

# Basics of Zbrush

## Objectives

After studying this unit, you should be able to:

- Load and Save ZTools
- Import and Export obj's
- Initialize primitives
- Go from 2.5D into 3D sculpting mode
- Navigate inside Zbrush
- Understand what are subtools and understand Subtool menu
- Understand Subdivisions

### 1.1 ZTools (Save, Load, Import, Export)



Tool palette

Tool palette can be found on the top of the right shelf. Zbrush doesn't use the term *Object*, rather it uses the term *ZTool*. This can be a bit confusing if you are used to working in other 3d software's out here, and are used to loading objects, saving them and working with them. To simplify things let's just say that ZTool=Object.

In the Tool palette we have some important buttons, such as

**Load Tool**- loads native Zbrush file \*.ztl

**Save Tool**- saves native Zbrush file \*.ztl

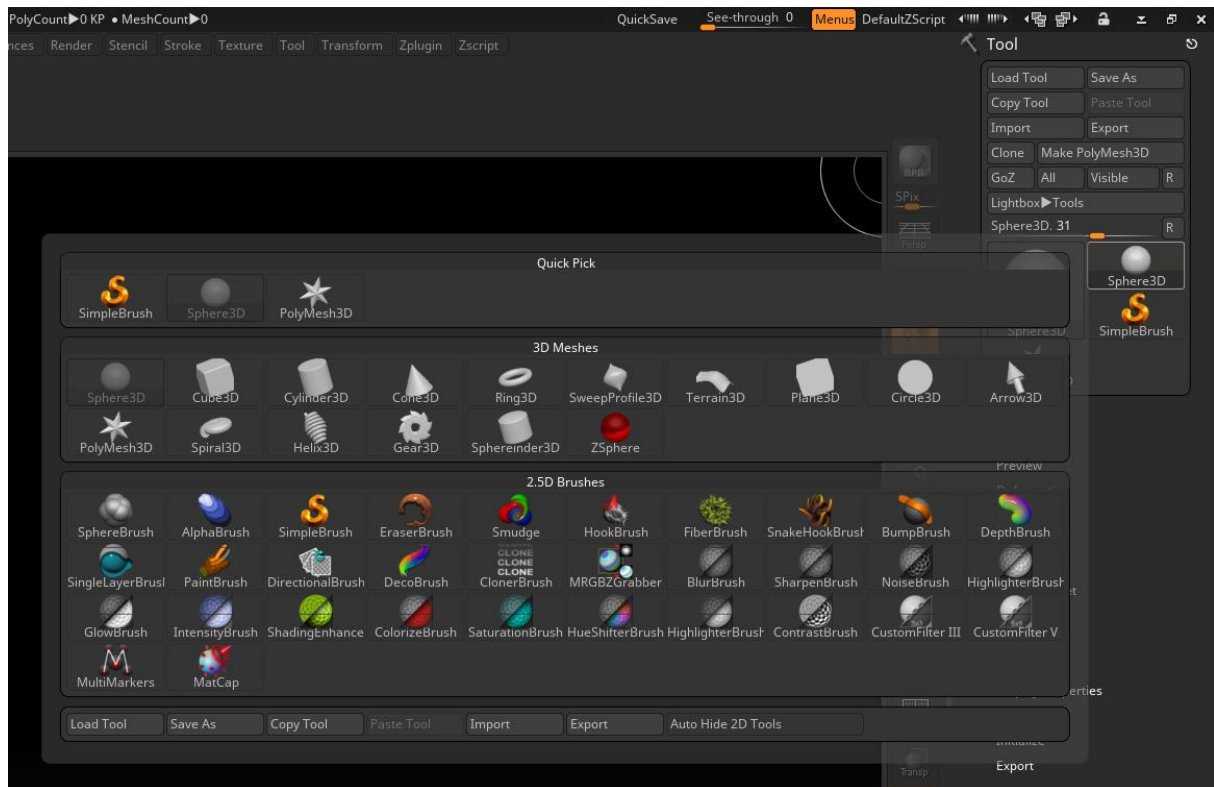
**Import** - allows us to import non native files, such as \*.obj

**Export** - allows us to export non native files, such as \*.obj

## 1.2 Primitives

In the Tool palette we also find ***Primitives***

***Primitives*** are pre made ZTools that come with Zbrush and are a great starting point for our sculpting projects



Primitives button pop-up palette

We have a variety of shapes to choose from, such as Sphere, Cube, Cone, Terrain.....

The slider, next to the primitives, lists all ZTools currently loaded into the Tool palette.

R button next to it will restore the palette configuration. When the number of items in the palette grows too large this button will restore the configuration. All but a few items will be hidden but they may be retrieved by pressing the large thumbnail and selecting from the pop-up palette.

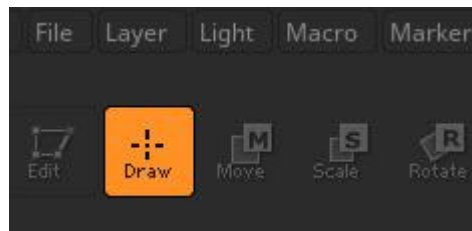
### 1.3. Drawing ZTools onto Canvas and going from 2.5D into 3D mode, Navigation

Once we select a primitive to start from we need to draw it onto the Canvas. We do this by selecting a primitive and LMB click and drag onto the canvas. We will see our selected primitive being dragged and scaled up on the canvas. We are still in 2.5D mode, which means we are not working in 3D space and can not look at our primitive from all angles, like we would expect in a normal 3D

environment. We are, in fact, drawing with 3d objects. You can try it out, it's a lot of fun!

If we want to clear our Canvas and start over, we use the hotkey **Ctrl+n**

To enter into the 3D mode, once we LMB click and drag our primitive we need to enter Edit mode. We are currently in Draw mode. Those buttons can be found on the left corner of the top shelf.



*Edit, Draw buttons*

All we have to do is to click on the Edit button, or press the hotkey **t**

Our Canvas now got a thin white frame around it and now if we click with LMB on the canvas, not the model, and drag we will see that the model will now rotate, in all it's 3d glory! We are now dealing with a 3d ZTool or we can also call it 3d object.

## ***Navigation***

**Clicking LMB on the canvas and dragging** is for rotating

**LMB+Shift while rotating** locks the view to the nearest axis.

**Alt+LMB** is for panning

**Alt+LMB and then release the Alt while keeping the LMB pressed** is for zooming.

## **1.4. Right Shelf buttons p.01**



*Right shelf buttons*

**BPR button** -This button is for rendering, which we will cover in later sections.

**Persp button**- is the button for turning perspective on and off. Perspective can help us perceive 3d forms better, but it is also very useful to be able to turn it off and see the lines of the model without perspective shortening.

**Floor button**- makes the axes planes visible. By default the y axis is on when we activate Floor button, but we can also turn other axis on by clicking on the axis letter within the button. It is very useful to know where is the floor and our model is positioned in relationship with it. Checking this will ensure that we easily and naturally navigate around our model and the 3d space, have shadows as expected as well as have the model positioned properly when exporting to other applications

I usually combine this with activating the **Rotate On Y Axis** button that ensures the floor will always remain straight , up will be up and down will be down.

**Local button-** is for local transformations and should **always be on**. This button tells Zbrush to keep the center of rotation of our view always on the last place we clicked on the model. This helps us navigate around the parts of the model that interests us and that we are currently working on.

If we zoom to close to our object and it covers the whole canvas area, we navigate around the model (since navigating is done by clicking on the canvas, not the model) by clicking on the outside of the white frame framing the canvas.

## 1.5. Making primitives into PolyMesh3D

Once we draw a primitive onto the Canvas and enter Edit mode, going from 2.5D to 3D, we will see that we still can not start sculpting on our 3d model. We need to convert that primitive into PolyMesh3D. We do this by pressing the **MakePolyMesh3D button** in the **Tool palette**. Now we can start sculpting on this ZTool! The ZTool we make like this will always have "**PM3D**" in it's name.

## 1.6. Initializing primitives

But, before we make it into a PolyMesh3D the primitive is not yet initialised. While we are still in this state we can change the attributes of the primitive. We do this in the **Initialize menu** on the bottom of the right tray. The options shown there will depend on the primitive we select.



*Initialize options*

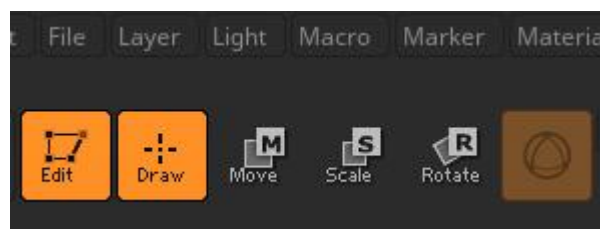
We can play with those options and see how they affect our primitive.

**Draw Polyframe button** on the *right shelf* shows us the topology of the primitive, and any other ZTool we have.

1. Select the primitive, LMB+drag on the canvas
2. Enter Edit mode by activating the Edit Button (hotkey "t")
3. Initialize the primitive using options in the Initialize menu
4. Press Make PolyMesh3D button to make it into a sculptable object

## 1.7. Move, Scale, Rotate

Move, Scale and Rotate buttons can be found in the left side of the upper shelf



*Move, Scale and Rotate buttons*

These are not to be confused with rotating, panning and zooming we already talked about. With those we control the way we are looking at the object, while with these buttons we are working on the object itself. We can move the object, change its size and scale and rotate it. We do this with **Move**, **Scale** and **Rotate buttons** respectively.

Hotkeys for them are

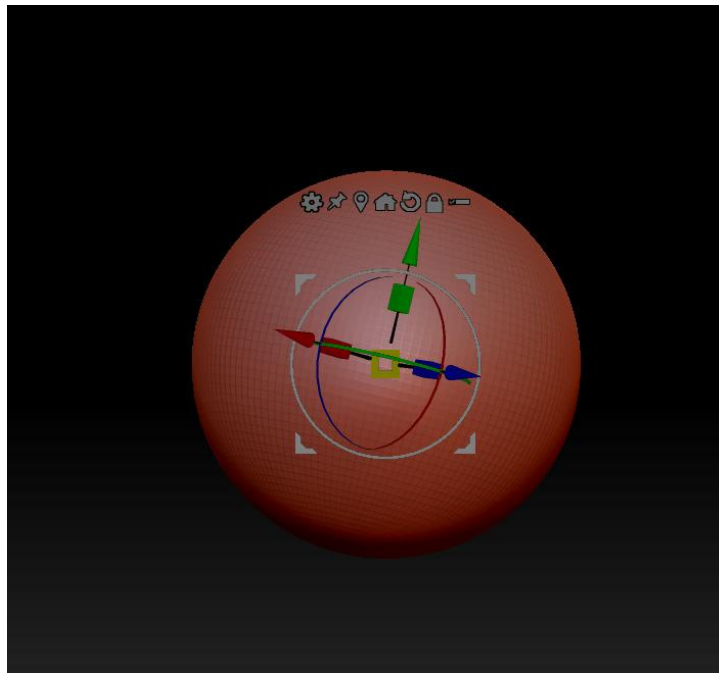
**Move-** "w"

**Scale-** "e"

**Rotate-** "r"

When we activate any of those transform buttons we also activate the Gizmo.

Once we active any of those buttons we exit Draw mode, meaning we can not sculpt on the object while we are moving, scaling or rotating it. To exit this mode we need to activate draw mode by clicking on the **Draw button**. The Gizmo 3D manipulator is a universal feature for ZBrush, providing a way to move, rotate and scale a model. The Gizmo 3D is an alternative to the TransPose action line in Zbrush that becomes active when we deactivate Gizmo 3D by clicking on the **Gizmo 3D button**, that can be found right next to Rotate button.



*Gizmo 3D*

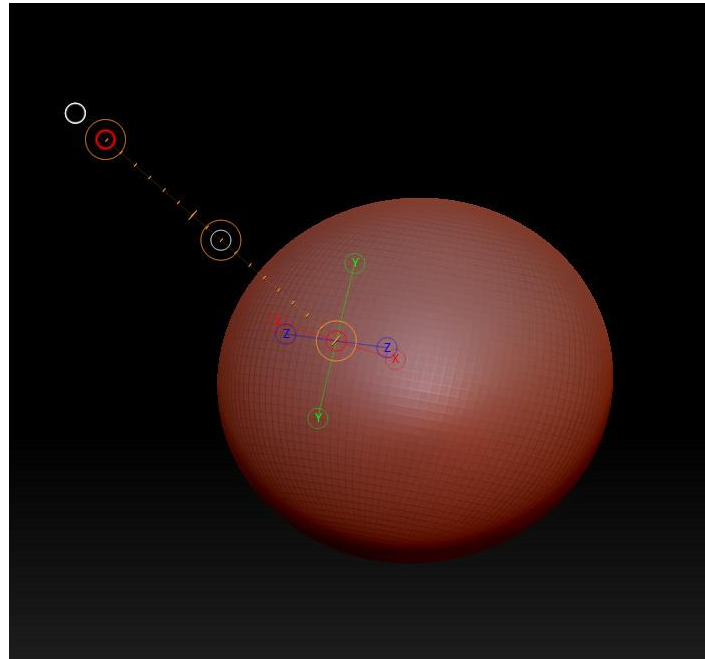
The Gizmo 3D offers most of the same features found in TransPose, but is condensed into a compact design. Depending on the actions you are looking for, you can choose between the TransPose action line and the Gizmo 3D to manipulate models in ZBrush. The arrows in Gizmo 3D are for moving, boxes are for scaling and the circles are for rotating. The white circle rotates not on the axis but from the angle of our view. The center box is for resizing. Above Gizmo 3D we have additional options controlling how it works. If you want to reposition gizmo press the lock icon and unlock it.

### **TransPose line**

When we deactivate Gozmo 3D we will activate TransPose line. To work with it simply draw it out from the place you wish to move, scale or rotate your object



by **LMB and dragging**. By LMB clicking the yellow parts of the TransPose line we change it's position. Once we enter the yellow circles we will see a white or red circle apearig. Clicking on those and graging we activate the desired action.



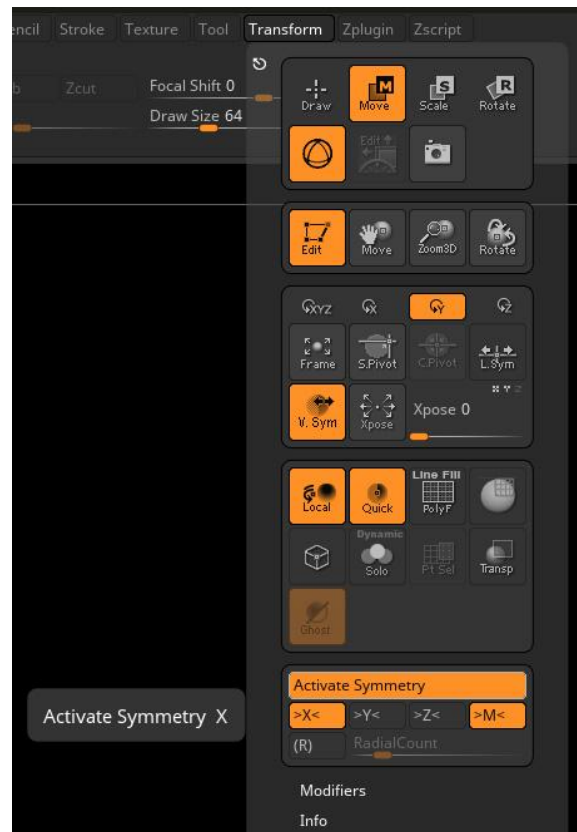
*TransPose line*

## 1.8. Right Shelve buttons p.02

Continuing to explore the right shelve buttons

**L. Sym button-** Local Symmetry button helps us establish symmetry when our model is not centered in the xyz coordinate system by looking at the topology and finding the symmetry line based on that.

To activate symmetry we can go under **Transform menu** on the top main menu and activate symmetry, or we can press the hotkey "**x**". Default symmetry axes is the X axes, but we can have symmetry on one, two or on all three axes



*Symmetry menu*

We can also activate radial count and have the symmetry propagated radially. Using these options we can very quickly sculpt complex symmetrical shapes.

Under the L.Sym button we find the **buttons for axes rotations**. By default **XYZ** button is turned on, but as I mentioned before, I prefer the Y axis rotation.

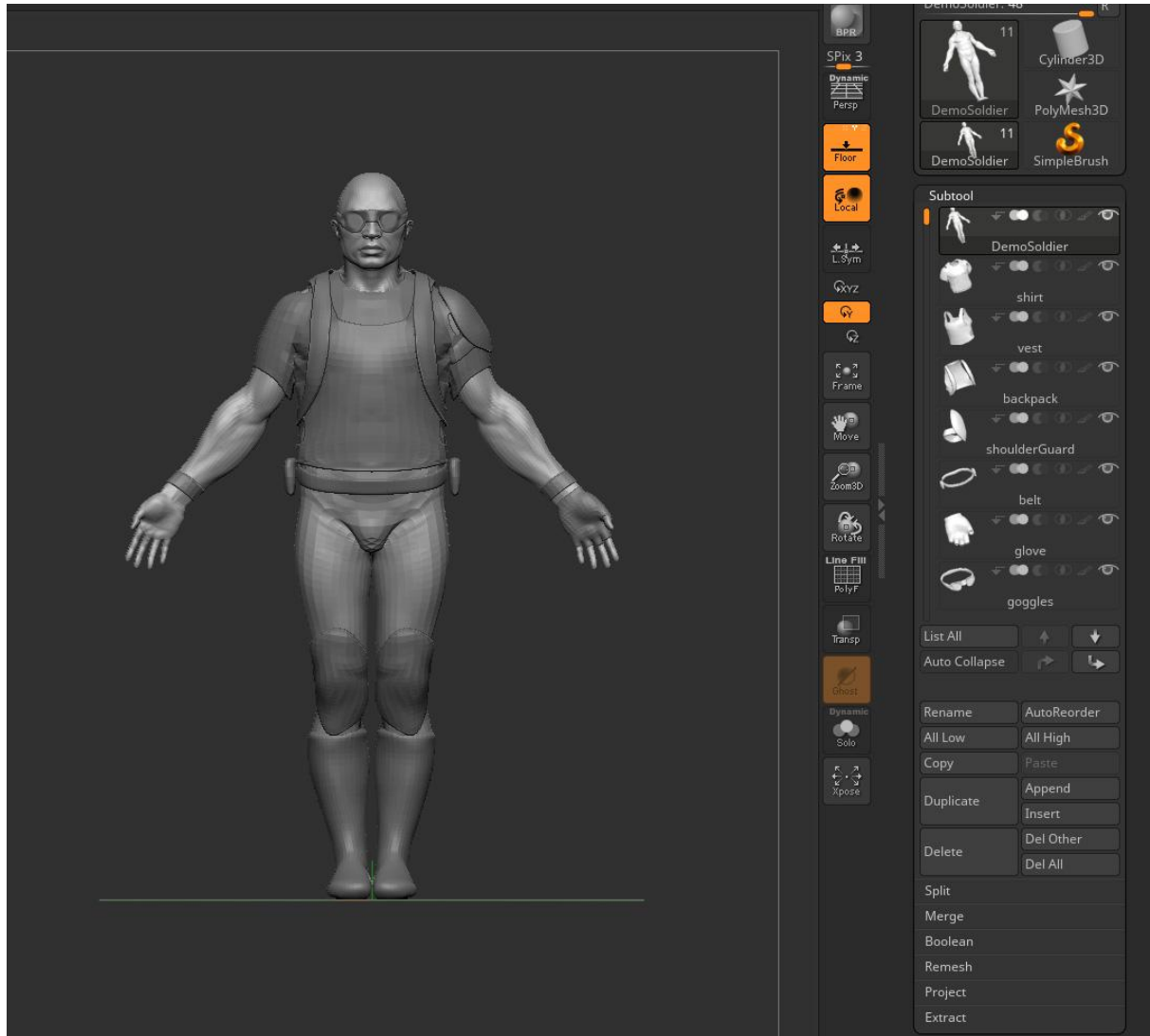
**Frame button**- places the ZTool in the center of the view.

**Move, Scale and Rotate view buttons** - are for adjusting our view of the model. I strongly encourage everyone to learn already mentioned hotkeys( under 1.3. Navigation) for these actions as it will make your sculpting experience much more fluid and natural if you don't need to go to these buttons every time you want to adjust your viewing angle.

**PolyF button**- was already mentioned and it draws our cage or polyframe on the object as well as polygroup. We can activate-deactivate them by pressing Line and Fill in the upper part of the button.

## 1.09. Subtools p.01

The next buttons on the right shelf are connected to the subtool option in Zbrush, so before we continue let's talk about subtools.



*Subtool example*

Our main ZTool can be divided into subtools. We can look at them as similar to layers in other digital software, such as Photoshop, After Effects, etc. It is a great way to break down complex shapes and objects into manageable parts.

Each SubTool can be equal to the maximum number of polygons your system can handle. If your system handles 8 million polygons and you have 4 SubTools then your model can be composed of 32 million polygons.

We can add ZTools and primitives to the current ZTool as subtools by clicking the **Insert button** in the **Subtool palette options**. A primitive is automatically turned into a PolyMesh 3D when we insert it as a subtool.

The name of the ZTool is the name of the first subtool, so it is a good practice to rename your subtools giving them logical names, and naming your first subtool the way you want your whole ZTool to be named. We do this by clicking the **Rename button**.

We select a subtool by clicking on it or by pressing the button for moving the selection up or down, which can be found right under the subtool list.

Once we press the **Insert button**, we will see our latest used ZTools in the **quick pick menu**. The new subtool is imported under the subtool that we had selected when clicking the insert button.

## 1.10. Right Shelve buttons p.03

Now that we know what Subtools are, let's cover the rest of the Right Shelve buttons.

**Solo button**- when activated hides all the subtools except the one that we are currently in.

**Transp button**- changes the way subtools are shown- making all the subtools, except the one that we are currently in, transparent.

**Ghost button**- changes the way transparency is displayed

We should know a few more things about Subtools-

The only subtool we can sculpt on is the one that is selected. That is also the subtool that will have the topology shown when we have the Draw Polyframe button on.

Symmetry is dependant on the subtool as well. So we can have it on in one subtool but off in another. Be mindful of this so you know that you have to turn it on for every subtool if you want to sculpt with symmetry on.

## 1.11.Subtool p.02

**Transpose Master plugin** found under **Plugin menu** in the **Main Menu** gives us the option of sculpting on multiple subtools at a same time, but we will not go into it at this stage.

Right under the **subtool Selection arrows** are the **Move subtool arrows** which move the position of the subtool in the stack up and down. The position of the subtool in the stack is very important for Boolean actions.

**Duplicate button**- duplicates a subtool

**Delete button**- deletes a subtool

Under these buttons are further Subtool options

### **Split menu**

Under the Split menu we find options for splitting ZTools into subtools. We can split a selected subtool into additional subtools base on a number of parameteres, such as Polygroups, Similar Parts, Unmasked Parts or Hidden Parts etc.

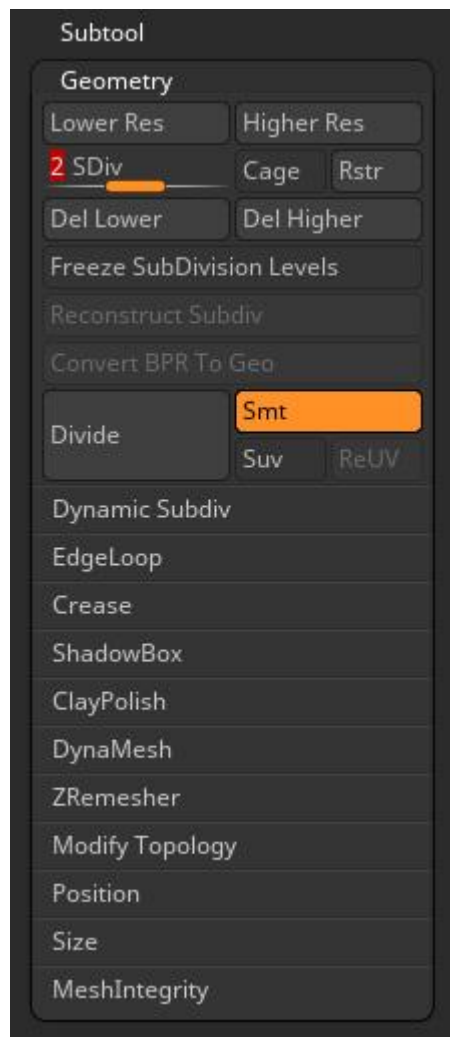
### **Merge menu**

Under Merge menu we find options for merging subtools. We can merge two or more subtools into one subtool in a couple of way, such as Merge Down, Merge Similar, Merge Visible

Those would be the most important Subtool functions and options that we will cover for now.

## 1.12. Subdivisions

Subdivisions can be found in the Geometry menu on the right tray.



*Subdivisions menu*

Number of polygons can be view as our resolution. The higher the number of polygons the more finer details we can sculpt. Subdivisions increases the polygon count of a model by replacing each polygon with multiple polygons- a 4 point polygon becomes 4 polygons, a three point polygon becomes 3 polygons.

ZBrush offers an additional powerful feature when using subdivision- an object retains a “subdivision history.” To put it another way, each time an object is subdivided, the geometry from the previous subdivision is remembered, all the way back to the original object that had no subdivisions. So a subdivided mesh can have multiple levels of subdivision, equal to the number of times it was subdivided plus one for the original level.

You can move back and forth between these subdivision levels as you model; if you need to make 'large-scale' changes to an object, such as raising a significant portion of the surface, you can do it at a lower subdivision level where the model's polygons are relatively large, while fine details can be sculpted at a high subdivision level. In either case, changes will be propagated across all levels, so sculpting geometry at one level does not lose the work you've done at another level.

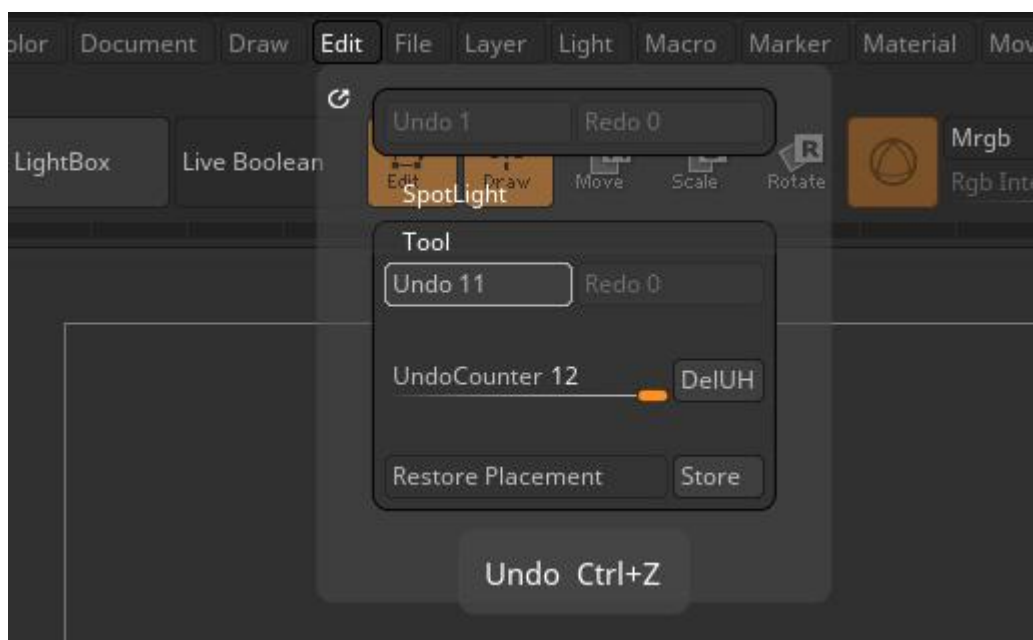
In Zbrush we can add subdivision levels until we have millions of polygons, making polygons so small that we truly feel like they don't exist and all we have is pure digital clay.

We add subdivisions by clicking on the **Divide button**. Subdivision levels can be seen on the top of the Geometry menu, where we see **Lower Res** and **Higher Res buttons**. Those buttons allow for us to go to higher or lower subdiv levels. Another way to do this is to simply click on the **scroller bar** right under those buttons and simply drag it left or right.

We can also delete subdiv levels using **Del Lower** and **Del Higher buttons**.

## 1.13. Undo

**Undo Menu** can be found in the **Main Menu**, under **Edit**.

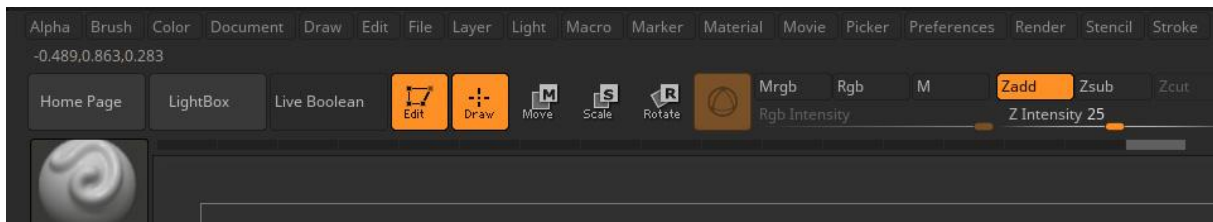


## *Undo Menu*

There we have the **Undo** and **Redo** buttons.

Hotkey for Undo is "**Ctrl+z**" and for Redo "**Ctrl+Shift+z**"

But, we can also use **Undo History** that is right under the top shelf, where we can scrub through our entire undo history simply by clicking on the highlighted scroll line and dragging it left or right



## *Undo History*

## 2. Summary

Zbrush has a lot of options and possibilities. It is important to start finding our way in it's UI and to understand the buttons that make up that UI and house those options. The sooner we learn the basics the sooner we will be able to create with ease and express our self using this amazing tool for digital sculpting. Learning basics like navigation, what are ZTools in Zbrush, how to use primitives and how to go from 2.5D to 3D is essential. Take your time to master these subjects as they are the foundation on top which we will build everything else.

## 3. Questions and Exercises

1. What is the Tool palette?
2. What are Primitives
3. How do we navigate in Zbrush?
4. Why is it good to turn the floor on?
5. What is the Local button?



6. What can we do with primitives before we turn them into PolyMesh3D?
7. What is the Draw mode?
8. What are the 4 steps we need to take before we can start sculpting in Zbrush?
9. What is Gizmo3D
10. What are the hotkeys for Move, Scale and Rotate of the Ztool?
11. What is the TrasPose line?
12. What are Subtools?
13. What are Subdivisions?
14. What is Undo History?

## 4. Key Terms

**LMB:** Left Mouse Button

**RMB:** Right Mouse Button

**ZTool:** Objects in Zbrush

**Primitives:** Pre-made ZTools that come with Zbrush and can be found in the Primitives pop-up palette

**Subtools:** ZTools can be divided into Subtools, something like layers in other computer applications

**Subdivisions:** Every polygon can be divided, increasing our poly count and with that sculpting resolution. These are called subdivisions.

## **6. Further Readings (books references)**

### **-Gizmo3D**

<http://docs.pixologic.com/user-guide/3d-modeling/modeling-basics/gizmo-3d/>

### **-Transpose line**

<http://docs.pixologic.com/user-guide/3d-modeling/modeling-basics/transpose/>

### **-Symmetry**

<http://docs.pixologic.com/user-guide/3d-modeling/sculpting/symmetry/>

### **-Subtools**

<http://docs.pixologic.com/user-guide/3d-modeling/modeling-basics/subtools/>

### **-Subdivisions**

<http://docs.pixologic.com/user-guide/3d-modeling/modeling-basics/subdivision-levels/>