Chapter *2*

Sculpting Brushes

Learning Objectives

After completing this chapter, you will be able to:
- *Understand digital sculpting*
- *Work with different types of sculpting brushes*

INTRODUCTION

Digital sculpting in ZBrush offers a very efficient and artistic way to create models. It allows you to add subtle details to 3D models that help in achieving photorealistic and hyperrealistic outputs. In this chapter, you will learn about the use of different brushes in sculpting.

Sculpting Brushes

The sculpting brushes are used to modify the shape of a 3D model. Depending on the type of brush chosen, you can pull, smoothen, grab, and pinch a 3D model. ZBrush contains an extensive library of brushes. Before using these brushes, you need to create a 3D primitive object or load a model from the LightBox browser. After creating a 3D primitive object or loading a model, you need to choose the **Edit** button in the top shelf. If this button is not chosen, then ZBrush will be in the paint mode and drawing on the canvas will simply create copies of 3D model in the canvas.

The different brushes in ZBrush can either be accessed from the **Brush** palette located at the top of the interface or from the left shelf, refer to Figures 2-1 and 2-2. Before using any brush, you can change its various settings in the **Brush** palette. In addition to this, you can also modify the brush size and depth by using the settings in the top shelf, refer to Figure 2-3.

Figure 2-1 *The partial view of the* **Brush** *palette at the top shelf*

Figure 2-2 The brushes accessed from the left shelf on choosing the Current Brush button
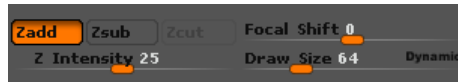

Figure 2-3 The different brush settings in the top shelf

After creating a 3D primitive object in the canvas, it should be converted into a polymesh. Polymesh is a collection of polygons or faces that form the surface of a mesh. When you drag a brush on a 3D primitive object, a message box will be displayed, prompting you to convert the 3D primitive object into polymesh, refer to Figure 2-4. You can also import 3D models created in external software applications. These 3D models are imported as polymeshes. The sculpting, texturing, and mapping can only be done on the polymeshes. To convert a 3D primitive object into a polymesh, choose the **Make PolyMesh3D** button from the **Tool** palette, refer to Figure 2-5. After converting a 3D primitive object into polymesh, you can increase the number of polygons so that you can sculpt easily at different resolutions. The various sculpting brushes in ZBrush are discussed next.
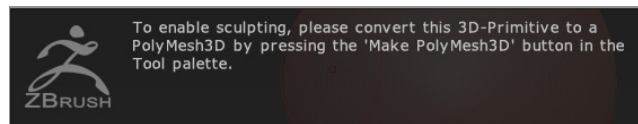

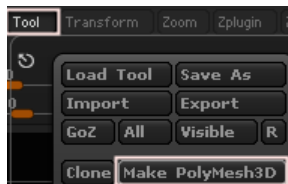*Figure 2-4 Message box displayed on using a brush on a 3D primitive object*

*Figure 2-5 The **Make PolyMesh3D** button in the **Tool** palette*

Note
*Before using the brushes on a polymesh, it is recommended to increase the number of polygons in the object. For achieving a greater level of detail on the object, you need to have larger number of polygons. When you place an object on the canvas, it has lower number of polygons. If you start sculpting on low poly objects, the output will not carry a high level of detail. To increase the number of polygons in the object, expand the **Geometry** subpalette in the **Tool** palette, and then choose the **Divide** button.*

Blob Brush

The **Blob** brush is used to add organic details to an object. This brush is ideal for creating fungus on the surface of an object. To sculpt using this brush, first create a 3D primitive object in the canvas. To do so, choose the Current Tool button from the **Tool** palette; a flyout will be displayed, refer to Figure 2-6. Choose the **Sphere3D** primitive from this flyout. Next, press and hold the left mouse button and drag the cursor on the canvas to create a sphere. After creating the sphere, choose the **Edit** button from the top shelf and then choose the **Make PolyMesh3D** button from the **Tool** palette; the primitive object will be converted into a polymesh. Next, expand the **Geometry** subpalette in the **Tool** palette, and then click thrice on the **Divide** button; the sphere will become smoother as more polygons are added, refer to Figure 2-7.
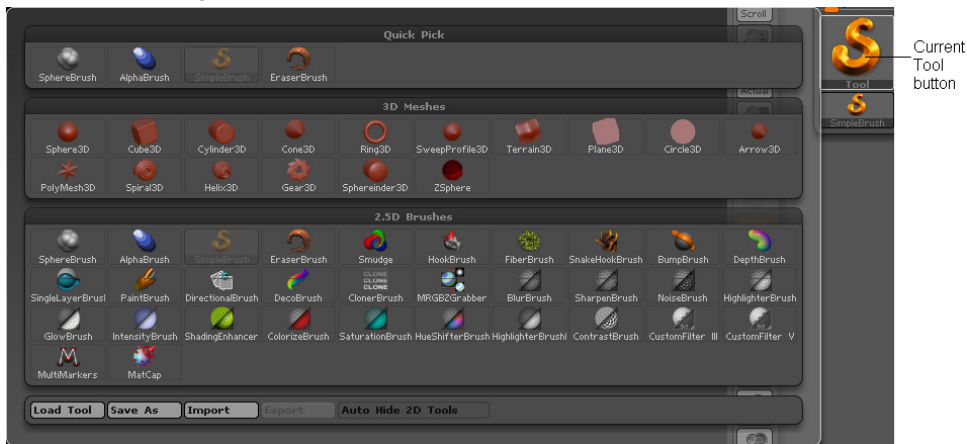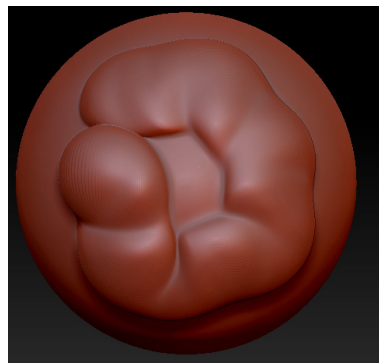

Figure 2-6 *Flyout displayed on choosing the Current Tool button*

Choose the Current Brush button from the left shelf; a flyout containing different sculpting brushes will be displayed. Next, choose the **Blob** brush from this flyout. If required, adjust the size of the brush using the [or] keys. Next, press and hold the left mouse button, and drag the cursor on the surface of the sphere; the shape of the sphere will be modified and will become blobby, refer to Figure 2-8.
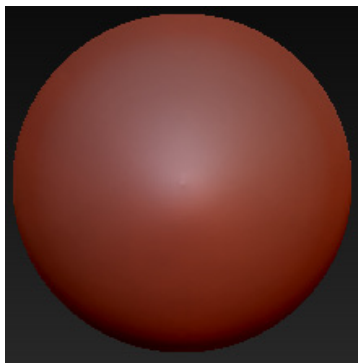
Figure 2-7 *The sphere smoothened*   **Figure 2-8** *Shape of the sphere modified using the* **Blob** *brush*

Clay Brushes

There are three types of Clay brushes, namely **Clay**, **ClayBuildup**, and **ClayTubes**, as shown in Figure 2-9. These brushes are discussed next.

Clay Brush

The **Clay** brush is used to add detail and depth to an object by using different alphas. To sculpt using this brush, create a sphere in the canvas, as discussed earlier. After creating the sphere, make sure you choose the **Edit** button from the top shelf. Next, convert the sphere into polymesh by choosing the **Make PolyMesh3D** button and then click thrice on the **Divide** button in the **Geometry** subpalette. Now, choose the Current Brush button from the left shelf; a flyout containing different sculpting brushes will be displayed. Choose the **Clay** brush from this flyout. Then, choose the Current Alpha button from the left shelf; a flyout will be displayed. From this flyout, select the required alpha, and then press and hold the left mouse button and drag the cursor slightly on the surface of the sphere, refer to Figure 2-10.
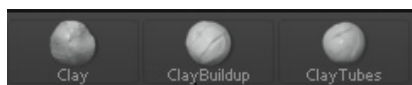

Figure 2-9 *The clay brushes*   **Figure 2-10** *Patterns created using different alphas*

ClayBuildup Brush

The **ClayBuildup** brush is used to increase the volume of an object significantly. On choosing this brush, a rectangular alpha gets automatically assigned to it. You can also choose other alpha images from the flyout displayed on choosing the Current Alpha button from the left shelf. To increase the volume of an object using this brush, press and hold the left mouse button and drag the cursor continuously on the surface of the object, refer to Figure 2-11.

ClayTubes Brush

The **ClayTubes** brush is similar to the **ClayBuildup** brush, with the only difference that it does not produce more displacement in the surface of the object, refer to Figure 2-12. On choosing this brush, a rectangular alpha gets automatically assigned to it. It gives an effect similar to an effect produced when a wooden tool is used on the surface of a wet lump of clay.
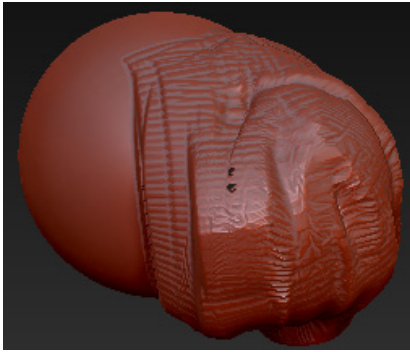
*Figure 2-11   Volume of the sphere increased using the **ClayBuildup** brush*
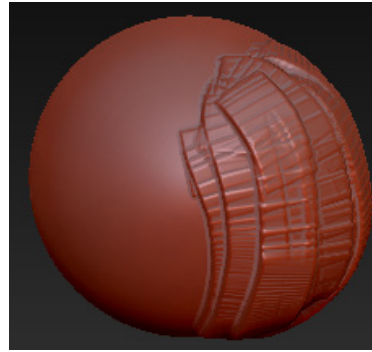
*Figure 2-12   Volume of the sphere increased using the **ClayTubes** brush*

Clip Brushes

The Clip brushes are used to slice a particular area of a 3D model, without deleting the polygons in that model. Instead, these brushes squash and squeeze the polygons, without affecting the number of polygons in an object. There are four types of Clip brushes, namely **ClipCircle**, **ClipCircleCenter**, **ClipCurve**, and **ClipRect**, refer to Figure 2-13. These brushes are discussed next.


Figure 2-13   The Clip brushes

ClipCircle Brush

The **ClipCircle** brush is used to squeeze in the polygons using the circular or elliptical mesh. By using this brush, all the polygons that lie outside of the mask will be pushed to the border of the mask. The resulting object will have hard edges. To use this brush, create a sphere in the canvas. After creating the sphere, make sure you choose the **Edit** button from the top shelf. Convert the sphere into polymesh by choosing the **Make PolyMesh3D** button from the **Tool** palette, and then click thrice on the **Divide** button in the **Geometry** subpalette.

Choose the Current Brush button from the left shelf; a flyout containing different sculpting brushes will be displayed. Choose the **ClipCircle** brush from this flyout; a message box prompting you to press CTRL+SHIFT to activate this brush will be displayed, refer to Figure 2-14. Choose the **OK** button in this message box. Press and hold CTRL+SHIFT and then drag on the cursor on the surface of the sphere; a marquee selection will be displayed, refer to Figure 2-15. Next, release the left mouse button; the shape of the sphere will be modified, as shown in Figure 2-16.
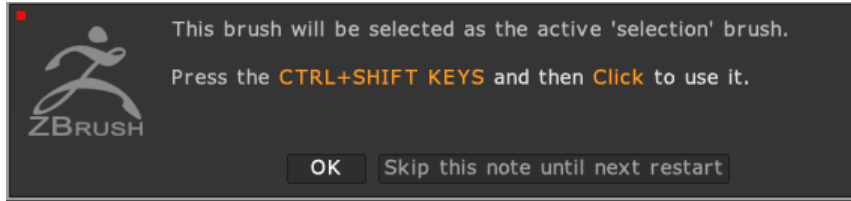
*Figure 2-14 The dialog box displayed on choosing the **ClipCircle** brush*
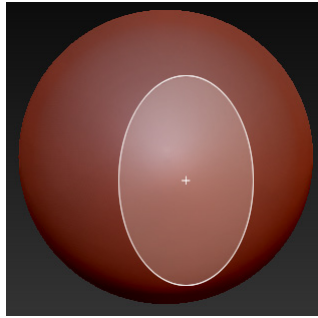

*Figure 2-15 A elliptical marquee selection displayed*
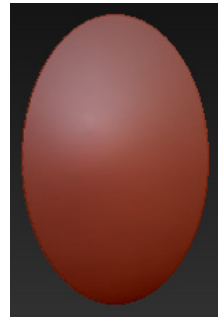
Figure 2-16 The shape of the sphere modified

ClipCircleCenter Brush

The **ClipCircleCenter** brush is similar to the **ClipCircle** brush, with the only difference that the brush stroke creates a perfect circular marquee selection as a mask, with its center point originating from the position where you first clicked and began dragging the cursor, refer to Figure 2-17. Figure 2-18 shows the shape of the sphere modified by using this brush.
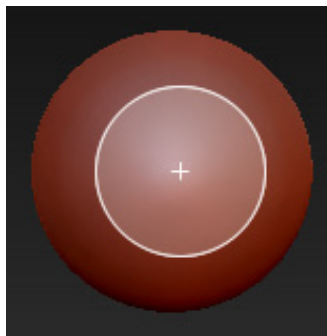
Figure 2-17   A circular marquee selection displayed
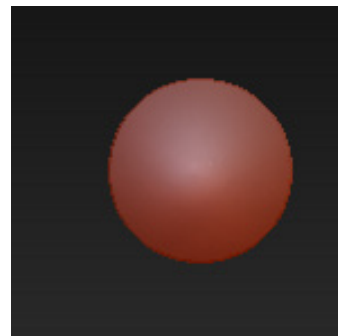
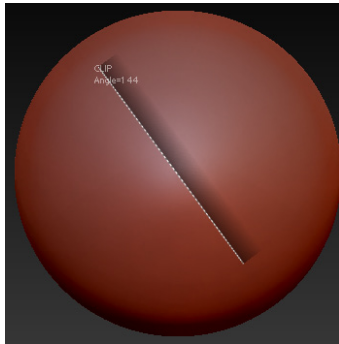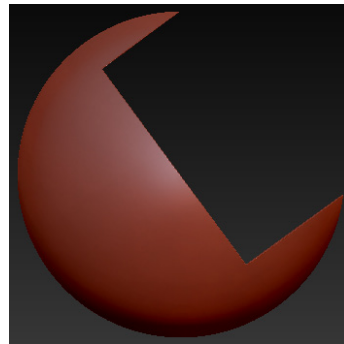*Figure 2-18   The shape of the sphere modified*

ClipCurve Brush

The **ClipCurve** brush is used to squeeze in the polygons using the curves or straight lines. To understand the usage of this brush, create a sphere in the canvas. After creating the sphere, make sure you choose the **Edit** button from the top shelf. Next, convert the sphere into polymesh by choosing the **Make PolyMesh3D** button from the **Tool** palette, and then click thrice on the **Divide** button in the **Geometry** subpalette.

Choose the Current Brush button from the left shelf; a flyout containing different sculpting brushes will be displayed. Choose the **ClipCurve** brush from this flyout; a dialog box asking you to press CTRL+SHIFT to use this brush will be displayed. Choose the **OK** button in this dialog box. Press and hold CTRL+SHIFT and then drag the cursor on the surface of the sphere starting from top to bottom; a straight line with grey highlighted area around it will be displayed on the surface of the sphere, refer to Figure 2-19. Release the left mouse button; the shape of the sphere will be modified, as shown in Figure 2-20.

You can change the position of the line by pressing SPACEBAR along with CTRL+SHIFT. In Figure 2-20, you will notice that the polygons in the direction of the grey highlighted area will be squeezed toward the line. On pressing the ALT key along with CTRL+SHIFT, a curved line will be created instead of the straight line, refer to Figure 2-21. On releasing the left mouse button, the polygons that are not in the direction of the grey highlighted area will be squeezed in, refer to Figure 2-22.
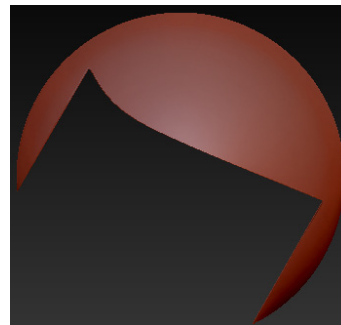

Figure 2-19 A straight line displayed on the surface of the sphere

*Figure 2-20   Shape modified by the **ClipCurve** brush*
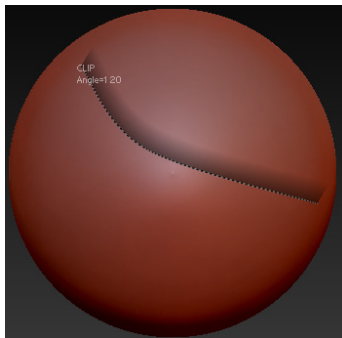
Figure 2-21 A curved line displayed on the surface of the sphere
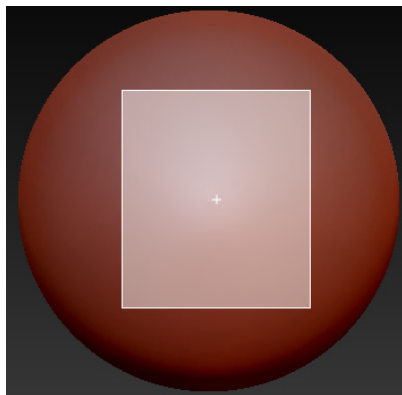

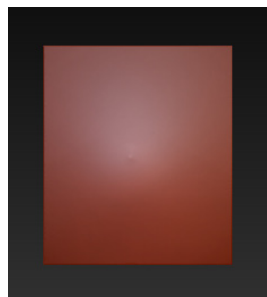*Figure 2-22 Shape modified by using the **ClipCurve** brush along with ALT*

ClipRect Brush

The **ClipRect** brush works similar to **ClipCircle** brush with the only difference that it uses a rectangular marquee selection to squeeze in the polygons, refer to Figures 2-23 and 2-24.

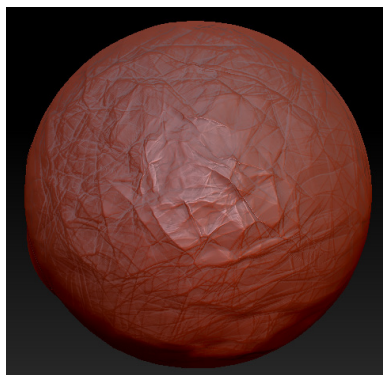*Figure 2-23 A rectangular marquee selection displayed*

Figure 2-24 The shape of the sphere modified

Crumple

The **Crumple** brush is used to create creases on the surface of a 3D object, as shown in Figure 2-25. This brush can be used to create wrinkles on skin or clothes.

*Figure 2-25 A pattern created using the **Crumple** brush*

Curve Brushes

There are fourteen types of the Curve brushes available in ZBrush, as shown in Figure 2-26. The Curve brushes are used to create different curve patterns on a mesh. These brushes are discussed next.

Figure 2-26 The Curve brushes

CurveEditable Brush

The **CurveEditable** brush is used to add depth to the surface of an object along a predefined path. To sculpt using this brush, press and hold the left mouse button, and drag the cursor on the surface of the object to create the shape of your choice; a curve indicating the path will be displayed, refer to Figure 2-27. After creating the path, hover the cursor on the surface of the path and click on it; a depth will be created along the path, as shown in Figure 2-28. You can modify the shape of the path either by moving the end points of the path created or by clicking on a point or by clicking on a point on the curve and then dragging the cursor.
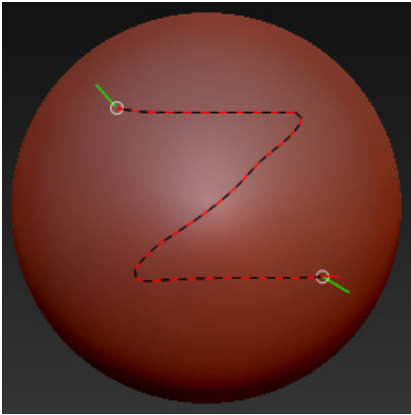

Figure 2-27 A path created on the surface of object

Figure 2-28 Depth created along the path

CurveLathe Brush

The **CurveLathe** brush is used to create different shapes on the surface of the object. Before using this brush, make sure that the value of **SDiv** slider is set to 1 or the geometry has not been subdivided. If you use this brush on a mesh which has been subdivided, a message box will be displayed, as shown in Figure 2-29.
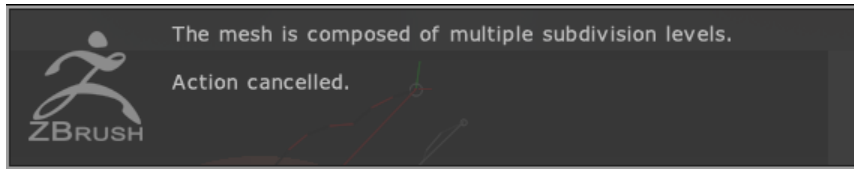

*Figure 2-29   The message box displayed on using the **CurveLathe** brush on subdivided mesh*

To use this brush, create a plane in the canvas and convert it into polymesh. Choose the Current Brush button from the left shelf; a flyout containing different sculpting brushes will be displayed. Choose the **CurveLathe** brush from this flyout. Next, press and hold the left mouse button, and drag the cursor on the surface of the object to create the shape of your choice; a profile curve indicating the shape of the new mesh will be displayed, refer to Figure 2-30. Now, release the left mouse button; a new mesh will be created on the surface, as shown in Figure 2-31.

You can move, scale, and rotate the newly created mesh by choosing the **Move**, **Scale**, and **Rotate** buttons, respectively from the top shelf. You can also create a duplicate copy of the mesh. To do so, choose the **Move** button from the top shelf. Press and hold the left mouse button and drag the cursor on the surface of the mesh and then release the left mouse button; a line with three circles will be displayed, refer to Figure 2-32. Press the CTRL key, and then press and hold the left mouse button and hover the cursor over the middle circle. Next, drag the cursor toward right; a duplicate copy of the mesh will be created, refer to Figure 2-33.

On creating a new mesh using this brush, you will notice that the color of the plane changes to grey and a mask is applied to it. To remove the mask, press and hold the CTRL key, and drag the cursor in the canvas area. After removing the mask, you cannot move, scale, or rotate the new mesh.
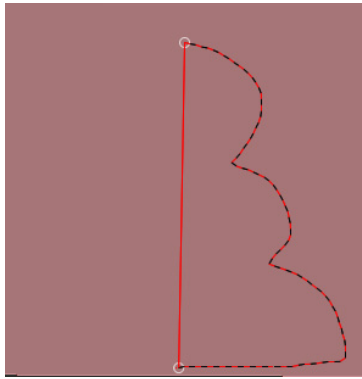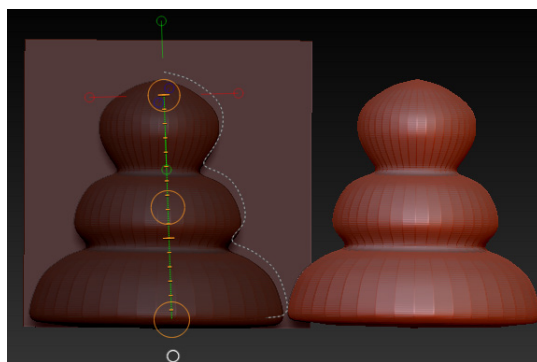

Figure 2-30 A profile curve created on the surface of plane
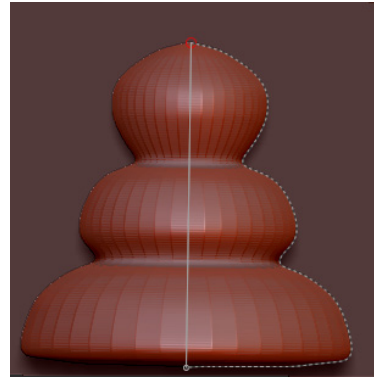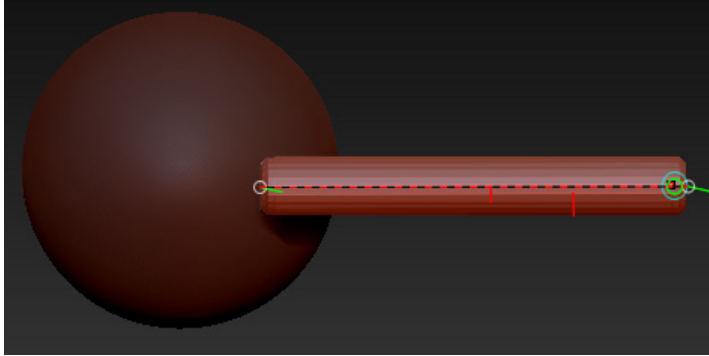

Figure 2-31 A new mesh created along the profile curve
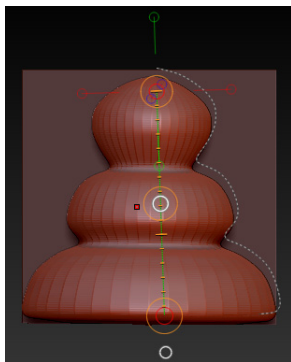
Figure 2-32 A line with three circles displayed

Figure 2-33 The duplicate copy of the mesh created
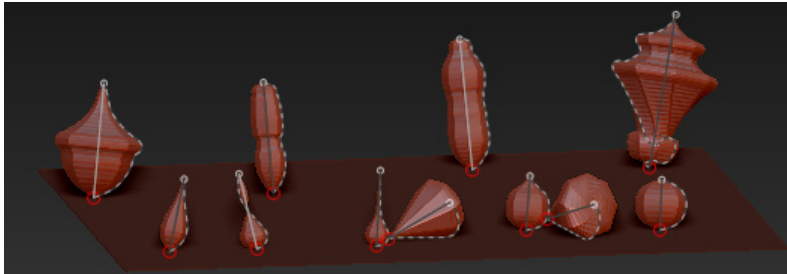
CurveLine Tube Brush

The **CurveLine Tube** brush is used to create a tube on the surface of an object along a straight line, refer to Figure 2-34. This brush does not work on the subdivided geometry.

Figure 2-34 *A tube created along the straight line*

CurveMultiLathe Brush

The **CurveMultiLathe** brush is used to create multiple shapes on the surface of the object by drawing profile curves for different shapes, refer to Figure 2-35. Each of these shapes can be modified as required. This brush does not work on the subdivided geometry.
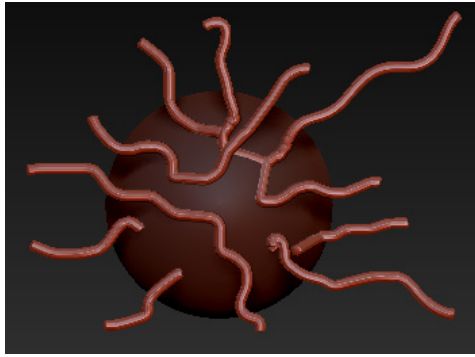

Figure 2-35 *Multiple shapes created on the surface of a plane*

CurveMultiTube Brush

The **CurveMultiTube** brush is similar to the **CurveTube** brush with the only difference that you can create multiple tubes on the surface of an object, refer to Figure 2-36. The shape of different tubes can be modified as required.

CurvePinch Brush

The **CurvePinch** brush is used to pinch the polygons of a mesh inward along the path defined by you. To sculpt using this brush, press and hold the left mouse button, and drag the cursor on the surface of the object to create the shape of your choice; a curve indicating the path will be displayed. After creating the path, hover the cursor on the surface of the path and click on it; the surface will be pinched along the path, as shown in Figure 2-37. You can modify the shape of the path either by moving the end points of the path created or by clicking on a point or by clicking on a point on the curve and then dragging the cursor.
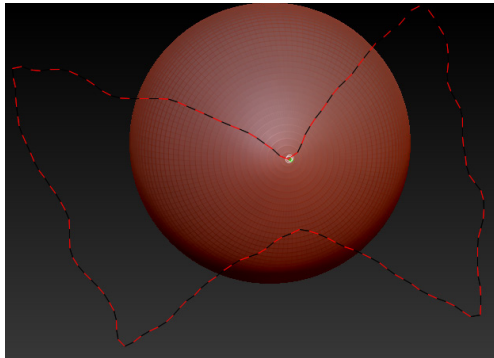
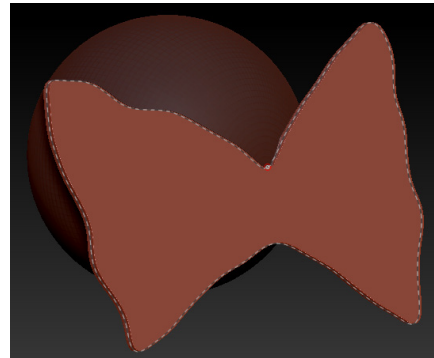***Figure 2-36*** *Multiple tubes created on the surface of a sphere*
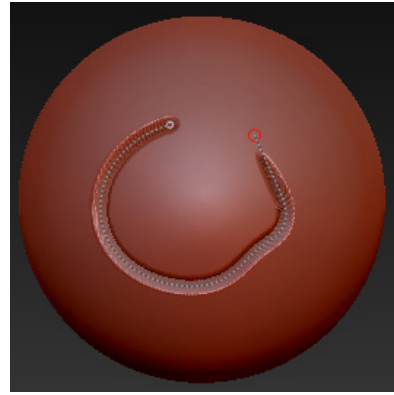
Figure 2-37 *The polygons pinched along the path*

CurveQuadFill Brush

The **CurveQuadFill** brush is used to create a planar mesh on the surface of an object. To use this brush, choose the Current Brush button from the left shelf; a flyout containing different sculpting brushes will be displayed. Choose the **CurveQuadFill** brush from this flyout. Next, press and hold the left mouse button and drag the cursor to draw an outline for the planar mesh that you want to create, refer to Figure 2-38. Next, release the left mouse button; the planar mesh will be created on the surface of the object, refer to Figure 2-39. The shape of the newly created mesh can be modified by moving the different points of the path.

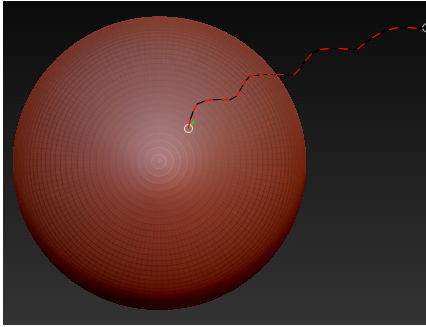***Figure 2-38*** *An outline drawn on the surface of the sphere*

***Figure 2-39*** *A planar mesh created on the surface of the sphere*

CurveSnapSurface Brush

The **CurveSnapSurface** brush is used to create surfaces between multiple number of curves created on the surface of an object. To use this brush, choose the Current Brush button from the left shelf; a flyout containing different sculpting brushes will be displayed. Choose the **CurveSnapSurface** brush from this flyout. Next, press and hold the left mouse button and drag the cursor to draw a curve, refer to Figure 2-40. Draw another curve below the curve drawn previously, refer to Figure 2-41; a surface will be created between the two

curves. Draw a third curve, refer to Figure 2-42; a surface will be created between the second and third curves. Continue drawing more curves to create the surface, as shown in Figure 2-43. The new surface can be moved by using the **Move** button at the top shelf.
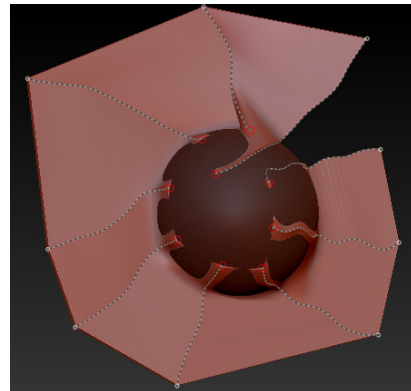

Figure 2-40   A curve drawn on the surface of the sphere
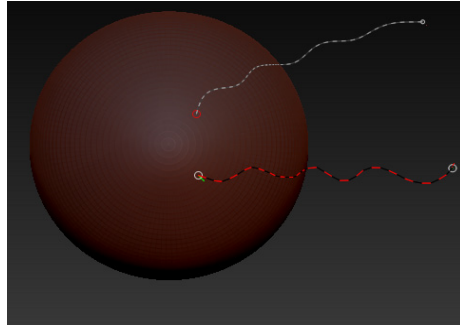
Figure 2-41   Second curve drawn below the curve drawn previously
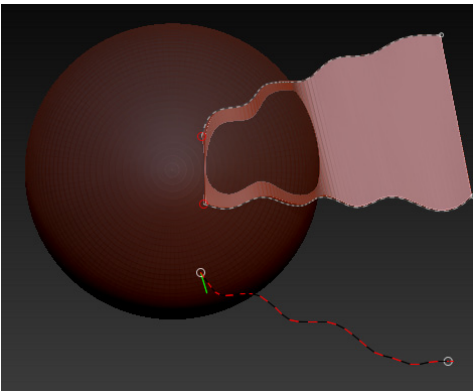
Figure 2-42   Third curve drawn below the second curve

*Figure 2-43   A surface created using the **CurveSnapSurface** brush*

CurveStandard Brush

The **CurveStandard** brush is used to pull out the geometry of an object in a specified path. To sculpt using this brush, press and hold the left mouse button, and drag the cursor on the surface of the object to create the desired shape, refer to Figure 2-44. After creating the path, click on it; a depth will be created along the path, as shown in Figure 2-45.

CurveStrapSnap Brush

The **CurveStrapSnap** brush is used to create a ribbon like curved surface on an object. To use this brush, choose the Current Brush button from the left shelf; a flyout containing different sculpting brushes will be displayed. Choose the **CurveStrapSnap** brush from this flyout. Next, press and hold the left mouse button and drag the cursor to draw a curve, refer to Figure 2-46. Release the left mouse button; a surface resembling a ribbon will be created along the curve, refer to Figure 2-47.
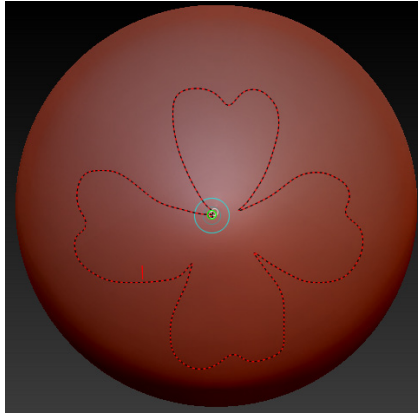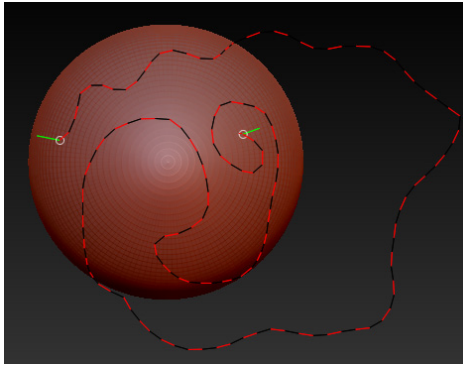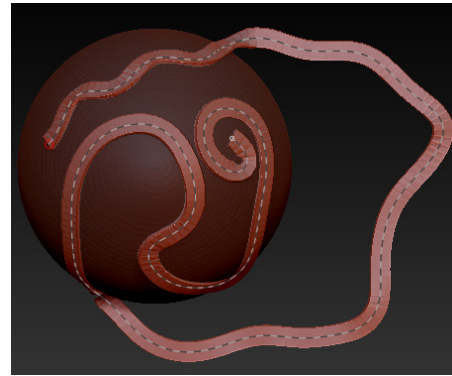
Figure 2-44 *A path created on the surface of the sphere*
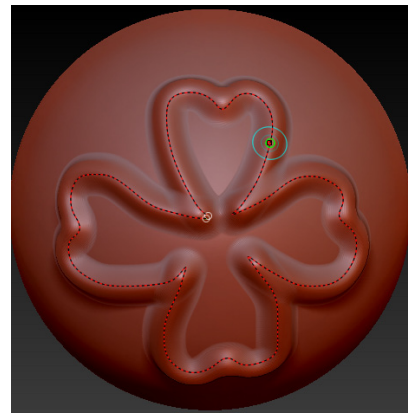
Figure 2-45 *The depth created along the path*

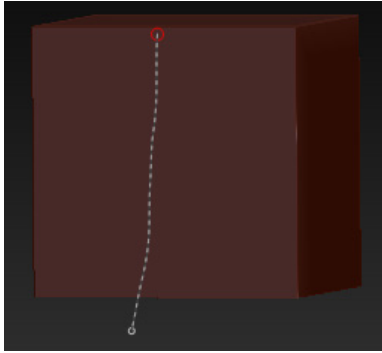***Figure 2-46*** *A curve created on the surface of the sphere*

Figure 2-47 *A surface resembling a ribbon created along the curve*
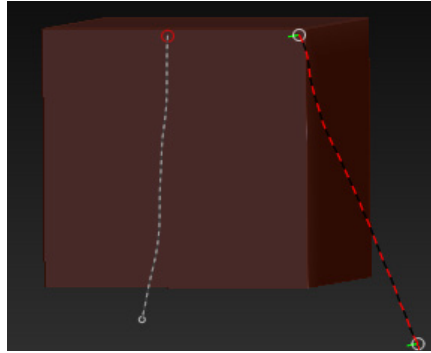
CurveSurface Brush

The **CurveSurface** brush is used to create a new mesh on the surface of an object by drawing curves for the new mesh. This brush is ideal for creating a flowing cloth on the surface of an object or wings on a model. The thickness of the new mesh depends on the value of the **Draw Size** slider located in the top shelf. If the value of this slider is high, the mesh will be thicker. To use this brush, create a cube in the canvas and convert it into polymesh. Choose the Current Brush button from the left shelf; a flyout containing different sculpting brushes will be displayed. Choose the **CurveSurface** brush from this flyout. Next, press and hold the left mouse button and drag the cursor to draw a curve, refer to Figure 2-48. Draw another curve on the right side of the curve drawn previously, refer to Figure 2-49; the two curves will be snapped, refer to Figure 2-50. Similarly, draw more curves on the surface of the cube; the new mesh will be created on the surface of the cube, refer to Figure 2-51.
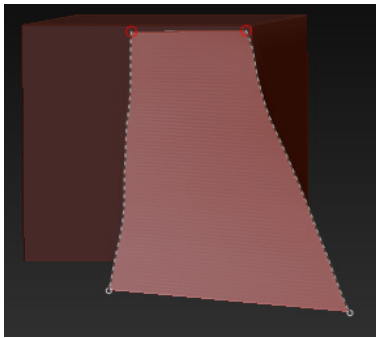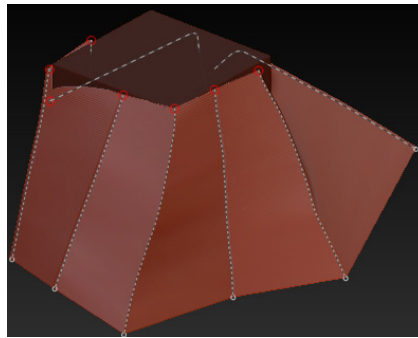
Figure 2-48 A curve drawn on the surface of the cube

Figure 2-49 Second curve drawn on the right side of the curve drawn previously


Figure 2-50 The two curves snapped

Figure 2-51 A new mesh created on the surface of the cube

CurveTriFill Brush

The **CurveTriFill** brush is used to create a planar surface by drawing an outline on the surface, refer to Figure 2-52.

CurveTube Brush

The **CurveTube** brush is used to create curved tube on the surface of an object. The shape of the tube can be modified as required, refer to Figure 2-53.
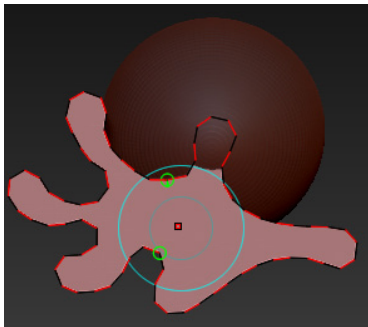
*Figure 2-52 A planar surface created using the **CurveTriFill** brush*
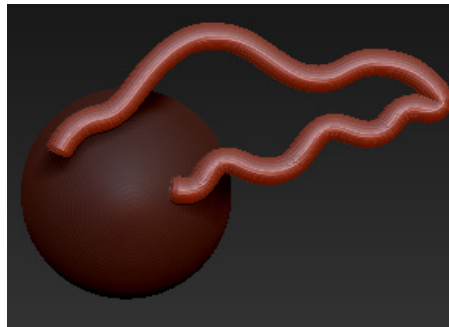
*Figure 2-53 A curved tube created using the **CurveTube** brush*

CurveTubeSnap Brush

The **CurveTubeSnap** brush is similar to the **CurveStrapSnap** brush with the only difference that instead of creating a ribbon like surface, it creates tubes.
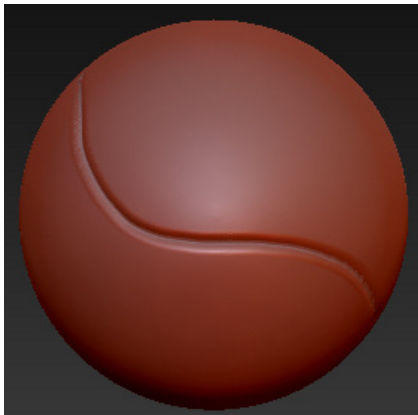
DamStandard Brush

The **DamStandard** brush is used to create very subtle details like wrinkles, clothing seams, machined bevels, and so on. On choosing this brush, the **Zsub** button gets automatically chosen. To use this brush, press and hold the left mouse button, and drag the cursor on the surface of the object; a seam will be created on its surface, refer to Figure 2-54.
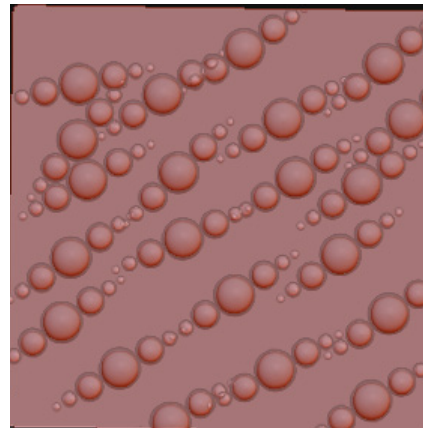
Deco1 Brush

The **Deco1** brush is used with different alphas to create detailed decorative designs in an object, refer to Figure 2-55. When this brush is chosen, an alpha gets automatically assigned to it. To sculpt using this brush, create a plane in the canvas. After converting the plane into polymesh, expand the **Geometry** subpalette in the **Tool** palette, and then click thrice on the **Divide** button; the plane will become smoother.

Choose the Current Brush button from the left shelf; a flyout containing different sculpting brushes will be displayed. Choose the **Deco1** brush from this flyout. Adjust the value of the **Draw Size** slider in the top shelf as required. Next, press and hold the left mouse button and drag the cursor slightly at different places on the surface of the plane; a pattern will be created on the surface of the plane, refer to Figure 2-55.

*Figure 2-54 A seam created in the sphere using the **DamStandard** brush*

*Figure 2-55   A pattern created on the surface of plane using the **Deco1** brush*
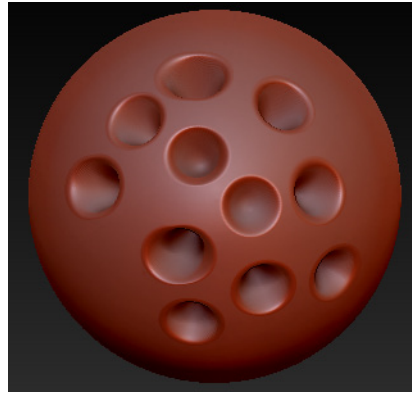
Displace Brush

The **Displace** brush is used to pull or push the polygons in a direction perpendicular to the surface of an object. To sculpt using this brush, create a sphere in the canvas. After converting the plane into polymesh, expand the **Geometry** subpalette in the **Tool** palette, and then click thrice on the **Divide** button; the sphere will become smoother. Choose the Current Brush button from the left shelf; a flyout containing different sculpting brushes will be displayed. Choose the **Displace** brush from this flyout. Adjust the value of the **Draw Size** slider as required, and set the value of **Z Intensity** slider to **100**. Next, press and hold

the left mouse button and drag the cursor slightly at different places on the surface of the sphere; the polygons will be pulled out perpendicularly, refer to Figure 2-56. To push the polygons in, you need to choose the **Zsub** button from the top shelf and then drag the cursor at different places, refer to Figure 2-57.
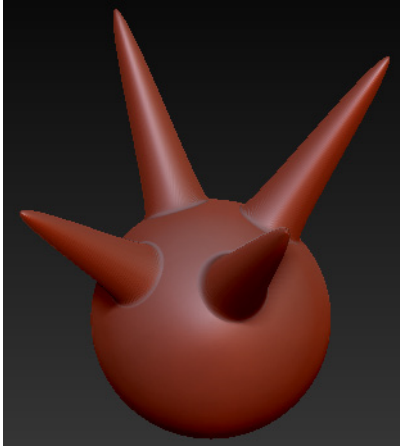
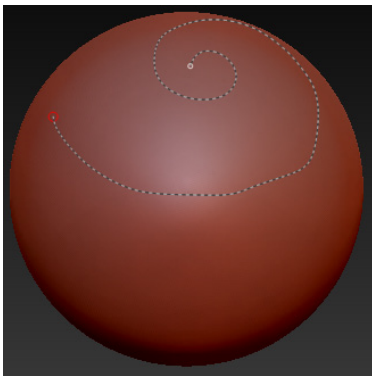*Figure 2-56* *The polygons pulled out using the **Displace** brush*

*Figure 2-57* *The polygons pushed in using the **Displace** brush*

DisplaceCurve Brush

The **DisplaceCurve** brush is used to pull or push the polygons in a direction specified by creating a path curve. To sculpt using this brush, adjust the value of the **Draw Size** slider as required and set the value of **Z Intensity** slider to **60**. Next, press and hold the left mouse button and drag the cursor on the surface of the object to create the path curve, refer to Figure 2-58. After creating the path curve, hover the cursor on the surface of the path and click on it; the polygons will be pulled out along the path curve, as shown in Figure 2-59.

Figure 2-58 *The path curve created on the surface of a sphere*
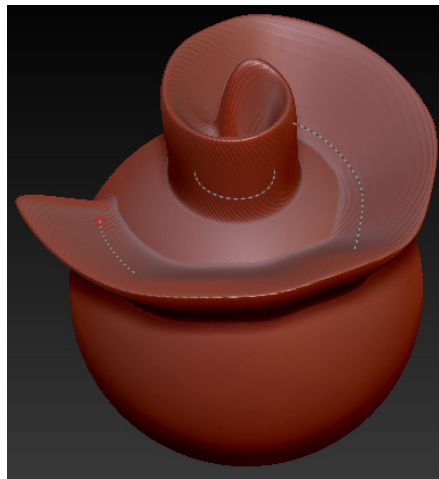
Figure 2-59 *The polygons pulled out along the path curve*

Elastic Brush

The **Elastic** brush is used to displace the polygons of the surface without changing the original shape of an object, refer to Figure 2-60. In Figure 2-60, you will notice that there is deformation in the surface but the original curves in the sphere are retained.
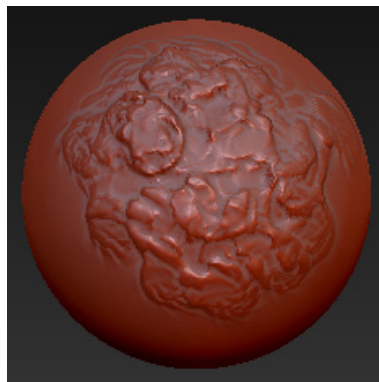
Flakes Brush

The **Flakes** brush is used to create roughness on the surface of an object. This brush can be used to create rust or flake like effect on a surface, refer to Figure 2-61.

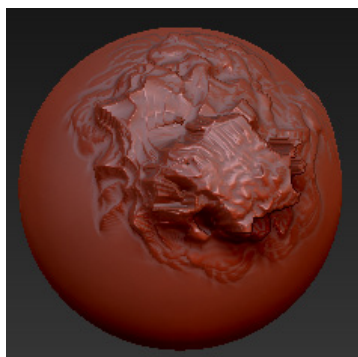*Figure 2-60* *The original shape of the sphere maintained*

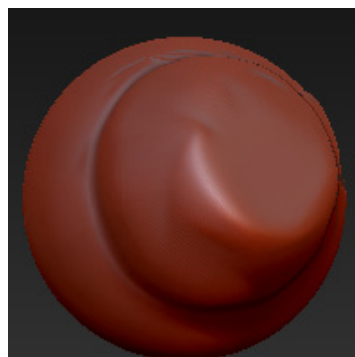*Figure 2-61* *Flakes created on the surface of a sphere*

Flatten Brush

The **Flatten** brush is used to flatten the displaced or extruded surface of an object. Figure 2-62 shows a surface on which the **Flakes** brush has been applied and Figure 2-63 shows the same surface flattened after using the **Flatten** brush on it.

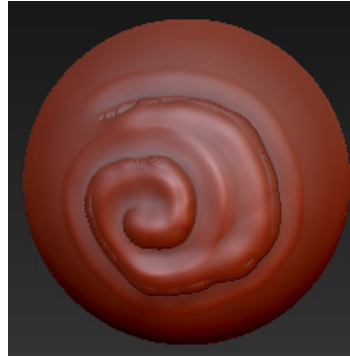*Figure 2-62* *Flakes created on the surface of a sphere using the **Flakes** brush*

Figure 2-63 *The surface of the sphere flattened using the **Flatten** brush*

Fold Brush

The **Fold** brush is used to fold the polygons inward along the path, refer to Figure 2-64.

Figure 2-64 *Folds created on the surface of a sphere*

FormSoft Brush

The **FormSoft** brush is used to create smooth displacement in the surface of an object.

Fracrture Brush

The **Fracrture** brush is used to make the surface of an object disordered and uneven. This brush is best suited for creating rocky surfaces or crystals.

Groom Brushes

The Groom brushes are used to sculpt the **FiberMesh**. The **FiberMesh** is mainly used to create hair on the surface of an object. It is also used to generate different types of fibers, fur, plants, flowers, and so on. The **FiberMesh** option can be accessed from the **Tool** palette. The Groom brushes have been designed specifically for the **FiberMesh**. These brushes are used to edit fibers in the mesh to create different patterns and hairstyles. There are sixteen types of Groom Brushes, refer to Figure 2-65. These brushes will be discussed in detail in the later chapters.

Figure 2-65 *The Groom brushes*

hPolish Brush

The term **hPolish** stands for the hard polish. The **hPolish** brush is used to displace the surface of an object inwards, so that the resulting surface will have sharp and well defined edges, as shown in Figure 2-66.

IMM Brushes

The term IMM stands for Insert Multi Mesh. The IMM brushes are used to insert different types of objects into an already existing geometry. There are seventeen types of IMM brushes, refer to Figure 2-67. Figure 2-68 shows a sphere with different types of objects inserted into it using these brushes.

*Figure 2-66 Surface of the sphere modified by the **hPolish** brush*
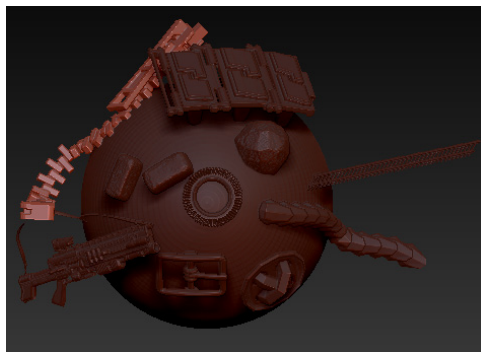

Figure 2-67 The IMM brushes

Note
*Before using some of the **IMM** brushes, you need to freeze the subdivision levels of the object. This can be done by choosing the **Del Lower** button from the **Geometry** subpalette of the **Tool** palette.*
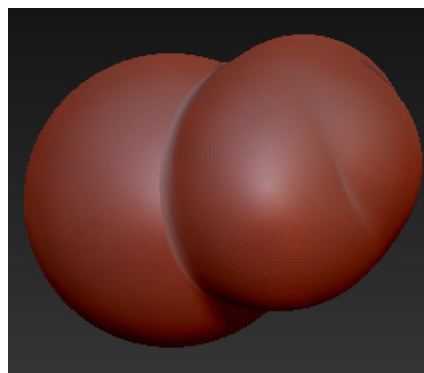
Inflat Brush

The **Inflat** brush is used to expand the surface of an object by a significant amount by pulling the polygons in a direction perpendicular to the surface, refer to Figure 2-69.

Figure 2-68 Different objects inserted into a sphere using IMM brushes

*Figure 2-69 Surface of the sphere expanded by using the **Inflat** brush*

Insert Brushes

The Insert brushes are used to insert different geometrical shapes like cube, sphere, cylinder, and so on, into an already existing geometry. There are eight types of Insert brushes, as shown

in Figure 2-70. Figure 2-71 shows different shapes inserted into a sphere using these brushes. These brushes work only when the geometry has not been subdivided.
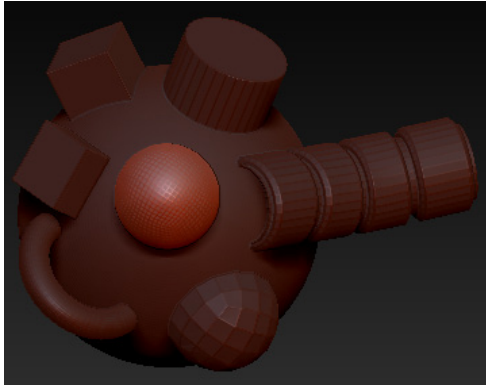

Figure 2-70 *The Insert brushes*

Layer Brush

The **Layer** brush raises or lowers the surface of an object by a fixed amount depending on the value of **Z Intensity**. Using this brush, the depth of displacement remains constant throughout the surface of an object, without any overlapping strokes, refer to Figure 2-72.

Figure 2-71 *Different shapes inserted into a sphere using the insert brushes*
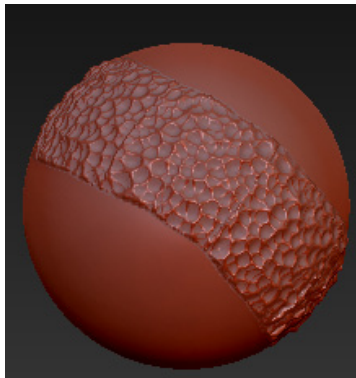
Figure 2-72 *Constant displacement created using the **Layer** brush*

LayeredPattern Brush

The **LayeredPattern** brush is used to create different patterns on the surface of an object, refer to Figure 2-73. On choosing this brush, an alpha is automatically assigned to it. The depth of the pattern created on the surface remains constant throughout the surface.

***Figure 2-73*** *A pattern created using the **LayeredPattern** brush*

Magnify Brush

The **Magnify** brush produces significant displacement on the surface of an object. The amount of magnification is determined by the value of the **Z Intensity** slider located in top shelf.

Mask Brushes

The Mask brushes are used to isolate a certain region of an object. If a particular area is masked on a surface, you cannot make any changes in that area. The unmasked area can be modified without affecting the masked area. There are six types of the Mask brushes, namely **MaskCircle**, **MaskCurve**, **MaskCurvePen**, **MaskLasso**, **MaskPen**, and **MaskRect**, refer to Figure 2-74.
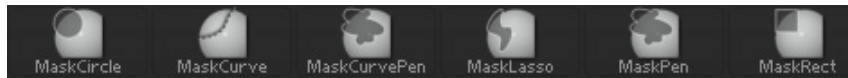

*Figure 2-74 The mask brushes*

The **MaskCircle** brush uses a circular stroke to create a mask. The circular area that comes under the mask cannot be sculpted or modified. To use this brush, create a sphere in the canvas. After creating the sphere, choose the **Edit** button from the top shelf. Convert the sphere into polymesh by choosing the **Make PolyMesh3D** button in the **Tool** palette, and then click thrice on the **Divide** button in the **Geometry** subpalette.

Choose the Current Brush button from the left shelf; a flyout containing different sculpting brushes will be displayed. Choose the **MaskCircle** brush from this flyout; a message box will be displayed prompting you to press the CTRL key to use this brush, refer to Figure 2-75. Choose the **OK** button to close this message box. Next, press and hold the CTRL key and drag the cursor on the surface of the sphere; a marquee selection will be displayed, refer to Figure 2-76. Next, release the left mouse button; a grey colored circular mask will be created on the surface of the sphere, as shown in Figure 2-77. You can also invert the mask by pressing CTRL+I.

The **MaskCurve** brush uses curves or straight lines to create a mask on the surface of an object. To use this brush, create a sphere in the canvas. After converting it into polymesh, click thrice on the **Divide** button in the **Geometry** subpalette. Next, choose the Current Brush button from the left shelf; a flyout containing different sculpting brushes will be displayed. Choose the **MaskCurve** brush from this flyout; a message box will be displayed prompting you to press the CTRL key to use this brush. Choose the **OK** button in this message box. Next, press and hold the CTRL key and then drag the cursor on the surface of the sphere starting from top to bottom; a straight line with grey highlighted area will be displayed on the surface of the sphere, refer to Figure 2-78. Next, release the left mouse button; a mask will be created on the surface of the sphere, as shown in Figure 2-79.
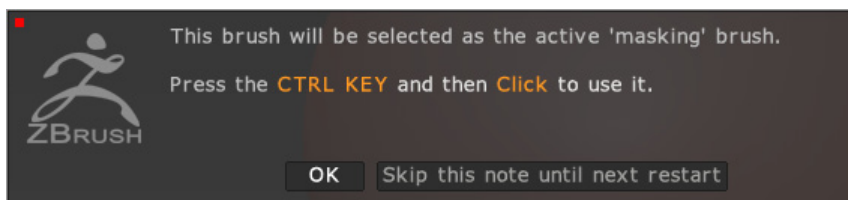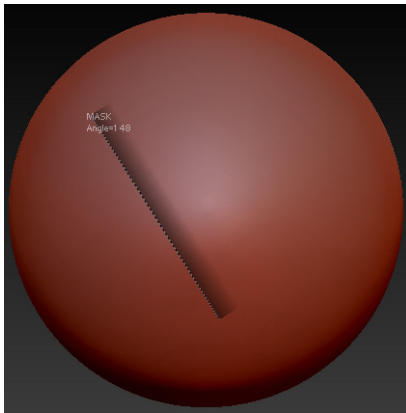

*Figure 2-75 The dialog box displayed on choosing the **MaskCircle** brush*
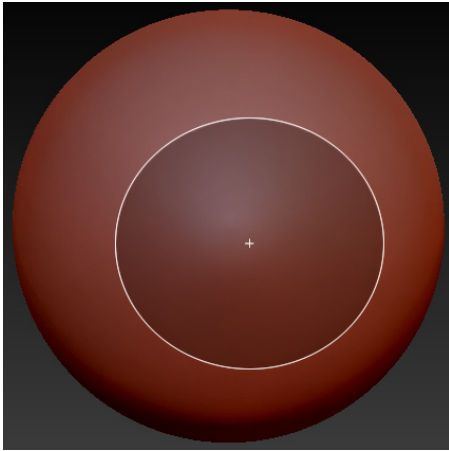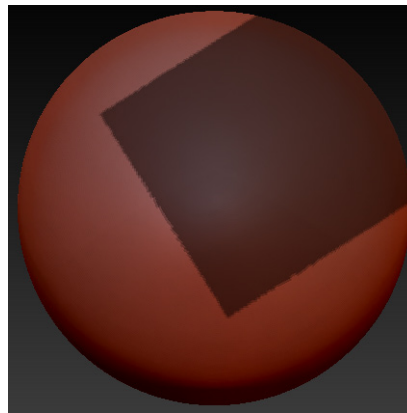
Figure 2-76   *A circular marquee selection displayed*
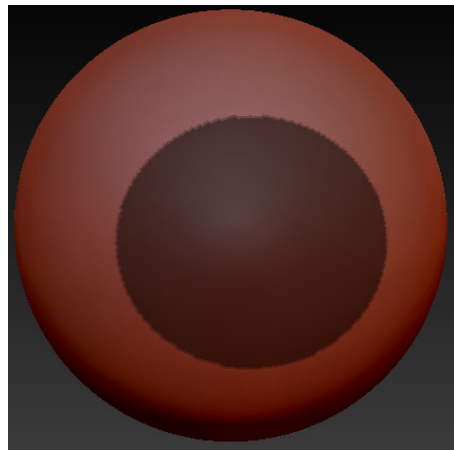
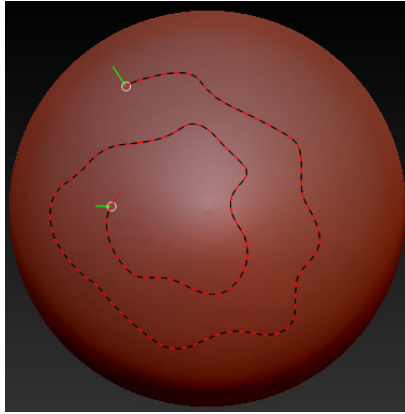*Figure 2-77*   *A circular mask created on the surface of the sphere*

Figure 2-78   *A straight line displayed on the surface of the sphere*

Figure 2-79   *A mask created on the surface of the sphere*

The **MaskCurvePen** brush is used to create a mask along the curve path. To sculpt using this brush, press and hold the CTRL key and drag the cursor on the surface of the sphere to create a curve path of your choice, refer to Figure 2-80. After creating the path, make sure the CTRL key is pressed, and then click on the path; a mask will be created along the path, as shown in Figure 2-81.

The **MaskLasso** brush is used to create freeform masks on the surface of an object using a mask overlay, refer to Figure 2-82. The **MaskPen** brush is used to draw a mask of any shape desired by you using a free hand, refer to Figure 2-83. It gives you the feel of working with a pen. The **MaskRect** brush is similar to **MaskCircle** brush with the only difference that it uses a rectangular stroke as a mask.

Figure 2-80 *A path curve created on the surface of the sphere*
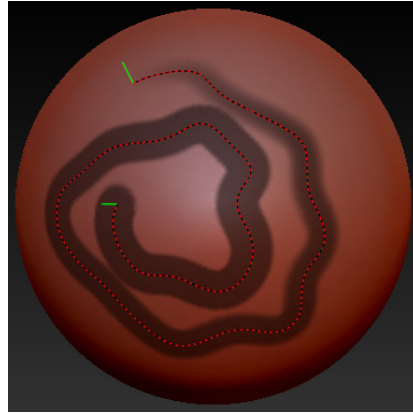
Figure 2-81 *A mask created along the path curve*
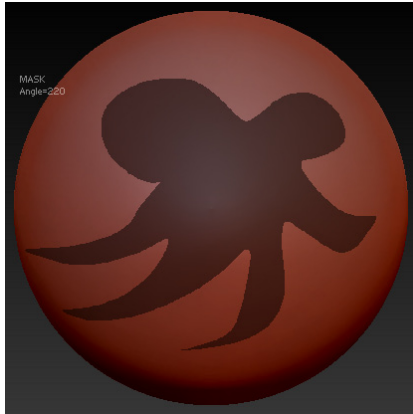
Figure 2-82 *A freeform mask created using the mask overlay*

Figure 2-83 *A mask drawn with freehand using the* ***MaskPen*** *brush*

You can remove a mask from a particular area of the mask by pressing CTRL+ALT and then dragging the cursor on that particular area, refer to Figures 2-84 and 2-85. To remove the entire mask from a surface, press and hold the CTRL key and then drag the cursor on the canvas area. You can also use different alpha images to create masks on the surface of an object.

MatchMaker Brush

The **MatchMaker** brush is used to fit one mesh into the contours of another mesh. For example, if you have modelled a human face and a mask separately, then you can fit the mask into the contours of face by pressing and holding the left mouse button and dragging the cursor on the surface of the mask.

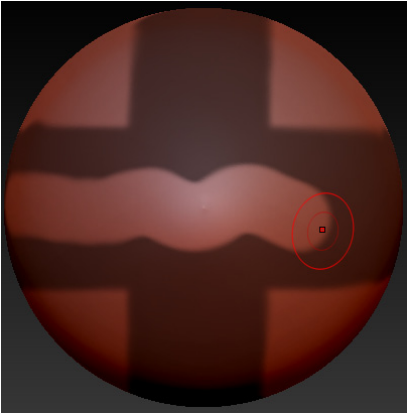*Figure 2-84 A mask created using the MaskPen brush*

Figure 2-85 An area of the mask removed

MeshInsertDot Brush

The **MeshInsertDot** brush is used to insert one 3D object into another. To use this brush, create a sphere in the canvas and convert it into polymesh. Next, choose the Current Brush button from the left shelf; a flyout containing different sculpting brushes will be displayed. Choose the **MeshInsertDot** brush from this flyout. Next, choose the **Brush** palette to expand it. In this palette, choose the **Modifiers** subpalette, refer to Figure 2-86. Next, choose the **MeshInsert Preview** button; a flyout will be displayed, refer to Figure 2-87. From the **3D Meshes** area of this flyout, choose the required primitive. Next, press and hold the left mouse button and drag the cursor on the surface of the sphere; the chosen primitive will be created on the surface of the sphere, refer to Figure 2-88. You can insert more primitives into the sphere by choosing the **MeshInsert Preview** button again, refer to Figure 2-89.
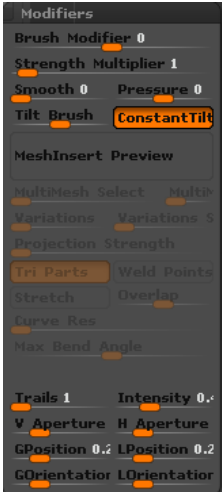

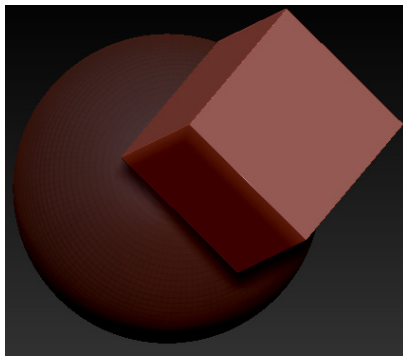*Figure 2-86 The **Modifiers** subpalette in the **Brush** palette*
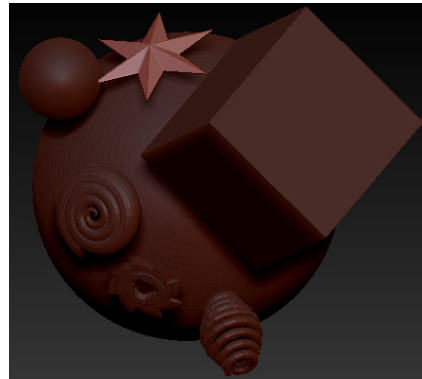
Note

*Before using the **MeshInsertDot** brush, make sure that the value of the **SDiv** slider is 1. This can be done by choosing the **Del Lower** button from the **Geometry** subpalette of the **Tool** palette.*

*Figure 2-87 The flyout displayed on choosing the **MeshInsert Preview** button*

Figure 2-88 A cube created on the surface of the sphere

Figure 2-89 Different types of primitives inserted on the surface of the sphere

Morph Brush

The **Morph** brush is used to apply the saved modification to a 3D object. This modified state of the model is known as morph. To understand the working of this brush, create a sphere in the canvas and convert it into polymesh. Next, expand the **Geometry** subpalette in the **Tool** palette, and then click thrice on the **Divide** button; the sphere will become smoother. Choose the Current Brush button from the left shelf; a flyout containing different sculpting brushes will be displayed. Choose the **ClayBuildup** brush from this flyout. Press and hold the left mouse button and drag the cursor on the surface of the sphere to create a pattern of your choice, refer to Figure 2-90. Next, in the **Tool** palette, expand the **Morph Target** subpalette, refer to Figure 2-91. Now, choose the **StoreMT** button in this subpalette; the current state of the sphere will be stored.

Choose the Current Brush button from the left shelf; a flyout containing different sculpting

brushes will be displayed. Choose the **ClayTubes** brush from this flyout, and then press and hold the left mouse button and drag the cursor on the surface of the sphere to create another pattern on the existing pattern, refer to Figure 2-92. Next, choose the **Morph** brush and then press and hold the left mouse button, and drag the cursor on the surface of the sphere, refer to Figure 2-93; the pattern created earlier will be displayed again and the new pattern will disappear.
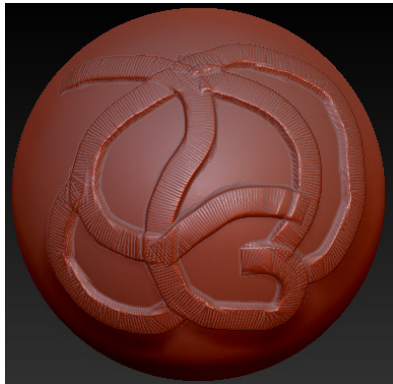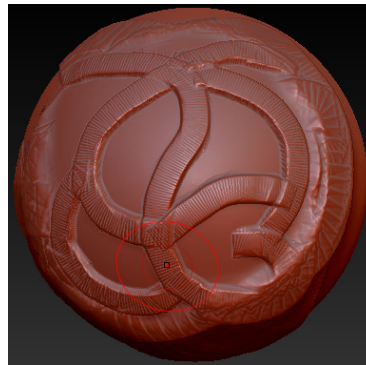

*Figure 2-90 A pattern created using the **ClayBuildup** brush*

*Figure 2-91 **Morph Target** subpalette in the **Tool** palette*
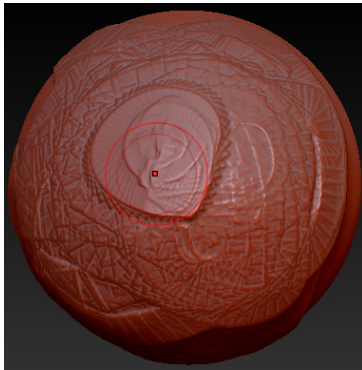
Figure 2-92 A pattern created on the existing pattern

*Figure 2-93 Cursor dragged on the surface of the sphere*

Move Brushes

There are four types of Move brushes, namely the **Move Elastic**, **Move Topological**, **Move**, and **MoveCurve**, as shown in Figure 2-94.


Figure 2-94 The move brushes

The **Move Elastic** brush is used to deform a 3D object by moving its polygons and causing less amount of stretching in the polygons. The **Move Topological** brush is used to modify areas where the cursor is dragged without affecting the surrounding geometry. This brush can be used to modify facial expressions. For instance, you can move the eyelid of the character without affecting the other areas of the eye, with the help of this brush. The **Move** brush is the most commonly used brush in ZBrush. It is used to form the basic shape of your model, refer to Figure 2-95. The **MoveCurve** brush is used to move the polygons of an object along the path curve, refer to Figure 2-96. The working of this brush is similar to the **DisplaceCurve** brush.
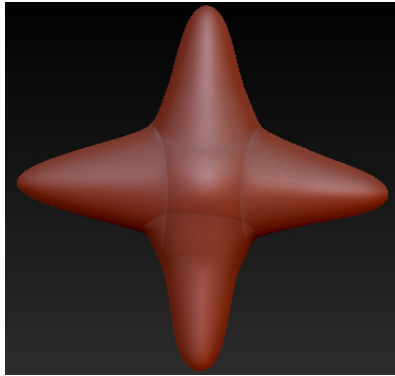
*Figure 2-95 Shape of the sphere modified using the **Move** brush*
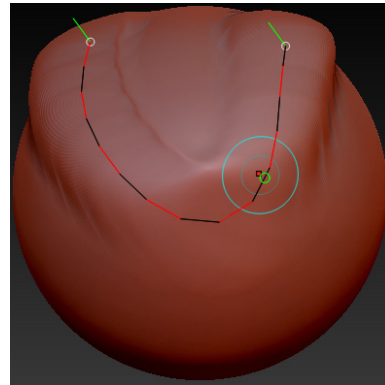
Figure 2-96 The polygons moved along the path curve

Noise Brush

The **Noise** brush adds noise to a surface thus making it rough, as shown in Figure 2-97. In Figure 2-97, the noise pattern has been created by dragging the cursor on the surface of the sphere continuously. This brush can be used to sculpt rocky surfaces. At very low value of **Z Intensity** slider, this brush can also be used to add details to an object.

Nudge Brush

The **Nudge** brush moves the polygons in the direction of brush stroke. You can change the geometry of an object using this brush.
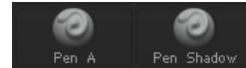
Pen Brushes

The Pen brushes are used in the **Quick Sketch** mode or painting on the polygons. There are two types of Pen brushes, namely **Pen A** and **Pen Shadow**, refer to Figure 2-98. Each of the pen brush creates different types of strokes. The **Pen A** brush creates a simple paint stroke, whereas the **Pen Shadow** brush creates an embossed stroke.
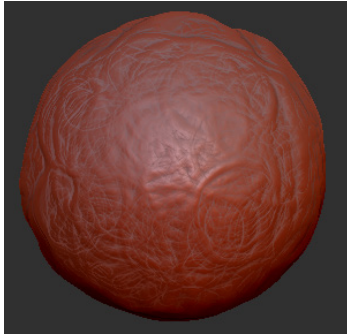
Figure 2-97 *Fractal noise added using the **Noise** brush*

Figure 2-98 *The pen brushes*

Pinch Brush

The **Pinch** brush is used to pinch the vertices of an object. This brush is useful in adding subtle details like dimples and cuts to a human face.

Planar Brush

The **Planar** brush is used to flatten the surface of an object, refer to Figure 2-99. This brush converts an elevated surface into a planar surface.

Polish Brush

The **Polish** brush is used to flatten and smoothen the surface of an object to make it look like a metallic object.

QRemesherGuide Brush

The **QRemesherGuide** brush is used to control the flow of edges in geometry. This brush is used in combination with the **QRemesher** feature. The **QRemesher** is used to edit the existing topology of an object. The **QRemesherGuide** brush facilitates this by enabling you to draw curves on the surface of an object. These curves decide the edge loop flow in the geometry. The **QRemesher** and the **QRemesherGuide** brushes will be discussed in detail in later chapters.
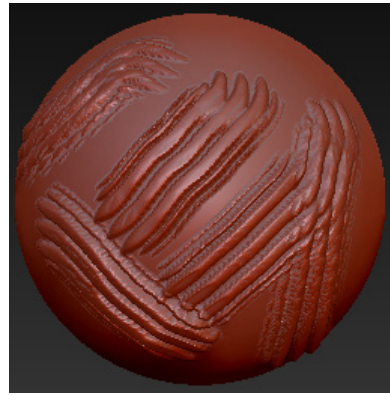
Rake Brush

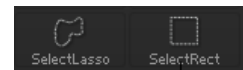The **Rake** brush is used to produce scratch like effect on the surface of an object, refer to Figure 2-100.
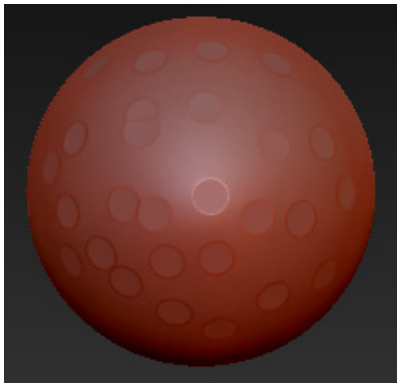
Figure 2-99 *The surface of the sphere* ***Figure 2-100*** *Scratches created on the*
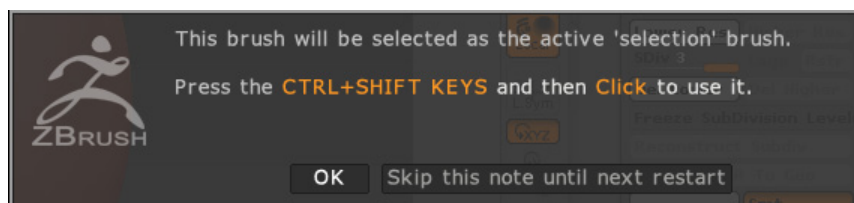*flattened* *surface of a sphere*

Select Brushes

There are two types of Select brushes namely the **SelectLasso**
and **SelectRect**, as shown in Figure 2-101. These brushes
are used to select and modify a particular area of an object.
The **SelectLasso** brush enables you to draw the desired
shape and the **SelectRect** brush uses rectangular stroke to

Figure 2-101 *The select brushes*

select an area. To understand the working of these brushes, create a sphere in the canvas and
convert it into polymesh. Next, expand the **Geometry** subpalette in the **Tool** palette, and then
click thrice on the **Divide** button; the sphere will become smoother. Choose the Current Brush
button from the left shelf; a flyout containing different sculpting brushes will be displayed.
Choose the **SelectLasso** brush from this flyout; a message box will be displayed prompting
you to press CTRL+SHIFT to activate this brush, refer to Figure 2-102.

Figure 2-102 *The dialog box displayed on choosing the* ***SelectLasso*** *brush*

Press CTRL+SHIFT, and then press and hold the left mouse button. Next, drag the cursor
on the surface of the sphere to create a selection area on the sphere; a green colored selection
mask will be displayed, refer to Figure 2-103. Release the left mouse button; the selected area
of the sphere will be displayed on the canvas, refer to Figure 2-104. Next, sculpt the selected
area using different brushes, refer to Figure 2-105. In this figure, the **Standard** brush and the
ClayBuildup brush have been used to sculpt the selected area. After sculpting the selected
area, press and hold the CTRL+SHIFT key and the left mouse button, and then click on the
canvas area; the complete model of the sphere along with the modified selection area will be
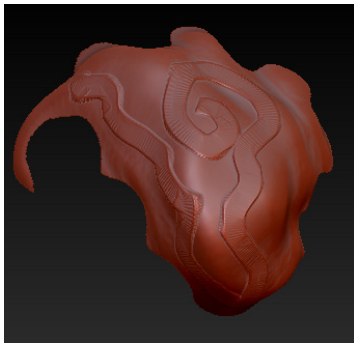displayed in the canvas area, refer to Figure 2-106.

The function of **SelectRect** brush is similar to **SelectLasso** brush with the only difference that you can create a rectangular selection mask using this brush, refer to Figures 2-107 and 2-108.
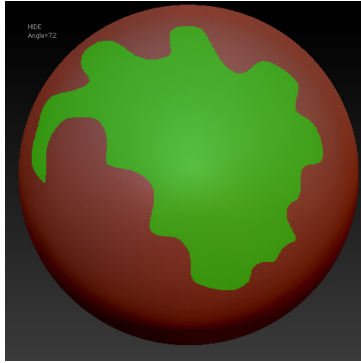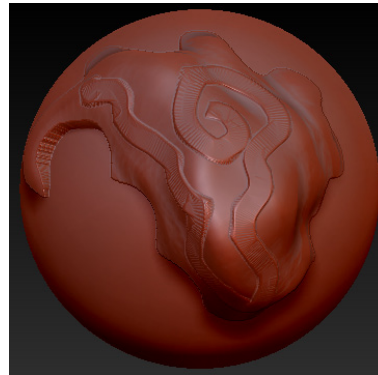

Figure 2-103   Green selection mask displayed on the surface of a surface
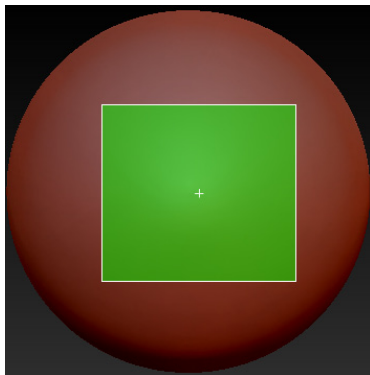

Figure 2-104   The selected area displayed in the canvas
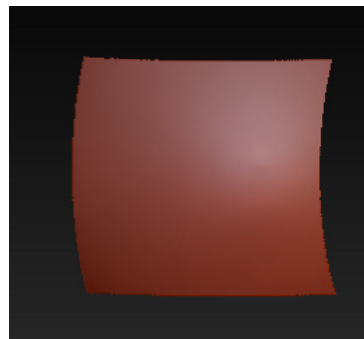

Figure 2-105   The selected area sculpted using different brushes

Figure 2-106   The complete sphere displayed in the canvas

Figure 2-107   The green colored rectangular selection displayed

Figure 2-108 The selected area of the sphere displayed in the canvas

Slash3 Brush

The **Slash3** brush is used to produce an effect resembling a pattern that is produced if a soft surface is cut by a knife, refer to Figures 2-109 and 2-110.

Figure 2-109 Pattern produced using the Slash3 brush

Figure 2-110 Pattern produced using the Slash3 brush

Slice Brushes

There are three types of Slice brushes, namely the **SliceCirc**, **SliceCurve**, and **SliceRect**, as shown in Figure 2-111. Before using these brushes, you need to make sure that the geometry is not subdivided.
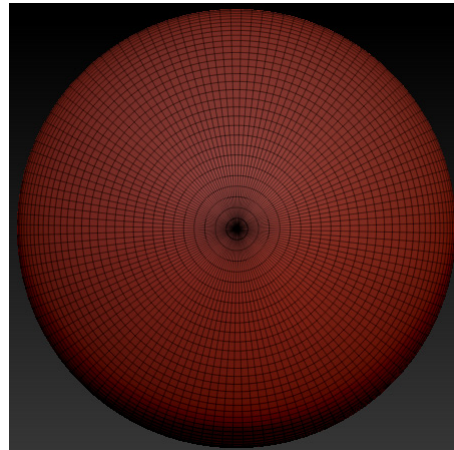
The **SliceCirc** brush is used to divide an object into a number of parts using a circular selection area, such that each part can be modified individually. To understand the working of this brush, create a sphere in the canvas and convert it into polymesh. Next, choose the **PolyF** button from the right shelf to view the polygon distribution of the sphere, refer to Figure 2-112.

Choose the Current Brush button from the left shelf; a flyout containing different sculpting brushes will be displayed. Choose the **SliceCirc** brush from this flyout; a message box will be displayed prompting you to press CTRL+SHIFT to activate this brush, refer to Figure 2-113. Press CTRL+SHIFT and then drag the cursor on the surface of the sphere; a circular selection mask will be displayed, refer to Figure 2-114. Release the left mouse button; the color of the selected area will change and it will be split into a separate group, refer to Figure 2-115. Press CTRL+SHIFT, and click on the split area; it will be displayed in the canvas, and rest of the sphere will disappear, refer to Figure 2-116. Next, sculpt the selected area using the **Standard** brush, refer to Figure 2-117. After sculpting the selection area, press and hold the CTRL+SHIFT key and then click on the canvas area; the complete model of the sphere along with the modified selection area will be displayed in the canvas area, refer to Figure 2-118.

The **SliceCurve** brush uses curves or straight lines to split an object into separate groups, refer to Figure 2-119. The **SliceRect** brush works similar to **SliceCirc** brush with the only difference that instead of creating a circular selection area, it creates a rectangular selection area, refer to Figure 2-120.
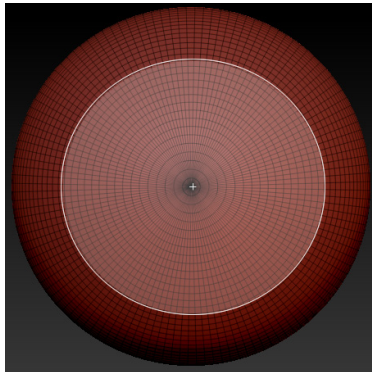
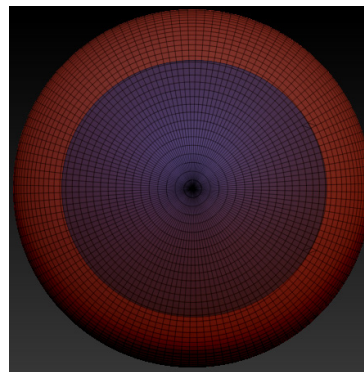**Figure 2-111** *The slice brushes*   **Figure 2-112** *The polygons of the sphere displayed*
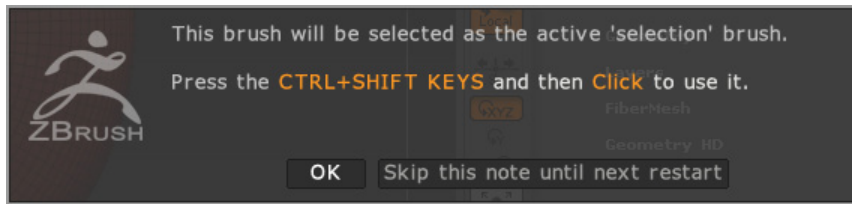
Figure 2-113 *The message box displayed on choosing the **SliceCirc** button*
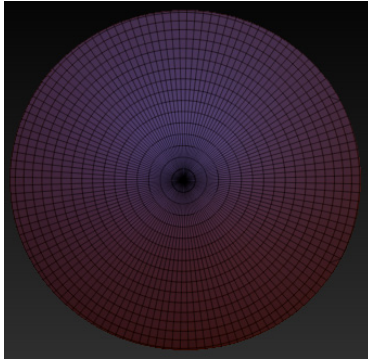

Figure 2-114 *A circular selection mask displayed on the sphere*

Figure 2-115 *The selected area of the mask separated from the sphere*

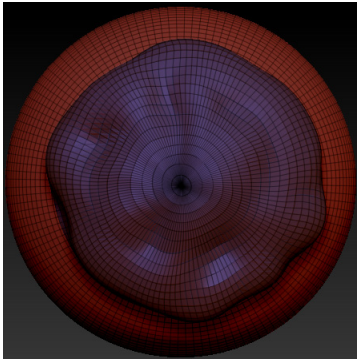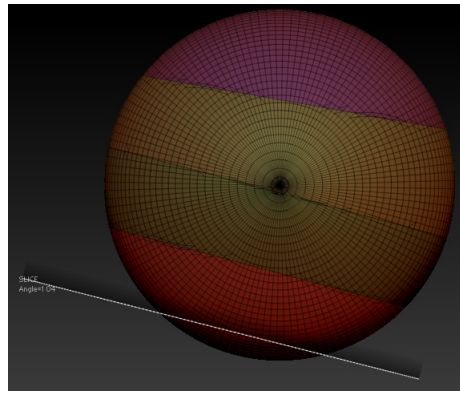*Figure 2-116   The selected area displayed in the canvas*
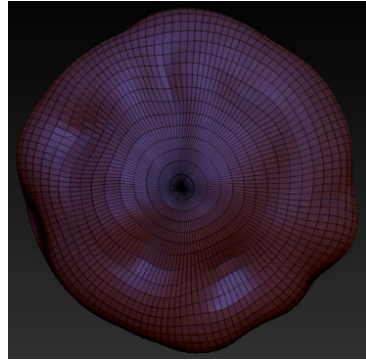
*Figure 2-117   The selected area sculpted using the **Standard** brush*

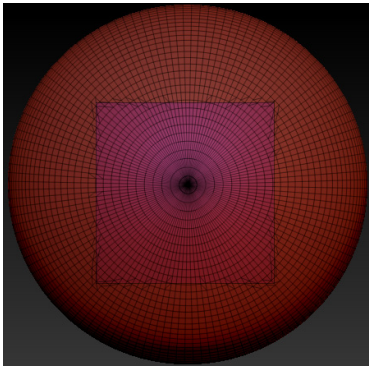*Figure 2-118   The complete sphere displayed in the canvas*

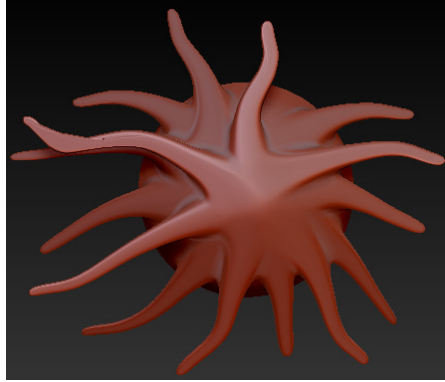*Figure 2-119   The sphere divided into different parts using the **SliceCurve** brush*

Slide Brush

The **Slide** brush is used to slide out the polygons of an object in the outward direction, refer to Figure 2-121.

Figure 2-120 *A rectangular selection area created on the surface of sphere*


***Figure 2-121*** *The polygons slid outward using the **Slide** brush*

Smooth Brush

There are three types of Smooth brushes, namely **Smooth**, **SmoothPeaks**, and **SmoothValleys**, as shown in Figure 2-122. The **Smooth** brush is used to even out the displaced surface in order to create a smoother appearance. To understand the working of this brush, create a sphere in the canvas and convert it into polymesh. Next, expand the **Geometry** subpalette in the **Tool** palette, and then click thrice on the **Divide** button; the sphere will become smoother.

Choose the Current Brush button from the left shelf; a flyout containing different sculpting brushes will be displayed. Choose the **Standard** brush from this flyout. Next, choose the Current Alpha button from the left shelf; a flyout containing different alpha images will be displayed. Choose the **Alpha 05** alpha image from this flyout. Next, press and hold the left mouse button and drag the cursor on the surface of the sphere to create a pattern, as shown in Figure 2-123.
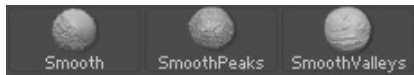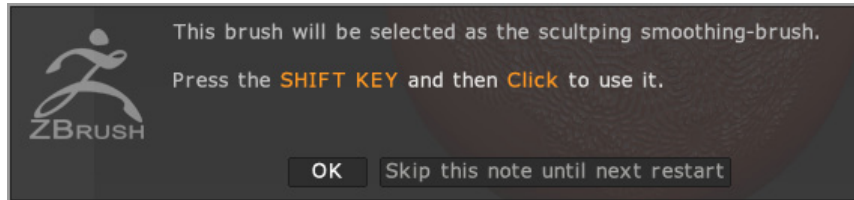

Figure 2-122 *The Smooth brushes*
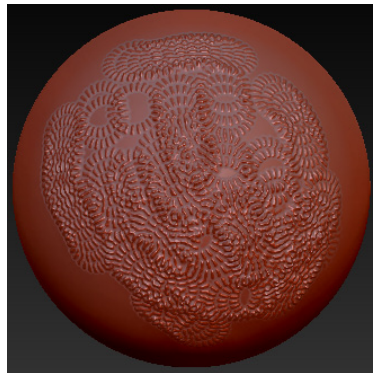
Figure 2-123 *Pattern created using the **Standard** brush*

Next, choose the **Smooth** brush; a message box prompting to press SHIFT to activate this brush will be displayed, refer to Figure 2-124. Choose the **OK** button from this message box. Press

SHIFT and then press and hold the left mouse button. Next, drag the cursor on the surface of the sphere; the sculpted area of the sphere will become smoother, refer to Figure 2-125.

The **SmoothPeaks** brush is used to smoothen the surface of the peaks created on an object, refer to Figures 2-126 and 2-127. In Figure 2-126, the peak has been created using the **ClayBuildup** brush. The **SmoothValleys** brush is used to smoothen the surface of the cavities created on an object, refer to Figures 2-128 and 2-129. In Figure 2-128 the cavity has been created using the **ClayBuildup** brush and then by choosing the **Zsub** button from the top shelf.

Figure 2-124 *The dialog box displayed on choosing the **Smooth** brush*

Figure 2-125 *The surface smoothened using the **Smooth** brush*
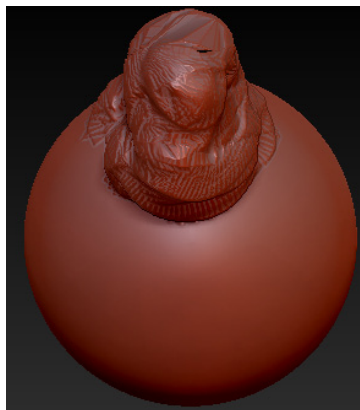
Figure 2-126 *Peak created using the **ClayBuildup** brush*

Figure 2-127 *Peak smoothened using the **SmoothPeaks** brush*

Figure 2-128 *Cavity created using*   ***Figure 2-129*** *Cavity smoothened*
*the **ClayBuildup** brush*   *using the **SmoothValleys** brush*
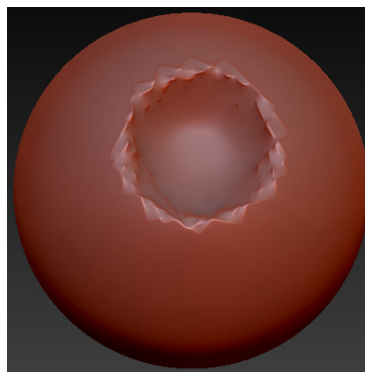
SnakeHook Brush

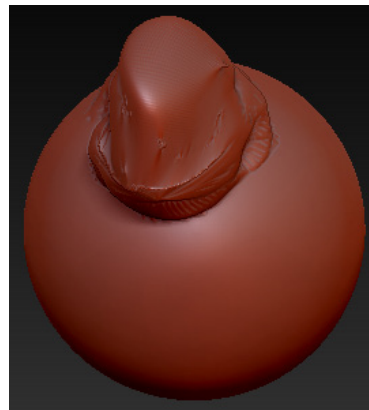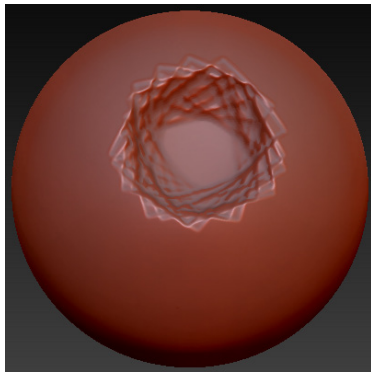The **SnakeHook** brush is used to pull out strands from a surface, as shown in Figure 2-130. These strands have narrow ends. This brush is ideal for making barks, horns, and so on.

Soft Brushes

There are two types of Soft brushes, namely the **SoftClay** and **SoftConcrete**, as shown in Figure 2-131. These brushes use alpha images to add detail to an object quickly. By default, the **SoftClay** brush uses a rectangular alpha to add depth and the **SoftConcrete** brush uses a stone like alpha to add depth to an object, refer to Figures 2-132 and 2-133. In the **SoftClay** brush, the edges of the alpha image are smooth. However, on using the **SoftConcrete** brush, the edges of the alpha image are hard.
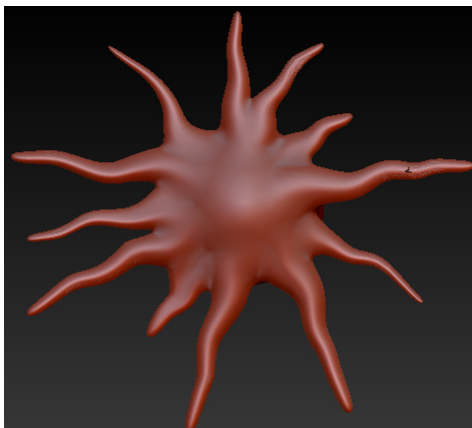
Figure 2-130 *Strands pulled out using the*   ***Figure 2-131*** *The soft brushes*
***SnakeHook** brush*
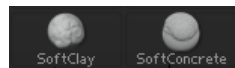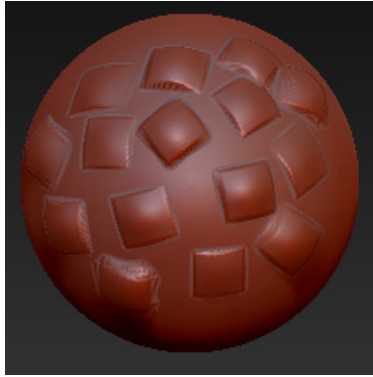
Figure 2-132 *Rectangular alpha added using the **SoftClay** brush*

Figure 2-133 *A stone like alpha added using the **SoftConcrete** brush*

Spiral Brush

The **Spiral** brush is used to create twisted displacement in the surface of an object, refer to Figure 2-134.

sPolish Brush

The **sPolish** brush stands for the soft polish brush. This brush is used to smoothen or polish the extruded surface of an object.

Standard Brush

The **Standard** brush is the default brush in ZBrush. It raises the surface of a mesh or pushes it inward depending on settings specified. If you choose the **Z add** button, the surface of the mesh will be raised. In organic modeling, the **Standard** brush can be used to sculpt a nose on the face of a character. Similarly, if you choose the **Zsub** button, the surface of the mesh will be pushed inwards. While modeling human faces, it can be used to sculpt eye sockets on the face of a character.

The **Z Intensity** slider will determine the strength of the stroke. Higher the value of intensity, higher will be the degree of elevation. The **Draw Size** slider helps you in controlling the size of the brush and the **Focal Shift** slider controls the softness or fall off of the edge of the brush. If you sculpt with **Zadd** button chosen while holding the ALT key, the surface will be pushed inward instead of being raised. Similarly, holding the ALT key with the **Zsub** button chosen will raise the surface of an object. Figure 2-135 shows a sphere sculpted by using the **Zadd** and **Zsub** settings of the **Standard** brush.

Figure 2-134 *Twisted displacement produced by using the **Spiral** brush*

Figure 2-135 *A sphere sculpted on using the **Standard** brush*

StitchBasic Brush

The **StitchBasic** brush is used to create a pattern of stitches on the surface of an object. This brush is ideal for sculpting clothes and leather accessories.

Topology Brush

The **Topology** brush is used to create a new mesh on the already existing object. This brush is ideal for creating accessories on a human model. This brush can be used if the geometry has not been subdivided. This brush will be discussed in detail in later chapters.

Transpose Brush

The **Transpose** brush is used to move, rotate, or scale an object. This brush can also be used to pose a character. To understand the working of this brush, choose the Current Tool button from the **Tool** palette; a flyout will be displayed. Choose the **Spiral3D** primitive from this flyout. Next, press and hold the left mouse button and drag the cursor on the canvas to create the spiral. After creating the spiral, choose the **Edit** button from the top shelf, and then choose the **Make PolyMesh3D** button from the **Tool** palette. Next, choose the Current Brush button from the left shelf; a flyout containing different sculpting brushes will be displayed. Choose the **Transpose** brush from this flyout; an action line will be displayed on the surface of the spiral, refer to Figure 2-136.

Press and hold the left mouse button and drag the cursor on the surface of the spiral; the size of action line will be increased, refer to Figure 2-137.

On choosing the **Transform** brush, you will notice that the **Move** button in the top shelf gets automatically chosen. This button will enable you to move the spiral in the canvas. To move the spiral, hover the cursor at the centre of the middle most circle of the action line and then press and hold the left mouse button. Next, drag the cursor; the position of the spiral will be changed in the canvas accordingly.
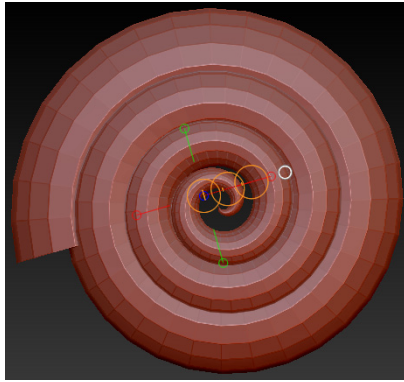
Figure 2-136 *Action line displayed on the spiral*
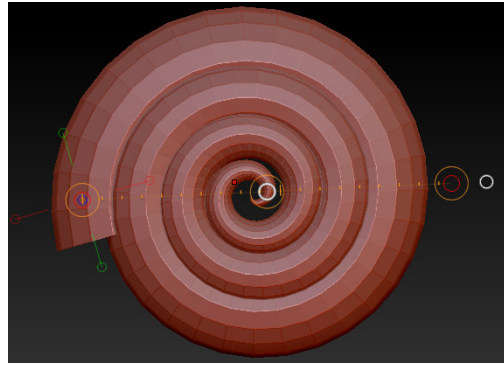
**Figure 2-137** *Size of the action line increased*

To scale the spiral, choose the **Scale** button from the top shelf and hover the cursor at the centre of the middle most circle of the action line and then drag the cursor in the canvas; the spiral will be scaled, refer to Figures 2-138 and 2-139.

To scale the spiral uniformly, hover the cursor at the centre of the end most circles of the action line and then press and hold the left mouse button. Next, drag the cursor in the canvas area; the spiral will be scaled uniformly. Similarly, you can rotate the spiral in the canvas by choosing the **Rotate** button from the top shelf.
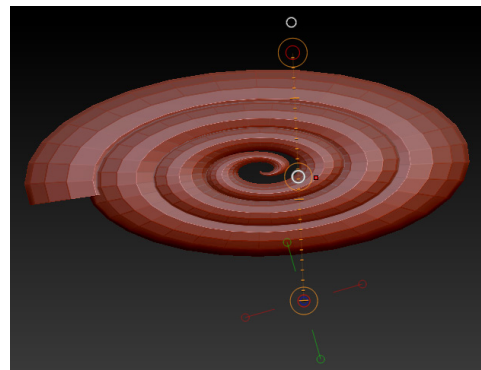
Note

To change the position of the action line on the surface of an object drag the cursor on the object at different positions; the action line will be displayed at those positions. To flip the direction of the action line, click on the green circle at the end of the action line.
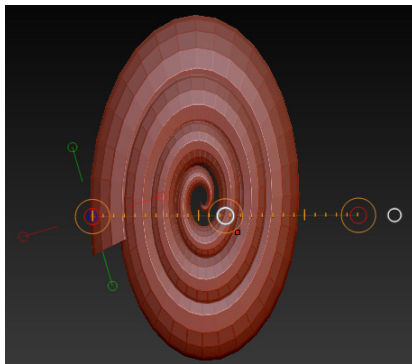
Figure 2-138 *Spiral scaled up vertically*

Figure 2-139 *Spiral scaled up horizontally*

You can also bend the surface of an object by using the **Transpose** brush. To do so, create a cube in the canvas and convert it into polymesh. Next, choose the **Transpose** brush; a small action line will be created on the surface of the cube. Press and hold the left mouse button and drag the cursor on the surface of the cube; the size of the action line will be increased,

refer to Figure 2-140. Hover the cursor at the centre of the middle most circle in the action line. Press the ALT key and then press and hold the left mouse button. Next, drag the cursor downward; the surface of the cube will be bent, refer to Figure 2-141.
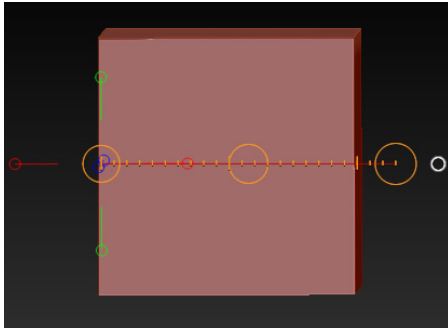
Figure 2-140 Action line displayed on the spiral
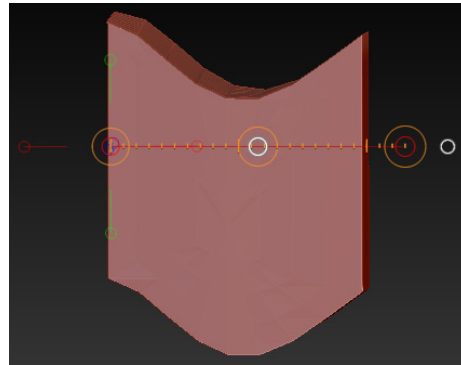

*Figure 2-141 Surface of the cube bent using the **Transpose** brush*

TransposeSmartMask Brush

The **TransposeSmartMask** brush is used to mask the distinct areas of the surface. This brush detects the curved areas in the surface and creates a mask around them. To understand the working of this brush, choose the **LightBox** button from the top shelf; the **LightBox** browser will be displayed. In the **Tool** tab of this browser, double-click on the file **Dog.ZTL**. Next, press and hold the left mouse button and drag the cursor on the canvas; the model of the dog will be loaded in the canvas, refer to Figure 2-142.

After loading the model, choose the **Edit** button from the top shelf, and then choose the **TransposeSmartMask** brush. Press and hold the CTRL key and then press and hold the left mouse button. Now, drag the cursor on the surface of the model; the size of action line will increase and a mask will be created on the top area of the model, refer to Figure 2-143. To increase the area of the mask, drag on surface of the model such that its size is increased significantly, refer to Figure 2-144.
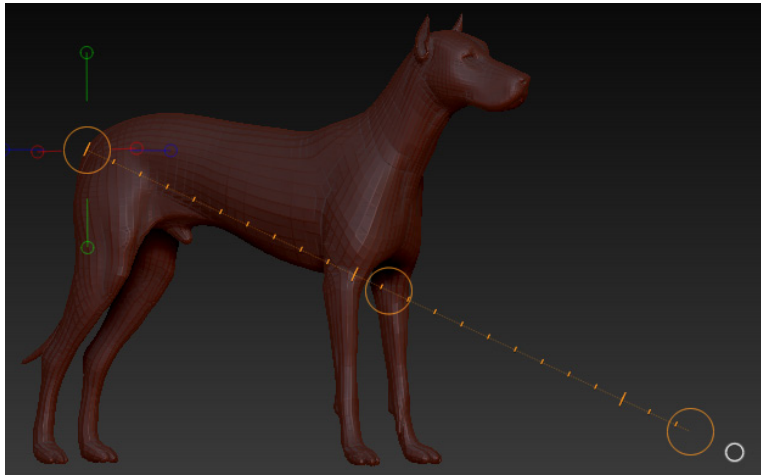

Figure 2-142 Model of the dog created in the canvas
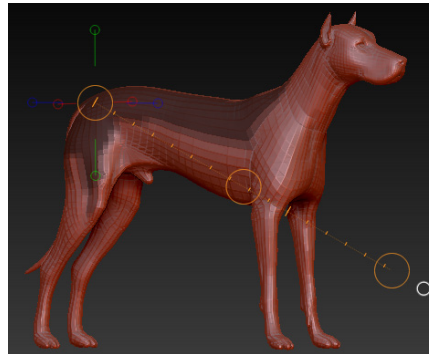
Figure 2-143 Mask created on the top area of the model

Figure 2-144 Mask created on the entire surface of the model

Trim Brushes

The Trim brushes are used to make the surface of an object flat. There are two types of Trim brushes namely **TrimAdaptive** and **TrimDynamic**, refer to Figure 2-145. The **TrimAdaptive** brush is used to create planes on the curved surface by slicing the curve. The **TrimDynamic** brush creates planes on the surface and maintains the curvature of the surface.
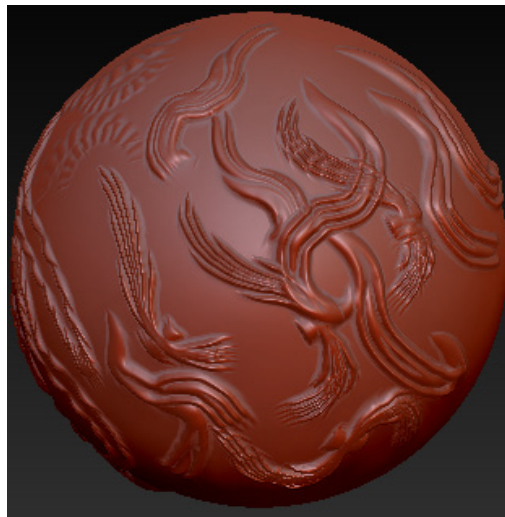

Figure 2-145 The Trim brushes

Weave1 Brush

The **Weave1** brush is used with different alphas to create different patterns on an object, refer to Figure 2-146.

*Figure 2-146 Different patterns created using the **Weave** brush*

ZProject

The **ZProject** brush is used mainly in texturing. If you want to texture a human face, then you need to keep the reference image along with the 3D model in the canvas area. By using the **ZProject** brush you can transfer the texture from the reference image into your 3D model. The **ZProject** brush uses the Z axis of the canvas to transfer sculpting and texturing details either from the canvas or from other subtools. This brush will be discussed in detail in later chapters.

Self-Evaluation Test

Answer the following questions and then compare them to those given at the end of this chapter:

1. Which of the following hot keys is used to activate the Clip brushes?

    (a) CTRL+ALT   (b) CTRL+SHIFT
    (c) CTRL   (d) None of these

2. The _____ brush is used to add wrinkles to an object.

3. The _____ brushes are used in the **Quick Sketch** mode or painting on the polygons.

4. The _____ brush is used mainly in texturing.

5. The _____ brush is used to create a pattern of stitches on the surface of an object.

6. The _____ brush is used to control the flow of edges in the geometry.

7. The **Divide** button in the **Geometry** subpalette is used to decrease the number of polygons in a mesh. (T/F)

8. The **MatchMaker** brush is used to fit one mesh into the contours of another mesh. (T/F)

9. The **Smooth** brush is activated by pressing the ALT key. (T/F)

10. Each time you subdivide a model with subdivision history using the **Divide** button, the **SDiv** slider should be at its highest setting. (T/F)

Review Questions

Answer the following questions:

1. Which of the following keys activates the alternate mode for the **Z Add** button and the **Z Sub** button?

    (a) ALT   (b) SHIFT
    (c) CTRL   (d) SPACEBAR

2. The term IMM stands for _____ .

3. The _____ brush is used to add organic details to an object.

4. The _____ brush is used to create a new mesh on the surface of an object by drawing curves for the new mesh.

5. The _____ brush uses a circular stroke to create a mask on the surface of an object.

6. The **Inflat** brush is used to expand the surface of an object by a significant amount. (T/F)

7. The **Rake** brush is used to isolate a certain region of an object. (T/F)

8. The **Transpose** brush is activated when the brush is in the **Draw** mode. (T/F)

9. The **ClayTubes** brush uses a rectangular alpha to add detail to a surface. (T/F)

Answers to Self-Evaluation Test
1. b, **2. Crumple**, **3.** Pen, **4. ZProject**, **5.** Eight, **6. QRemesherGuide**, **7.** F, **8.** T, **9.** F, **10.** T