Object Data** window, change the type to **Sun** and then rotate it to: **X = 55.788948°**, **Y = 16.162031°**, and **Z = 19.84318°**; you can press *N* and then type these values in the slots of the **Rotation** panel at the top of the **Properties** 3D window sidepanel.
26. Press *N* to hide again the **Properties** 3D window sidepanel and in the toolbar of the 3D window, go to the **Viewport Shading** button and select **Rendered** (or directly press the *Shift* + *Z* shortcut) to have a nice preview of the effect:



The Rendered preview of our character so far

27. Save the file.

How it works…

Actually, the **eyes** of the character are composed of two distinct objects: the **Eyeball** and the **Cornea** object.

The **Cornea** object is the transparent layer covering the **Eyeball** object, and by clicking on the eye icon in the **Outliner**, it has been made invisible in the 3D viewport but still renderable. With the **Cornea** object visible in the 3D views, **irises** and **pupils** would have been hidden behind, making the work of animating the **eyes** quite hard; animators always need to know what the character is looking at.

Both the **Cornea** and **Eyeball** objects, at the moment, are mirrored to the right by the **Mirror** modifier; this will be changed when we skin the mesh to the **Armature**.

If you can't find the **Rendered** view in the **Viewport Shading** mode button on the 3D viewport's toolbar, you may want to make sure you have the latest version of Blender; only versions after **2.6** have this feature for the Blender Render engine.

Modeling the armor plates

In the previous recipe, we modeled the character's **eye** and we had already modeled the **teeth** in Chapter 2, *Sculpting the Character's Base Mesh*, because we needed them, at that moment, to go on with the sculpting; they had been made with simple **Cube** primitives quickly scaled and tweaked in **Edit Mode**.

It is now time to model the **armor** for our warrior. Let's begin by creating the hard metal plates. We are going to use an approach similar to the modeling of the **fangs**, which is by starting with a **Cube** primitive and subdividing it to have more geometry to be edited in the proper shape, and we'll also use the **LoopTools** add-on to simplify some processes.

Getting ready

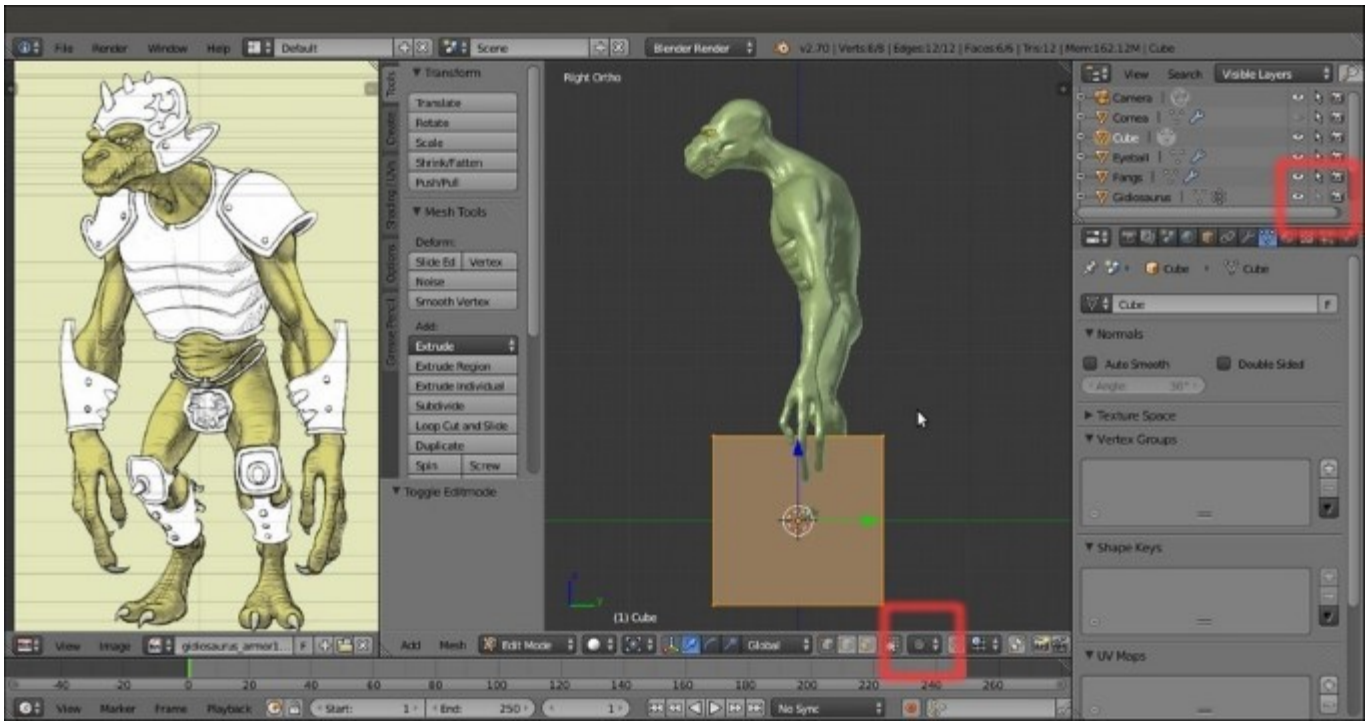
We will carry on with the `Gidiosaurus_modeling.blend` file:

1. Press *3* on the numpad to go in **Side** view.
2. By scrolling the middle mouse wheel, zoom back to frame the **Gidiosaurus** mesh in the 3D window.
3. In the **Outliner**, click on the arrow icon on the right-hand side of the **Gidiosaurus** item to make it unselectable.

How to do it…

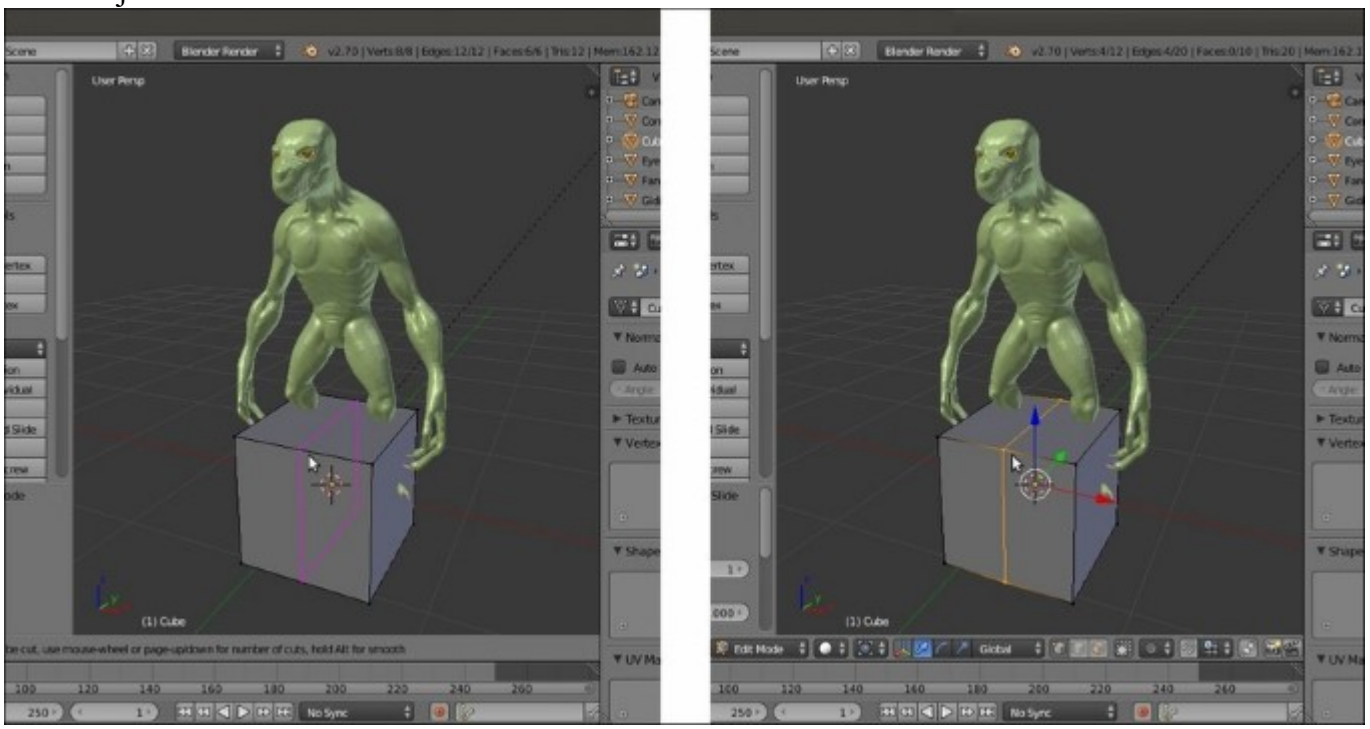
Now, we can start to build the **armor**; let's go with the **chest** piece:

1. Note that the **3D Cursor** is in the middle of the scene, at the character's pivot location (*Shift* + *S* | *Cursor to Selected* or also *Cursor to Active*, just in case).
2. Press *O* to disable the **Proportional Editing** tool; go to the 3D viewport toolbar to verify that the tool button is grayed.
3. Press *Shift* + *A* and add a **Cube** primitive to the scene.
4. Press *Tab* to go in **Edit Mode** and scale all the vertices to **0.500** (or press *S* | **.5** | *Enter*).



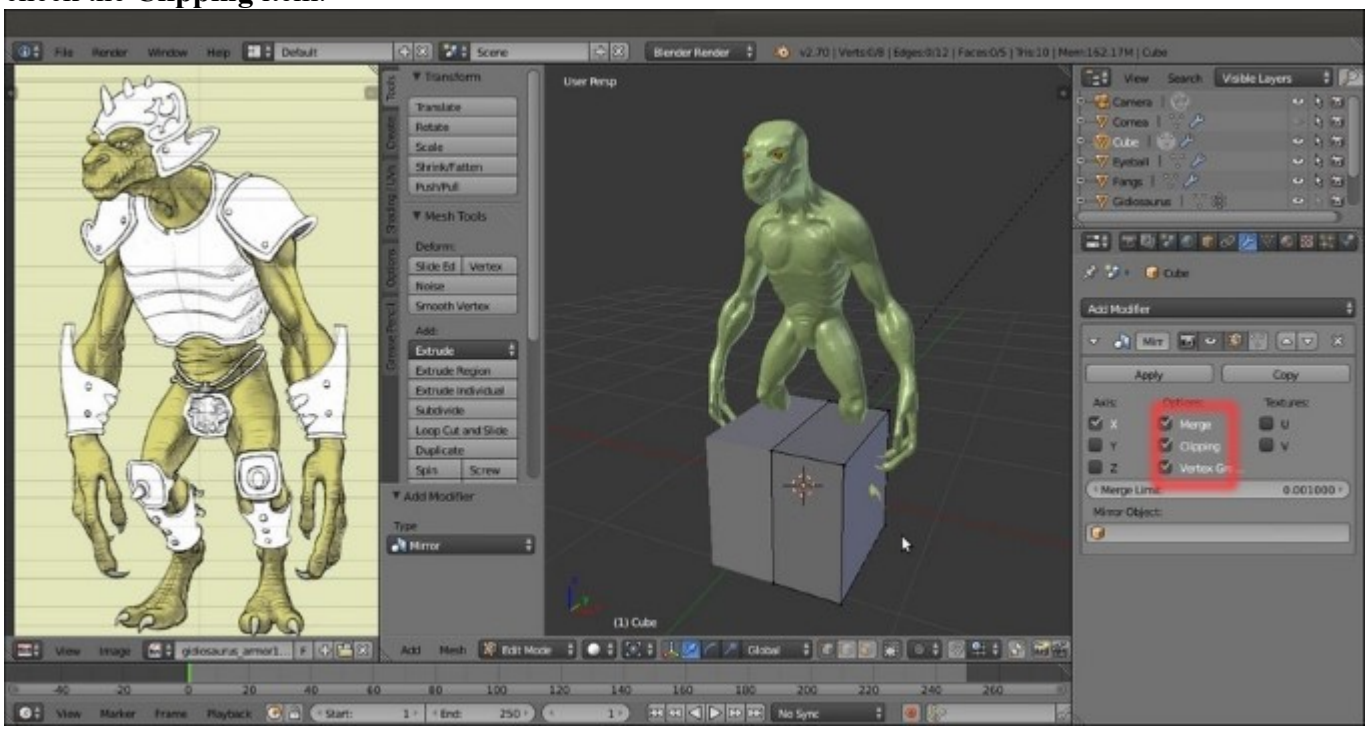
Adding the Cube primitive to the scene

5. Press *Ctrl* + *R* to add a loop along the *y* axis and then left-click twice to confirm it at the middle of the object:



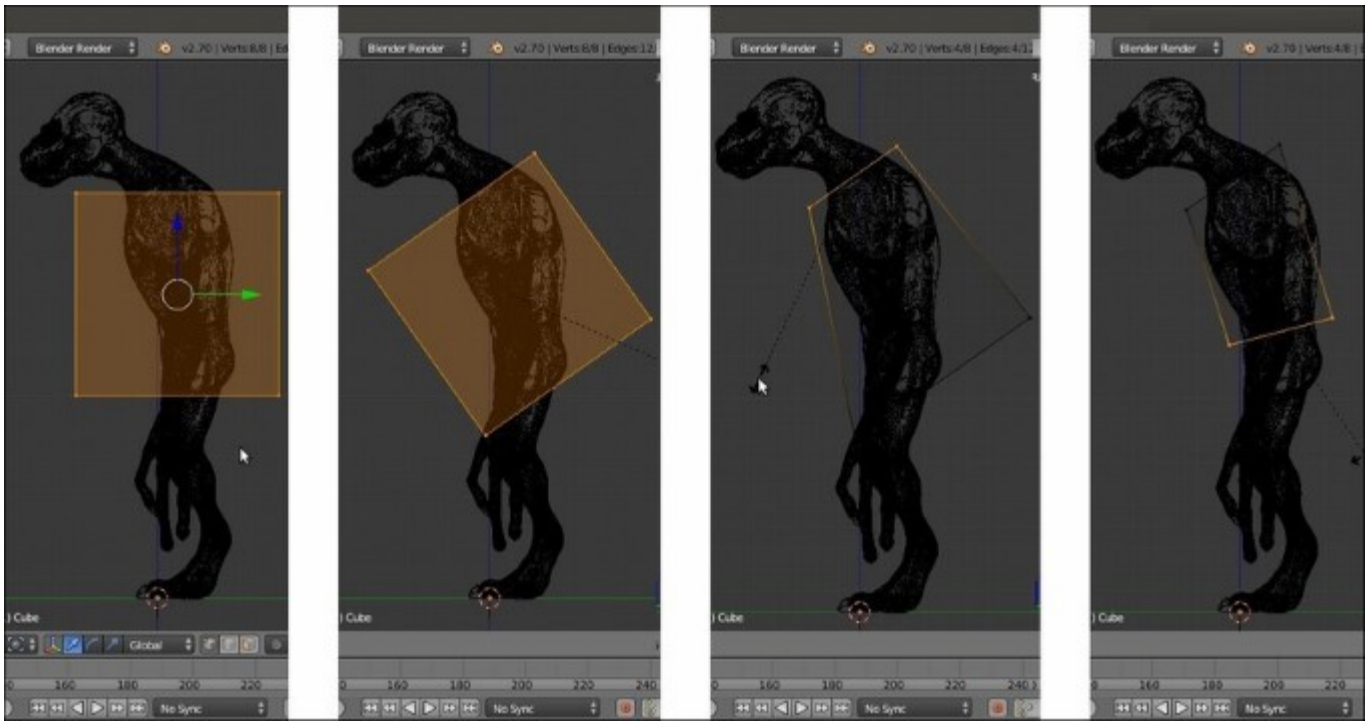
Adding a central vertical edge-loop to the Cube

6. Select the right-side vertices of the **Cube** and delete them; then, assign a **Mirror** modifier and check the **Clipping** item:



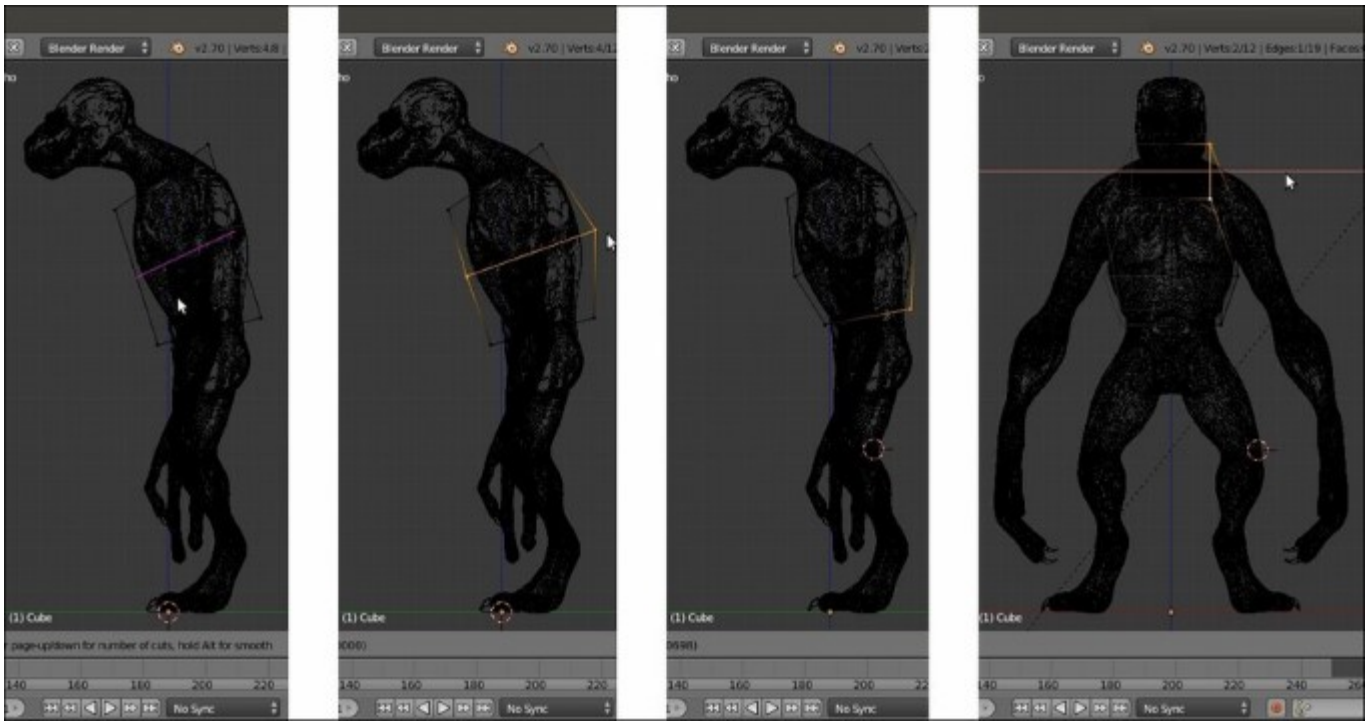
The Cube with the Mirror modifier

7. Go again in **Side** view and press *Z* to go in the **Wireframe** viewport shading mode; select all the vertices and move them upward.
8. Rotate the vertices to reflect the angle of the character's **chest**.
9. Select the upper vertices and scale and rotate them to fit the creature's **neck** area.
10. Select the bottom vertices and scale and rotate them to fit the base of the **chest**:



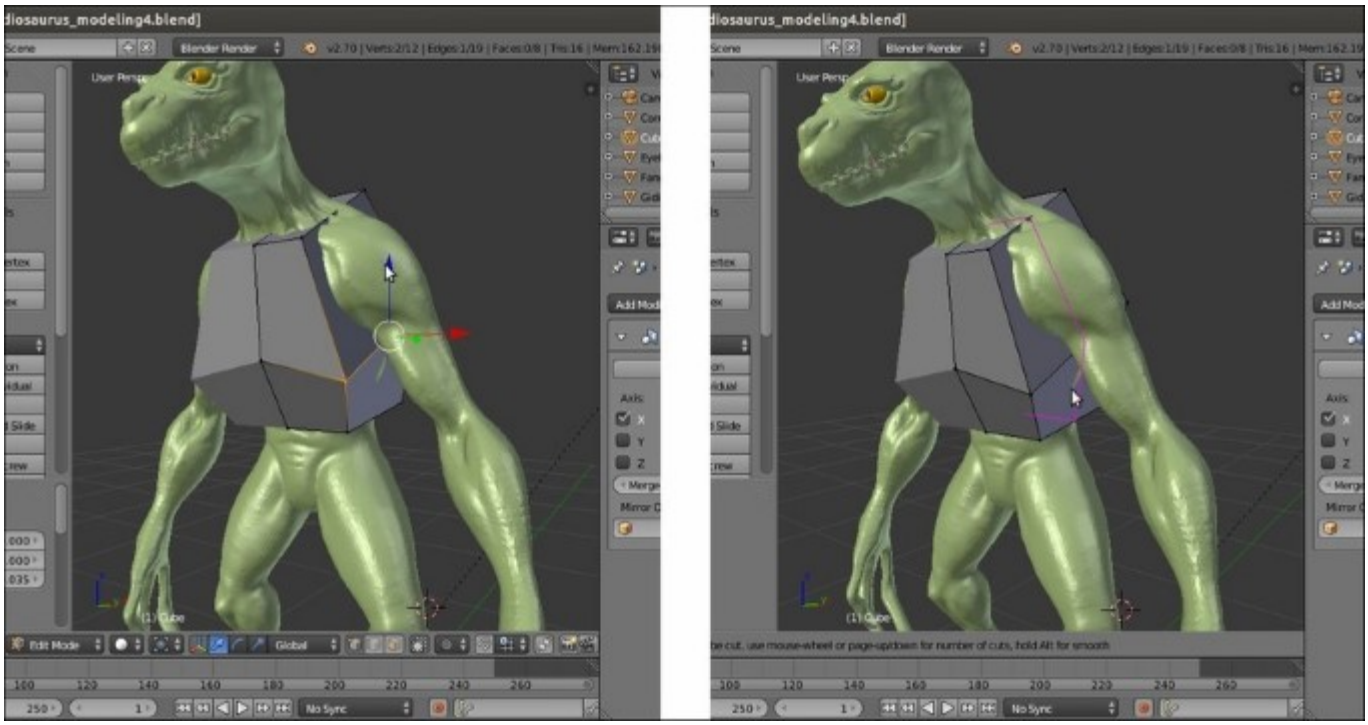
Starting to model the armor from the Cube primitive

11. Press *Ctrl* + *R* to add a new horizontal edge-loop at the middle of the **Cube**; scale it bigger to fit the shape of the creature's **chest**.
12. While still in **Side** view, grab and move the vertices to conform them to the **chest** shape.
13. Press *1* to go in **Front** view and again move the vertices to adjust them consistently to the character's **chest** shape:



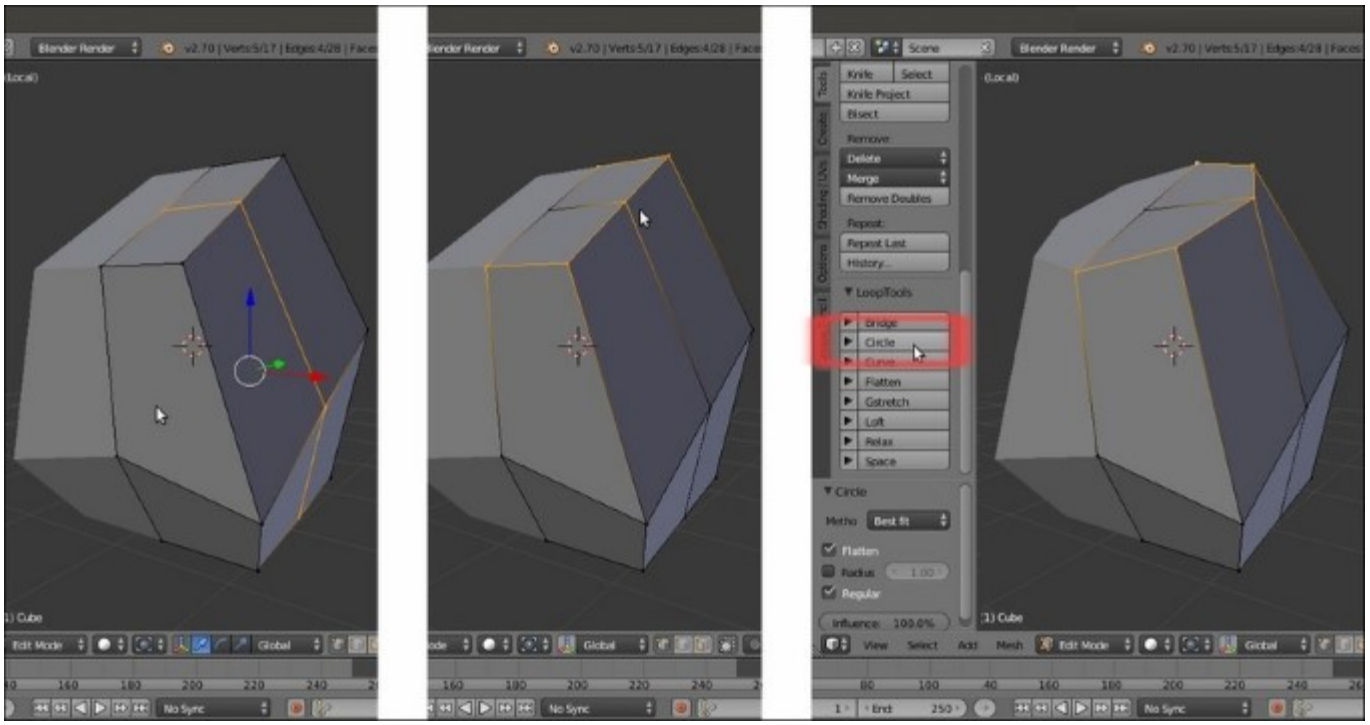
Adding more geometry and shape to the Cube

14. Select the **2** middle outer vertices and move them down, in order to place the edge connecting them just below the character's **armpit**.
15. Press *Ctrl* + *R* to add a loop along the *x* axis; click twice to confirm it at the middle of the lateral side:



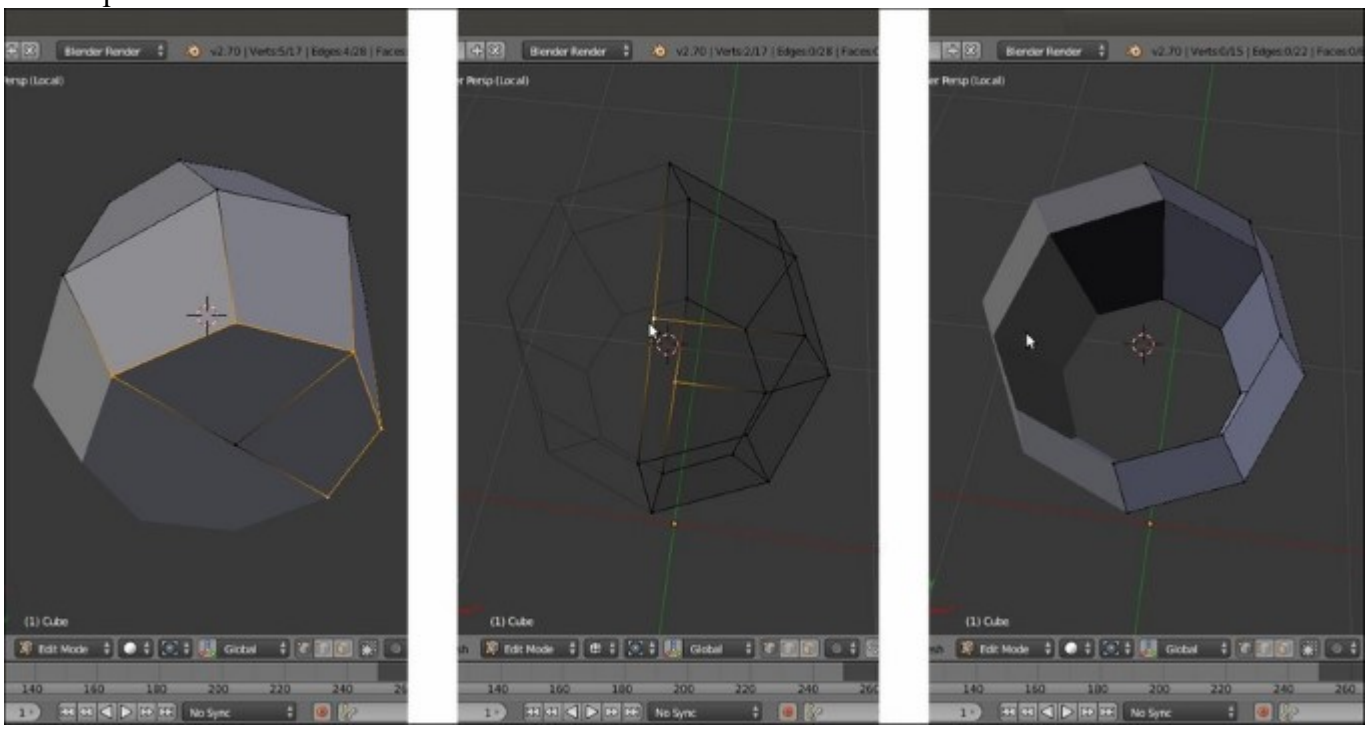
Adding more geometry again

16. Press the slash key (/) on the numpad to go in **Local** view with the selected object (in this case, even if still in **Edit Mode**, it is the **Cube**) and select the upper outer edge-loop.
17. Go to the **Tool Shelf** panel and scroll down the **Tools** tab to find the **LoopTools** subpanel (the **LoopTools** items are available also in the **Specials** menu that we can call by pressing the *W* key in **Edit Mode**); click on the **Circle** button to make the selection on a circular path:



Using the LoopTools add-on

18. Do the same also with the middle and the bottom edge-loop; then, select the central upper and bottom pole's vertices and delete them:

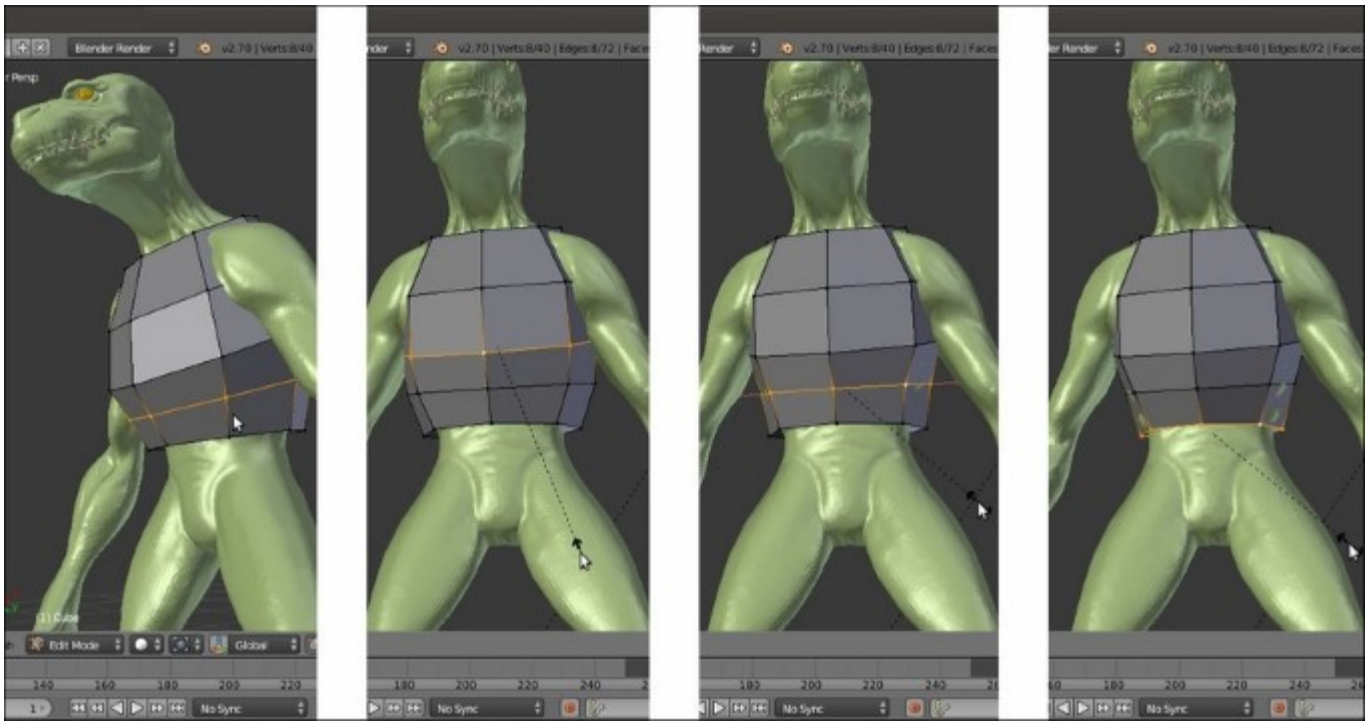


Going on with the modeling

19. Press the slash key (/) on the numpad to go out of **Local** view.
20. Press *Tab* to go out of **Edit Mode** and go to the **Object Modifiers** window under the main **Properties** panel; click on the **Apply** button to apply the **Mirror** modifier.
21. Go back in **Edit Mode** and press *Ctrl* + *R* to add a horizontal edge-loop to the upper half of the mesh.
22. Scale the new edge-loop to **1.100**:

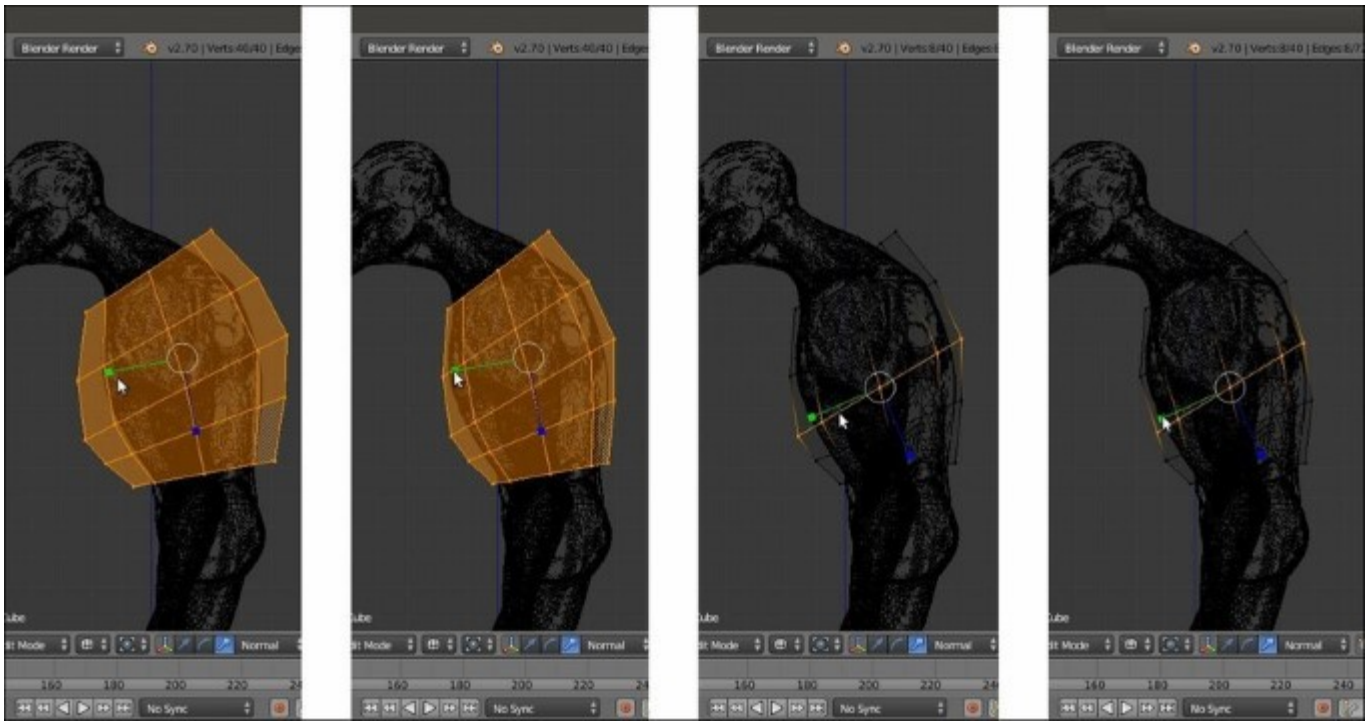
Adapting the shape of the armor to the chest by adding more geometry as edge-loops

23. Add a new horizontal edge-loop also to the lower half of the mesh.
24. Select the middle edge-loop and scale it smaller on the *x* axis, to **0.900**.
25. Select the bottom edge-loop and scale it smaller on the *x* axis as well.
26. Select the last edge-loop and repeat the operation.



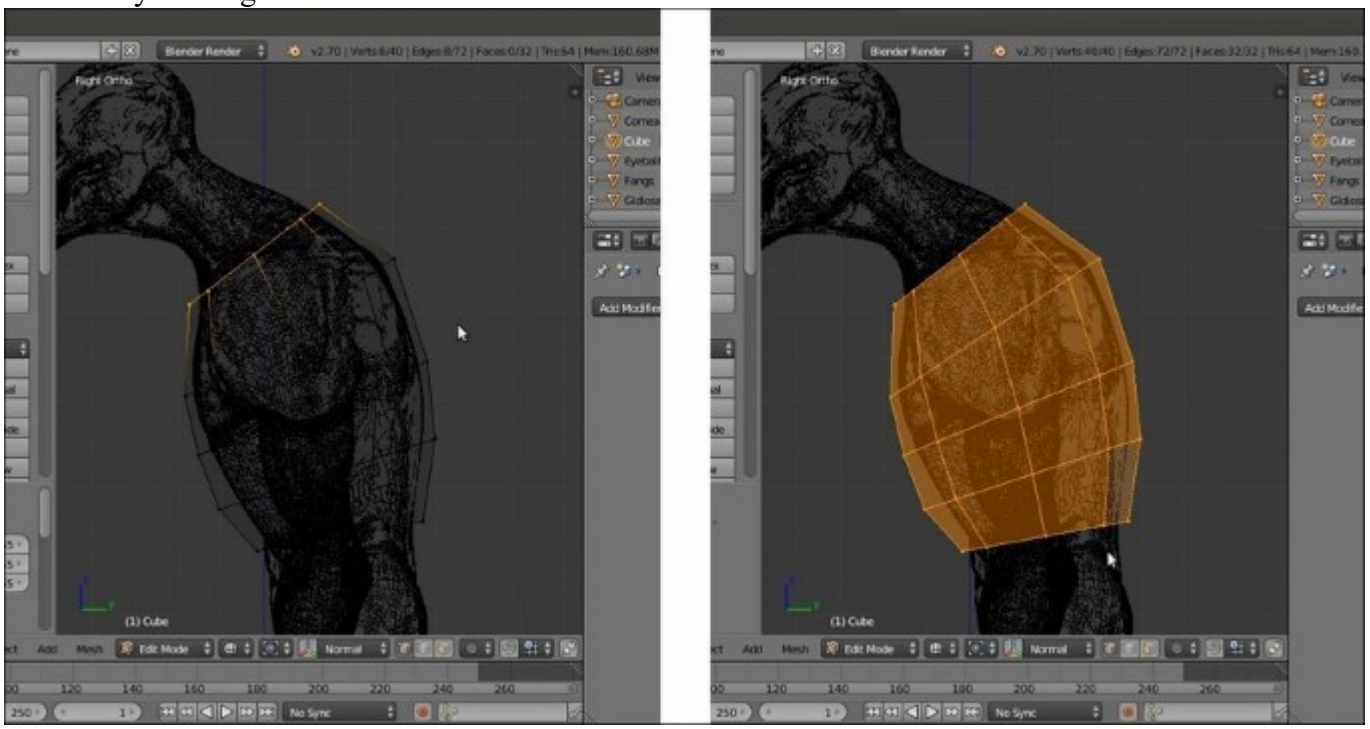
Going on with the modeling by adding edge-loops

27. Press *3* on the numpad to go in **Side** view and *Z* to go in the **Wireframe** viewport shading mode.
28. If not already, enable the widget in the toolbar of the 3D window; set the **Transformation manipulators** to **scaling** (the last icon to the right) and the **Transform Orientation** option to **Normal**.
29. Select all the vertices and by moving the green scaling manipulator of the widget, scale smaller all the edge-loops on the normal *y* axis; small enough to almost reach the character's **back** and **chest** surfaces.
30. Deselect everything and then select the middle edge-loop (press *Alt* + right-click); scale it again by using the widget to get close to the **torso** shape:



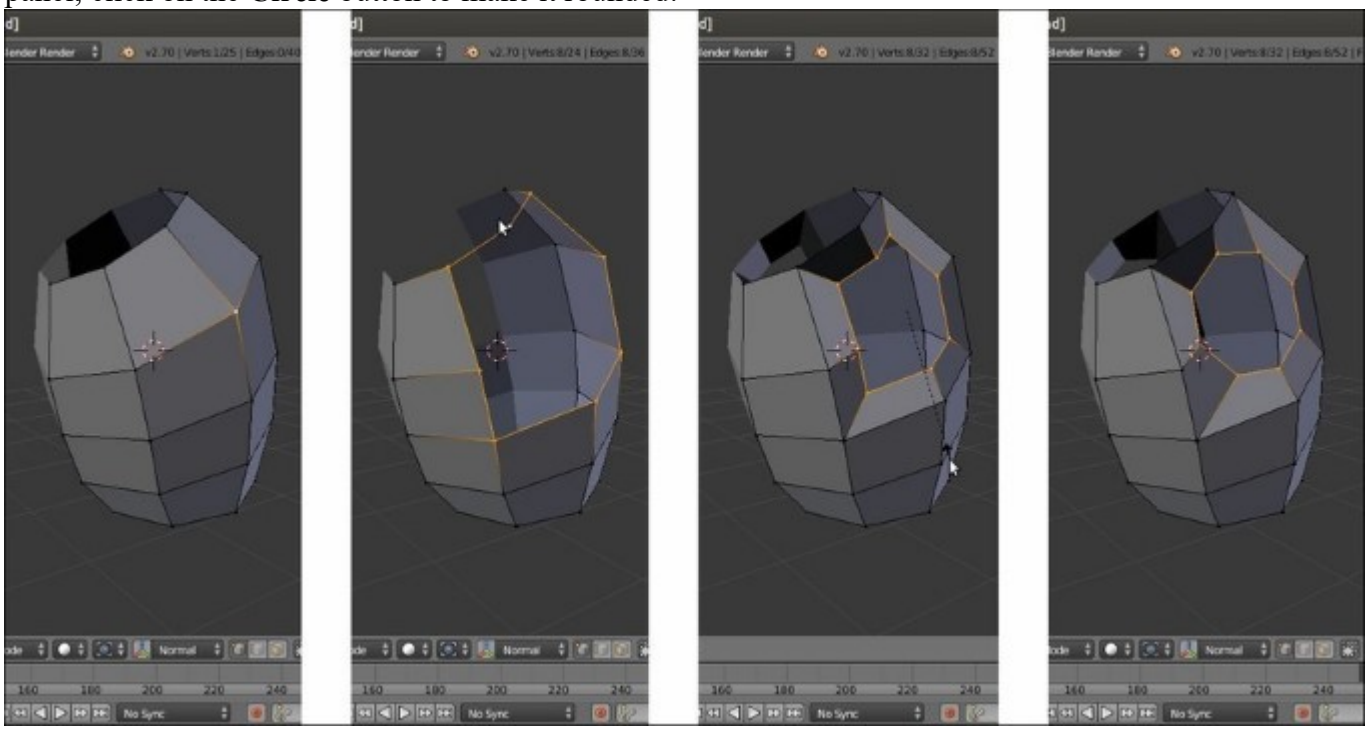
Adjusting the chest armor depth

31. Do the same with the other edge-loops by selecting them individually, rotating and scaling them, and also by moving the vertices.



Refining the lateral profile of the armor

32. Press the slash (*/*) key on the numpad to go again in **Local** view.
33. Select the right-side vertices of the **Cube** and delete them.
34. Go to the **Object Modifiers** panel and assign a new **Mirror** modifier; as usual, check the **Clipping** item.
35. Select the central vertex on the upper-side part and delete it.
36. Select the resulting loop of edges around the resulting hole (you can press *Alt* + right-click and then *Shift* + right-click to add the remaining unselected top vertex to the selection; it doesn't get selected with the edge-loop because there are no faces connecting it to the other vertices, but only edges).
37. Press *E* and then *S* to extrude new faces and scale them (about **0.600**).
38. Select the new edge-loop and go to the **LoopTools** panel under the **Tools** tab of the **Tool Shelf** panel; click on the **Circle** button to make it rounded:

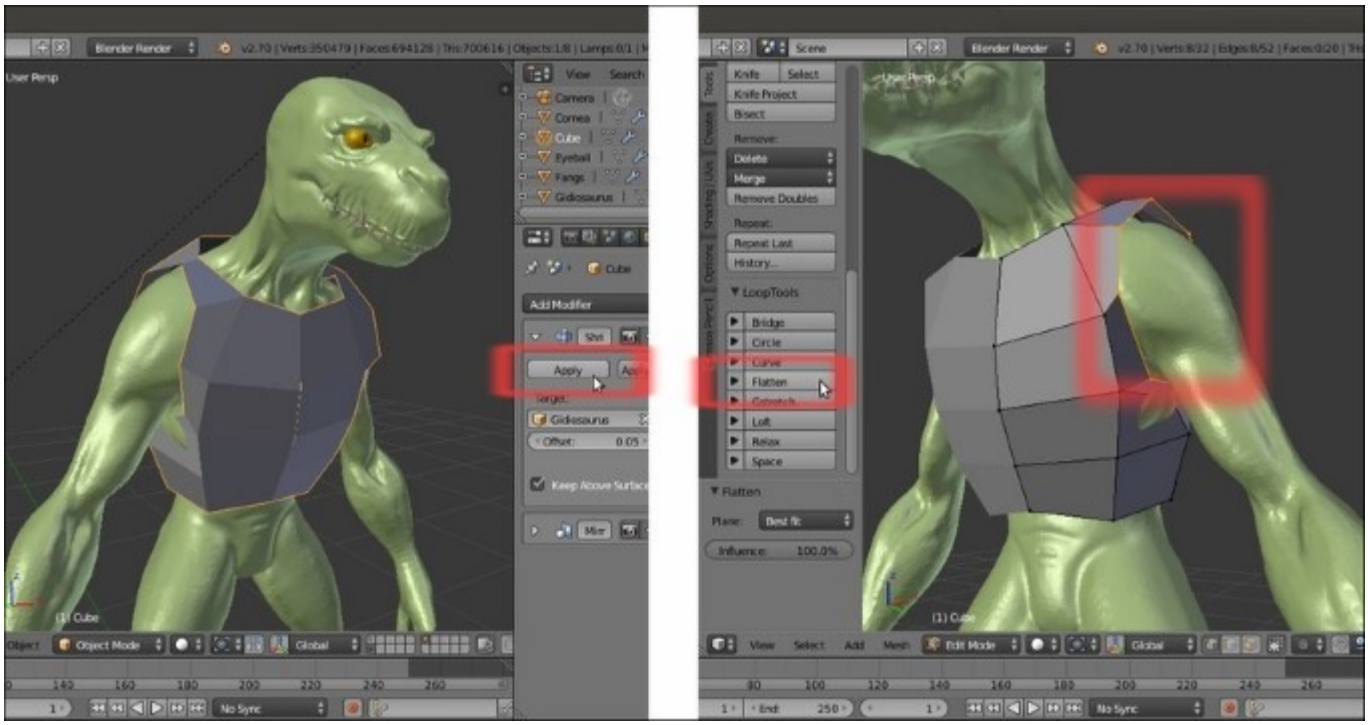


Adding the arm's holes

39. Go in **Front** view and move the edge-loop outward.
40. Go out of **Edit Mode** and press the slash (*/*) key on the numpad to go out of **Local** view.
41. Press *1* on the numpad to go again in **Front** view. Go to the **Object Modifiers** panel and assign a **Shrinkwrap** modifier to the **Cube**; check the **Keep Above Surface** item and in the **Target** field, select the **Gidiosaurus** name:

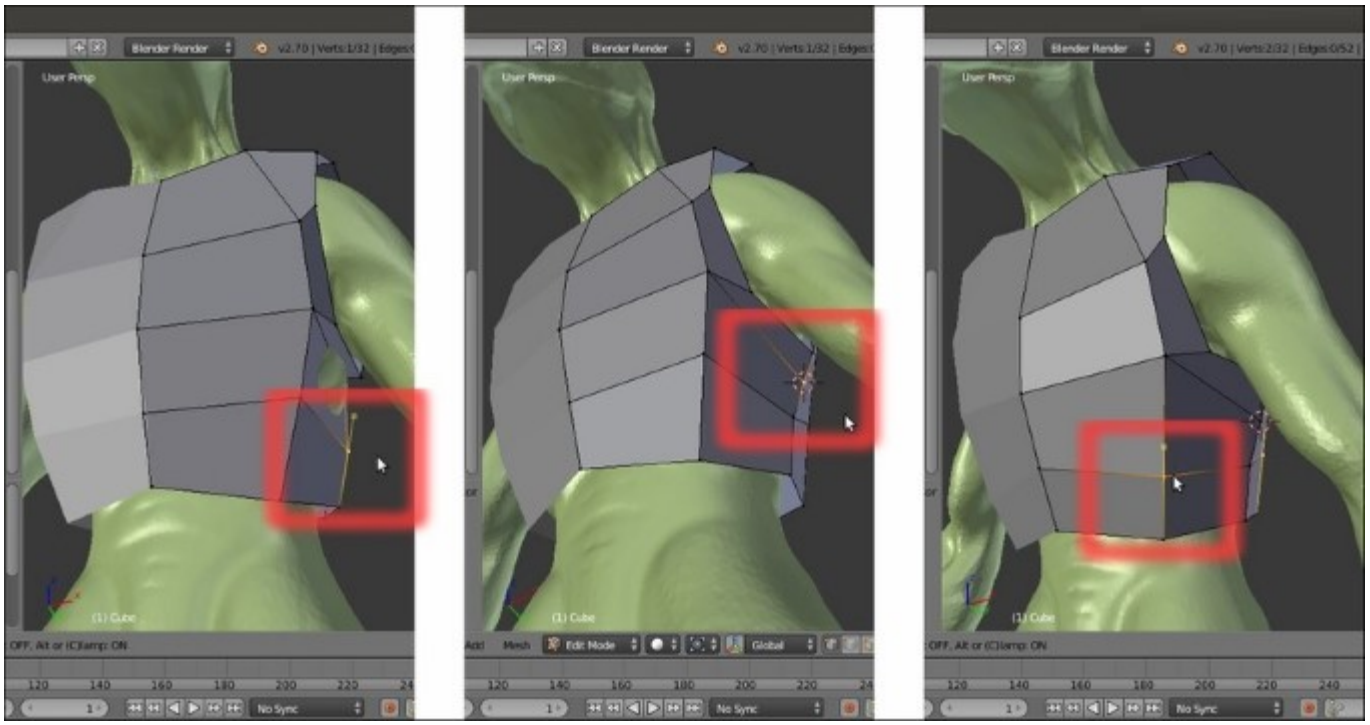
Assigning the Shrinkwrap modifier to the chest armor

42. Set the **Offset** value to **0.05**.
43. Move the **Shrinkwrap** modifier to the top of the modifier stack and click on the **Apply** button.
44. Go in **Edit Mode** and select the **shoulder** edge-loop; go to the **LoopTools** panel and click on the **Flatten** button:



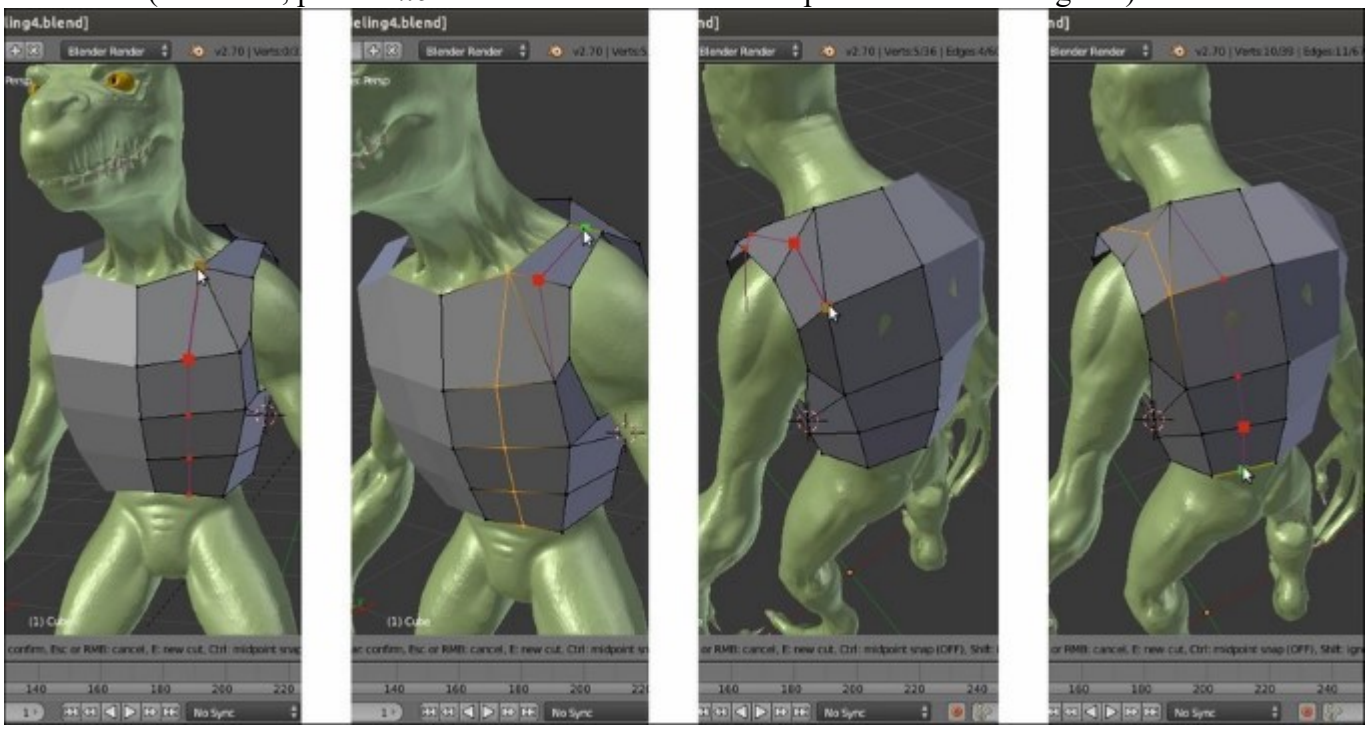
Refining the modeling through the LoopTools add-on

45. Fix, below the **armpit**, the lateral vertices that are curved inwards, by using the *Alt* + *S* shortcut to move them outward along their normal, the **3D Cursor** and the **Snap** pop-up menu (*Shift* + *S*) to place them midway from other vertices, and the *Shift* + *V* shortcut to slide them along the edges:



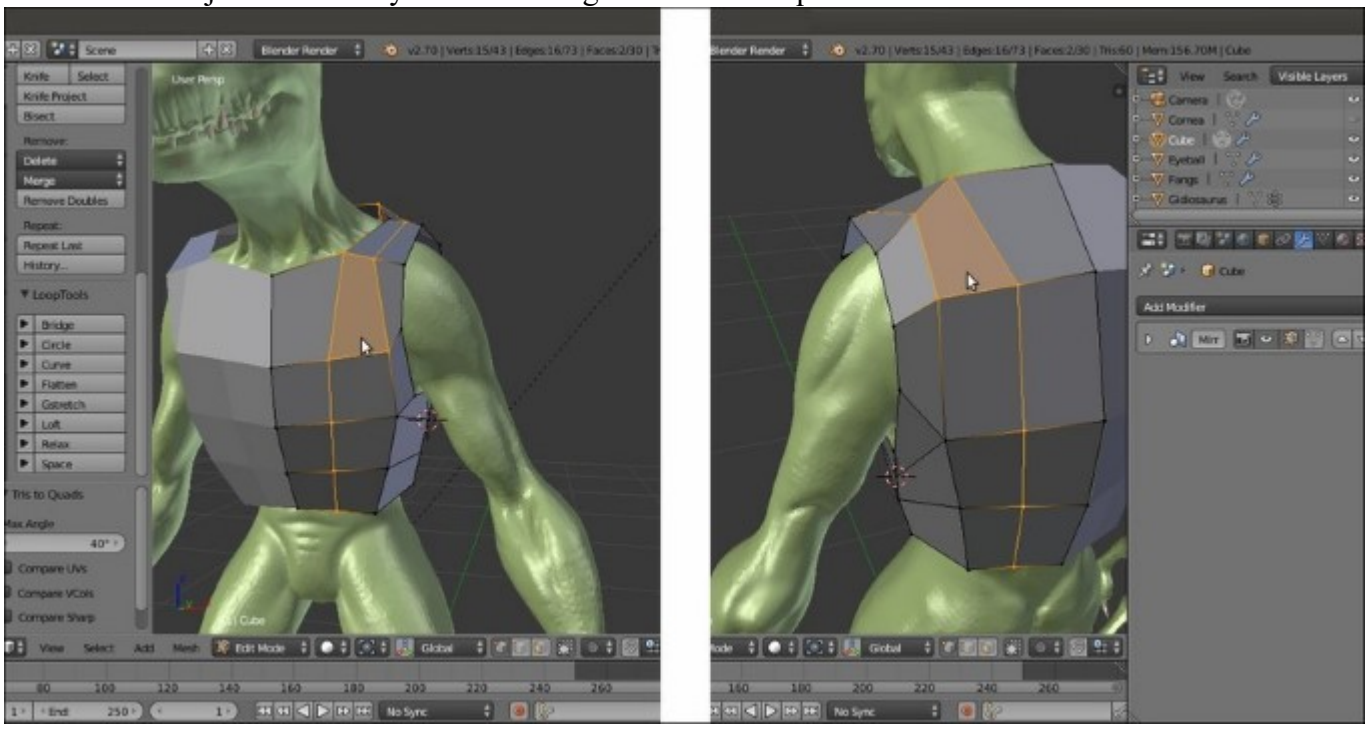
Tweaking vertices

46. Press the *K* key to activate the **Knife Topology Tool**; by keeping the *Ctrl* key pressed to constrain the cuts to the middle of the edges, cut a new edge-loop as shown in the following screenshot (each time, press *Enter* to confirm the cut and then pass to the following one):



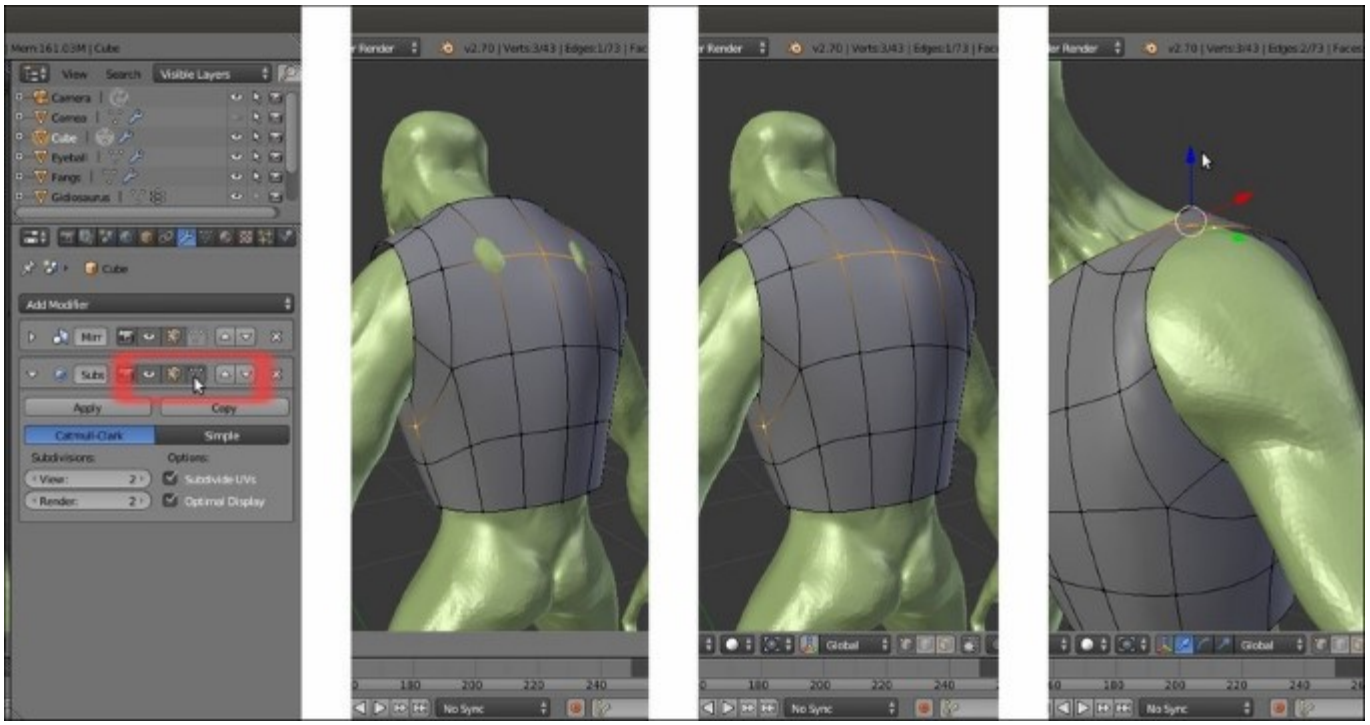
Using the Knife tool

47. Press *Alt* + *J* to join the already selected triangular faces into quads:



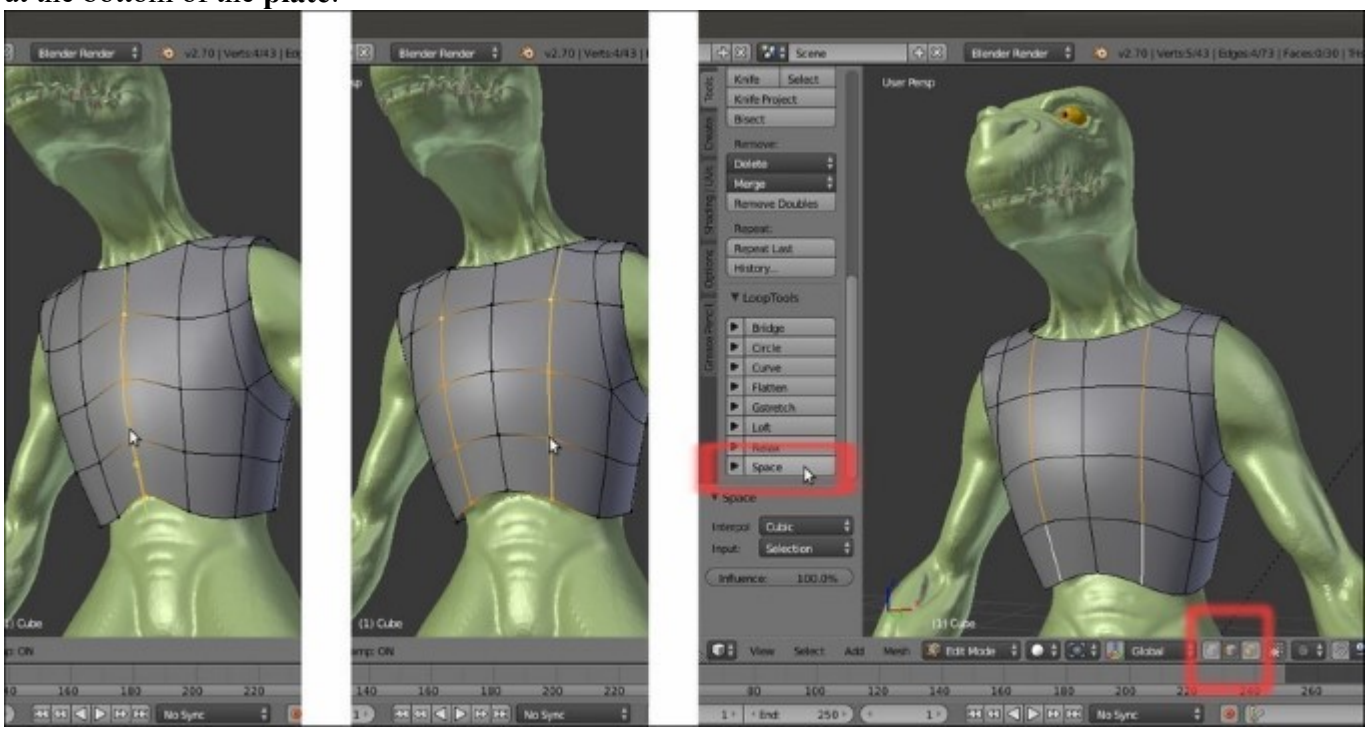
Joining two triangular faces into one quad face

48. Select all the vertices and press *Ctrl* + *N* to recalculate the normals.
49. Deselect all the vertices and go to the **Object Modifiers** window; assign a **Subdivision Surface** modifier, set the **Subdivisions** level for **View** to **2**, and check the **Optimal Display** item. Click on the *Adjust edit cage to modifier result* icon, the last one to the right with the editing triangle, in order to see the effect of the modifier in **Edit Mode**.
50. Go out of **Edit Mode** and then go to the **Tools** tab under the **Tool Shelf**; under the **Edit** subpanel, select the **Smooth** shading.
51. Go back in **Edit Mode** and select the vertices (in our case, mainly on the side and back) corresponding to areas where the sculpted mesh is overlapping the **armor**. Press *Alt* + *S* to scale their position along their normals and so fix the overlapping; then, select the upper vertices of the **shoulder** and move them closer to the character's **shoulder** surface:



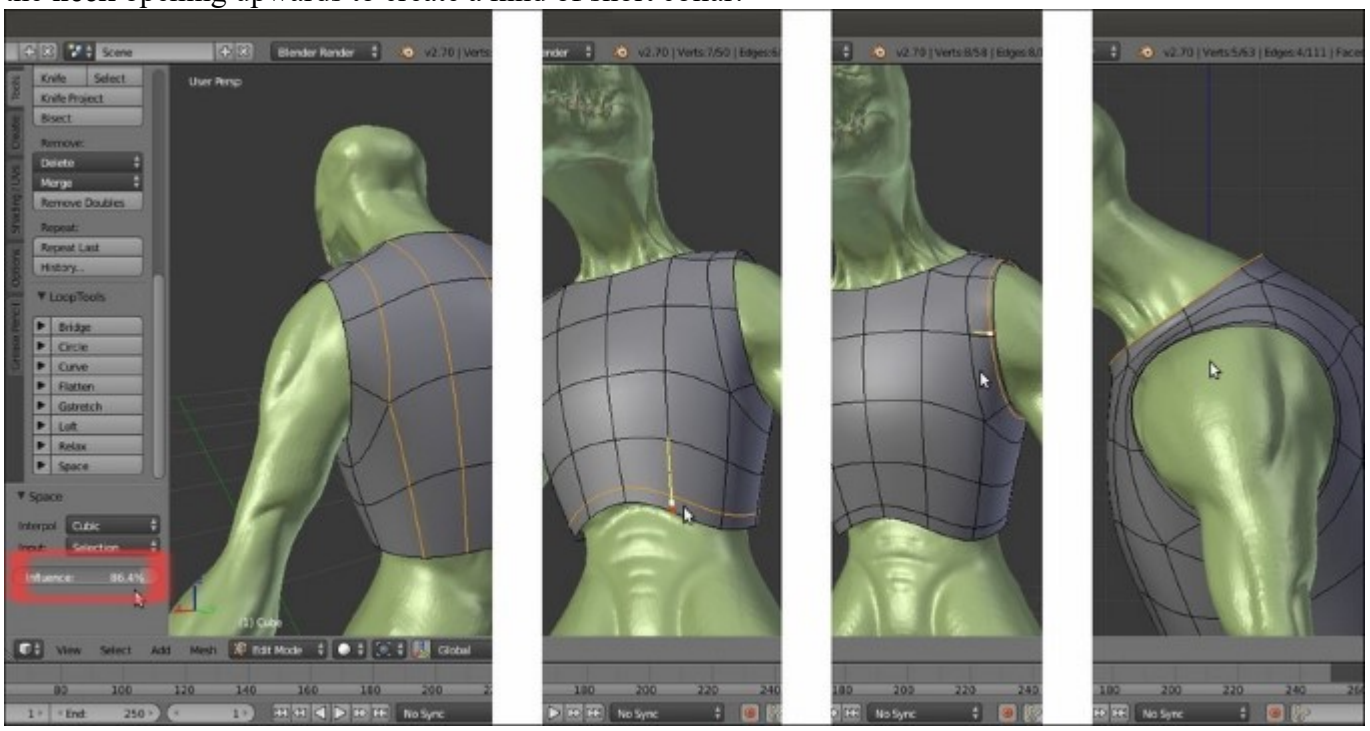
Tweaking vertices with the visible cage of the Subdivision Surface modifier

52. Repeat the operations of the previous step on all the vertices that need it; select the vertices on the **belly** and press *Shift + V* to move them upward, but along the edges to model the arc shape at the bottom of the **plate**:



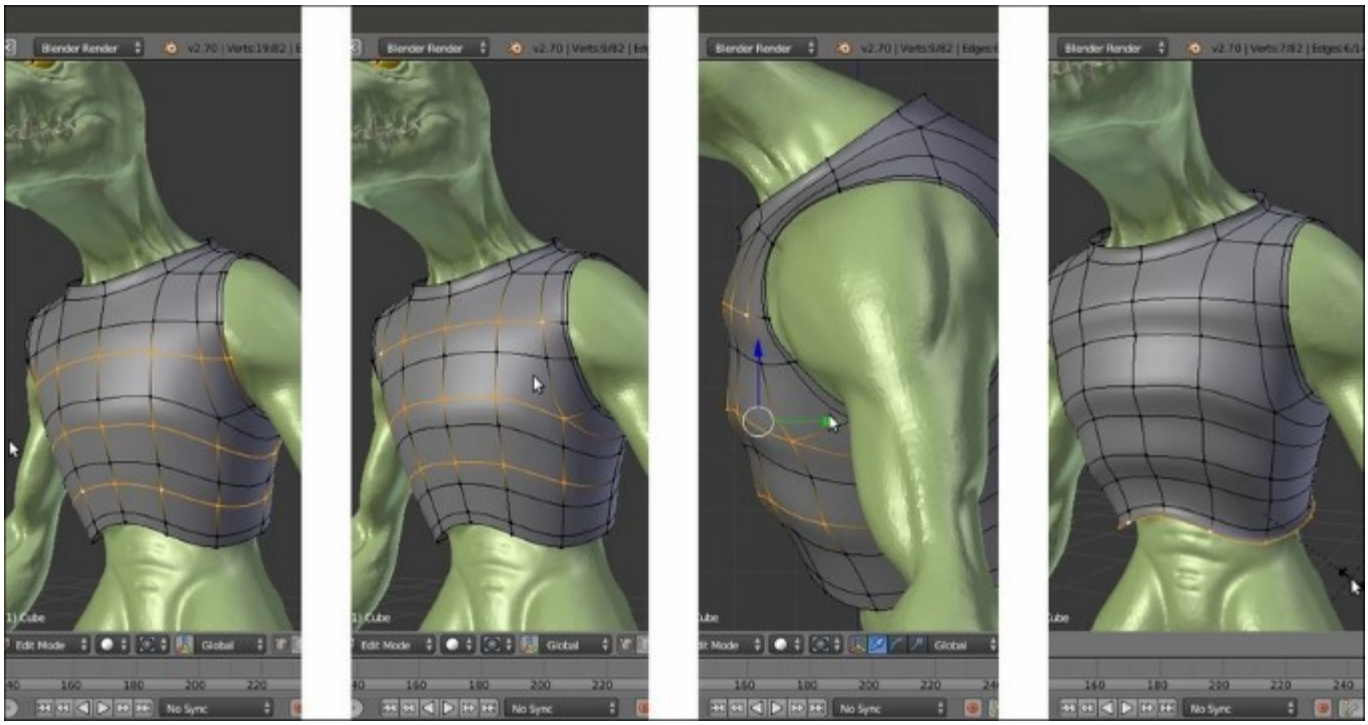
Sliding the vertices and adjusting the polygonal flow through the LoopTools add-on

53. Select the edges of the front and back and click on the **Space** button in the **LoopTools** add-on panel; if needed, tweak the value of the **Influence** slider at the bottom of the **Tools** tab to set the amount for the operation.
54. Add edge-loops at the bottom of the **armor** and at the **shoulder** opening to create a rim; extrude the **neck** opening upwards to create a kind of short collar:



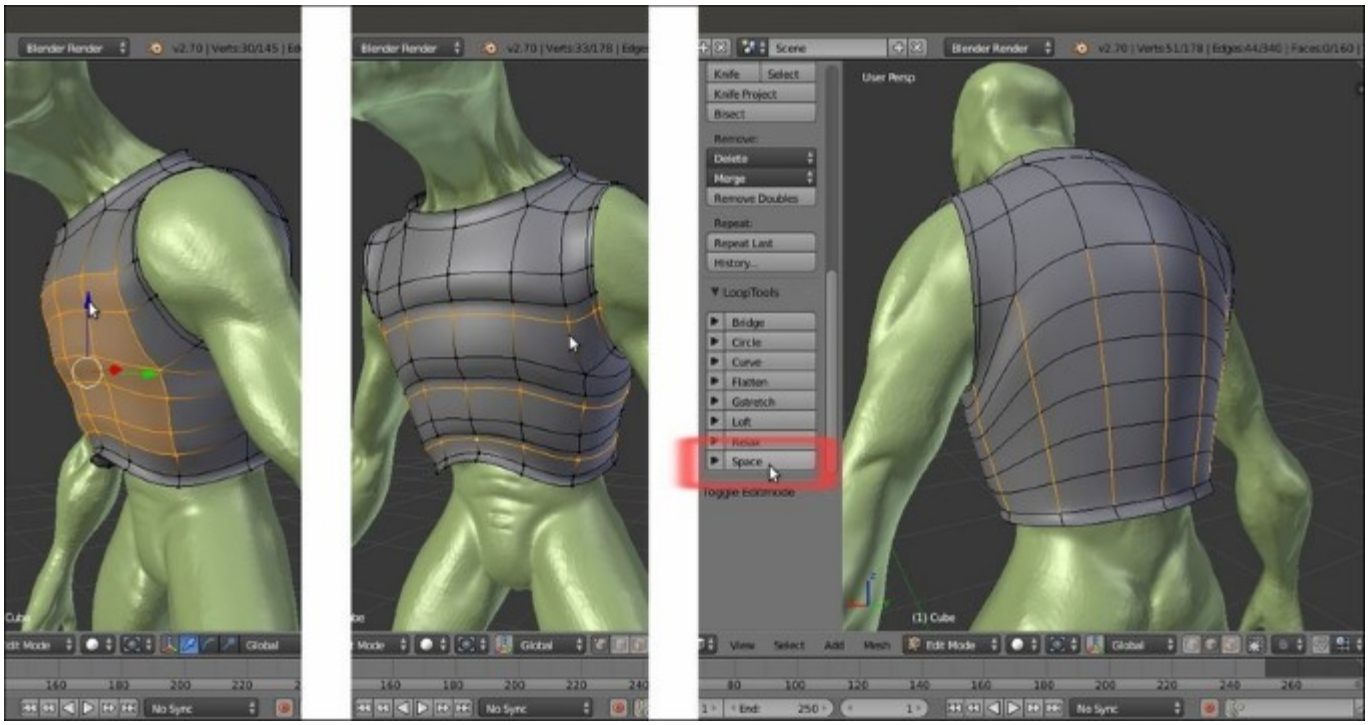
Extruding geometry

55. Add edge-loops on the front of the **chest** plate as shown in the following screenshot (*Ctrl* + *R* and then slide it to **0.500**) and then select the front vertices of the alternate edge-loops and in **Side** view, move them forward.
56. Select the last bottom edge-loop and scale it bigger (to **1.100**):



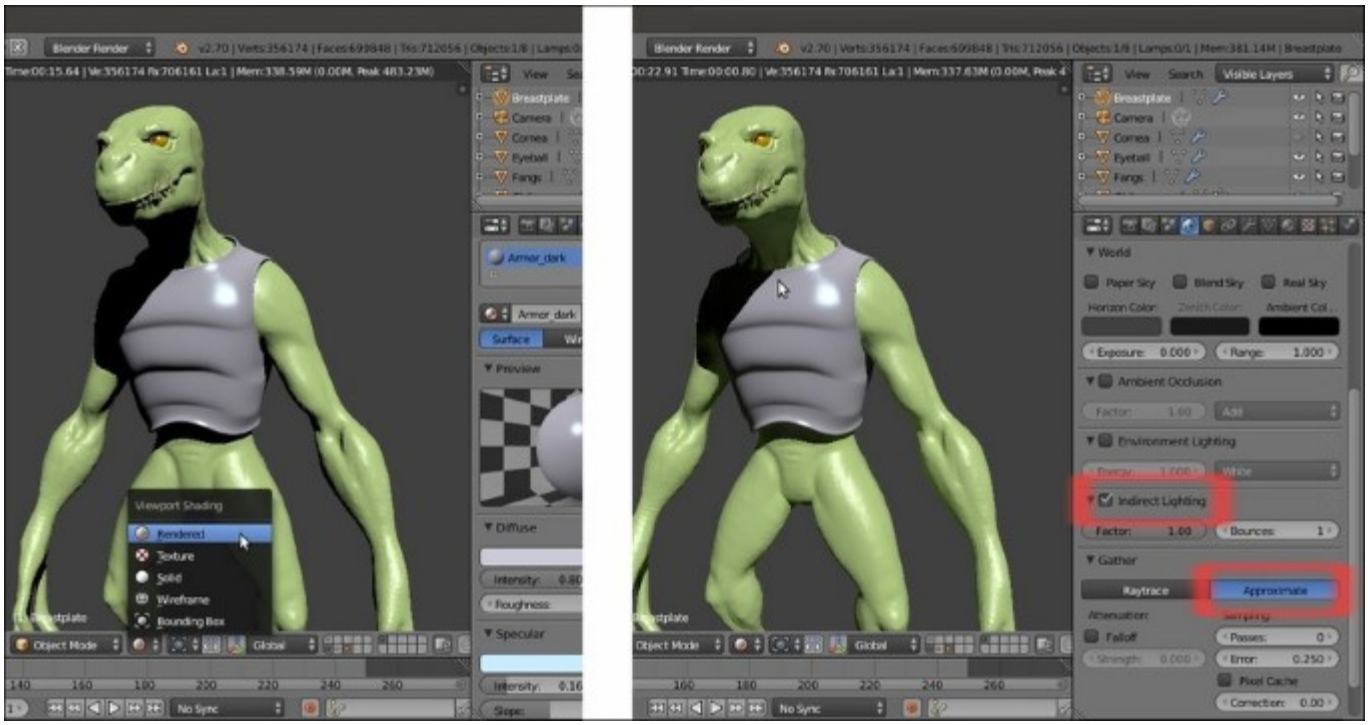
Adding edge-loops to add detailing to the armor

57. Move the front vertices of the **breast** and **belly** downward, using the image loaded in **UV/ Image Editor** as reference. Add more edge-loops to add definition to the front of the **chest** plate (in the following screenshot, the three added edge-loops are selected at the same time only to highlight them; in Blender, they must be added one at a time). Then, smooth the resulting oddly spaced back vertices by using the **Space** button of the **LoopTools** add-on:



Making the edges' length even through the LoopTools add-on

58. In the **Outliner**, rename the **Cube** item as **Breastplate** (by either double-left-clicking or by pressing *Ctrl* + left-click on the item).
59. Then, go to the **Material** window under the main **Properties** panel and assign a new material to the **Breastplate** object; rename the material as `Armor_dark`. Set the diffuse color to **RGB 0.605**, **0.596**, **0.686** and the **Diffuse Shader Model** option to **Oren-Nayar**; set the specular color to **RGB 0.599**, **0.857**, **1.000** and the **Specular Shader Model** option to **WardIso**; set the **Intensity** value to **0.164** and the **Slope** value to **0.100**. Under the **Shading** subpanel, check the **Cubic Interpolation** item.
60. Go to the **Object Modifiers** window and assign a **Solidify** modifier; move it up in the stack, before the **Subdivision Surface** modifier. Set the **Thickness** value to **0.0150** and check the **Even Thickness** item.
61. Set **Viewport Shading** to **Rendered** to have a quick preview (be sure to have the proper scene layers activated, that is, the **6th** for the lighting and the **11th** and **13th** for the **character** and **armor**). Then, go to the **World** window under the main **Properties** panel and activate the **Indirect Lighting** tab; then, click on the **Approximate** button under the **Gather** subpanel. For the moment, leave the rest as it is:



The Rendered result so far, with some World Lighting setting

62. Save the file.

How it works…

This is the usual polygonal modeling process that is common to most aspects of 3D packages. Starting from a **Cube** primitive, we moved and arranged the vertices to model the **chest** armor plate, extruding and also adding new edge-loops by using the **Knife Topology Tool** and the *Ctrl* + *R* shortcut.

We used the **Mirror** modifier to work only on half of the mesh and to have the other half automatically updated. In some cases, we had to temporarily apply the **Mirror** modifier to better scale the edges as complete circles (otherwise, they would have been half circles with odd scaling pivot points); then, we had to delete the vertices from one side and assign the **Mirror** modifier again.

At a certain point, as the **armor's** shape got more defined, we started to tweak the vertices in **Edit Mode**, but with the **Subdivision Surface** modifier applied to the editing cage in order to have the right feedback while conforming the **armor's** shape to the **character's** shape.

We also used a few of the options available in the **LoopTools** add-on that has been revealed to be an incredibly handy aid in the modeling process.

See also

- https://sites.google.com/site/bartiuscrouch/looptools
- http://www.blender.org/manual/modeling/index.html

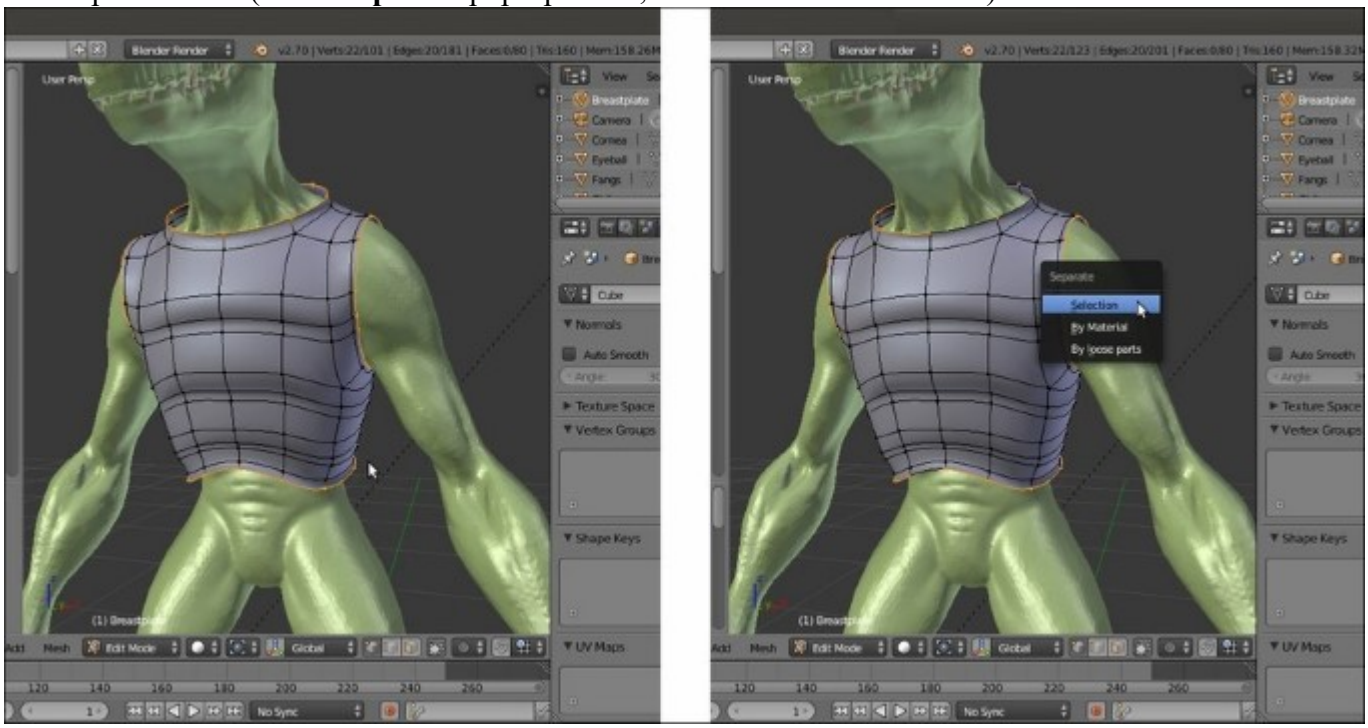
Using the Mesh to Curve technique to add details

In the previous recipe, we modeled the basic bulk of the **Breastplate**. We are now going to see a simple but effective technique to add detailing to the borders of the **armor** plate.

How to do it…

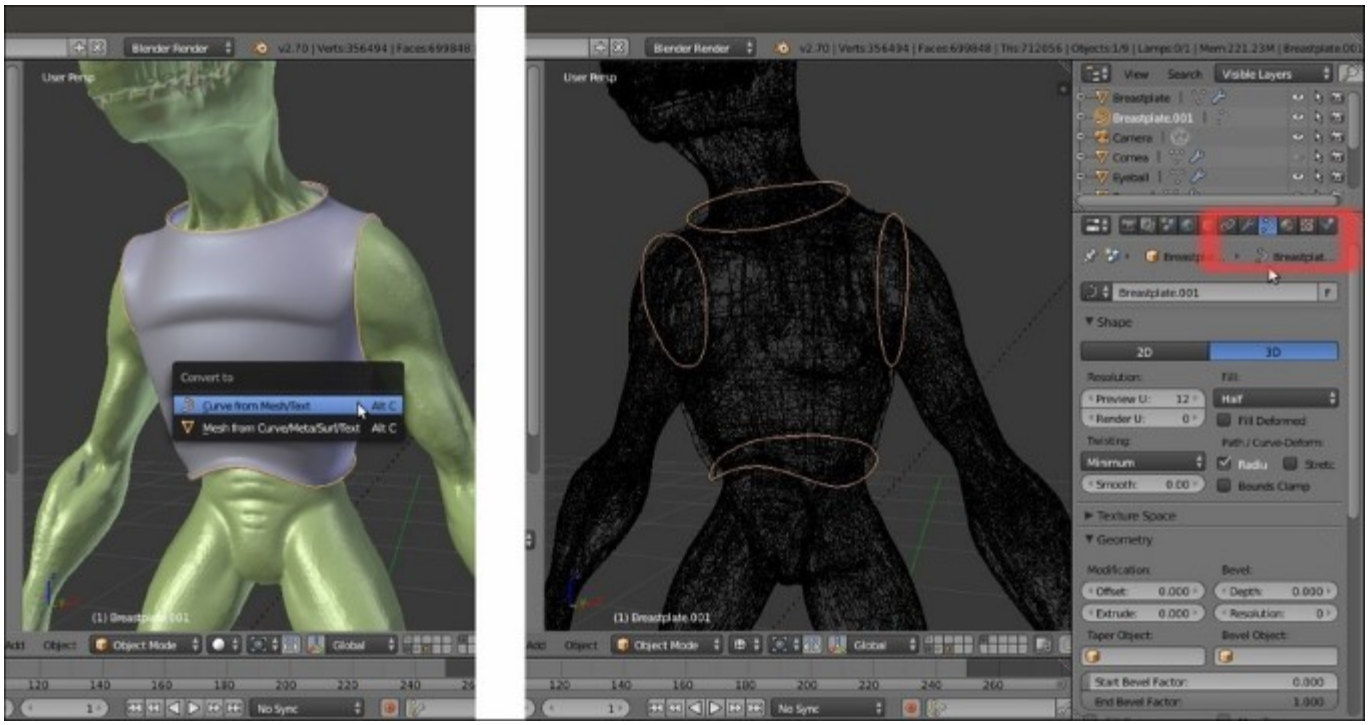
Assuming we have gone out of **Edit Mode** and then saved the file, reopen the `Gidiosaurus_modeling.blend` file and proceed with the following:

1. Go back in **Edit Mode** and select the edge-loop around the **neck** (*Alt* + right-click), the edge-loop around the **shoulder** hole (*Alt* + *Shift* + right-click), and the last one at the base of the **Breastplate** (*Alt* + *Shift* + right-click again).
2. Press *Shift* + *D* and soon after, the right-mouse button to duplicate without moving them; press *P* to separate them (in the **Separate** pop-up menu, choose the **Selection** item):



Separating geometry by selection

3. Go out of **Edit Mode** to select the **Breastplate.001** object (the duplicated edge-loops).
4. Press *Alt* + *C* and in the **Convert to** pop-up menu, select the first item: **Curve from Mesh/Text**.
5. The mesh edge-loops actually get converted into **Curve** objects, as you can see in the **Object Data** window under the main **Properties** panel on the right-hand side of the UI:



Converting the geometry in Curves

6. In the **Object Data** window, under the **Geometry** tab, set the **Extrude** value to **0.002** and the **Depth** value to **0.010**; then, under the **Shape** tab, set the **Fill** mode to **Full**:

"Modeling" the Curves by the settings

7. Press *Alt* + *C* and this time, in the **Convert to** pop-up menu, select the second item: **Mesh from Curve/Meta/Surf/Text**.
8. Press *Tab* to go in **Edit Mode**, press *A* to select all the vertices, and in the **Mesh Tools** tab under the **Tools** tab in the **Tool Shelf** panel, click on the **Remove Doubles** button (note that in the top main header, a message appears: **Removed 2240 vertices**; so always remember to remove the doubles after a conversion!).
9. Go out of **Edit Mode** and click on the **Smooth** button in the **Edit** subpanel; in the **Outliner**, rename it as **Breastplate_decorations**.
10. Assign a **Subdivision Surface** modifier, with the **Subdivision** level as **2** and **Optimal Display** enabled.
11. Go to the **Material** window and assign a new material; rename it as `Armor_light` and copy all the settings and options from the `Armor_dark` material, except for the diffuse and the specular colors—set them to **RGB 1.000** (pure white; a faster way is to assign the `Armor_dark` material, make it a single user, change the colors to white, and rename the material as `Armor_light`).

Assigning a new material

12. As always, remember to save the file.

How it works…

Even if at first sight this seems a complex process, actually it's one of the easiest and fastest ways to model a mesh. We have just duplicated the edge-loops that are located where we had the intention of adding the modeled borders. With a simple shortcut, we have converted them to a **curve** object that can

be beveled both by other curve objects or simply by values to be inserted in the fields under the **Geometry** tab. Then, once we obtained the shape we wanted, we converted the curve back to a mesh object.

We could have kept the armor decorations as **curves**, but by converting them to meshes, we have the opportunity to unwrap them for the mapping of the textures according to the rest of the **armor**.

Note that the **Preview U** value under the **Resolution** item in the **Shape** subpanel for the **curve** objects should be kept low if you don't want a resulting mesh with a lot of vertices; you can set it quite lower than the default **12**. Just experiment before the final conversion, while keeping in mind that once converted to mesh, the **decorations** will probably be smoothed by a **Subdivision Surface** modifier with the rest of the **armor**; in any case, the obtained **decorations** mesh can also be simplified at a successive stage.

In this chapter, we saw the process that can be used to model the **armor** meshes. We will not demonstrate the rest of the **armor** modeling, as the same techniques can be used over again. However, feel free to model the rest of the **armor** on your own or have a look at the provided `Gidiosaurus_modeling_02.blend` file:

The completed armor as it appears in the rendering

Chapter 4. Re-topology of the High Resolution Sculpted Character's Mesh

In this chapter, we will cover the following recipes:

- Using the Grease Pencil tool to plan the edge-loops flow
- Using the Snap tool to re-topologize the mesh
- Using the Shrinkwrap modifier to re-topologize the mesh
- Using the LoopTools add-on to re-topologize the mesh
- Concluding the re-topologized mesh

Introduction

The re-topology of a mesh, as the name itself explains, is simply the reconstruction of that mesh with a different topology; usually, the re-topology is used to obtain a low resolution mesh from a high resolution one.

In our case, this is obviously needed because we are later going to rig and animate our **Gidiosaurus**, and these tasks would be almost impossible with a mesh as dense as the high resolution sculpted one; we not only need to reconstruct the shape of the mesh with a lower number of vertices, but also with the edge-loops properly placed and flowing for the best render and deformation of the character's features.

In Blender, we have several tools to accomplish this task, both hardcoded into the software or as add-ons to be enabled, and in this chapter, we are going to see them.